PENNSYLVANIA

SCHOOL BUS DRIVER’S MANUAL

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Publication Number 117
Pennsylvania Department of Transportation
Harrisburg, PA
This work was sponsored by the Pennsylvania Department of Transportation (PENNDOT) and the U.S. Department of Transportation (U.S. DOT). The opinions, findings, and conclusions expressed in this publication are those of the author and not necessarily those of PENNDOT or the U.S. DOT.
FOREWORD

Through the Highway Safety Program of the National Highway Traffic Safety Administration, under the U.S. Department of Transportation, Federal Standard 17 requires that each state develop plans to reduce, as much as possible, the danger of death or injury to school children while being transported to and from school. This manual and associated training course is Pennsylvania’s response to this standard. This manual (PENNDOT Publication 117) was originally written in 1978, then revised in 1986, prior to the current revision. It is intended as a working training and reference guide for professional school bus drivers throughout Pennsylvania.

The safe, efficient operation of a school bus requires many diverse skills, such as vehicle operation, emergency response, and control of pupil behaviors. This manual provides a basic foundation for effective school bus operation for inexperienced operators, but also serves as an important refresher for the veteran driver. General procedures and precepts are emphasized for school bus operators in rural, urban, and suburban areas. While the information is adaptable to many school bus driving learning situations, it must be emphasized that many procedures must be adapted to meet local school conditions and requirements. The manual should be used for both pre-service and in-service school bus driver training programs that are presently in effect throughout Pennsylvania.

Organizations or individuals interested in pupil transportation and safety may freely use the contents of this manual in whole or in part, provided the material used is properly cited.
ACKNOWLEDGEMENTS

The revision of this manual involved the help of many individuals. The advisory group, listed below, was responsible for the many changes in content and the reorganization of the material. Thanks to Dr. Davida Charney for improving the readability of the manual. Also, thanks to the many people at the Pennsylvania Transportation Institute for their assistance in putting the manual together; and to Ms. Robin Tallon for the figures. Corporal James F. Boyd and Sergeant George J. Kaminsky of the Bureau of Patrol, Pennsylvania State Police, and Mr. John Dattalo of the Department of Education also contributed by reviewing the manual.

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UNIT A

THE SCHOOL BUS DRIVER:
ROLE, RESPONSIBILITIES, AND REQUIREMENTS

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- School Bus Driver
- Parents
- Mechanic
- Bus Driver Instructor
- Teacher
- Other Motorists
- PENNDOT
- Principal
- Crossing Guard
UNIT A
THE SCHOOL BUS DRIVER: 
ROLE, RESPONSIBILITIES AND REQUIREMENTS

INTRODUCTION
Transporting students to and from school is a necessary part of a sound education program. For a safe, efficient, and economical transportation program, competent school bus drivers and standard bus operation are necessary. At present, there are approximately 24,000 school buses in operation within the Commonwealth.

Before you get behind the wheel of a school bus, you need to understand your role as a bus driver and your responsibilities to your passengers, your school system, and your fellow workers. These topics are covered in the first part of this unit. The second part describes the requirements for certified school bus drivers in Pennsylvania.

YOUR ROLE AND RESPONSIBILITIES
The school bus driver plays an important role in the educational system. The role includes a number of responsibilities the driver must willingly accept.

YOUR ROLE AS A DRIVER
Learning to drive a vehicle the size of a school bus is a difficult task involving knowledge of laws, regulations, visual and mechanical skills, judgments, decisions, and accurate responses. Your performance as a school bus driver is dependent on your skills.

You are Important
You, the professional school bus driver, are a very important person with a responsible part to play in the educational system. In many instances, you are the first representative of the school system to meet the children in the morning and the last to see them at night. You are in a position to have a large influence on a child's attitude toward school.

You are Responsible
Like the captain of a ship, the school bus driver is responsible for efficient and economical vehicle operation, passenger and vehicle safety, and order and discipline. The good school bus driver successfully accomplishes this assignment and is respected and appreciated as a person performing a difficult and necessary service. While children are on the bus, their safety is in your hands.

You are a Member of the Safety Team
Perhaps no other area of educational operations demands more responsibility for student welfare than the transportation of students in buses on public highways, streets, and roads. The driver is a very important member of the safety team, which includes students, parents, teachers, school administrators, and law enforcement officials. As a key member of this team, you must constantly strive to improve operational safety and efficiency. (See Figure A-1.)
YOUR RESPONSIBILITIES AS A DRIVER

As a professional driver, you are expected to meet high standards of conduct. A school bus driver is more than a professional driver and is expected to meet standards of conduct higher than those of professional drivers. Student passengers and their parents place a great deal of confidence in you. You should act deserving of this confidence, including being:

- A dependable person who can be relied upon to carry out your duties in letter and spirit.
- Emotionally stable to work effectively and patiently with students, parents, and school officials under different weather conditions and mechanical difficulties.
- Mature enough to cope with unexpected and unusual situations.
- Interested in the welfare and needs of others.
- Willing to practice patience and understanding.
- Observant of all traffic laws, Pennsylvania Department of Transportation (the Department) regulations, and local rules and regulations, which includes conducting two emergency evacuation drills on your bus every school year.
- Neat and clean, as a symbol of the entire school system.
- Careful to refrain from using profanity.
- Well rested, so that you are free from fatigue.

A school bus driver also has the following specific responsibilities:

**Your Driving Technique**

When you drive a bus load of children to school every day in all kinds of hazardous highway and weather conditions, you are charged with a serious responsibility. The vital links to safety—proper driver attitude, knowledge and skill—are developed through your interest in safe driving. Your ability to cope with a constantly changing driving environment demands both pre-employment preparation and continual in-service activity. You must constantly re-evaluate your driving technique. It is important that you honestly evaluate yourself to ensure that you are physically and mentally prepared for driving your bus.

**Your Passengers**

Try to establish a positive relationship with your passengers. Their conduct will depend a great deal on what you say and do. If possible, learn your students’ names and greet them in a personable and friendly manner. Your expression of interest in each child will help you to gain the confidence of your riders. Remember, an essential part of your job is to maintain discipline.
according to procedures established by your local school system. Since students desire recognition of their good traits and abilities, compliment good conduct, habits, and deeds.

Under ordinary loading and unloading circumstances, communication between driver and passenger should be encouraged. You should help your passengers understand and follow what is considered normal and proper behavior on the school bus. Maintain a businesslike yet friendly relationship with all students.

**Public Relations**

Public relations is the opinion people have of both drivers and the school system. By the way drivers do their daily jobs, they contribute favorably or unfavorably to public relations. Careful, courteous drivers make good impressions; careless, thoughtless drivers create harmful impressions. For example, the school bus driver who weaves in and out of traffic attracts more unfavorable attention and more comment than one who observes proper lane usage. One discourteous, irresponsible act reflects poorly on all members of the student transportation team.

In many school districts, the school bus driver is the only contact parents have with school personnel. Good or bad impressions of the school are conveyed by the driver’s attitude toward both students and their parents. You will encounter students and parents with a wide range of attitudes toward you and the school system. You should be flexible and treat everyone in a courteous and professional manner.

Your reputation in the community, your courteous treatment of children and their parents, and your willingness to better prepare yourself for your position will help parents and children to have confidence in you.

You should consider all enforcement officers in the community, including crossing guards and school patrols, as part of the safety team. Their job, as well as yours, is to ensure safety on the highways. You should strive to develop good working relations with them—their authority and experience may be invaluable to you.

Building desirable public relations is a continuous process, and depends on the attitude you bring to work each day. You can add to your system’s reputation by showing pride in your work. This sustains a good public opinion.

Good relations within your organization are essential. Public relations begins with fellow employees. An organization whose members have mutual friendliness, interest, and respect has met a major requirement of good public relations.

**Your Supervisor and Fellow Employees**

Someone in your school district or company is assigned the responsibility of supervising you as an employee. The person is another member of the safety team and is vitally interested in the safety of your riders. Cooperation with your supervisor and fellow employees is essential to transportation safety. The following are ways you can cooperate with them:

- Understand and support your written school policy.
- Communicate often with your immediate supervisor and accept his/her authority.
- Willingly accept your responsibilities and assignments.
- Don’t repeat personal or confidential information.
- Always inform your supervisor of discipline problems, bus conditions, highway conditions, and changing pick-up/discharge conditions.
• Submit required forms and reports on time.
• Report all crashes, whether or not damage is apparent, including crashes with property, pedestrians, vehicles, domestic animals, and passengers. Also report those crashes near, but not involving, your bus.
• Be helpful, assisting others in pre-trip inspections and school loading and unloading.
• Comply with your school district regulations regarding the number of chaperons that accompany students on various school activities.
• Help out with conditions such as routine overload, route adjustments, equipment repair, loading stop adjustments, and other areas of student safety.

SCHOOL BUS DRIVER ENDORSEMENT REQUIREMENTS

According to federal standards, each state must have regulations to insure that all school bus drivers are in good physical condition, of good character, and skilled in the operation of their vehicles. They should have morals above reproach, an even temperament, the ability to adjust to the varying conditions of their job, and positive attitudes toward safety. To become a certified school bus driver in Pennsylvania, a person must meet several initial requirements and then successfully complete the training requirements established by the Department.

INITIAL REQUIREMENTS—FIRST STEP

To become a certified school bus driver in Pennsylvania, you must obtain an appropriate Commercial Driver’s License (CDL) Knowledge Test Authorization/Learner’s Permit. To apply for a CDL Knowledge Test Authorization/Learner’s Permit:

• You must be eighteen (18) years of age or older.
• You must complete the Commercial Learner’s Permit Application (see Figures A-2a and A-2b, DL-31CD Appendix A-2 and A-3) and submit a check or money order payable to “PENNDOT” for any applicable fee required with this form. The cost will be indicated on the form.
• You must submit a Commonwealth of Pennsylvania School Bus Driver’s Physical Examination Form (see Figure A-4, DL-704 Appendix A-6). It must be completed by a physician appointed or approved by the local school board. You can obtain this form from your employer. If you satisfactorily pass the physical examination, the examining physician will issue a Physician’s Certificate. (See Figure A-11, Appendix A-11.) The Physician’s certificate is valid for one (1) year and should be kept by the driver. The completed school bus driver’s physical examination form is sent along with the DL-31CD.

Once these forms are completed, the knowledge test authorization and school bus learner’s permit can be obtained either through mail or same-day service available at the Riverfront Office Center, Driver/Vehicle Customer Services. If the forms listed above and the fee are forwarded through the mail, the knowledge test authorization and school bus learner’s permit will be returned in approximately seven (7) days from receipt of the documents. If the knowledge test authorization and school bus learner’s permit are obtained through same-day service, the forms and fee are taken directly to the Driver/Vehicle Customer Services area, Riverfront Office Center in Harrisburg. Applications are processed on weekdays at the customer service windows.
KNOWLEDGE TEST AUTHORIZATION AND SCHOOL BUS LEARNER’S PERMIT - SECOND STEP

Upon receipt of these forms, the Department reviews your document for correctness, license suspension, and determination of medical competency. If you meet the physical requirements of the School Bus Driver Regulations (Title 67, Chapter 71 of the Pennsylvania Code), a CDL knowledge test authorization and school bus learner’s permit are issued.

**You may not use the Knowledge Test Authorization for driving purposes!** The school bus learner’s permit may only be used to operate a school bus.

The Knowledge Test Authorization and School Bus Learner’s Permit are valid for one (1) year. During this one-year period, you will be required to complete all knowledge and skills testing. The knowledge examination will consist of:

- Vision Test
- Knowledge tests, including, but not limited to general knowledge, passenger endorsement, school bus endorsement, and if you are going to drive a bus with air brakes, removal of the air brake restriction.

If you do not meet the physical qualifications required of school bus drivers, your application will be denied.

TRAINING AND SKILLS TESTING REQUIREMENTS–THIRD STEP

Before you are eligible to take your skills test(s), 30-days must have lapsed and you must have passed all of the applicable knowledge tests.

**The School Bus Driver Training Course**

The Pennsylvania school bus driver training course is administered by local school districts or intermediate units under the supervision of the Department. This course is available to all public, private, and parochial school bus driver applicants. To obtain a Pennsylvania School Bus Endorsement, you must complete a minimum of twenty (20) hours of instruction including at least fourteen (14) hours of classroom instruction and six (6) hours of vehicle familiarity and driving instruction (in-bus training). **The in-bus portion of the training must be one-on-one training with a certified instructor.** This requirement (commonly known as the pre-service course) can be completed in two ways:

- Complete the full twenty (20) hours of instruction before attempting to pass the skills examination administered by the Department or a State-certified third party tester. This method is recommended by the Department.
- Complete ten (10) hours of instruction (seven [7] hours of classroom training and three [3] hours of in-bus training) and attempt to pass the skills examination administered by the Department or a State-certified third party tester. If successful, you have 120 days from the date the endorsement card is issued to complete the remaining ten (10) hours of instruction (seven [7] additional hours of classroom training and three [3] additional hours of in-bus training).

After completing the full twenty (20) hours of instruction or the first ten (10) hours of instruction, you are issued a school bus training certificate of completion card. (See Figure A-9, Appendix A-11.) State law (Title 75, Section 1607) requires that a person hold the learners permit for 30 days before he or she is eligible to take the skills test administered by the Department or State-certified third party tester. This examination must be completed within twelve (12) months of the completion date of the training.
When taking the skills examination, bring the following documents to the test site:

- A valid driver’s license (if you are a licensed driver)
- A valid Pennsylvania CDL learner’s permit
- A valid Physician’s Certificate (DL-742)
- A valid school bus training Certificate of Completion card (DL-713)
- The current vehicle registration card for the bus being driven
- A valid insurance card or proof of financial responsibility for the bus being driven
- A valid driver’s license of the person accompanying you

You must be accompanied by a certified CDL driver to legally drive the bus to the testing point and back in case you fail the driving examination.

**The skills examination will be administered in three parts:**

- The safety inspection shall be the first part of the skills examination. Inability to correctly perform the air brake check in item (M) will result in automatic failure of this portion.

- The basic skills test is the second part of the skills examination. The test will be comprised of a selection of maneuvers from the following exercises:
  
  (i) Simulated or actual student discharge
  (ii) Simulated or actual railroad crossing
  (iii) Forward Stop
  (iv) Straight line backing
  (v) Alley dock
  (vi) Parallel Park (driver side)
  (vii) Parallel Park (conventional)
  (viii) Right Turn
  (ix) Backward serpentine

- The on-road driving test is the third part of the skills examination. An automatic failure will occur if you commit any traffic offense, run over a curb or sidewalk, or cause a crash. (An accumulation of minor infractions will also cause a failure.)

You are permitted to take the driving examination three (3) times on a valid CDL learners permit. The examination may be taken only once during a given day. If you fail a portion of the test, you may return on another day and retake only that portion which you failed. If you fail the driving examination three (3) times, you must reapply for a CDL learner’s permit, pay the appropriate fee, and complete all training requirements again.

If you fail to successfully pass the skills examination within twelve (12) months, you will be required to repeat all twenty (20) hours of training.

If you successfully complete the examination, your passing test results will be credited to your driving record. Once your record reflects that all minimum requirements have been met, you will receive a CDL license displaying the “S” endorsement and a school bus endorsement card from the Department. If the full twenty (20) hours of the training course have been completed, the school bus endorsement card is valid for one (1) year. The school bus endorsement card is reissued annually by the Department if the requirement for the annual physical examination is met. If you successfully pass the driving examination after completing only ten (10) hours of instruction, you must complete the additional ten (10) hours of instruction (seven [7] hours of classroom and three [3] hours of in-bus instruction) within 120 days of the endorsement card issue date, or the Department will cancel your school bus endorsement card.
PLEASE NOTE: School Bus Driver’s are required to carry three credentials when operating a school bus in Pennsylvania: a valid commercial driver’s license displaying the “S” endorsement, a valid school bus endorsement card, and a valid physician’s certificate.

HEALTH AND SAFETY REQUIREMENTS
You must be fit to drive a school bus with regard to the health and safety of the students being transported. To establish fitness you must:

• Comply with Pennsylvania Department of Health and any local school district regulations and policies regarding communicable diseases.
• Have a clean criminal history record. An applicant must complete a Request for Criminal History Record Information. (See Figure A-5, SP4-164, Appendix A-7.)
• Have a clean child abuse history record. An applicant must complete a Pennsylvania Child Abuse History Clearance. (See Figure A-6 and A-6a, CY-113, Appendix A-8 and A-9.)
• Have no record of motor vehicle crashes or traffic violations determined to be excessive in number by your employer.
• Be drug- and alcohol-free when driving, and you must not consume any alcoholic beverages within eight (8) hours prior to operating a school bus.

Local requirements may be more stringent than those listed above.

DRIVER RECERTIFICATION
You must renew your school bus certification every four (4) years, completing a minimum of ten (10) hours of instruction and the “S” endorsement knowledge and skills examinations. The instruction must include seven (7) hours of classroom training and three (3) hours of in-bus training. This ten (10) hour course (commonly known as the in-service course) may be completed at any time during the twelve (12) months immediately preceding the recertification date on your school bus endorsement card. The Department notifies you of this requirement through a notice mailed one year before your endorsement expires. (See Figure A-7, DL-746, Appendix A-10.) Issuance of a new school bus certificate of completion card for recertifying drivers is optional.

Upon successful completion of the training and testing requirements, a new school bus endorsement card is issued to you forty-five (45) days prior to the expiration of your current “S” endorsement. If you fail the skills examination three (3) times, your current school bus endorsement card must be surrendered to the examiner. You must then reapply for the “S” endorsement learner’s permit and complete all training requirements for new drivers outlined in the previous sections. Any training taken as a requirement for the first permit or for recertification cannot be counted toward new permit training requirements.

If the recertification requirements are not completed before the recertification date of the school bus endorsement, you have one (1) year from that date to complete the training and testing requirements. If the requirements are not completed within this additional year, you must reapply for an “S” endorsement permit and repeat all training and testing procedures.

After completing the recertification course, a new school bus endorsement will be mailed to you. (See Figure A-10, Appendix A-11.) If your old school bus endorsement expired before, or shortly after, the completion of recertification training, you are not permitted to operate a school bus until receiving the new school bus endorsement from the Department.
When taking the examination for recertification, you must bring the following documents to the testing site:

- A valid driver’s license
- A school bus recertification notice
- A valid physician’s certificate
- The current vehicle registration card for the bus being driven
- A valid insurance card or proof of financial responsibility for the bus being driven

**ANNUAL PHYSICAL EXAMINATION**

To maintain a valid school bus endorsement, you must pass an annual physical examination given by a physician appointed or approved by the local school board. A Pennsylvania School Bus Driver’s Physical Examination form (see Figure A-4, DL-704, Appendix A-6) must contain the signatures of both you, the driver, and the physician before sending it to the Department.

A letter is mailed to you approximately ninety (90) days prior to the expiration of your school bus physical. The purpose of this letter is to remind you that your physical is about to expire. Your school bus endorsement card will not be renewed unless the Department has a current physical on file. You must pass the minimum requirements listed on the physical examination form. Additional medical information may be required to further determine physical competency. If the Department determines that you are not physically competent to operate a school bus, your school bus endorsement will be recalled. You may request a re-examination.

Upon passing the physical examination, the examining school transportation physician will issue a physician’s certificate (see Figure A-11 Appendix A-11) valid for one (1) year. This certificate must be carried whenever operating a school bus.

**CHANGE OF INFORMATION ON LICENSE**

A new camera card or photo license will be issued whenever you are adding or deleting an endorsement, removing a restriction, or upgrading your class of license.

If you are changing your name or address on your CDL license or “S” endorsement, you must complete form DL-80CD (see Figures A-3a and A-3b, Appendix A-4 and A-5) and forward it to the Department with the appropriate fees.

**Documents Carried While Operating a School Bus**

The following current and valid documents must be carried by you at all times while operating a school bus:

- CDL license (see Figure A-8, Appendix A-11)
- Pennsylvania School Bus Endorsement (see Figure A-10, Appendix A-11)
- Physician’s Certificate (see Figure A-11, Appendix A-11)
- Vehicle registration card for the bus being driven
- A valid insurance card or proof of financial responsibility for the bus being driven
APPENDIX A.

NECESSARY FORMS
**Figure A-2a**

DL-31CD - Commercial Learner’s Permit Application (front)
APPENDIX A. NECESSARY FORMS

APPLICATION INFORMATION

1. RENEWAL FEE: • The amount listed applies whether you already have a PA CDL, or if you are currently a licensed PA non-commercial driver upgrading to a CDL. If using out-of-state address, complete box below.

   • You do not need to pay a photo fee if you have previously been issued a CDL permit for the exact same categories you are applying for on this application.
   • The most current version of this form can be found at: www.state.pa.us (keyword - DMV Forms)

OUT-OF-STATE ADDRESS. We may not issue driver license products to an out-of-state address, except in the case of an employee of federal or state government, armed forces personnel, or their families, whose workplace is located outside of Pennsylvania. If this exception applies to you, please check the appropriate box and include documentation of your status with this application.

   Attach a letter from your employer on their letterhead to document your status, or attach a copy of your current Photo ID issued by your employer. If you are the immediate family of a person meeting one of the allowable exceptions, attach the documentation of the person employed. Additionally, you must indicate your relationship to that person.

   I certify that my workplace is located out of state and I am employed by, or am the immediate family of a person employed by:

   Relationship to person meeting exemption (check one): □ Spouse □ Dependent Child

2. ORGAN DONATION AWARENESS TRUST FUND (ODTF): You have the opportunity to contribute $1.00 to the Fund. The additional $1.00 must be added and included in your payment. You must also check the block provided to ensure proper handling of your contribution. The ODTF provides for the development and implementation of donor awareness programs and funds shall be appropriated subject to the approval of the Governor.

3. INCREASE FEE: • A CDL costs $10.00 more per year than a non-commercial license. Pay the appropriate increase fee if you are currently licensed as a non-commercial driver. If you already have a CDL, you do not have to pay an increase fee.

   To calculate the number of months to use for your increase fee, look at your current license. Count the current month and the month your license expires. EXAMPLE: If the current month is May, and your license expires in July, you would use 3 months for your required increase fee. If your license expires in:
   • 9-6 Months -------------------- Don’t pay an increase fee. Your $10.00 annual fee is contained in the renewal fee.
   • 7-12 Months $10.00 is due
   • 13-24 Months $20.00 is due
   • 25-36 Months $30.00 is due
   • 37-48 Months $40.00 is due

4. HAZMAT FEE: • The fee is required for the original issuance or renewal of a CDL with an “H” or “X” endorsement. Include this fee if:

   • You have applied for a Hazardous Materials permit, regardless of your existing class of license, or
   • You are already a CDL driver with an “H” or “X” endorsement on your license and you are renewing with this form. (You must have passed your HAZMAT recertification prior to renewing your CDL or you will be decertified.)

5. PHOTO FEE: • Except as noted below, all applications require a photo fee. When you pass your permit test(s), you will receive a new license reflecting your new status.

   You do not need to pay a photo fee if you have previously been issued a CDL permit for the exact same categories you are applying for on this application. EXAMPLE: You previously received a CDL permit for Class B and a P Endorsement, but did not successfully pass testing. On this application, you again apply only for a Class B and a P Endorsement. In this example, no photo fee would be due.

6. Application must be forwarded with check made payable to PENNDOT to Bureau of Driver Licensing, P.O. Box 68272, Harrisburg, PA 17106-8272

COMMERCIAL CLASS INFORMATION

CLASS A - A permit to operate any combination of vehicles with a gross vehicle weight rating of 26,001 pounds or more, provided the gross vehicle weight rating of the vehicle(s) being towed is in excess of 10,000 pounds. (HOLDERS OF CLASS A LICENSE MAY, WITH APPROPRIATE ENDORSEMENTS, OPERATE VEHICLES WITHIN COMMERCIAL CLASSES B & C.)

CLASS B - A permit to operate any single vehicle with a gross vehicle weight rating of 26,001 pounds or more, or any such vehicle towing a vehicle not in excess of 10,000 pounds. (HOLDERS OF A CLASS B LICENSE MAY, WITH APPROPRIATE ENDORSEMENTS, OPERATE ALL VEHICLES WITHIN COMMERCIAL CLASSES B & C.)

CLASS C - A permit to operate any single or combination vehicle that does not meet the definition of Class A or Class B and requires the H or P endorsement. Holding this class license does not authorize operation of vehicles requiring motorcycle classification.

ENDORSEMENTS - The following authorizations are required when operating vehicles of the type listed.

* H - TRANSPORTING HAZARDOUS MATERIALS
* N - TANK VEHICLES
* T - DOUBLE AND TRIPLE TRAILERS
* X - HAZARDOUS MATERIALS AND TANKER VEHICLE (H & N)

P - PASSENGER VEHICLE CARRYING PASSENGERS
S - SCHOOL BUS (When adding an “S” endorsement, you must attach a School Bus Physical Exam Form DL-704)

* In accordance with Federal and State Hazardous Materials Regulations, operators of vehicles which require the “H” or “X” endorsement must be 21 years of age or older.

RESTRICTIONS - The following restrictions prohibit you from operating certain type vehicles:

L - NOT EQUIPPED WITH AIR BRAKES (If you are going to drive a commercial vehicle with air brakes you must obtain a permit and pass the Air Brake Tests to avoid having an L Restriction on your Commercial License.)
B - May not drive a Class A bus
C - May not drive a Class A or B bus (The C restriction must be removed to operate a Class B bus)

PROVISIONS OF SECTION 3709 OF THE VEHICLE CODE

Section 3709 provides for a fine of up to $300 for dropping, throwing or depositing, upon any highway, or upon any other public or private property without the consent of the owner thereof or into or on the waters of this Commonwealth, from a vehicle, any waste paper, sweepings, ashes, household waste, glass, metal, refuse or rubbish or any dangerous or detrimental substance, or permitting any of the preceding without immediately removing such items or causing their removal.

For any violation of Section 3709, I may be subject to a fine of up to $300 upon conviction, including any violation resulting from the conduct of any other persons present within any vehicle of which I am the driver.

Figure A-2b

DL-31CD - Commercial Learner’s Permit Application (back)
### DL-80CD - Application to Replace/Correct

#### Commercial Driver’s License

**Application to Replace/Correct**

**Appendix A-5**

<table>
<thead>
<tr>
<th>Driver’s License Number</th>
<th>LAST NAME</th>
<th>JR. ETC.</th>
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**First Name**

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<th>MIDDLE NAME</th>
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**Date of Birth**

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<th>Month</th>
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**Social Security Number**

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**Telephone Number**

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**E-Mail Address**

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**Application for Replacement (Check One)**

- CDL Learner’s Permit and/or Knowledge Test Authorization
- CDL Camera Card
- CDL Photo License
- School Bus Driver Endorsement Card

**Replacement Required Due To:**

- Reason - (check one):
  - Lost
  - Stolen
  - Mutilated
  - Never Received
  - Correction
  - Change of Address

**Organ Donor Designation**

- Add
- Remove

**Address Change**

- A Post Office Box number may be used in addition to the actual residence address, but cannot be used as the only address. See reverse if using an out-of-state address.

**New Street Address**

<table>
<thead>
<tr>
<th>CITY</th>
<th>STATE</th>
<th>ZIP CODE</th>
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**If you are a registered voter in PA, would you like us to notify your county voter registration office of this change?**

- Yes
- No

**If you are not a registered voter, you may contact your county voter registration office.**

**Name Change Reason**

- Marriage
- Divorce
- Other (see reverse side)

**Date of Birth Social Security Number Telephone Number (8:00 A.M.-4:30 P.M.) E-Mail Address**

- Month Day Year
- - -

**Other Changes**

**Height**

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<tr>
<th>MONTH</th>
<th>DAY</th>
<th>FEET</th>
<th>INCHES</th>
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**Sex**

- Male
- Female

**Class M**

**Hazmat Endorsement**

**Other Changes**

**Affidavit: This section must be notarized**

**Authorization and Certification**

**Signature of Person Administering Oath**

**This Form May Be Duplicated**

---

**Figure A-3a**

Commercial Driver’s License (front)
APPENDIX A. NECESSARY FORMS

**Figure A-3b**

DL-80CD - Application to Replace/Correct Commercial Driver’s License *(back)*

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**APPLICANT INFORMATION**

- **OUT-OF-STATE ADDRESS CHANGE.** We may not issue driver license products to an out-of-state address, except in the case of an employee of federal or state government, armed forces personnel, or their families, whose workplace is located outside of Pennsylvania. If this exception applies to you, please check the appropriate box and include documentation of your status with this application. Attach a letter from your employer on their letterhead to document your status, or attach a copy of your current Photo ID issued by your employer. If you are the immediate family of a person meeting one of the allowable exceptions, attach the documentation of the person employed. Additionally, you must indicate your relationship to that person.

I certify that my workplace is located out of state and I am employed by, or am the immediate family of a person employed by:

- US Armed Forces
- Federal Government
- Pennsylvania State Government

**Relationship to person meeting exemption (check one):**
- Spouse
- Dependent Child

- Return your completed and signed application with your check or money order made payable to “PENNDOT”, to: Bureau of Driver Licensing, P.O. Box 68272, Harrisburg, PA 17106-8272.

- If your license is due to expire within six (6) months, complete form DL-143CD (Renewal of a Commercial Driver’s License).

- If you find or recover your original license after you have submitted this application for a duplicate, return the original license with a letter of explanation to: Bureau of Driver Licensing, PO Box 68615, Harrisburg, PA 17106-8615. **After the duplicate is issued, the original license is no longer valid.**

---

**PROVISIONS OF SECTION 3709 OF THE VEHICLE CODE**

Section 3709 provides for a fine of up to $300 for dropping, throwing or depositing, upon any highway, or upon any other public or private property without the consent of the owner thereof or into or on the waters of this Commonwealth, from a vehicle, any waste paper, sweepings, ashes, household waste, glass, metal, refuse or rubbish or any dangerous or detrimental substance, or permitting any of the preceding without immediately removing such items or causing their removal.

For any violation of Section 3709, I may be subject to a fine of up to $300 upon conviction, including any violation resulting from the conduct of any other persons present within any vehicle of which I am the driver.

---

**Appendix A-6**

Revised Pennsylvania School Bus Driver Training Manual
**Figure A-4**

DL-704 - School Bus Driver’s Physical Examination Form

Appendix A-7
**APPENDIX A. NECESSARY FORMS**

---

**Figure A-5**

SP 4-164 - Request for Criminal History Information

---

**Appendix A-8** Revised Pennsylvania School Bus Driver Training Manual
## PENNSYLVANIA CHILD ABUSE HISTORY CLEARANCE

Complete section 1 only. Print clearly in ink. Envelope $10.00 money order only. Payable to department of public welfare. Do not send cash or personal check.

SEND TO: CHILDLINE AND ABUSE REGISTRY, DEPARTMENT OF PUBLIC WELFARE, P.O. BOX 8170 HARRISBURG, PA 17105-8170

APPLICATIONS THAT ARE INCOMPLETE, ILLEGIBLE OR RECEIVED WITHOUT FEE WILL BE RETURNED UNPROCESSED. IF YOU HAVE QUESTIONS CALL 717-783-6211.

### SECTION I

<table>
<thead>
<tr>
<th>APPLICANT IDENTIFICATION</th>
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<tbody>
<tr>
<td>NAME</td>
</tr>
<tr>
<td>STREET</td>
</tr>
<tr>
<td>CITY, STATE, ZIP CODE</td>
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</table>

### PREVIOUS NAMES USED SINCE 1975 (INCLUDE MAIDEN NAME, NICKNAMES, ALIASES)

1 (FIRST, MIDDLE, LAST) 2 (FIRST, MIDDLE, LAST) 3 (FIRST, MIDDLE, LAST)

### PURPOSE OF CLEARANCE (CHECK ONE BLOCK ONLY)

- CHILD CARE
- FOSTER CARE
- ADOPTION
- SCHOOL

- VOLUNTEERS — A COPY OF YOUR PROCESSED "REQUEST FOR CRIMINAL RECORD" (FORM BPS-164) MUST BE ATTACHED. OUT-OF-STATE RESIDENTS MUST ALSO ATTACH A COPY OF THEIR PROCESSED FBI CLEARANCE (FORM FD-258).

### PREVIOUS ADDRESSES SINCE 1975 (ATTACH ADDITIONAL PAGES IF NECESSARY)

1.
2.
3.
4.

### HOUSEHOLD MEMBERS (LIST EVERYONE WHO LIVED WITH YOU AT ANYTIME SINCE 1975 TO THE PRESENT)

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<tr>
<th>NAME (FIRST, MIDDLE, LAST)</th>
<th>RELATIONSHIP</th>
<th>PRESENT AGE</th>
<th>SEX</th>
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I certify that the above information is accurate and complete to the best of my knowledge and belief and submitted as true and correct under penalty of law (Section 6301 of the Pennsylvania Crimes Code).

Applicants are required to show the Administrator the original Document. Administrations are required to keep a copy of this child abuse history record on file. Any person altering the contents of this document may be subject to civil, criminal or administrative fines.

Applicant’s Signature __________________________ Date ________

### SECTION II

<table>
<thead>
<tr>
<th>RESULTS OF HISTORY CHECK</th>
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<tbody>
<tr>
<td>APPLICANT IS NOT LISTED IN A REPORT OF CHILD ABUSE OR A REPORT FOR SCHOOL EMPLOYEE.</td>
</tr>
<tr>
<td>APPLICANT IS LISTED IN A REPORT OF CHILD ABUSE OR A REPORT FOR SCHOOL EMPLOYEE (SEE BELOW).</td>
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VERIFIER DATE: ________

VERIFIER’S SUPERVISOR DATE: ________

Figure A-6

CY-113 Pennsylvania Child Abuse History Clearance (front)

Revised Pennsylvania School Bus Driver Training Manual

Appendix A-9
**Figure A-6a**

CY-113 Pennsylvania Child Abuse History Clearance *(back)*
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DRIVER LICENSING
HARRISBURG
17123

SCHOOL BUS RECERTIFICATION NOTICE

November 15, 2002

Jane Q. Public
123 Apple Road
Mytown, PA 12345

Dear School Bus Driver:

Your School Bus (S) endorsement expires on 11/30/03. To renew your S endorsement and continue your school bus driving privileges, you are required to:

1. Complete a ten (10) hour training course (*7 hours classroom and 3 hours in-bus instruction*),
2. Successfully complete a school bus driving skills evaluation, and
3. Successfully pass an S endorsement knowledge examination.

These requirements should be completed during the 12 month period prior to the expiration date of your S endorsement. The requirements can be completed in any order. Waiting until the last month to complete the requirements may delay the issuance of your S endorsement card.

You must present this letter at the time of each evaluation.

Skills Evaluation

| Pretrip Safety Inspection | F ____ F ____ F ____ P ____ _________ |
| Basic Skills              | F ____ F ____ F ____ P ____ _________ |
| On-Road Skills            | F ____ F ____ F ____ P ____ _________ |

S Endorsement Knowledge Exam F ____ F ____ F ____ P ____ _________

If your S endorsement is recalled or expired, this letter authorizes you to drive only during the course of the examination.

If you have any questions, please contact your employer or the Special Driver Programs Unit at (717) 787-9671.

Sincerely,

Rebecca L. Bickley, Director
Bureau of Driver Licensing

Figure A-7

DL-746 - School Bus Driver Recertification Notice
**Figure A-8**
CDL Photo Driver’s License

**Figure A-9**
Certificate of Completion

**Figure A-10** - School Bus Endorsement Card

**Figure A-11** - Physical Examination Certificate
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STUDENT MANAGEMENT AND DISCIPLINE

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DRIVER-STUDENT INTERACTIONS........................................B-4
  General Guidelines for Interacting with Students ................B-5
  Serious Discipline Problems ..........................................B-6

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UNIT B
STUDENT MANAGEMENT AND DISCIPLINE

INTRODUCTION

This unit is a general guide to help you manage student passengers. It presents general guidelines, which you may need to adapt to meet the specific local policies approved by your school district board of directors. In disciplinary cases, always follow written school district policy. The person ultimately responsible for discipline among the students is the school principal.

Students already have parents, families, teachers, counselors, and friends playing roles in their lives. You, the driver, are the first contact children have outside their homes every day; your attitude toward them may set the stage for their conduct for the remainder of the day. As a school bus driver, you must establish a professional distance from students that will enable you to maintain an orderly ridership. It is therefore very important that you become familiar with the general age groups with which you will be dealing, and that you understand and know how to apply techniques of controlling student behavior.

Students are affected by what they experience while they are traveling to and from school. These experiences, both good and bad, become an important part of their education, and extension of the regular school day. Many of the same rules of behavior are in effect on the bus as in the classroom.

In cooperation with school officials and parents, you are responsible for the safety of the students who ride your bus. You must be able to control them and the bus during the ride and during loading and unloading.

Federal standards of the national highway safety program provide guidelines for a student ridership program developed by the states to improve student transportation safety. All students who ride buses must be instructed in safe riding practices. Local school districts, however, are permitted to institute more stringent programs. The student ridership program should be a cooperative effort between students, parents, school officials, and bus drivers. A sound training program makes the bus driver’s job easier and improves transportation safety. This unit discusses aspects of the student ridership program related to student behavior.

DESIRABLE STUDENT BEHAVIOR

You can avoid many problems on the bus by recognizing good behavior and using proper techniques to reinforce that behavior. While it is often easier to use negative terms when dealing with behavior, it is much more effective to use positive comments to reinforce the good things that happen on the bus. Learn to recognize the behaviors that are desirable and emphasize them with positive comments. For example:

- “I saw you pick up that gum wrapper, Fred, and I appreciate it.”
- “Jane, you were at the stop on time this morning. Good for you.”
- “That’s what I like to see.”
If you learn to stress the positive, you will eventually eliminate the negative. Work to develop this skill. It will mean many safe and pleasant trips.

When your students are under control, they will observe safe procedures at all times. In particular they must:

- Be on time at bus stop locations at home and at school. They should leave home in time to reach the bus stop five (5) minutes before scheduled pickup and avoid playing or loitering when waiting for a bus. Present safety procedures for walking on the highway clearly to students.
- Enter and leave the bus, at school loading stations and at highway bus stops, in an orderly fashion, following instructions. They must be careful about their own safety and the safety of others. They must move without haste, crowding, and pushing.
- Remain quiet enough not to distract you, as you need to keep your mind on driving and on traffic situations. Students must avoid shouting and other boisterous activity and may not carry on unnecessary conversations with you while the bus is in motion. If you are worried about activity in the bus, you cannot be a safe driver. At all times, students must show consideration for you and your problems. Let your passengers know what is an acceptable noise level and enforce this limit.
- Remain seated while the bus is moving. They must go directly to their seats after entering the bus and remain seated until the bus has stopped and you signal that it is time to rise and leave.
- Not destroy property. Transportation equipment is expensive. Tell students that they must cooperate in keeping it in good condition. Tell students about any local policies on destruction of property. To prevent damage, inspect the interior of the bus before a new group of passengers enters and again after they exit, as often as possible. Maintain an accurate seating chart to help you identify violators.
- Not extend arms or other parts of the body out of the windows. No objects may ever stick out an open window. It is up to you to tell students when they may open and close windows.
- Not throw objects inside the bus or out the windows. They must not scatter waste paper and other trash along the highway. Plan to collect such material inside the bus, and dispose of it after the trip is over. Students must not shoot "paper wads" or other material in the bus. They must keep the aisle clear, holding their books and other belongings or stowing them properly out of the way. Remind students that it is their bus, and solicit their help in keeping it clean.

Your school administration must prepare lists of rules and regulations covering student behavior and distribute them to students and parents. The parents' active cooperation is also helpful.

**DRIVER-STUDENT INTERACTIONS**

As a professional bus driver, you should always have a general knowledge of your passengers. Since you have contact with the students for only a short time each day, you will not know as much about the students as their teachers. However, you should learn the names and general behavior of each of your passengers. You must not only know how to perform your job as a driver, but you must also know something of your riders' behavior patterns and a great deal about their reactions in order to safely pick up and deliver your passengers. Your main function is to transport the students to their destination and discharge them safely.

You must also know how to approach students in a way that will gain their respect. It is better to
talk to students without shouting, showing anger, or displaying irritation. Be careful to never threaten them with any action that you cannot enforce. Give your instructions to the students without favoritism. If you overlook poor behavior by one student, you lose the respect of the other students. Strike a happy medium by being neither too lenient nor too harsh; both extremes are equally bad for the morale of the students on your bus. Your attitude should be friendly, cheerful, and businesslike.

Building good bus conduct starts the first day of the school year. State the rules very clearly. Be sure to deal with the very first infraction promptly and firmly. It is much easier to prevent a bad situation than to correct one.

Work to build morale and cooperation with your students by being friendly, courteous, and helpful. Over time, high student morale will help you control the worst offenders. When offenders find that improper conduct is unacceptable to the group, they will think twice about doing things that cause them to “lose face” with the group. If your school district has a student court of inquiry, it can often help in enforcing discipline.

GENERAL GUIDELINES FOR INTERACTING WITH STUDENTS

Remember the following points when dealing with students:

• Though each student is different, do not allow special privileges to any student unless requested by the school administration.

• Observe the rights and privileges of each child only as long as he or she obeys the rules of good bus behavior. Riding is a privilege, not a right. The moment a student “gets out of line,” deal with the offender fairly, impartially, and in the same manner you treat all such offenders.

• Remember that all eyes are on you while you are driving the bus. Your words and actions have tremendous influence on your passengers. Speak quietly, clearly, confidently, and firmly when talking to the students on your bus.

• Praise students generously when they accept responsibility and show a general pattern of good behavior. Do not single out individual students for praise before the group; instead, praise them privately when other students are not present.

CLASS: A STUDENT MANAGEMENT MEMORY AID

To help you remember important student management techniques, learn the rules represented by the letters of the word “CLASS.” By remembering one easy word, you will be able to remember five simple rules for student management.

C = Consistent. ... Always be consistent with praise and discipline. Whenever a student behavior problem arises, follow through with the appropriate consequences.

L = Limits. ............ Set limits and make sure that the students are aware of them. They should be the same for all students.

A = Attitude .......... Have a positive attitude. A cheerful smile may change the behavior of a student. The attitude of the driver often becomes the attitude of the student.

S = Share .......... Share with the students what is expected of them. State the rules and their consequences. If the students do not know the rules they cannot be expected to follow them.

S = Support .......... Support other drivers and exchange experiences. Other individuals may be able to assist in difficult situations. Also by sharing, common problems may be
discovered and new techniques explored. Support is also needed from the school district, usually via the principal.

SERIOUS DISCIPLINE PROBLEMS
Do not try to handle serious discipline cases yourself. Refer all such cases to your supervisor or the school principal. Give all the facts and be sure the entire problem is clear. Usually the child who causes problems on the bus is also causing problems in the classroom. The school administrator has the whole picture of the child, while you, as a driver, know only about his or her bus behavior. If you have a serious problem that must be settled while the bus is on the road, use the following procedures:

1. Stop the bus in a safe place. This act makes the students realize the seriousness of the situation.
2. Stand up and speak to the offender(s) in a courteous, but firm “I-mean-business” manner.
3. If you must change a student’s seat, move the student to a seat near you so you can watch him or her more closely.

If these steps don’t work, stop the bus and send a passerby to telephone the supervisor or principal; don’t start until you get a response. **NEVER** send students to telephone school officials. You are responsible for all students; keep them on the bus. If you are near the school, you also might consider turning the bus around and driving back to the school. Never order any student off the bus. Call for assistance or ask a passerby to call.

CHARACTERISTICS OF STUDENT BEHAVIOR
As described below, kindergarten and elementary students behave differently than middle school and secondary students.

KINDERGARTEN AND ELEMENTARY SCHOOL AGE STUDENTS (GRADES K-5)
The kindergarten or elementary school age student prefers a great deal of physical activity. Normally, these students have a problem staying in their seats. When they can’t move, they often talk instead. Loud talking on the bus is a problem that you will need a lot of patience to deal with, but absolute silence among students is not a healthy school bus atmosphere. Students vary in the amount of activity they need, and their behavior will vary from day to day. Students of this age have very short memories, and the day after an occurrence they may have forgotten all about it. For this reason, they rarely hold grudges against those who discipline them. Beginning bus drivers should not try to gain the children’s favor by letting small misdeeds go unnoticed. Take prompt and continued action for all infractions of bus conduct.

These younger students tend not to pay attention to the feelings of adults, but, on the other hand, they care a lot about what the adults think of them. They also are sensitive to the opinions of other youngsters and sometimes tend to pick on children who do not fit in well with the group. If you transport non-exceptional and exceptional students in the same bus, be alert to ensure that the exceptional students are not being insulted.

Be careful not to allow individual children to hurt themselves socially by setting themselves up as the “driver’s pet.” Some students who have not yet learned to get along with others may also misbehave to attract attention.
Given the way students of this age behave, you may be able to promote a group spirit “to make our bus the best.” Many bus drivers have achieved excellent results by discussing bus rules with their students and making them “our rules.” Some drivers develop a game of having each busload try to excel in keeping the bus clean, behaving well on the bus, and staying orderly when loading and unloading. This method requires considerable skill, and new bus drivers should consult experienced drivers before attempting to start this type of competition.

MIDDLE-SCHOOL AGE STUDENTS (GRADES 6-8)
Students in the middle school are usually very curious and very willing to learn things they consider to be useful. Students enjoy using skills to solve “real-life” problems.

These students are often centered on themselves and will argue to convince others or to clarify their own thinking. They begin to think more independently and critically.

SECONDARY AGE STUDENTS (GRADES 9-12)
In the junior and senior high school age groups, girls are usually more mature than boys and tend to be more like each other than the boys are. Girls tend to be more easily influenced by boys than boys by girls. Boy/girls relationship problems may cause trouble on the school bus when some of the students are “going steady”; other students often shield couples petting in the rear of the bus. Be alert to stop such actions as soon as you spot them. Ingenuity in seating arrangements—for instance, the senior girls opposite seventh grade boys—can help to prevent this problem.

Students of this age are very concerned about their dignity and want to be treated like adults, although they do not always act the part. They are apt to be erratic in their behavior, and they are usually very anxious to dress and act the same as all members of their group.

You must be very careful not to make remarks about administrators and teachers. Secondary school students are chronic gossips, and any belittling remark you make may be widely circulated and magnified when retold. Students may also pass on remarks unintentionally to parents and others.

Young bus drivers must expect the older students to resent any great show of authority. Do not hesitate to ask for help from your supervisor or principal to solve problems involving these students.

SUMMARY OF AGE-LEVEL CHARACTERISTICS
The behavioral characteristics of elementary and secondary students are presented in summary form to assist you in dealing with these age groups.

Kindergarten and Elementary Students can be expected to be:

- Physically active.
- Talkative (loud).
- Forgetful (predictably unpredictable).
- Insensitive to the feelings of others (may pick on physically or mentally handicapped passengers).
- Sensitive to adult criticism.
- Willing to cooperate in group projects.
- Harder to handle in the afternoon than in the morning.
Middle-School Age Students can be expected to:
• Change at different rates.
• Be vulnerable to bouts of low self esteem.
• Have new interests and abilities as well as many new feelings, thoughts, and concerns.
• Identify with their peer groups and want to belong.
• Seek limited independence and autonomy.
• Question rules and beliefs that they had accepted at face value until now.
• Be easily offended and sensitive to criticism.
• Behave erratically and inconsistently.

Secondary Students have the following characteristics:
• Girls will be more mature than boys.
• Girls will be more influenced by boys than vice versa.
• Boy/Girl relationships may cause problems.
• Concerned with their dignity (image).
• Gossipy, repeat things to their parents.
• Resent authority.
• Organize in groups.
• More prone to vandalism.
• Try to disturb the driver.

GUIDELINES FOR CONTROLLING STUDENT BEHAVIOR
The following pointers can help you prevent and/or control discipline problems you may encounter on your bus:

KEEP DISCIPLINE PRIVATE WHENEVER POSSIBLE
• If an individual breaks the rules of bus conduct, do not reprimand him or her in front of all the students riding the bus. Individual behavior problems that do not affect the others on the bus are best handled in a private manner.
• Avoid a showdown with a chronic troublemaker in front of the other students. Instead, report an incident to the principal and supervisor and request their help in the matter.
• Do not threaten the entire busload for the misdeeds of a few. Focus your attention on the students creating the disorder; avoid disciplining all of the students when restoring order.
• It is a good rule never to say anything unpleasant to more than one person at a time. On the other hand, if general bus safety is being threatened by one or more students, a driver should point out their misbehavior in front of all bus passengers. A case in point is the lighting of matches by students riding the bus. Stop the incident immediately in front of the entire busload of students.

STAY PROFESSIONAL
• Young people greatly resent any sign of favoritism. Avoid being too lenient with normally well-behaved students and too harsh toward those who have been causing trouble.
UNIT B. STUDENT MANAGEMENT AND DISCIPLINE

• Never lose your temper. In the event of an argument or misunderstanding, the less emotion you display, the less emotion you will arouse in the student. Avoid using threats or physical force. Be consistent in your actions.

• Young people tend to test adults to see how far they can go or how much they can get away with. Deal with this behavior fairly and firmly, avoiding harshness or unfriendliness. If students know that reasonably good behavior is expected of them at all times on the school bus, then you may not have any real disciplinary problems.

• Start out the school year being extremely strict and gradually lessen discipline if bus behavior remains satisfactory. Students also may calm down during the course of the year. If a difficult child shows signs of calming down, do not hold a grudge; rather, show encouragement.

• Do not exchange wise cracks and gossip with the students, as your actions should aid the educational program of the school district. Avoid shouting, arguing, and obscene language.

• Avoid holding grudges against students. Do not prejudge students because of family name, background, appearance or neighborhood. Avoid being overly suspicious, but be alert for potential discipline problems.

• Act in a responsible manner. Show the importance of your job in your actions.

• Always be courteous to children. Provide compliments whenever possible.

• Keep alert. Do not ignore minor incidents—they can easily become major problems.

SET DISCIPLINE STANDARDS

• Do everything possible to inform students that they have important responsibilities in ensuring group safety.

• Settle discipline problems quickly.

• Handle serious discipline problems only when the bus is stopped.

• Seat any troublemakers near you on a front seat.

• Display smooth driving skills; poor driving habits often increase student misbehavior and frighten younger passengers.

WORK WITH SCHOOL AUTHORITIES

Discipline on school buses is the biggest problem confronting school bus drivers. At one time the entire burden for conduct was placed upon the bus driver. This attitude is fast disappearing as parents and schools recognize the need for cooperative effort.

You are responsible for the conduct of students on your bus, but you must have the backing of the school administration to effectively discharge this responsibility. A copy of local school district rules should be posted in a conspicuous place in the bus. Always follow written school district policy. In cases of continued misconduct, report the student to the supervisor or principal and ask to have the student’s privilege to ride the school bus withdrawn.

In many school districts, the first action taken is a reprimand or a withdrawal of bus privileges for a short period of time, usually a week. If the student’s behavior does not improve after returning, the privilege to ride the bus for the balance of the school year may be denied or the student may be transferred to another bus. Never put a student off the bus for misconduct; you are not empowered to make the decision yourself. School officials may take this step after all other measures have failed to improve the situations.
Remember the following pointers:

- Follow the local policy adopted by the school board.
- Supply a copy of the rules to each student.
- If you believe that any action taken by the school administration does not promote good or safe school bus behavior, ask to meet with the principal or supervisor to discuss the matter. Patiently remind the administrator that discipline for the entire busload of students is threatened if no action is taken against chronic offenders.
- Maintain close contact with the principal and secure their cooperation.
- Always follow written school district policy.

**ASSERTIVE DISCIPLINE**

There are many differences between the students of today and the students of past decades. More children today have emotional or physical problems, and increasingly large numbers of students come from dysfunctional families. These factors, combined with a decrease in respect for authority in general, have resulted in many discipline problems for those who work with students. Past disciplinary techniques of school personnel are no longer as useful as they once were.

A set of guidelines and disciplinary skills, known as Assertive Discipline, can assist school personnel with handling disciplinary problems. Assertive Discipline is a result of Assertiveness Training, which helps individuals express their needs and wants and have them met in their personal and professional lives (Canter, 1976). Assertive Discipline was developed for classroom situations. Teachers and other personnel must be able to understand and communicate their needs to students in order to meet the needs of students. A more productive environment results when needs of both students and teachers are met.

Assertive discipline can and should be applied to school bus student/driver situations. School bus drivers need to have an orderly and quiet bus; students need a safe ride to and from school. The ride is much safer for the students when your needs are met. Along with the differences in today’s students, individual bus drivers also differ. Each bus driver operates in a different manner and may allow behaviors that other bus drivers will not allow. This creates a conflict for the student who expects you to react in the same manner that previous bus drivers have. Assertive discipline can help you communicate your particular needs to the students. Although you should effectively maintain order on the school bus, you also need to avoid alienating students or infringing upon their rights. Setting limits for the student must be balanced with showing compassion and warmth.

An assertive discipline plan categorizes disciplinary measures into three types: non-assertive, hostile, and assertive. Each of these describes the method of discipline employed and the skills used. Individuals may exhibit any of these types of discipline under different circumstances. These terms categorize the methods used, not the person using them.

**NON-ASSERTIVE DISCIPLINE**

There are two basic situations classified as non-assertive discipline. First, if you do not clearly convey your wants and needs, then the student cannot be expected to follow them. A second non-assertive technique is to state your needs but not back up the statements with actions. A bus driver who acts in a non-assertive manner is passive. Students will not usually cooperate with a non-assertive individual.
HOSTILE DISCIPLINE
Hostile bus drivers express their wants and needs in (negative) ways that violate the rights of the student. While students usually obey a hostile bus driver, they may become afraid of you and act more aggressively towards their families or other children.

ASSERTIVE DISCIPLINE
Assertive individuals clearly state their needs and back up their statements with appropriate actions. Assertive people have a positive outlook and believe in their abilities. They communicate effectively and plan how to respond with actions. They are persistent and quick to respond in a meaningful way, operating in a take-charge manner but aware of the support needed by each individual child. Assertive discipline creates a positive environment in which the needs of both you and your students are met, with a balance between the rights of each person, and a balance between the limits you place on students and the support you show for students. Because of this, the student trusts and respects you (Canter, 1976).

Several obstacles may stand in your way as you try to achieve assertive discipline. First, you will not be able to influence a student if you do not believe you can. It’s easy to make excuses for poor student behavior, such as emotional illness, heredity, brain damage, ignorance, peer pressure, inadequate parenting, socioeconomic background, or environment. You need to recognize the difference between students who cannot control their actions and those who can but do not want to. Even a student with many afflictions can choose whether to display good or poor behavior. In general, you must expect a student to behave well, as students tend to do what is expected of them.

You must identify student’s individual needs for a given bus trip; they may be different for field trips than for routine trips. You must also be able to clearly state these needs to all students on the bus. Tell all students that you expect them to behave well and tell them the consequences, should they choose to behave poorly. Reinforce these directives by following through with appropriate actions. This includes praise when a student does something well and discipline for poor behavior. All students must receive the same disciplinary sanctions, but recognize that some students need more attention and support than others. Misbehavior in a student may indicate the need for extra attention.

No disciplinary plan is foolproof. Some students will continue to misbehave even when you have acted correctly. Sometimes you will need to ask the help of other drivers, a teacher, or the principal in dealing with a particular student or situation. The assertive discipline plan can be a helpful tool for routine student management.
REVIEW QUESTIONS

1. Why do you play a special role in the lives of the students you transport?
2. Why types of behavior should you encourage?
3. How can you build the proper relationship with your students?
4. Describe the differences between the various age levels.
5. What methods should you use to maintain student cooperation?
6. What is the best way to discipline a student who has misbehaved?
7. Who should you contact about a chronic troublemaker?
8. What does the word “CLASS” suggest for controlling student behavior?

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UNIT C
STUDENT LOADING AND UNLOADING

INTRODUCTION

In Pennsylvania, as well as across the nation, accidents during student loading and unloading are responsible for more school bus related deaths than any other source. From 1980 to 1990, 19 students were killed while entering or leaving the school bus. Listed below are descriptions of a few of these fatalities. They clearly show that students are often killed by their own school bus because the driver could not see them crossing in front of or behind the bus. A particularly hazardous situation is when a student leaving the bus reaches a point of safety, then re-approaches the bus, slipping under the wheels as it proceeds. To prevent these accidents, you must be very attentive at all times during student loading and unloading.

PENNSYLVANIA LOADING AND UNLOADING FATALITIES *

• The school bus pulled away from an appointed stop. A late arriving student ran after the bus. When she was alongside the bus, she slipped and fell underneath. The student was crushed by the rear wheels. (14 year old female)

• A student exited the school bus. He then crossed safely in front of the bus and went to his yard. For some unknown reason he came back after the bus. He slipped and fell under the back dual wheels. The student’s head and chest were crushed. (7 year old male)

• The school bus stopped to discharge a kindergarten student at the bus stop. The student exited the bus. The driver proceeded to turn the corner. The student was struck and run over by the right wheel of the bus. The driver was unaware that the student had been run over and killed. (5 year old female)

• The school bus stopped to discharge passengers at the bus stop. The students exited the bus. A student crossed behind the bus. The bus struck the student, it’s right rear wheel rolling over and killing her. (4 year old female)

• The school bus stopped to discharge passengers at the bus stop. A student exited the school bus. She then proceeded to cross in front of the bus. The student was struck by a truck, which had illegally passed the stopped school bus. (8 year old female)

• The school bus stopped to discharge a student at the bus stop. The student exited the bus and reached a place of safety. The driver proceeded toward the next stop. At that time the students and driver felt a large bump. The rear left side wheels of the bus had rolled over the student. (9 year old male)

• The school bus stopped to discharge passengers at the bus stop. A student crossed in front of the bus. Someone called out the student’s name. He turned, as the driver moved the bus forward. The driver did not see the student. The student was run over and killed. (5 year old male)

• The school bus stopped to discharge passengers at the bus stop. The student exited the school bus. The driver proceeded to turn right. The student was struck and run over by the bus’s rear wheel. The driver was unaware the student had been struck and killed. (7 year old female)

* Representative Pennsylvania school bus loading and unloading fatalities (1985-1990)

Loading and unloading maneuvers expose students and drivers to many hazards. You must be aware of the proper procedures for both driving the bus and maintaining student behavior while performing these maneuvers. Driving procedures can be found in the unit on driving.
fundamentals. This unit presents procedures for maintaining safety during loading and unloading. These procedures include controlling traffic, assisting students crossing streets or highways, seating the students, and loading and unloading the students. The procedures below also cover proper use of the eight-way light system at the bus stops.

**THE LOADING/UNLOADING ZONE**

The school bus loading and unloading zone is a dangerous location. Every year, many students are killed near the loading zone of their bus. You must be extra cautious and alert when loading or unloading students. The following is an example of an alert, quick acting driver who prevented a tragedy.

*During a noon return of kindergarten students at a stop with a wide shoulder, the bus was stopped and a student was unloading. The driver saw a car in her mirrors that was obviously committed to passing the bus on the right side. The bus door was open, and the child was going down the steps. The driver grabbed the child's coat and pulled her down onto the bus step.*

The most dangerous areas around the school bus are indicated in Figure C-1, and include an area 10 feet from the bus, stretching around it on all sides.

*Figure C-1. School Bus Danger Zone*

You must adequately warn other motorists of your actions when loading or unloading students. All school buses in Pennsylvania are equipped with a school bus eight-way light system. This system consists of two amber flashing lights and two red flashing lights mounted on the front and rear of the bus. In addition, as of July 1994, all school buses are required to have a side stop arm.
WHEN SELECTING LOADING ZONES AT A BUS STOP
FOLLOW THESE PROCEDURES CAREFULLY!

• Load students only at designated bus stops approved by the school board. Student loading zones should be on the extreme right side of the highway where visibility is clear for at least 500 feet.
• Students should wait at a specific designated place. This spot should be at least 10 feet from the edge of the highway at the approved bus stop, and it should be used throughout the school year.
• Tell students to be on time. Students and driver both share the responsibility of maintaining the bus schedule.

LOADING PROCEDURES

APPROACH AND CHECK
1. When approaching the designated stop, start slowing down in preparation for the stop.
2. Always watch for late-arriving students who may be running to the bus stop. Use the mirrors to check for students to the rear of the bus.
3. When the loading zone is between 300-150 feet away, (at most the length of a football field) activate the amber flashing lights of the school bus eight-way light system to warn other vehicles. Brake gradually with the transmission in gear while approaching the stop.
4. Check all mirrors to see that traffic is clear and that it is safe for you to stop.
5. Approach students with extreme care:
   • When road and traffic conditions are normal, require students to stand at least 10 feet from the edge of the road.
   • When road surface is hazardous (e.g., slippery, rough), stop short of the bus stop, as much as 20 feet, and ease the bus carefully to the stop. Instruct students to always wait a safe distance from the flow of traffic, especially during inclement weather.

STOP
6. Come to a full stop.
7. Always place transmission in neutral (in case you are unexpectedly distracted).
8. Set the parking brake correctly; check it again to be sure.
9. Open front entrance door slightly, activating the red flashing lights and side stop arm and deactivating the amber flashing lights of the school bus eight-way light system. Open door completely after traffic stops.

LOAD
10. Instruct students not to move toward the bus until the bus stops and the door opens.
   • When students must cross a roadway before getting on the bus, you must be able to see them at all times. When crossing in front of the bus, students should be able to see your face (at least 10 feet in front of the bus).
   • Be alert to warn students of an illegally passing motorist. Stress that students must look both ways before crossing the street or highway in front of the bus.
11. Do not tolerate crowding or pushing.

12. Seat students according to local policy.
   - Keep in mind that seating capacity is limited according to the inspection sticker affixed on
     the bus by the Pennsylvania State Police.
   - Remember that passengers are not permitted to stand.
   - Establish and use seating charts for both morning and evening runs when possible.
     These charts are helpful in controlling student behavior and assist you in getting to know
     the student’s names.

CHECK AND PROCEED

13. When all students are seated on the bus, close the front door to deactivate the red flashing
    lights.
   - Wait for everyone to be seated before putting the bus in motion. Otherwise, you cannot
     expect your passengers to remain seated while the bus is in motion.
   - Know the students assigned to your bus and be careful not to leave students stranded.
     Count the students on your bus.
   - When all passengers are seated, prepare to proceed to the next stop.

14. Using all mirrors, check traffic, put the transmission into proper gear, release the parking
    brake, recheck the mirrors, and proceed safely to your next stop.

UNLOADING PROCEDURES

Unload students only at properly designated bus stops. Use the following procedures when
unloading students at a bus stop:

APPROACH AND CHECK

1. When approaching the designated bus stop, start slowing down in preparation for the stop.
2. As you approach the bus stop, look in the rearview mirrors to check traffic conditions.
3. When the loading zone is between 300-150 feet away, activate the amber flashing lights of
   the school bus eight-way light system to warn other vehicles. Brake gradually with the
   transmission in gear while approaching the stop.
4. Do not allow students to stand until the bus has come to a full stop.
5. Check all mirrors to see that traffic is clear and that it is safe for you to stop.

STOP

6. Come to a full stop.
7. When stopped, always place the transmission in neutral.
8. Set the parking brake correctly; check it again to be sure.
9. Open the front entrance door slightly, activating the red flashing lights and side stop arm
   and deactivating the amber flashing lights of the eighty-way light system. Open the door
   completely after traffic stops.
UNLOAD

10. Do not permit students to leave the bus except at regularly assigned stops unless they have written permission from a school administrator. It is illegal for you to discharge students at places other than their assigned stops.

11. Watch students as they leave the bus and make sure they reach a point of safety.
   • Instruct students who must cross a roadway after getting off the bus to stand on the side of the roadway far enough in front of the bus to see your face (at least 10 feet). Be alert for passing motorists so that you may warn students. The students are to look both ways before stepping in front of the bus into the roadway.
   • Instruct students who do not have to cross the roadway after unloading exactly where they should walk or wait until the bus pulls completely away. Tell them to never re-approach the bus.
   • Students should never cross the roadway behind the bus.
   • Take extra time with elementary school age students to make sure they understand these procedures. Be overly cautious when loading and unloading these students.
   • Make sure the students reach and stay at a point of safety before you proceed. One method is to count the students as they get off the bus.

CHECK AND PROCEED

12. Close front door to deactivate the flashing red lights, check all mirrors for traffic or pedestrians, put the transmission into proper gear, release the parking brake, recheck the mirrors, and proceed safely to your next stop.

ENFORCING THE SCHOOL BUS TRAFFIC STOPPING LAW

While loading or unloading, check to make certain that traffic in all directions obeys the red flashing lights as required by state law.

• On highways or trafficways not separated by a physical barrier, traffic in all directions must stop at least 10 feet away from the bus and remain stopped until every child has entered the bus (when loading) or has reached the sidewalk or side of highway (when unloading). Painted center lines, singing dividers, or a center turning lane do not create separate roadways; all traffic must stop on highways with these markings.

• On highway or trafficways separated by a physical barrier, Traffic moving in the same direction as the bus must stop as described above. Traffic approaching the bus from the opposite direction may proceed with caution. A highway with separate roadways is divided into two or more roadways with physical barriers such as: concrete median barrier, metal median barrier, non-mountable curb or clearly indicated dividing sections (e.g., concrete mountable curb, trees or shrubs, rock or boulders, stream grass) to block traffic between the roadways.

• The driver of a vehicle approaching an intersection where a school bus is stopped to load or unload students must stop the vehicle at the intersection until the flashing red signal lamps are no longer actuated.

• Emergency vehicles (fire engines, ambulances, and police cars) must also obey the red flashing warning lights of a loading or unloading school bus. These vehicles, however, should not be delayed. Halt or finish your loading or unloading, check the safety of your passengers, deactivate the school bus eight-way light system, and allow the emergency vehicle to pass as quickly as possible.
If you see another vehicle disobeying these laws:

- Make certain that no students attempt to cross the highway.
- Note the license number, color, and type of the vehicle; time and location of the incident; and identity of the driver, if possible. You must deliver a signed, written report containing this information within 48 hours to the police with jurisdiction where the incident occurred.

### REVIEW QUESTIONS

1. Why is the loading zone particularly hazardous?
2. What methods should you use to make sure all students safely load and unload the bus?
3. When should you activate your eight-way flashing light system when approaching a loading zone?
4. Where should students cross the road if necessary?
5. In what gear should you place the bus to load and unload?
6. Which vehicles may pass a stopped school bus that is loading or unloading?
UNIT D
TRANSPORTATION OF EXCEPTIONAL STUDENTS

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UNIT D
TRANSPORTATION OF EXCEPTIONAL STUDENTS

INTRODUCTION

Local school districts are responsible for providing special education programs and services for the exceptional students within their district. The school district or intermediate unit must identify, locate, and evaluate all exceptional students within its boundaries and place them into programs that are planned uniquely for them. Whenever appropriate, these students are included in the regular school environment, which includes ordinary transportation to and from school. Where this is not possible, however, special transportation is provided, often involving different types of vehicles and procedures. With this specialized transportation service, these students can receive the education, therapy, and other opportunities that they need.

Mainstreaming of exceptional students is increasing in the transportation of students. You must have a working knowledge of:
(1) guidelines for managing exceptional students while they are being transported, and
(2) special transportation procedures used for these students.

This unit provided information on both of these topics. The position you hold as driver of these students may be one of the most demanding and difficult jobs you will ever have, but it also may be one of the most rewarding.

 DRIVER RESPONSIBILITY

Local policy is the guideline for your role and responsibility as a driver of exceptional students. To ensure smooth pick-up and return of students, keep in mind that:

• Stops will be established by the Intermediate Unit staff or school district in cooperation with the bus contractor. Changes in stops must be approved by the Transportation Department.

• The student’s home may be assigned as the pickup and return location. If so, you may wish to introduce yourself to each student’s parent(s) by telephone or personal visit, and tell them approximately what time you will pick up the student each morning and approximately when you will deliver the student home in the afternoon.

• Remind parents to have the student ready for morning pickup at least 5 minutes before your expected arrival. If the student is continually late for pickup, notify your supervisor. (Keep written notes of dates.)

• A responsible adult should be home to receive the student in the afternoon.

To ensure students’ safety in case of a crash:

• Keep a written description of your route, pupils’ addresses, and their telephone numbers in a safe place.

• If you assign permanent seats in your bus, keep one copy of the seating arrangement in the bus and turn one copy in to the office.
CONFIDENTIAL INFORMATION

By law, the information identifying exceptional students is confidential—it is your duty to keep the information confidential.

You will have to talk occasionally to parents and teachers about transporting a student. Apart from these practical conversations, do not discuss anything concerning students, parents, teachers, classes, or vehicles with parents or neighbors. If anyone raises a question, refer them to the proper source, i.e., teacher, principal, or supervisor. Never hold any discussions in front of the students.

Secure medical and emergency information for each student. Record any medications used by the student, when they should be administered (drivers are never to administer any medications), and any possible side effects. Note any unique behavior patterns to watch for and procedures for managing any circumstances that might arise while the student is under your supervision.

GUIDELINES FOR MANAGING EXCEPTIONAL STUDENTS

To manage exceptional students while transporting them, you must know their specific behavior patterns and required treatments. All students are affected by other people’s actions, particularly people who play significant roles in their lives, but exceptional students may be especially sensitive to the behavior and moods of others.

Parents, teachers, and special education professionals can give you information about the nature and extent of a student’s handicap along with other relevant information.

In addition to following the previous guidelines for managing students, keep these points in mind about dealing with exceptional students.

• Be observant and try to anticipate problems. Always expect the unexpected.
• Keep teachers, professionals, and parents informed of problems with the student or significant change in behavior.
• In dealing with the teachable mentally retarded, insist that they make their needs known to you by speaking or pointing.
• Give socially and emotionally disturbed students some responsibility in setting the standards of behavior they must meet.
• If an emotionally disturbed student becomes agitated or loses self-control, you should verbally intervene and attempt to calm the situation.
• Be aware that “bad days” happen. The student’s efficiency and self control may vary from day to day or from week to week. These puzzling shifts may lead you to feel that much of the student’s behavior is willful disobedience. Remember, these fluctuations may not be under the student’s control.
• Always put safety first. If a student’s behavior is distracting or dangerous to others, report the situation to your supervisor immediately.
• Introduce a substitute driver to the students in advance if possible, since a change in routine may cause some students to react emotionally. Make sure the new driver has explicit, written instructions about the route and pick-up and drop-off times for each student.
“START”: A MEMORY AID FOR MANAGING EXCEPTIONAL STUDENTS

You will likely carry at least one exceptional student on your bus during your driving career. Because you may not even know that you are transporting an exceptional student, everyone should be aware of the special concerns relating to exceptional students. An easy way to remember these special concerns is with the word “START.”

S = Special ...................... Every exceptional student is unique. You should get to know each one and learn of their individual traits. Talk with the student, their parents, and teachers to find out important information. Students, even those with the same condition, are different. The more you know about their needs the better you can accommodate them. Be aware that some information is confidential.

T = Treat Equally .............. Treat all students the same, regardless of whether or not they are exceptional. Exceptional students want to be treated the same as all other students. Although there are many differences, all students should be required to follow the same rules. No one should be given special treatment or privileges.

A = Attention ................... You must pay attention to exceptional students. Some students will behave poorly in order to get your attention. By paying attention to them, you may improve their behavior. They may require more of your time than other students.

R = Restraints ................... Students with physical disabilities often require special seats or restraining devices. Learn to properly secure these students in their seats. Those who use wheelchairs need proper tiedowns.

T = Different Techniques ..... A particular method may not work in all situations with all students. If you are having trouble maintaining control of a student, change your method and try something new. Keep trying until you find something that works. The old saying “try, try, try again” is particularly appropriate when it comes to handling exceptional students. Be sure to ask other drivers or your supervisor for helpful suggestions in handling particular students or situations.

TYPES OF EXCEPTIONAL STUDENTS

In addition to the general guidelines above, you should understand the different types of exceptional students you may be transporting and the specific procedures to use in managing each type.

PHYSICALLY HANDICAPPED (PH)

Physically handicapped students have orthopedic health problems caused by injury or disease. Some severely handicapped students may require wheelchairs or other holding devices. Moderately handicapped students can walk with crutches or a walker. They may need help in boarding. Whenever possible, some slightly handicapped students are integrated into the regular transportation system. These students sometimes avoid trying to do things for themselves. Encourage them to become as independent as their condition will permit.
Some common physical disorders and their effects include:

- Cerebral Palsy—causes abnormal changes in physical movement, sometimes including other problems such as seizures.
- Spastic Paralysis—results in slow, explosive, or poorly coordinated movements.
- Ataxia—causes unsteadiness, falling, and erratic movement of the eyes.
- Athetosis—causes frowns and other facial grimaces, uncontrolled movements, lurching, and writhing. Problems increase when the student becomes self-conscious and tries to control movements.
- Tremor—cause an involuntary shaking of the arms, legs, or trunk.
- Muscular Dystrophy—a progressive general weakening or wasting away of various muscle groups in the body. Children may wear braces at first and use a wheelchair as the disease progresses.
- Spina Bifida—a birth defect involving the spinal cord. Depending upon the severity of the defect, the student may be partially paralyzed, deformed, or mentally retarded.
- Poliomyelitis—a viral infection in the spinal cord that weakens muscles. The student may use crutches or a wheelchair. This disorder does not affect intelligence.

Some students may have multiple handicaps, including other disorders described in this unit.

**VISUALLY IMPAIRED (VIP)**

Students who are visually impaired are either blind or partially sighted. Their educational development may not be very different from that of seeing students, but they may have trouble adjusting. Totally blind students usually do not have problems speaking, hearing, or understanding, but they may be behind other students of the same age in some school subjects. This may cause them to feel embarrassment with their classmates. Learning to move around, find objects and places, and orient themselves to new situations helps them develop poise and independence. So be sure to allow them to move independently, while watching out for their safety.

**SPEECH IMPAIRED (SI)**

Speech impaired students may attend special classes even though their problem may not involve any intellectual retardation. Speech difficulty, however, may be combined with other types of handicaps.

**HEARING IMPAIRED (HI)**

Hearing impaired students often require special transportation. Hard-of-hearing students are those with slight to moderate hearing loss; their sense of hearing is still functional, though they may use a hearing aid. Deaf students must be taught through their other senses. Their greatest difficulty is to learn speech and language. To communicate, the student learns to respond to lip movement, facial expression, signs, and/or finger spelling. Ask the teacher or parent to explain the nature and extent of the student’s hearing loss and the best way to communicate with him or her.

The hearing impaired student must board and leave the vehicle at the curb. Never allow the student to cross any streets without adult supervision, since the student may be unable to hear oncoming traffic or warning signals.
LEARNING DISABLED (LD)

Students who are learning disabled have a disorder in one or more of the basic psychological processes involved in understanding or using spoken or written language. The disorder may show up as trouble with listening, thinking, speaking, reading, writing, spelling, or solving math problems. This category does not include students with learning disorders caused by visual, hearing, or motor handicaps or mental, emotional, or environmental disorders. The learning disabled often have average or above average intellectual ability.

Learning disabled students do not all behave alike. However, the following behaviors are common:

• Poor planning and a general disorganization. Their ability to solve problems, follow instructions, and learn changes from moment to moment and day to day.
• Extreme emotional reactions. In frustrating situations, the student may “go to pieces” more than the situation deserves.
• Overactivity. The student may be unable to sit still or stick to one task for very long before looking for something else to do.
• Impulsiveness. The student often exhibits uncontrolled, abrupt, and sudden changes in behavior, which seem impulsive. These students often act without considering the consequences and may endanger or harm themselves or others.

Students behaving in these ways may seem to be deliberately disobedient or stubborn when, in fact, they can’t control their behavior. Your main goal in disciplining these students should be to help the student control his emotions. While this is what you might expect of all students, it is harder for the learning-disabled student to achieve this goal.

MENTALLY RETARDED

These students have impaired mental development, which seriously reduces their ability to learn. The category includes students who have significant difficulties with learning, motivation, or social adjustment as a result of less-than-average intellectual functioning. Students within this category may be mildly mentally retarded and relatively self-sufficient or they may be severely mentally retarded and totally dependent.

AUTISTIC STUDENTS

Childhood autism is a disorder that usually begins before the age of 2 1/2 years. An autistic student may display some of these characteristics:

• Indifference to other people. Autistic students sometimes treat other people as if they were objects and just in the way. They may bump into you as if you were a piece of furniture, without excusing themselves or noticing that they bumped into another persons.
• Difficulty looking people in the eye. When you talk to autistic students, you often have to work hard to get and keep their attention, especially if they are not facing you. Autistic students may not notice or pay attention to other students or adults.
• Problems with their speech and language. Some autistic students cannot speak at all. Others may just scream or make other noises. Sometimes if they can speak, speech is unusual. They tend to repeat whatever you say instead of answering you. They may use language that you can’t understand or that is confusing, such as reversing the use of the words “you” and “I.”
• Unusual reactions to different parts of their environment. They are very resistant to any change. They are easily upset and anxious about changes other students may not even notice, such as if a different type of bus picks them up; if they are in the window seat instead of the aisle seat; if they are sitting next to someone they don’t usually sit next to. They are often very sensitive to changes in temperature, loud noises, or physical touch and have a panic reaction at times to some of these changes.

• Unusual interest in objects. They may cling to objects, and examine and reexamine them. They are also fascinated by various kinds of movements, becoming completely absorbed by a spinning wheel or fan.

• Problems with their own movement. They may repeat movements over and over again without any particular purpose, for example, swaying, rocking, or flapping their hands.

When dealing with autistic students, remember that these students are affected by a disorder; their conduct is not necessarily willful. They cannot always control or stop their behavior when you ask them to. These students need sameness, calmness, structure, and firmness along with gentleness, and patience.

SERIOUS EMOTIONAL DISTURBANCE (SED)

Students who are emotionally disturbed act in ways that are inappropriate, either in their nature or in their timing or degree. They have unusual difficulties maintaining interpersonal relationships; can be aggressive, withdrawn, anxious, or easily frustrated; and often have low self confidence. These students may be unable to express feelings and needs without creating problems for themselves and others. Autistic students and those with learning adjustment problems and behavior disorders are included in this group.

OTHER HEALTH IMPAIRED (OHI)

This group includes students who are chronically ill and students who are temporarily disabled and require special transportation. For example, these students may be hemophiliacs, heart patients, or post-operative patients. Talk to parents or teachers to find out about the special needs of these students on your route. Some students may wear medical identification tags that specify care and medical limitations.

GIFTED OR TALENTED STUDENTS

These students meet the ability criteria for special programs. They may require special transportation if these programs are not provided by the local educational agency.

NEUROLOGICALLY IMPAIRED (NI) (BRAIN DAMAGED)

Students who have incurred a moderate to severe injury to the brain as identified by a neurological examination, resulting in severe behavior and learning disorders.

EPILEPTIC STUDENTS

Epilepsy is a chronic nervous disorder, characterized by seizures. You should know what to do if a student has a seizure during the bus ride. Follow these steps to minimize any injuries to the student:

• Keep calm. The student is usually not suffering or in danger.

• Help the child to a safe place, but do not restrain his or her movements. Move away anything the student may strike against with his or her head, arms, or legs. Most injuries occur from bumping hard objects.
Loosen tight clothing and turn the student on his or her side.
Do not force a hard object between the student’s teeth.
Do not give the student anything to drink.
Saliva may flow from the student’s mouth. Wipe it away with a tissue.
Stand by until the student has fully recovered consciousness and seems clearheaded. The student may seem dazed and incoherent for awhile after a seizure.
Encourage deep breathing after the student regains consciousness.
Assure the student that all is well and encourage him or her to go about regular activities. Occasionally after a seizure the student may want to sleep. Help him or her to a safe place to rest.

TRANSPORTING EXCEPTIONAL STUDENTS

Transferring exceptional students involves special equipment and procedures in addition to basic bus driving skills. This section describes bus stop procedures, the modified vehicles and special equipment used in transporting exceptional students, and emergency procedures and evacuation drills.

BUS STOP PROCEDURES

Identifying Bus Stops

- The bus stop for exceptional students may be located on the sidewalk or driveway in front of their homes.
- The bus stop should have level parking, smooth approaches from the house, and adequate space for placing ramps and loading wheelchairs.
- Bus stops in which you must pull the vehicle over to the left side of the street, facing oncoming traffic, are prohibited.
- Each stop requires its own approach. Adapt procedures for the particular needs of the student and the location.
- Stops for exceptional students require more time and care than those for average students. Find a place where traffic will not be unduly held up if the school bus eight-way light system is activated.

Loading Procedures

- Following the procedures outlined in the unit on loading and unloading for pulling up to the bus stop.
- If you can pull the vehicle completely off the road surface, you don’t need to use the school bus eight-way light system. However, you must use the hazard warning lights.
- Sometimes students will need your help boarding or carrying their belongings. Assisting in the loading of a physically handicapped or nonambulatory student is a time when you are permitted to leave the wheel of your vehicle. If you must leave the wheel, put the transmission in park or neutral and turn off the ignition. Be sure to remove the keys and set the emergency brake. On some vehicles with special equipment such as a lift, you must leave the engine on during loading and unloading. In these situations, make sure the transmission is in park or neutral and the emergency brake is engaged before you leave the vehicle for loading or unloading.
• In order to board or leave the bus, the severely handicapped student may need the help of several people (e.g., parents, attendants) in addition to yourself. Be sure that all persons involved know their role in this procedure, ideally before the beginning of the school year.

• Most vehicles have seat belts that you must help students secure. Before turning on the engine again, make sure that all seat belts are fastened, all doors and windows are locked, all security devices are engaged, and all belongings are securely placed. Keep messages and supplies for delivery to parents or teachers in a secure place.

• Plan considerably more time to load exceptional students. Allow a 3-minute wait for a student to appear, plus a 3- to 5-minute (or sometimes longer) loading time.

• Remember—if a student requires an escort, you must never leave him or her unattended.

Assigning Seats

• If your exceptional student is mainstreamed on a large bus with many other regular education students, don’t automatically assign the student to the front seat. Typically, front seats are saved for problem students, and not many students want to sit near the driver. Exceptional students are like most of your student passengers—they would prefer to sit in the rear of the bus with their friends.

• When assigning a seat to your exceptional student consider such factors as mobility and independence of the student, ease of emergency evacuation, availability of dependable assistance, and vulnerability of the exceptional student to interaction of other students.

On the Road

• While on the road after loading or before unloading your passengers, watch for any behaviors that might cause a dangerous situation. If attendants are available, assign them to make sure that all students remain safely seated and secure. With or without attendants, make periodic checks yourself. Knowing each student’s specific behavior patterns will enable you to avoid potentially dangerous situations while transporting these students.

Unloading Procedures

• Unloading procedures are similar to loading, but in the reverse order.

• Never leave students outside or inside their homes unless a parent or other responsible person is there. Since policies differ from area to area, local school district officials must establish specific procedures to follow when no responsible person is present where the student is to be unloaded.

MODIFIED VEHICLES AND SPECIAL EQUIPMENT

Depending on the needs of exceptional students in each school district, various modifications can be made to vehicles and special equipment can be obtained. You will be given additional training by the local school district or intermediate unit in the operation of modified vehicles and special equipment that you will need to use.

Modified Vehicles

Because exceptional students have a wide variety of needs, there is also a wide range of vehicles to transport them. Such vehicles include personal autos, taxis, 10-passenger cars and vans, 12-passenger minibuses, and 66-passenger and larger school buses. Modified vehicles must conform to standards set by the Pupil Transportation Section, PENNDOT. Exceptions to these standards must receive prior approval from PENNDOT.
**Special Equipment**

State law (Title 75, Section 4581) requires that children that are under four years of age and transported in a school vehicle must be fastened securely in a child safety seat. The law also requires that children four years of age or older, but under eight years of age, must be fastened in a seat belt and in a child booster seat. Any children transported that are over the age of eight, but less than 18 years of age, must be fastened in a seat belt.

Other special equipment you may have to use includes manual ramps and automatic lifts for wheelchairs, seat belts, positioning belts or harnesses, and stretchers. Exceptional students are often in wheelchairs, and a general description of the automatic lifts and manual ramps used to load and unload them is presented below. The specific procedures for using all special equipment will be provided as a part of your local training.

*Manual Ramps for Bus or Van.* Some vehicles carry ramps to allow attendants to manually roll wheelchairs into a van or bus or to allow students who can walk to enter without climbing deep steps. A combination ramp and shallow step is also available. You may have to pin the ramp into place on the vehicle. You may also use special techniques to push the wheelchair and the passenger up the ramp and to lower them down without straining yourself (or the attendant) and without endangering the security of the student.

*Automatic Lifts.* Buses and other vehicles designed or converted to carry passengers in wheelchairs are often equipped with an automatic wheelchair lift. In these cases, guide the wheelchair onto the lift platform and lock the wheelchair’s brake. After you secure the rider, raise the platform to bus floor level by activating a special control switch. Once the wheelchair is inside, always position and secure it to the floor with a wheelchair restraining device and secure the student independently of the wheelchair. Check with your supervisor for the correct method of tiedowns.

**EMERGENCY PROCEDURES AND EVACUATION DRILLS**

The procedures to follow in case of an accident or any serious condition that forces you to stop and seek assistance are generally the same as those outlined in Unit H (Accident and Emergency Procedures) and Unit I (Student Emergencies). Carry a copy of first aid procedures in the vehicle. Make sure your vehicle has the required and optional emergency equipment listed and described in Unit H. In addition to this equipment, a door-holding device is recommended because you will have to help students unload in an evacuation.

When planning emergency procedures, keep these points in mind:

- Under no circumstances should you leave the students being transported.
- An orthopedically handicapped student can sometimes serve as a second-in-command in emergency situations if an aide is not available. Consult with the parents and teachers in advance about the abilities of particular students to decide whether this would work.
- Assign blind and deaf students to a partner who can assist them in case of an emergency.
- Because many exceptional students have trouble remembering, evacuation drills for them should be limited to simulations at the school, where school supervisory personnel can assist in performing the drill and help train those students capable of taking responsibility. Bus evacuation procedures and drills are described in Unit H.
- Exceptional students who can walk are evacuated in the same manner as non-exceptional students, whenever possible.
• In a crisis, students who can’t walk may be placed on the floor and pulled by their clothing out of any available door. Ramps may be used to roll or slide them to the ground.
• Exceptional students who have been involved in a crash or an emergency evacuation should be examined by the school nurse even if they appear uninjured. On the homeward trip, inform the parent or guardian of the incident.

**REVIEW QUESTIONS**

1. What is your role as a driver of exceptional students?
2. With whom can you discuss information about an exceptional student?
3. In addition to following the guidelines presented in previous units, what guidelines are specific to managing exceptional students?
4. Describe what you may need to do to assist physically handicapped students.
5. What behavior patterns are common to students with learning disabilities?
6. What procedures should you follow if a student has a seizure?
7. In addition to loading procedures discussed in unit C, what procedures do you need to follow when loading an exceptional student?
8. How can you evacuate the exceptional students from your bus?
9. Explain the memory aid “START.”
10. What is the single most important consideration in transporting exceptional students?
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PREVENTIVE MAINTENANCE

INTRODUCTION

As a school bus driver, you have great responsibility in the preventive maintenance program. You are on the road with the vehicle for several hours each day and depend on proper operation of the bus; you are in the best position to observe how it performs under all conditions. Learn to recognize defects both during the pre-trip inspection and while on the road, and immediately report problems to your supervisor or the bus maintenance department. Don’t attempt to diagnose the trouble, but report what you hear, see, smell, and feel. Remember, defects cannot be repaired if they are not reported. Furthermore, you should not operate a bus that is not running properly, is not safe, or does not have the proper equipment on board.

This unit covers the normal daily preventive maintenance tasks assigned to you during the pre-trip inspection, while on the road, and after the trip. Responsibility for these tasks may vary due to differences in buses and/or local policy. If you are ever unsure of the preventive maintenance duties assigned to you, ask your supervisor.

Preventive maintenance includes pre-trip inspection, monitoring on-the-road vehicle performance, and post-trip inspection and reporting. The purpose of the pre-trip is to find problems that could cause a crash or breakdown. The post-trip includes filling out a vehicle condition report that helps the vehicle owner decide when to fix something.

PRE-TRIP INSPECTION

A series of simple and easy checks can be made each day before you start your route. They will contribute to your daily safety and will add many miles of trouble-free operation to the life of the bus. The checks are presented in a logical sequence, and the entire pre-trip inspection procedure should take about 15 minutes. (See Figure E-1.) Even if the school district or contractor performs a pre-trip inspection on the bus, you, the driver, should always check the bus before driving. Always do a pre-trip inspection the same way each time so you will be less likely to forget a step.

Keep several rags or paper towels and window cleaning fluid with you during the inspection. The rags are useful for removing caps and checking fluid levels under the hood, and the window cleaning fluid is used for washing windows, mirrors, and headlights.

A checklist makes the daily pre-trip inspection easy. As a driver, you are likely to be required to fill out such a form. In general, clean all lights, reflectors, and glass as you go along.
Figure E-1. Pre-Trip Inspection
1. VEHICLE OVERVIEW

As you approach the vehicle, note its general condition, and look for damage or leanings to one side. Look under the vehicle for fresh oil, coolant, grease, or fuel leaks. Check the area around the vehicle—above and below—for hazards to vehicle movement (people, other vehicles, objects, low hanging wires or limbs, etc.).

Note any recent problems and inspect these to see if they were fixed. Review the last bus inspection report—if available.

2. UNDER-THE-HOOD INSPECTION

Although some contractors and school districts do not require drivers to perform under-the-hood checks, all drivers should be trained in the proper procedure. Make your first set of checks under the hood while the engine is cool and the various fluid systems have had time to stabilize.

Check that the parking brakes are on and/or wheels chocked. You may have to raise the hood, tilt the cab (secure loose items so that they don’t fall and break something), or open the engine compartment door. Check the following:

- Engine oil level.
- Coolant level in radiator; condition of hoses.
- Power steering fluid level; condition of hose (if any).
- Windshield washer fluid level.
- Battery fluid level, connections and tie downs (battery may be located elsewhere).
- Automatic transmission fluid level (may require engine to be running).
- Tightness and excessive wear on belts on the alternator, water pump, and air compressor—learn how much “give” the belts should have when adjusted right, and check each one.
- Leaks in the engine compartment (fuel, coolant, oil, power steering fluid, hydraulic fluid, battery fluid).
- Cracked, worn insulation around electrical wiring.

Lower and secure hood, cab, or engine compartment door.

3. START ENGINE AND INSPECT INSIDE OF BUS

- Make sure parking brake is on.
- Put gearshift in neutral (or park if available).
- Turn off the heaters before starting so the engine will reach operating temperature more quickly.
- Start engine; listen for unusual noises.

For engines with an automatic choke, fully depress and then release the accelerator to engage choke.

For vehicles with a manual choke, keep the accelerator pushed all the way down while you pull out the choke, then release the accelerator and disengage the clutch. Turn the ignition key to engage the starter; release the key the instant the engine starts. If the engine fails to start, do not keep the starter engaged for more than 15 seconds. Excessive heat will build up, damaging internal parts of the starter. Wait 10 to 15 seconds before trying again.
For diesel engines, make sure the injector pump is engaged before starting. Refer to Unit F for starting and driving a diesel vehicle.

3a. Look at the Gauges

Check all of the following gauges:
- Oil pressure should come up to normal within seconds after engine is started.
- Ammeter and/or voltmeter should be in normal range(s).
- Coolant temperature should begin gradual rise to normal operating range.
- Oil, coolant, and charging circuit warning lights should go out right away.
- Fuel gauge should indicate a safe margin for the day’s trip.
- Buses equipped with hydraulic brakes with vacuum assist have a vacuum gauge and low vacuum warning light. If the gauge reads less than normal or the warning light starts to blink, report the condition.
- Air gauges with warning buzzers on buses with air brakes stop buzzing when air pressure increases above 60 psi. Do not drive the bus if the pressure is less than this.

3b. Check Condition of Controls

Check all of the following for looseness, sticking, damage, or improper setting:
- Steering wheel.
- Clutch.
- Accelerator (gas pedal)
- Brake Controls.
  – Foot brake
  – Parking brake
  – Retarder controls (if vehicle has them)
  – Transmission controls
- Horn(s).
- Windshield wiper/washer. Spray the washer fluid before turning on the wipers, to avoid damaging the windshield.
- Lights.
  – Headlights
  – Dimmer switch
  – Turn signal
  – Four-way flashers
  – Clearance, identification, marker light switch(es)
  – School bus eight-way light system
  – Strobe light, if applicable

3c. Check all Mirrors

Check mirrors to make sure they are clean and adjusted so that you can see all areas around the bus from the driver’s seat. The interior rearview mirror must provide a good view of passengers and the area directly behind the bus. The right and left side mirrors must provide a clear view past the right and left rear of the bus. The right and left front fender-mounted rear mirrors (convex mirrors) must provide a clear view from the forward-most point of the front fenders past the rear of the bus. The left front fender-mounted crossover mirror (convex) must provide a view of the blind area directly in front of the bus.
3d. Check Exits and Service Door Controls

- Service doors: make sure the service doors operate properly; they should open and close smoothly.
- Emergency door: be sure the emergency door is unlocked and operable, with the warning buzzer working. Keep the door shut to prevent carbon monoxide fumes from entering. The emergency door must not be locked at any time during operation of the bus.

3e. Check the Passenger Compartment

- Examine seats for looseness and the condition of the upholstery. Correct any problems, if possible, and report any hazardous conditions to your supervisor.
- Sweep daily to ensure that the bus is free of clutter or trash, which could cause a student to slip or fall.

3f. Check Emergency Equipment

- Check for safety equipment:
  - Spare electrical fuses (unless vehicle has circuit breakers)
  - Three red reflective triangles and emergency marker equipment
  - Properly charged and rated fire extinguisher
  - Complete first aid kit (refer to Unit I)
  - Wrecking bar
- Check for optional items such as:
  - Tire chains (where winter conditions require them)
  - Tire changing equipment
  - List of emergency phone numbers
  - Accident reporting kit (packet)

4. TURN OFF ENGINE AND CHECK LIGHTS

Turn on all lights and signal devices. Check the interior signal pilot and dashboard lights. Make sure the headlight dimmer switch is working. Check the dome and stepwell lights. Activate the school bus eight-way light system. While it is on, the red flashing lights will be activated once you open the service door of the bus. Leave all lights on at this point so you can check them from the outside during your walk-around inspection.

5. WALK-AROUND INSPECTION

Walk around the bus for the next set of checks. For these checks, leave the engine running with the parking brake set, transmission out of gear and lights and signal devices left on. It is a good idea to team up with another driver when checking mirrors, headlights, the red and amber flashing lights of the school bus eight-way light system, side marker lights, brake lights, and backup lights.

Develop the habit of observing tires for abnormal wear patterns. Figure E-2 shows several types of abnormal wear that can cause steering problems, shimmy conditions, and premature tire wear. Do not drive with tire defects such as bubbles, cracks, or abnormal tire wear patterns.

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**Figure E-2.**
Abnormal Tire Wear Patterns
5a. Check Right Front

- Right fender-mounted mirror
- Right front wheel
  - Condition of wheel and rim: missing, bent, broken studs, clamps, and lugs; any signs of misalignment.
  - Condition of tires: properly inflated; valve stem and cap OK; no serious cuts, bulges, tread wear; no less than 4/32 inch tread on front tires.
  - Use wrench to test any rust-streaked lug nuts. Rust may indicate looseness.
  - Hub oil level OK, no leaks
- Right front suspension (See Figure E-3)
  - Condition of spring, spring hangers, shackles, U-bolts.
  - Condition of shock absorbers.
- Crossing Control Arm
- Right Front Brake
  - Condition of brake drum.

![Figure E-3. Suspension System](Broken Leaf Spring)
5b. Check Front Side

- Condition of front axle.
- Condition of steering system (See Figure E-4).
  - No loose, worn, bent, damaged, or missing parts.
  - Grab the steering mechanism to test for looseness. Steering wheel play should not be more than 10 degrees or 2 inches of movement at the rim of a 20-inch diameter steering wheel.

![Figure E-4. Steering System](image)

- Condition of windshield
  - Check for damage. Clean it if dirty. Never wipe a dry window or mirror; this can cause fine scratches. When cleaning the windshield, never move the wiper arms from side to side. This breaks the gear in the motor. You can lift the wiper straight off the windshield and then drop it back into place after cleaning.
  - Check the windshield wiper arms for proper spring tension.
  - Check wiper blades for damage, "stiff" rubber, and secure attachment.

- Lights and reflectors.
  - Parking, clearance, and identification lights clean, operating and proper color (amber at front).
  - Reflectors clean and proper color (amber at front).
  - Front turn signal light clean, operating, and proper color (amber or white on signals facing forward).
  - Left school bus eight-way light system—lights clean and operating.
5c. Check Left Front
- Check all items as for right front.
- Check left side stop arm and wing guard.
- Left front fender rear and crossover mirrors.

5d. Check Left Side
- Left fuel tank(s).
  - Securely mounted, not damaged or leaking
  - Cap(s) on and secure
  - Battery check: securely mounted, fluid level OK, no leaks
- Condition of visible parts.
  - Transmission: not leaking
  - Exhaust system: secure, not leaking, not touching wires, fuel, or air lines
  - Frame and cross members: no bends or cracks
  - Air lines and electrical wiring: secured against snagging, rubbing, wearing
  - Spare tire carrier or rack not damaged (if so equipped)
  - Spare tire and/or wheel securely mounted in rack
  - Spare tire and wheel adequate (proper size, properly inflated)

5e. Check Left Rear
- Condition of wheels and rims: no missing, bent, or broken spacers, studs, clamps, or lugs.
- Condition of tires: properly inflated; valve stems and caps OK; no serious cuts, bulges, tread wear; tires not rubbing each other and nothing stuck between them.
- Tires.
  - Same type, not a combination of radial and bias types.
  - No obstructions between dual wheels
  - Wheel bearing/seals not leaking
  - Tread depth not less than 2/32 inch
  - Recaps are permitted on rear tires but not on front
- Suspension.
  - Condition of spring(s), spring hangers, shackles and U-bolts
    - Axle secure
- Brakes.
  - Condition of brake drum(s)
  - Condition of hoses: look for any wear due to rubbing
  - Adjustment of slack adjuster (if air brakes equipped)
  - Condition of brake chamber (if air brakes equipped)
- Lights and reflectors.
  - Side-marker lights clean, operating, and proper color (red at rear, others amber)
  - Side-marker reflectors clean and proper color (red at rear, others amber)

5f. Check Rear Side
- Lights and reflectors.
  - Rear clearance and identification lights clean, operating, and proper color (red at rear)
  - Reflectors clean and proper color (red at rear)
  - Tail lights clean, operating, and proper color (red at rear)
  - Right rear turn signal operating and proper color (red, yellow, or amber at rear)
• License plate(s) present, clean, and secured.
• Splash guards present, not damaged, properly fastened, not dragging on ground or rubbing tires.
• Rear emergency door and side emergency door exits open and close properly.
• Exhaust System.
  – Pipes, muffler, tailpipe, and hangers secure
  – No excessive smoke, hissing, vibration, or noise.

5g. Check Right Rear
Check all items as on left side and fuel tank area—including straps, cap, and signs of fuel leaks.

6. CHECK SIGNAL LIGHTS

6a. Get in and turn off lights:
  • Turn off all lights.
  • Turn on left turn signal lights.

6b. Get out and check lights
  • Left front turn signal light clean, operating, and proper color (amber or white on signals facing the front)
  • Left rear turn signal light and both stop lights clean, operating, and proper color (red, yellow, or amber)

6c. Get in Vehicle
  • Turn off lights not needed for driving.
  • Display head lamps during the entire period that the school bus is in operation.
  • Check for all required papers, trip manifests, permits, etc.
  • Secure all loose articles in driver’s compartment.

7. START THE ENGINE AND CHECK BRAKE SYSTEM
Test for hydraulic leaks. If the vehicle has hydraulic brakes, pump the brake pedal three times. Then apply firm pressure to the pedal and hold for 5 seconds. The pedal should not move. If it does, there may be a leak or other problem. Get it fixed before driving.

Refer to the section on air brakes in Unit J for testing air brakes.

7a. Test Parking Brake
  1. Fasten seat belt
  2. Allow vehicle to move forward slowly
  3. Apply parking brake, if it doesn’t stop vehicle, it’s faulty; get it fixed

7b. Test Service Brakes
  1. Release parking brake
  2. Move forward at about 5 mph
  3. Push brake pedal firmly
  4. Watch for “pulling” to one side or the other, it can mean brake trouble. Watch for any unusual brake pedal “feel” or delayed stopping action. They can mean trouble.
PREVENTIVE MAINTENANCE WHILE ON THE ROAD

The previous section detailed checks that you should make before leaving on your daily route. This section deals with preventive maintenance while on the road. The section is divided into two parts: detecting abnormal vehicle behavior, and following good driving habits that will extend the life of the vehicle and its components.

DETECTING ABNORMAL VEHICLE BEHAVIOR

Detecting abnormal vehicle behavior requires you to use all of your senses: sight, sound, smell, and touch. As a first step, you must learn to recognize the normal running condition of the vehicle while at the wheel so that you can compare unusual steering, rattles, odd smells, and other conditions with normal conditions. For this reason, and as a vital safety practice, it is important to road test the vehicle every morning before picking up the first passenger. This is not to say that after the road test, your preventive maintenance responsibilities are over. Throughout a trip, you should constantly monitor the engine gauges and the general operating condition of the vehicle in the same manner as during the road test. Obviously, defects observed on other buses should be reported.

1. Continuous Checks
   • Watch gauges and instruments for trouble.
     – Instruments
     – Air pressure gauge (if you have air brakes)
     – Temperature gauges
     – Pressure gauges
     – Ammeter/voltmeter
   • Use your senses (sight, sound, smell, feel) to check for problems
   • Check critical items when you stop:
     – Tires, wheels, and rims
     – Brakes
     – Lights
   • Watch your mirrors

   If you see, hear, smell, or feel anything that might mean trouble, check it out.

2. Check the Parking Brake

   Check the parking brake before pulling out onto the road.

   • If your bus is equipped with a ratchet-type lever, you should feel a distinct clicking of the ratchet pawl and the lever should lock firmly into place when you apply the brake. When properly adjusted, this brake should be capable of holding the bus on a hill. If you detect excessive looseness or lever travel, the lever slipping out of locked position, the lever binding, or the brake not holding the bus on a hill, have the parking brake adjusted.
   • If the parking brake is an over-center type, it should not take excessive effort to apply, but it should still prevent the vehicle from rolling on a grade or with the transmission in gear.
   • If the bus is equipped with air brakes, pull out the parking brake control knob to engage the parking brake and push it in to release the parking brake. If the vehicle does not hold with the knob in the engaged position, have the rear brakes adjusted.
3. **Check the Service Brakes**

Check the service brakes after the parking brake, preferably before reaching the highway. Test at low speeds by bringing the bus smoothly to a complete stop. Your bus should stop in a straight line without skidding, swerving, pulling to either side, grabbing, locking, or making excessive noise.

- For buses with hydraulic brakes, the brakes should not need to be pumped to have braking power and should not need excessive pedal effort to engage. If they need either, have the brakes adjusted.
- With air brakes, the bus should stop as described above, but you have an additional check. Since air pressure is being used to apply the brakes, you will see some loss of pressure (as indicated on the air pressure gauge). In general, a brake adjustment is required if the gauge pressure drops by more than 10 lbs. during a single brake application. Make this check with the maxi-brake off. Check the air pressure gauge and vacuum gauge periodically while on the road.

4. **Check the Transmission**

Automatic transmissions should not slip or produce harsh, jerking shifts. With a manual transmission, check that all forward and reverse gears engage smoothly with no unusual metallic clashing noises, burning clutch smells, or shifting difficulties.

The clutch should engage easily and smoothly, without jerking, slipping excessively, or chattering. Also, with a properly adjusted clutch, the pedal should move freely for approximately the first 1 to 1 1/2 inches. Greater or lesser amounts of free clutch travel, or freeplay as it is commonly called, may indicate clutch wear.

5. **Check the Steering**

While the bus is moving straight ahead, check the steering for the amount of play or looseness in the wheel. Check for a binding feel or any unusual noises when making full turns. As with the other checks above, report any unusual conditions at once.

6. **Check the Suspension**

To ensure safe control of the bus while on the road, check the suspension. The suspension may have a malfunction if the bus sags at one end or corner, if it bounces excessively, and if the bottom hits the road when going over bumps or pot holes. Also check that the bus tracks properly and does not weave or sway when turning.

7. **Check the Engine**

In addition to periodic gauge checks, especially oil pressure, temperature, and ammeter/voltmeter, listen for any unusual engine noises. During the test drive, note any hesitation in acceleration or any power loss when going uphill. This behavior can indicate cylinder misfires, damaged valves, or inaccurate engine timing. All of these problems can cause early engine wear and excessive fuel consumption.

As stated earlier in this section, you should continually check the items mentioned above while on the road. However, it is especially important to make these checks before picking up your first passenger. Report any abnormal operating condition immediately.
GOOD DRIVING HABITS

The second part of your on-the-road preventive maintenance responsibility is operating the vehicle properly through good driving habits. Most of the procedures to be covered in this section will have no immediate effect on the vehicle's operation, but if practiced regularly, they will significantly increase the lifespan of the vehicle components.

Proper Use of the Clutch

The clutch is the most abused component in the bus because of frequent use and because many drivers do not understand its function. A clutch assembly will give many miles of trouble-free operation if you drive properly and maintain the clutch properly. Here are some pointers:

• Don’t use the clutch as a brake. Many drivers incorrectly use the clutch as a brake. For example, they will stop on an incline and, by feathering the clutch (letting the clutch partially out), hold the bus from rolling. By so doing, they force the slipping clutch to hold the entire weight of the bus and passengers. This severe friction generates excessive heat, which greatly shortens the life of the clutch.

• Don’t ride the clutch. The throw-out bearing is a component of the clutch that does not turn when the clutch pedal is released, its normal position during driving. “Riding the clutch” is when the weight of a driver’s foot resting on the clutch pedal is enough to move the throw-out bearing forward until it makes contact with the pressure plate and spins at the same speed as the engine. This serves no purpose except to increase wear and cause premature destruction of the bearing. The bearing is engineered to last a certain length of time and is factory packed in enough grease for this usage. Excessive use will use up this grease and will burn out the bearing. When shifting, use the clutch briefly and smoothly to achieve maximum durability.

• Make sure the clutch is adjusted properly. Another term you may have heard is toeboard clearance, or freeplay. This refers to the amount of travel of the clutch pedal between its highest position and the point where you can feel contact being made. This clearance must be maintained in order to prevent the throw-out bearing from turning. On most equipment, clearance should be approximately 1 to 1 1/2 inches. Due to normal wear of the clutch, clearance decreases gradually. The clutch should be adjusted frequently to maintain freeplay. Alert your supervisor or mechanic if the clutch needs to be adjusted.

Proper Use of the Brakes

Brakes are another commonly abused vehicle component. You can extend brake life if you follow a few pointers. By watching the traffic ahead, you can observe when you may have to stop; slow the bus by letting up on the gas pedal prior to the stop so that the brakes will be used lightly and only for a short time. You can use the engine’s braking power to slow the bus prior to making a stop and to control your speed on downgrades. When stopping, apply the brakes gently whenever possible and ease up on pedal pressure as speed drops so that you are using very light pressure at the end of the stop. Do not: (1) disengage the clutch until the bus has almost stopped, (2) brake quickly or harshly or for extended periods of time on downgrades. Both of these actions cause excessive brake heat and shorten brake life and braking effectiveness. For buses with automatic transmissions, refer to the section on shifting procedures in Unit F (Driving Fundamentals).

Protection of the Rear Axle

Protection of the rear axle is a third good driving habit. For long rear axle life, never spin the rear wheels on slippery surfaces (such as snow or ice) or loose surfaces (such as sand or gravel). If the rear wheels spin for a long time, the high speed will throw the lubricant out from between the
gears, which can damage the differential assembly. In more extreme cases, the internal gears may seize and break the shaft. Also, if a spinning wheel suddenly hits dry pavement or solid ground, the resultant shock can totally destroy the differential.

Proper Use of the Transmission
Proper use of the transmission can save wear and tear on gears, clutch, engine, and brakes. Maintain a constant speed whenever possible to save fuel and reduce wear on drive line components.

Manual Transmission. With a manual transmission, always start the vehicle moving in low gear, moving at a slow rate of speed. This will ensure proper lubrication of internal transmission and rear axle parts and will avoid the possibility of lugging the engine or slipping the clutch. As you move faster, progressively shift the transmission to the gear that will maintain the desired road speed. When driving a vehicle with a manual transmission:

- Always start off in first gear when carrying a heavy load.
- With a four-speed transmission, use first through fourth gears on level ground.
- With a five-speed transmission under light load conditions, use second through fifth gears for normal driving.
- When going up hills, downshift to avoid lugging the engine.
- When going down a hill, use one gear lower than would be required to go up the hill. Using lower gears will help slow the bus down and prevent the brakes from overheating due to excessive use.
- Stop completely before shifting into first gear or reverse.

Automatic Transmission. For vehicles equipped with automatic transmissions, proper selection of the correct gear provides better control without undue wear on the transmission. Avoid using the accelerator to hold a vehicle with an automatic transmission on a hill. When driving a vehicle with an automatic transmission, use the gearshift as described in the owner's manual for better vehicle control. Shifts are especially helpful when approaching hills and grades.

Before driving a bus equipped with an automatic transmission for the first time, consult the owner's manual for detailed operating instructions.

While the preventive maintenance on-the-road checks and driving habits presented in this section are vitally important to the safe operation and long life of the vehicle, your singlemost important preventive maintenance responsibility is to immediately and accurately report any malfunctions.

POST-TRIP PREVENTIVE MAINTENANCE PROCEDURES
Your maintenance responsibilities are not over until you stop the vehicle, check it over, and report its condition to your supervisor or maintenance department. Complete the following steps at the end of every trip:

- Fill the fuel tank in the evening rather than waiting until the following morning if this is one of your responsibilities. This will reduce the overnight condensation of water vapor inside the fuel tank.
• When parking your bus, after you set the parking brake and put the transmission in neutral, allow the engine to idle slowly for a few minutes. This will permit proper lubrication of all engine parts.

• While the engine is idling, check the interior for broken windows, ripped seats, or other damage that should be repaired before the bus is used again. Check on and under the seats for sleeping students. Check the exterior of the bus for burned out bulbs or other damage that needs to be repaired. Reenter the bus, turn off all electrical equipment, shut off the engine, remove the keys, and secure the bus.

• Do not leave the parking brake on overnight if there is a chance of freezing weather. This will prevent it from becoming frozen in the engaged position. The vehicle manufacturer may suggest that the vehicle be left in gear so it will not move.

• Report any and all abnormal conditions encountered during the day to your supervisor or maintenance department.

You may have to make a written report each day on the condition of the vehicle(s) you drove. Report anything affecting safety or possibly leading to mechanical breakdown.

The vehicle inspection report tells the vehicle owner about problems that may need to be fixed. Keep a copy of your report in the vehicle for one day. That way, the next driver can learn about any problems you have found.

### REVIEW QUESTIONS

1. Explain the seven steps of the pre-trip inspection.
2. What should you do during the walkaround inspection?
3. During a trip, what signs would indicate abnormal vehicle behavior?
4. How can you properly use the clutch and the transmission to reduce vehicle wear?
5. What are the procedures in your area for reporting vehicle problems?
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DRIVING FUNDAMENTALS I

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UNIT F
DRIVING FUNDAMENTALS I

INTRODUCTION

The purpose of this unit is to teach you the basic driving skills necessary to transport your passengers safely and efficiently. As a professional school bus driver, you are entrusted with the lives and safety of human cargo that cannot be measured in terms of dollars and cents. “Better late than never” is an old saying that applies to all drivers. You can’t rush and drive cautiously at the same time. Establish a pattern for driving cautiously and stick with it, late or not. Drive according to the motto “Safety first...schedule second.” Plan your schedule so you always have plenty of time. In addition to learning a pattern of special driving skills, you must practice each skill correctly until it becomes a habit. Statistics indicate that a large number of past crashes involving school buses resulted from driver errors. The following procedures have been developed to assist you in driving a school bus safely.

PREPARING TO DRIVE

Your experience in driving automobiles can provide a basis for learning to drive a school bus. Automobile and bus operation require similar knowledge, including rules of the road and general safe driving habits. The skills needed to operate the steering, transmission, lights, wipers, and other mechanical components of a bus are similar to those for an automobile. There is usually, however, a difference in scale. Most differences between automobile and bus operation are due to the relatively large size and weight of the bus. Always remember that a bus has a longer stopping distance, slower acceleration, wider turning radius, and higher and wider clearances. Another difference is that while school bus drivers sit higher and have a better forward view, there is much more reliance on mirrors for adequate rear and side viewing.

State laws applicable to all drivers (both passenger auto and school bus) are not described in this manual. For information on these laws, check the Pennsylvania manual for drivers (Pub #95).

Getting the bus ready for your daily run is an important part of safe driving. The procedures to be followed are covered in the preceding unit on preventative maintenance. This unit covers on-the-road activities.

STARTING AND DRIVING A DIESEL VEHICLE

STARTING A DIESEL

To start vans and short buses (with wait to start or glow plug indicator lights):

1. Set the parking brake and put the gear shift in neutral or park;
2. Turn ignition key on—wait for either wait to start or glow plug indicator light to go out;
3. Touch accelerator (do not pump);
4. Activate starter;
5. If vehicle does not start, turn ignition key off and repeat above instructions.
To start 72-passenger buses (five-speed and automatic transmissions with an engine stop lever next to ignition key):

1. Set parking brake and put gear shift in neutral, (with five-speed also press clutch);
2. Push engine stop lever in;
3. Touch accelerator;
4. Activate starter.

Automatic diesels do not have park—use the parking brake and start in neutral.

**DRIVING A DIESEL**

To drive a five-speed diesel:

- Get the bus moving in first gear and shift to second gear;
- At approximately 15 mph, shift to third gear;
- At approximately 30 mph, shift to fourth gear;
- Over 45 mph, shift to fifth gear

Note that gear ratios are higher in a diesel; always start out in first gear to avoid excessive clutch wear. When using rpms for your shifting guide, do not shift lower than 1500-1700 or higher than 28000-31000 rpm.

To drive a 72-passenger automatic diesel:

- When going down hills, use service (foot) brake and downshift to third gear. If on a steeper hill or if stopping on the downgrade, shift down again to second gear. Downshifting will make it easier to control the vehicle, and will save wear on the brakes.
- After parking the bus, always leave the engine running for at least 5 minutes before turning the engine off.

To stop a diesel engine (engine stop lever type):

- Set the parking brake and put gear shift in neutral;
- Turn the ignition key off and pull engine stop lever out to stop engine (leave engine stop lever out).

  NOTE: Be careful to avoid running out of fuel with a diesel. This will damage the engine.

- Some diesel side panels are equipped with a Booster Pump. Use this pump only when the defroster or heater is operating.
- Some automatic 72-passenger diesels have been equipped with a clutch fan on the engine. This fan will turn on and off automatically after the engine has reached a normal operating temperature (170°F).

**SHIFTING GEARS**

Gear shifting requires skill and practice. You must learn the best range of speed for changing gears upward and downward, and you must shift gears without losing your view of the road. In the course of your driving experiences, you may be required to shift gears in vehicles with standard transmissions and vehicles with automatic transmissions.
SHIFTING STANDARD TRANSMISSIONS

Before shifting with a standard transmission, you must reach proper speeds. The proper speeds are indicated below. These speeds may vary slightly depending on make of the engine, transmission, gear ratio, and terrain.

- **Upshifting**
  - First to second gear: 1 to 5 mph
  - Second to third gear: 5 to 15 mph
  - Third to fourth gear: 15 to 25 mph
  - Fourth to fifth gear: 25 to 30 mph

- **Downshifting**
  - Fifth to fourth gear: 30 to 35 mph
  - Fourth to third gear: 25 to 30 mph
  - Third to second gear: 5 to 10 mph
  - Second to first gear: bus stopped

Be sure you are familiar with the gear positions. Check the gear chart on the gearshift lever knob or dashboard. Ask your supervisor or instructor if you cannot find it or do not understand it.

**Shifting Procedures**

Here is the step-by-step procedure, from a starting position, for shifting standard transmissions:

1. Make sure parking brake is set.
2. Press clutch pedal.
3. Shift gear lever into starting gear. For average terrain and load, this should be second gear, although load, terrain, or both may dictate the use of first gear. Never start in a gear higher than second, since this places undue load and wear on the engine and clutch.
4. Press foot brake.
5. Release parking brake lever. If it is a ratchet type, pull brake lever slightly back to release pressure.
6. Release clutch gradually to point of engagement and hold. At the same time, release foot brake and press accelerator slightly to increase engine power and prevent stalling.
7. Slowly and gradually release the clutch the rest of the way and at the same time, slowly and gradually increase the acceleration.
8. Remove foot from clutch pedal completely. Do not “ride the clutch,” that is, do not keep your foot on the pedal. Always put your left foot back on the floor between shifts and once shifting is completed.
9. Increase engine speed before shifting to a higher gear.
10. To shift to next higher gear, first press the clutch pedal and release the accelerator, then shift the gear lever into the next gear. Release clutch smoothly but more quickly than in starting gear, and press accelerator smoothly and quickly to prevent loss of vehicle speed. Be sure to remove foot completely from clutch pedal. Proceed in this gear until proper vehicle speed is reached for shifting to next gear.
11. Repeat procedures in previous step until the bus is in the highest or cruising gear.
Shifting Tips
When shifting a standard transmission, observe the following:

• Never skip a gear in up- or down-shifting; this causes undue engine and clutch wear.
• Shift up or down as dictated by traffic speed and terrain to prevent engine lugging or excessive engine racing.
  – Never allow an engine to pull heavily on upgrades, turns, or curves.
  – Don’t let the engine race excessively on a downgrade.
• Never force the transmission into gear when an improperly timed shift causes excessive gear clashing.
• When going down a hill, shift into one gear lower than the gear that would be used when going up the hill.

Starting on an Upgrade
When you must keep the bus from drifting backward on upgrades, don’t hold the bus in place with the clutch and accelerator. Instead, use the following procedures:
1. With right foot on the brake pedal, left foot pressing the clutch, and shift lever in gear, pull on the hand brake far enough that the bus will not drift backward when the foot brake is released.
2. Move right foot to the accelerator and start normally, releasing the hand brake slowly as the clutch is engaged.
3. If the hill is very steep, you may have to start in first gear.

Double Clutching
Double clutching is the practice of shifting to neutral before shifting up or down. Although synchron-mesh transmissions have nearly eliminated the need for double clutching, it is still a good practice in most cases. Check with your supervisor or instructor to determine if double clutching is recommended for the vehicles you drive. This process coordinates the engine speed and transmission speed to synchronize the gears for easy up and down shifting. Double clutching, in most cases, eliminates gear clashing, which can damage the transmission. It is a skill that requires continuous practice of the procedures described below.

Shifting Up
1. Release accelerator, press the clutch, and shift to neutral at the same time.
2. Release clutch.
3. Let engine and gears slow down to the rpm required for the next gear (this takes practice).
4. Press the clutch and shift to the higher gear at the same time.
5. Release clutch and press accelerator at the same time.

Shifting Down
1. Release accelerator, press the clutch, and shift to neutral at the same time.
2. Release clutch.
3. Press accelerator, increase engine and gear speed to the rpm required in the lower gear.
4. Press the clutch and shift to the lower gear at the same time.
5. Release clutch and press accelerator at the same time.
Shifting gears using double clutching requires practice. If you remain in neutral too long, you may have difficulty putting the vehicle into the next gear. If so, don’t try to force it. Return to neutral, release clutch, increase engine speed to match road speed, and try again.

SHIFTING AUTOMATIC TRANSMISSIONS
Some buses are equipped with automatic transmissions. You should know the basic shift positions and how to operate the automatic transmission. Read and follow the manufacturer’s instructions, which are usually found in the bus owner’s manual. Although there are variations, the following procedures generally apply.

These procedures are used from a starting position:
1. Press foot brake with right foot.
2. Move selector lever into forward or drive position.
3. Release parking brake.
5. As the speed of the bus increases, the transmission will automatically shift to the next higher gear until reaching cruising gear.
6. To downshift for additional power when ascending a grade, press the accelerator to the floor firmly. This will cause transmission to downshift one gear. Then move selector lever to a lower gear selection for additional engine braking.

STEERING AND TURNING
You must know the proper techniques for steering a school bus and must be able to make all turning maneuvers correctly and smoothly.

STEERING TECHNIQUES
Proper steering requires the proper positioning of your hands on the steering wheel. Grip the wheel securely with both hands, putting your left hand at approximately the nine o’clock position and your right hand at approximately the three o’clock position. Your hands should be on the outside of the steering wheel with your thumbs on the front of the wheel.

Two steering methods are recommended for school bus drivers. In the push-pull steering method, one hand pulls, and the other hand pushes. The hand-over-hand method also may be used but you should be careful not to catch your thumb on the safety chain of your wristwatch, bracelet, or clothing while steering. Never palm the steering wheel or turn it with a finger or thumb.

To maintain proper lane position, get the “big picture” of the road ahead. Always aim high in steering; don’t use white lines or other steering guides too close to the bus.

TURNING PROCEDURES
To drive your school bus you must use the steering techniques described above while executing a number of different turning maneuvers. These maneuvers include rounding curves, using turn signals, and making left and right turns. The average speed limits on freeways and other roads on your route force you to use practiced skills and judgment to perform these maneuvers.
properly and safely. This includes being aware of the pivot or turning point of the bus while following the various turning procedures. For large school buses, the pivot point is located at the rear axle. The procedures described below are applicable in most driving situations.

**Rounding Curves**

Judge beforehand if you will be able to negotiate an upcoming curve at your present rate of speed. If you must brake, do so before entering the curve. Never plan to brake in the middle of a curve as this can cause skidding and loss of control. Use the following procedures when steering through curves (see Figure F-1):

1. Slow down and look ahead for the sharpest point in the curve.
2. Brake, if necessary, before getting into the curve.
3. For curves to the right, move as close to the center line as is safe, and use the width of the lane while rounding the curve. This will help to smooth out the curve.
4. For curves to the left, enter the curve from the right edge of your lane.
5. When you reach the midpoint of the curve, resume power and accelerate through the remainder of the curve.

![Figure F-1. Stay in Lane](image)

**Using Turn Signals**

Use these three rules when signaling:

- Signal early. It is the best way to keep others from trying to pass you.
- Signal continuously. You need both hands on the wheel to turn safely. Don’t cancel the signal until you have completed the turn.
- Cancel your signal. Don’t forget to turn off your turn signal after you’ve turned (if you don’t have self-canceling signals).

**Making Left and Right Turns**

The procedures listed below will enable you to prepare for and make turns and to reenter the traffic pattern while maintaining proper lane positions. When making either a left or right turn, start signaling at least 100 feet before turning at speeds of 35 mph or less, and at 300 feet before turning at speeds over 35 mph. (See Figures F-2 and F-3.)
Left Turn Procedures

1. Give proper left turn signal early (at least 100 feet away).
2. Reduce speed and downshift to the proper gear needed to execute the turn.
3. Position the bus to the left edge of the traffic lane.
4. Because you do not have the right-of-way, check traffic signals, signs, pedestrians, or vehicles for a clear right-of-way. Use both outside mirrors and check especially for vehicles attempting to pass the bus on the left side.
5. If you must stop before making the turn, keep the front wheels straight and the brake pedal pressed. This stopping procedure will prevent your bus from being shoved into the path of oncoming traffic if you are struck from the rear. Also, leave a space of a few feet between your bus and the vehicle in front of you. You should be able to see the rear wheels of the vehicle in front of you. If not, you are too close.
6. Check your left mirror and execute the turn smoothly without strain on the engine. Enter the highway in the left-most lane available. Steer wheels back into position; do not let the steering wheel spin wheels back. Check that your turn signal is off.
7. After completing a left turn onto a multiple-lane highway, pick up speed and move into the right lane as soon as possible.

Right Turn Procedures

1. Give proper right turn signal early.
2. Reduce speed and downshift to the proper gear needed to execute the turn.
3. Position the bus to the right edge of the traffic lane.
4. Check for traffic signals, signs, pedestrians, and vehicles to determine clear right-of-way. Be sure to check for vehicles between right side of the bus and the curb.
5. Check your right mirror and execute the turn smoothly without strain on the engine. Never shift gears during a turn. Enter the right-most lane available. Steer wheels back into position; do not let steering wheel spin wheels back. Check that your turn signal is off.
REVIEW QUESTIONS

1. What are some of the differences between driving a school bus and a car?
2. Explain how to start a diesel vehicle.
3. What is the proper procedure for shifting your vehicle?
4. How should you hold and turn the steering wheel?
5. What are three good rules for using your turn signals?
6. When rounding a curve, where should you brake?
7. At what point should you turn on your turn signal when making a left or right turn?

BACKING

Because you cannot see everything behind your vehicle, backing is always dangerous. Avoid backing whenever you can. When you park, try to park so you will be able to pull forward when you leave. When you have to back, follow these rules:

KEEP STUDENTS ON THE BUS

Keep all students on the bus. State law requires that if backing is required at or near a loading or unloading zone, all students must be seated on the bus during the backing.

BACK AND TURN TOWARD THE DRIVER’S SIDE

Plan your maneuver. Back toward the driver’s side so you can see better. Backing toward the right side is very dangerous because you can’t see as well. If you back and turn toward the driver’s side, you can watch the rear of your vehicle by looking out the side window. Use driver-side backing—even if it means going around the block to put your vehicle in this position. The added safety is worth it.

When backing a bus, turn the top of the steering wheel toward the direction you want to go.

LOOK AT YOUR PATH

Look at your line of travel to be sure you know what is behind you before you begin. Don’t take chances. Sometimes you can’t see enough with your mirrors; it’s much safer to get out and look, even if it means walking behind the bus. By so doing, you may prevent a serious accident. Check your clearance to the sides and overhead both in and near the path your vehicle will take.

Use a Helper Whenever Possible

If possible, have someone stationed behind the bus to warn traffic and act as your guide. If a guide is not available, it is advisable to use reflectors or flares to block off the lane of traffic the vehicle is backing into.
If a guide is not available and you must back the bus, the proper procedure is:

1. Stop the bus in the correct position to back and activate the four-way hazard warning lights. If the bus does not have automatic back-up signals, use the horn.
2. Using mirrors, check that the way is clear to the rear and sides.
3. Put transmission in reverse.
4. Using mirrors, back slowly and smoothly.

**BACK SLOWLY**
Always back as slowly as possible so you may make corrections before you get too far off course. Use the lowest reverse gear so that you can correct any steering errors more easily before you get too far off course. Going slowly means you can also stop quickly if necessary.

**MAKING A TURN-AROUND**

Most bus routes are planned to eliminate turn-arounds because they are extremely hazardous maneuvers. However, if you must turn your bus around at a loading zone, always load passengers being picked up before making the turn-around, and always unload passengers being discharged after making the turn-around. A turn-around in twilight or darkness should be made only when someone is present to stop traffic on any roadway used for the maneuver. A turn-around should be made in the following manner (see Figure F-4):

1. Activate the four-way hazard warning lights at least 200 feet before your stopping point.
2. Stop the bus in the proper position on the highway one full bus length ahead of the area into which your are backing.
3. Check traffic to the front and rear, as well as roadside obstacles such as poles, trees, and culverts. You should have traffic visibility for at least 500 feet in either direction.
4. Using all mirrors and looking carefully in all directions to observe traffic and obstacles, back slowly and cautiously into the designated area.
5. Reenter the highway, make sure to check traffic both ways, deactivate the hazard warning lights, and proceed with extreme caution.

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![Figure F-4. Turn-Arounds](image-url)
STOPPING

Stopping a school bus smoothly and within the limits of safety is the sign of an expert driver. Good drivers have their vehicles under control at all times and know that braking distances increase greatly as speed and vehicle weight increase. In addition to knowing the distance required to safely stop their bus under all driving conditions, skillful drivers use correct stopping procedures, which increase bus life and lower maintenance costs.

STOPPING DISTANCES

Whenever you are driving, plan to keep enough space in front of you so that you can stop quickly if necessary. Before you can bring the bus to a complete stop, you must first recognize the need to stop (for example, to avoid a potential crash), and then apply the brakes. Refer to Unit G for a more complete description of stopping distance. The following table shows stopping distances for various speeds based on a reaction time of 1 second. Notice how the total stopping distance increases more and more as speed increases.

<table>
<thead>
<tr>
<th>SPEED (Miles per Hour)</th>
<th>REACTION + (Feet per Second)</th>
<th>BRAKING = (Distance in Feet)</th>
<th>TOTAL (Stopping Distance in Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>7.3</td>
<td>1.2</td>
<td>8.5</td>
</tr>
<tr>
<td>10</td>
<td>14.6</td>
<td>5.0</td>
<td>19.6</td>
</tr>
<tr>
<td>20</td>
<td>29.3</td>
<td>20.0</td>
<td>49.3</td>
</tr>
<tr>
<td>30</td>
<td>44.0</td>
<td>45.0</td>
<td>89.0</td>
</tr>
<tr>
<td>40</td>
<td>58.6</td>
<td>80.0</td>
<td>138.6</td>
</tr>
<tr>
<td>50</td>
<td>73.3</td>
<td>125.0</td>
<td>198.3</td>
</tr>
<tr>
<td>60</td>
<td>88.0</td>
<td>180.0</td>
<td>268.0</td>
</tr>
</tbody>
</table>

This information was compiled from the results of extensive testing on a clear, dry road surface, using vehicles with properly adjusted brakes and correctly inflated tires. If brakes and/or tires are not in proper working order, the braking distance, and thus the stopping distance, will be greater.

You can see that stopping distance increases as speed increases so you must leave more space at faster speeds. Adverse weather conditions also increase stopping distance. Stopping a vehicle on roads covered with ice or sleet requires a distance at least five times greater than that required from dry concrete. When driving in bad weather, further increase your following distance to compensate for increased stopping distances.

FOLLOWING DISTANCES

Knowing the stopping distances required for different road conditions and speeds will help you determine safe following distances when driving. A good general rule for determining a safe
following distance on the highway is to allow an absolute minimum of 4 seconds between the 
bus and the vehicle ahead under normal conditions; allow 5 seconds if you bus is going over 40 
mp. Increase this interval if driving on a slick or loose surface.

Some drivers may believe that the stopping distances given in the table are incorrect and that 
their stopping distances are less than those shown. This misconception has been responsible for 
a number of tragic crashes.

In a large vehicle, it’s often hard to see whether a vehicle is close behind you. You may be 
tailgated:
- When you are traveling slowly. Drivers trapped behind slow vehicles often follow closely.
- In bad weather. Many car drivers follow large vehicles closely during bad weather, especially 
  when it is hard to see the road ahead.

If you find yourself being tailgated, here are some things you can do to reduce the chances of a 
crash:
- Avoid quick changes. If you have to slow down or turn, signal early and reduce speed very 
  gradually.
- Increase your following distance. Opening up room in front of you will help you avoid having to 
  make sudden speed or direction changes that could surprise the driver behind you. Leaving 
  room ahead also makes it easier for the tailgater to get around you.
- Don’t speed up. It’s safer to be tailgated at a low speed than a high speed.
- Avoid tricks. Don’t turn on your tail lights or flash your brake lights. Follow the suggestions 
  above.

**STOPPING PROCEDURES FOR STANDARD TRANSMISSIONS**

Different procedures are required for stopping at low and high speeds or on an upgrade or 
downgrade. If you stop the bus for more than several minutes in a non-traffic situation, turn off 
the engine. This not only conserves fuel but eliminated the possibility of poisonous carbon 
monoxide exhaust fumes entering the bus.

**Low Speed Stopping**

When you are in a low gear or are traveling 10 mph or less, use the following stopping 
procedures:
1. Release the accelerator and when speed decreases to 3 to 5 mph, press the clutch pedal.
2. Apply the brakes gradually by increasing pressure.
3. To prevent the bus from jerking, reduce the brake pressure slightly but not completely just 
   before coming to a stop.
4. Place the gear shift lever into the neutral position.
5. Release the clutch and remove foot from the clutch.

**Stopping at Speeds Greater than 10 mph**

When traveling in a higher gear, the procedure for stopping is as follows:
1. Release the accelerator and press the brake pedal.
2. When you reach the minimum speed for the next lower gear, downshift to that gear. Using 
   the lower gear will reduce the buildup of heat and avoid excessive brake wear.
3. Downshifting can be very effective and smooth if you use third gear for the slowing action in five-speed transmissions, and second gear in four-speed transmissions.

Stopping on an Upgrade
When coming to a stop on an upgrade, you should:
1. Be aware of the traffic behind you.
2. Apply pressure on the foot brake lightly for a smooth stop.
3. Press clutch with left foot; shift into neutral.
4. Hold bus with hand brake if necessary. Don’t use the clutch as a brake.
5. Allow an extra safety margin of space between the bus and the vehicle ahead.

Stopping on a Downgrade
When coming to a stop on a downgrade, stop as you would on an upgrade, except downshift to reduce speed as necessary. If the downgrade is quite long and/or steep, use the “snub” braking technique discussed later in this unit.

CHECKING OVERHEAD CLEARANCE
Hitting overhead objects is a danger. Make sure you always have enough room overhead.

• If you doubt you have safe space to pass under an object, go slowly. If you aren’t sure you can make it, take another route. Warnings are often posted on low bridges or underpasses, but sometimes they are not.
• Don’t assume that the heights posted at bridges and overpasses are correct. Repaving or packed snow may have reduced the clearances since the heights were posted.
• Some roads can cause a vehicle to tilt, causing problems for clearing objects along the edge of the road, such as signs or trees. Where this is a problem, drive a little closer to the center of the road.
• Before you back into an area, get out and check for overhanging objects, such as trees, branches, or electric wires. It’s easy to miss seeing them while you are backing. (Also check for other hazards at the same time.)
• Know the height of your vehicle.

REVIEW QUESTIONS

1. What procedure should you follow when backing your bus?
2. If you must execute a turn-around at a loading zone, when should you unload the students?
3. What are some of the factors that affect stopping distance?
4. How much distance should you allow between your bus and the vehicle in front of you?
5. How much overhead clearance do you have while driving your bus?
APPRAOHING RAILROAD CROSSINGS

Crossing railroad tracks represents one of the greatest hazards in terms of mass casualties and fatalities for school buses. Planned safety procedures for vehicles crossing railroad tracks can help eliminate accidents. Practice the procedures discussed below until they become automatic actions.

Due to their large size, railroad locomotives appear to be moving more slowly than their actual speed. Drivers often mistakenly judge that they have enough time to safely cross before the train reaches the crossing. Be aware of this fact, and whenever in doubt, wait for the train to pass. You have a number of young lives depending on you; always use extra caution when making decisions at railroad crossings.

WHEN A BUS MUST STOP AT A RAILROAD CROSSING

A school bus, whether or not carrying passengers, must stop at all railroad crossings. The exceptions are:

- Crossings that are controlled by a police officer or flagman.
- Crossings that are regulated by a functioning highway traffic control signal transmitting a green light.
- Any crossing marked by the former rail operator with a “tracks out of service” sign.
- An industrial or spur line crossing marked with an “exempt” sign.

PROCEDURES FOR STOPPING AT A RAILROAD CROSSING

When you must stop your bus at a railroad crossing, always follow these procedures.

Prepare to Stop

1. Request complete silence from passengers so that you have minimal distraction. If necessary, turn heaters off to further reduce noise.
2. Turn off any AM-FM, 2-way, or CB radio, or any other noise emitting device not necessary to the safe operation of the bus.
3. Get the big picture; check traffic control devices.
4. Activate four-way hazard lights.

Stop the Bus

5. Follow stopping procedures described earlier in this unit.
6. Stop in a position that permits you to have a clear view of the tracks in both directions. The front bumper must be clear of the tracks, at least 15 feet away and at most 50 feet away.
7. Shift into neutral; apply the parking brake.
8. Make sure that you do not activate the school eight-way light system.

Look and Listen

9. Open service door and driver’s window.
10. Look and listen through the open door and window.
No Approaching Train
If you see and hear no signs of an approaching train, do the following:
1. Release parking brake.
2. Look and listen a second time, close the door, and proceed quickly and smoothly.
3. Shift into a gear that will take the bus across the tracks without hesitation. Shifting gears on the tracks is not permitted.

Approaching Train
Trains always appear to be moving slower than they actually are. Follow these procedures when a train is approaching the crossing:
14. Hold bus position; use the parking brake.
15. After the train passes, proceed across the tracks as described above.

Multi-Track Crossings
At crossings with more than one set of tracks, do the following:
1. Make sure no train is approaching on any of the tracks.
2. After a train passes, wait until other tracks become visible before proceeding. A second train may be approaching from the opposite direction.

CROSSING DRAWBRIDGES
Stop at drawbridges that do not have a signal light or traffic control attendant. Stop at least 50 feet before the draw of the bridge. Look to make sure the draw is completely closed before crossing.

You do not need to stop, but you must slow down and make sure it’s safe, when:
• A traffic light on the bridge is showing green.
• The bridge has an attendant or traffic officer who controls traffic whenever the bridge opens.

ENTERING THE FLOW OF TRAFFIC
While driving, you will frequently leave one traffic stream and become part of another or cross through a second stream of traffic. In many cases, your vehicle movements will be regulated by automatically timed traffic control signals. In other cases, the merging points or intersections will be controlled only by stop or yield signs and your good judgment.

GENERAL
Observe the following procedures before you reach the point of entry into the roadway or lane of the second traffic stream:
1. If you intend to turn, turn on the appropriate turn signal well before the point of entry.
2. Stop just before the point of entry. If you are on a freeway acceleration lane marked with a yield sign, see the next section on ramps.
3. Check your mirror to see that all passengers are seated.
4. Check that no pedestrians are in the path of the bus.

5. Look left and right to see if there are any moving vehicles on the road you will enter.

6. Yield the right-of-way to vehicles already on the road.

7. Look for a suitable gap in traffic and, with reasonable safety, accelerate smoothly into the roadway. Turn off the turn signal after you are safely in your lane.

**ENTRANCE AND EXIT RAMPS**

Observe the following procedures when driving on entrance or exit ramps.

1. Check and recheck the traffic ahead when entering the driving lane on an entrance ramp. Look specifically for vehicles that are stopped or slowing down.

2. When driving on a long entrance ramp with an acceleration lane marked with a yield sign, check the traffic ahead, and, if possible, allow the vehicles ahead to leave the acceleration lane before attempting to merge into the roadway. Use the acceleration lane to match speed with the main stream of traffic before entering a suitable gap. Always use turn signals when merging.

3. If you are entering the main roadway from an entrance ramp without an acceleration lane, stop before merging. Through the side window, observe the main stream of traffic and do not proceed until you detect a gap large enough for accelerating and merging safely and smoothly.

4. When approaching and entering an exit ramp, observe the speed of traffic and adjust your speed appropriately. Remember, posted speed limits for off ramps and on ramps are for automobiles, but may not be safe for larger vehicles. Watch for other vehicles that may be stopped or waiting in line at the end of the exit ramp.

**INTERSECTIONS**

Follow these procedures at intersections:

1. Observe the traffic in and around the intersection.

2. Watch for vehicles that are near or approaching the intersection quickly; slow down or stop to permit these vehicles to clear the intersection.

3. If your vision is blocked by buildings, trees, parked vehicles, or other obstructions, stop at the intersection and edge forward slowly.

4. Observe other vehicles when proceeding directly through an intersection. Yield the right-of-way to them if necessary. Be prepared to stop if other vehicles signal a left turn.

**USING LANES AND POSITIONING ON THE HIGHWAY**

Changing lanes, being passed by other vehicles, and passing other vehicles are maneuvers that you will execute often while driving a school bus. The size of a school bus and the safety of your passengers require the use of proper procedures when executing these maneuvers.
GENERAL
Follow these procedures on all roads:
• Stay within one lane for normal driving; do not straddle lane markers.
• Activate your four-way hazard warning lights when your speed is below 25 mph or below the posted minimum speed on open highways.
• Use parking lane for stopping and parking only.
• Where there is more than one lane for traffic in the same direction, travel in the right-most lane unless you intend to pass or turn left. Do not drive in the parking lane.
• Drive at a safe following distance from other vehicles. A discussion of safe following distances can be found earlier in this unit.

CHANGING LANES
On highways and streets with multiple lanes of traffic in the same direction, use these procedures to change lanes:
• When changing lanes, look for traffic approaching from behind you in the new lane.
• If your vision in the mirror is obscured by a blind spot, look up and down (vertically) or back and forth (horizontally) until you can see around the blind spot.
• On multi-lane roads, look for vehicles in your lane and adjacent lanes about to enter the lane you wish to enter. Note their speeds, and be sure you can execute your lane change maneuver safely.
• Signal your intention to change lanes well before beginning the maneuver.

BEING OVERTAKEN AND PASSED
School buses are often overtaken and passed by other vehicles. In this situation, keep the following in mind:
• When there is no potential hazard, stay in right-hand lane and maintain speed.
• When on a narrow road, if following traffic builds up and a regular stop is not close by, pull completely off the road, using the right turn signal, and stop. Allow vehicles to pass, but never signal for them to pass. Then use your left turn signal and resume your position on the road. If you cannot pull completely off the highway, use this procedure only in legal passing zones. Passing vehicles are prohibited by state law from crossing over highway lane markings in no-passing zones.

DON'T DIRECT TRAFFIC
Some drivers try to help out others by signaling when it is safe to pass. You should not do this; you could cause an accident. You could be blamed and it could cost you many thousands of dollars.

OVERTAKING AND PASSING
Usually you won’t have to overtake and pass other vehicles. But when it is necessary, follow these procedures:
1. Observe the traffic ahead, and do not pass if the lead vehicle is signaling a left turn, changing lanes in order to pass another vehicle, or passing pedestrians, cyclists, or animals.
2. Wait until your view of the road ahead and behind is clear and there is an acceptable gap in traffic.

3. On a two-lane road, check to be sure there is no oncoming traffic, and check traffic signs and road markings to determine if passing is allowed.

4. Turn on the left turn signal well before passing. As an extra caution, signal your intention to pass to the vehicle in front of you. When the lead vehicle’s vision to the rear is blocked or its driver seems inattentive, blow your horn during the day or flick the headlights at night to signal your intention.

5. When clear, pull smoothly into the passing lane and turn off the left turn signal.

6. After moving past the vehicle at a safe speed, turn on the right turn signal, then move back into the right lane when you are at least one and one-half bus lengths ahead of the passed vehicle.

7. Turn off the right turn signal.

**MOUNTAIN DRIVING AND STEEP DOWNGRADES**

In mountain driving, the force of gravity plays a major role. If you have a heavy load, you will have to use lower gears and go slower to climb hills. In coming down steep hills, gravity will tend to speed you up. You must go slow enough that your brakes can hold you back without getting too hot. If the brakes become too hot, they may start to “fade.” This means that you have to apply them harder and harder to get the same stopping power. If you continue to use the brakes hard, they can continue to fade until you can’t slow down or stop at all. You can avoid these dangers by going slow when going downhill.

**USING GEARS GOING DOWNHILL**

- **USE LOWER GEARS WHEN GOING DOWNHILL.**
  No matter how big your vehicle is, going down long, steep grades can cause your brakes to fail if you go too fast. Using lower gears will help you keep from going too fast. Lower gears allow engine compression and friction to help slow the vehicle. This is true whether you have an automatic transmission or a manual transmission.

- **BE IN THE RIGHT GEAR BEFORE STARTING DOWN THE HILL.**
  If you have a large vehicle with a manual transmission, don’t wait until you have started down the hill to shift down. You might get hung up in neutral and lose the benefit of engine braking. You would find yourself coasting, which would be illegal and dangerous.

- **YOU MAY HAVE TO USE LOWER GEARS GOING DOWN A HILL THAN WOULD BE REQUIRED TO GO UP THE HILL.**
  With older buses, a rule for choosing gears used to be to use the same gear going down a hill that you would need to climb up the hill. However, new buses have low friction parts and streamlined shapes for fuel economy. They may also have more powerful engines. This means they can go up hills in higher gears and have less friction and air drag to hold them back going down hills. Find out what is right for your bus.

**PROPER BRAKING**

When going downhill, brakes will always heat up. They are designed so brake shoes or pads rub against the brake drum or disks to slow the vehicle, which creates heat. Brakes are designed to take a lot of heat. However, brakes can be made to fail from excessive heat by attempting to slow
down from too high a speed too many times or too quickly. Brakes will fade (have less stopping power) when they get very hot, and they can get to the point where they will no longer slow the vehicle.

The proper braking technique for driving on long and/or steep downgrades is:

1. Apply the brakes just hard enough to feel a definite slowdown;
2. When your speed has been reduced to approximately 5 mph below your “safe” speed, release the brakes; and
3. When your speed has increased to your “safe” speed, repeat steps 1 and 2. This is also known as “snub” braking.

USING ESCAPE RAMPS

Escape ramps have been built on many steep mountain grades. Escape ramps are made to stop runaway vehicles safely without injuring drivers and passengers. Escape ramps use a long bed of loose, soft material (pea gravel) to slow a runaway vehicle, sometimes in combination with an upgrade.

Know escape ramp locations on your route. Look for signs that indicate where ramps are located. Escape ramps save lives and equipment. Use them if you lose your brakes.

Also see the section “Loss of Brakes” in Unit H (Accident and Emergency Procedures).

**REVIEW QUESTIONS**

1. Why do trains appear to be moving slower than they are?
2. What is the proper procedure for stopping at a railroad crossing?
3. How should you enter traffic at an entrance ramp?
4. What should you be particularly watchful of at intersections?
5. In general, which lane should you travel in on a four-lane highway?
6. What should you do if someone attempts to pass your bus?
7. How should you use your gears to your advantage when going down a steep downgrade?
8. What is the proper braking method on a long or steep downgrade?
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DRIVING FUNDAMENTALS II

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UNIT G
DRIVING FUNDAMENTALS II
INTRODUCTION

The United States Department of Transportation, through a study of accidents, concluded that human failure or error accounted for 85 percent of all accidents. The additional 15 percent of traffic accidents are caused by road conditions and mechanical defects, factors usually beyond the control of the driver. However, according to many accident investigators, 95 to 99 percent of all traffic accidents are due to human failure or error. A large percentage of accidents blamed on road conditions are actually caused by drivers failing to properly adjust their driving to changing road and weather conditions, and many accidents blamed on mechanical defects are actually caused by drivers failing to consider known mechanical defects or failing to have proper repairs made immediately when they find mechanical defects.

The number of traffic accidents due to human failure or error can be reduced dramatically through the knowledge and practice of defensive driving. Defensive driving is a set of procedures and techniques designed to help you, the driver, avoid getting yourself, your vehicle, and your passengers into hazardous situations. A number of short courses on the basics of defensive driving are offered throughout the state. You should enroll in one of these courses to improve your driving skills and to become aware of your limitations as a driver. There is nothing new or magical about the concept of defensive driving. The formula is simply:

Recognize Potential Hazards + Decide on the Defense + Act in Time = Safety

This unit considers how you can apply these steps to the following types of normal and unusual conditions you must face while driving a school bus:

• Your condition to drive.
• The condition of your vehicle.
• The weather and road conditions.
• Road construction, pedestrians and other obstacles.

Unit H (Accident and Emergency Procedures) covers procedures and techniques for emergency and accident situations where the driver did not or could not avoid a potential hazard.

DRIVER CONDITIONS

Are you mentally and physically ready to drive? Good defensive drivers are aware of their own deficiencies and constantly strive to overcome them.

KNOWLEDGE

Evaluate your knowledge of state and local driving rules and regulations, driving fundamentals, emergency procedures, and defensive driving habits. If you are uncertain or have questions, ask before it’s too late.
SKILLS
If you need practice in driving maneuvers, operating safety equipment, or other driving-related skills, ask your supervisor for help, then practice with your supervisor or on your own. Always practice in an empty bus rather than in one filled with students.

HEALTH
Check yourself for fatigue, sickness, deficient eyesight, and deficient hearing. If you have any of these health problems, you should not drive until cleared by health services or your doctor.

For example: is your depth perception poor? If you have problems with judging distance, this may be the cause. The fact that your depth perception is not as good as it might be, or used to be (this is a normal eye-aging condition) does not mean that you have to give up driving. You must be aware of the problem, however, and adjust your driving to it.

DRUGS AND DRIVING
ALCOHOL
Alcohol and Driving. Drinking alcohol and then driving is a very dangerous mistake. People who drink alcohol are involved in traffic accidents resulting in over 20,000 deaths every year. As a school bus driver, your personal decisions also directly affect the lives of many others. You should know:
• How alcohol works in the human body.
• How it affects driving.
• Pennsylvania has zero tolerance for drug and alcohol use by school bus and school vehicle drivers.
• When driving a school bus or school vehicle, a driver is “driving under the influence” if his or her blood alcohol content is 0.02% or more.
• Laws regarding drinking and driving.
• Legal, financial, and safety risks of drinking and driving.
If you have questions about the law, ask your supervisor to provide clarification.

The Truth about Alcohol. There are many dangerous ideas about the use of alcohol. The driver who believes in these wrong ideas is more likely to get into trouble. Here are some examples:

<table>
<thead>
<tr>
<th>FALSE</th>
<th>TRUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol increases your ability to drive</td>
<td>Alcohol is a drug that will make you less alert and reduce your ability to drive safely</td>
</tr>
<tr>
<td>Some people can drink a lot and not be affected by it</td>
<td>Everyone who drinks is affected by alcohol</td>
</tr>
<tr>
<td>If you eat a lot first, you won’t get drunk</td>
<td>Food will not keep you from getting drunk</td>
</tr>
<tr>
<td>Coffee and a little fresh air will help a drinker sober up</td>
<td>Only time will help a drinker sober up; other methods just don’t work</td>
</tr>
<tr>
<td>Stick with beer—it’s not a strong wine or whiskey</td>
<td>A few beers are the same as a few shots of whiskey or a few glasses of wine</td>
</tr>
</tbody>
</table>

Table G-2
**What is a drink?** It is the alcohol in drinks that affects human performance. It doesn’t make any difference whether that alcohol comes from “a couple of beers,” two glasses of wine, or two shots of hard liquor.

All of the following drinks contain the same amount of alcohol:
- A 12-ounce glass of 5% beer.
- A 5-ounce glass of 12% wine.
- A 1 1/2-ounce shot of 80 proof liquor.

**How does alcohol work?** Alcohol goes directly from the stomach into the blood stream. A drinker can control the amount of alcohol he or she takes in by having fewer drinks or none. However, you cannot control how fast your body gets rid of alcohol. If you have drinks faster than your body can get rid of them, you will have more alcohol in your body and your driving will be more affected. The amount of alcohol in your body is commonly measured by the Blood Alcohol Concentration (BAC).

**What determines Blood Alcohol Concentration?** BAC is determined by the amount of alcohol you drink (more alcohol means higher BAC), how fast you drink (faster drinking means higher BAC), and your weight (a small person doesn’t have to drink as much as a large person to reach the same BAC).

**How does alcohol affect the brain?** Alcohol affects more and more of the brain as BAC builds up. The first part of the brain that is affected controls judgment and self control. One of the bad things about this is that it can keep drinkers from knowing they are getting drunk. And of course, good judgment and self control are absolutely necessary for safe driving.

As blood alcohol concentration continues to build up, muscle control, vision, and coordination are affected more and more. Eventually, a person will pass out.

**How does alcohol affect driving?** All drivers are affected by drinking alcohol. Alcohol affects judgment, vision, coordination, and reaction time. It causes serious driving errors, such as:
- Slower reactions to hazards.
- Driving too fast or too slow.
- Driving in the wrong lane.
- Running over the curb.
- Weaving.
- Straddling lanes.
- Quick, jerky starts.
- Not signaling, failure to use lights.
- Running stop signs and red lights.
- Improper passing.

All of these increase the chances of a crash, losing your driver’s license, or injuring yourself and others. Crash statistics show that the chance of a crash is much greater for drivers who have been drinking than for drivers who have not.
OTHER DRUGS

Besides alcohol, other legal and illegal drugs are common in our society. Laws prohibit you from having or using drugs while on duty. These laws prohibit you from being under the influence of any “controlled substance.” Many medicines, both patent and prescribed, can affect your eyesight, hearing, and judgment. Read the labels on patent medicine bottles and jars to check for possible side effects. Ask your doctor about prescriptions or over-the-counter medications you are taking to get a clear understanding of their effects on you. Will they impair your ability to perform the job at hand?

CONCENTRATION AND ATTITUDE

If you have personal problems, will you be able to concentrate on the job of driving a bus with many lives as your responsibility? Being under emotional stress will often affect your ability to control the students on a loaded bus. You may be tired, dejected, or depressed, making it hard to cope with a bus full of young, spirited children. We bring this to your attention because you will have to be extra cautious as you drive. During times of stress, ordinarily good drivers will miss stop signs and red lights and fail to yield the right-of-way. Under normal conditions, they would never commit these serious errors.

You must be alert to your own attitude. If you are under severe emotional pressure and are unable to concentrate on your driving, or fear that you cannot control your temper under stress, don’t drive. Under normal day-to-day stresses, your attitude could still affect your good driving judgment. You must be aware of your attitude so that you can be alert, think positively, keep yourself under control, and keep your mind on the job at hand.

The single biggest cause of Pennsylvania school bus accidents in 1988-90 was lack of concentration. Driver inattention caused 25 percent of all school bus accidents in Pennsylvania during 1988-89. It is extremely important that you remain alert and attentive at all times. Even the shortest lapses into daydreaming or inattention can cause severe accidents to occur. Always be aware of what is happening in your surroundings. You must anticipate what other drivers will do and what road conditions will be in order to act appropriately.

ATTENTION AND MONITORING

There are many things that you must be aware of when you are driving a school bus. You must be able to divide your attention between the students, the road, other vehicles, and your own bus. At each point on your trip, you must focus your attention on the most important factor at that time. For example, you must carefully focus on the students crossing the street at loading and unloading zones.

First, determine what you need to observe while driving the bus, both inside and outside the bus. Inside the bus, you must be aware of the students and their behavior, the dashboard, your inside mirrors, and the steering wheel. Outside the bus, you must observe other traffic, pedestrians, your outside mirrors, the road in all directions, and the surrounding area.

Next you must know the importance of checking each of these items. It is critical to monitor the behavior of the students when students are misbehaving. It is also important to monitor student behavior before and after leaving the school or other stops. On the dashboard, you must check the fuel gauge, oil gauge, temperature gauge, and speedometer. It is best to look at the gauges carefully at the start of the trip, and occasionally during the trip, especially if there seems to be a problem with the bus. The speedometer should be monitored throughout the entire trip to maintain a safe speed. There are usually two inside mirrors that you must monitor: the rearview...
mirror and the interior mirror. It is necessary to monitor the rearview mirror frequently throughout the trip to watch the behavior patterns of the traffic behind the bus. The interior mirror is used to monitor the students, most frequently when there are behavior problems. You should always be aware of your hand position on the steering wheel. Your hands should be placed at 10 o’clock and 2 o’clock, and the hand-over-hand method or the push-pull method should be used for turning.

Constantly monitoring the traffic in front of the bus is a necessity. Your eyes should move back and forth across the road, scanning the activity. Always be on the lookout for pedestrians especially at intersections and near parks, houses, or cars. The use of your mirrors will greatly extend the view outside and around the bus. For example, the side mirrors allow you to see the traffic approaching from behind your bus and those passing you, in addition to the surroundings at loading and unloading zones. The crossover mirrors also allow a further view in front of the bus, most often at a loading or unloading zone. Carefully checking and rechecking these mirrors for students that may be in front of the bus during loading or unloading is essential.

There are many ways to pay attention to your surroundings while driving the bus. Use the method that is most comfortable to you and allows you to be more aware of everything around you. For example, when stopped at a bus stop and loading passengers, you should concentrate on the students outside the bus. Most of your time should be spent focusing on the crossview mirrors and directly at the students through the front and side windows, while still watching the other traffic through the side and rearview mirrors. When the bus is in motion, your attention is focused less on the crossview mirrors, and more on the road in front of the bus. Your view must alternate between the front window of the bus, the side mirror, the rearview mirror, the interior of the bus, and the dashboard. While looking at each of these in any order, it is important that you always remember to check everything.

More attention is needed on areas that are more critical for student’s safety. It may be helpful to follow the guidelines presented in the following table for how often you should check things.

<table>
<thead>
<tr>
<th>How Often</th>
<th>While Driving</th>
<th>At a Bus Stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constantly</td>
<td>Other traffic; road in front of bus</td>
<td>Side mirrors; crossover mirrors; road in front and to the side of the bus; students loading the bus</td>
</tr>
<tr>
<td>Frequently</td>
<td>Side mirrors; rearview mirrors; interior of the bus; area near road—for pedestrians</td>
<td>Interior of the bus; surrounding area</td>
</tr>
<tr>
<td>Occasionally</td>
<td>Speedometer; controls on dashboard</td>
<td>Control on dashboard</td>
</tr>
</tbody>
</table>

It is not always easy remembering to watch all of your mirrors, controls, and surroundings. Distractions while driving can affect your attention. The most common thing that will distract your attention is the students riding the bus. Be prepared for this and be sure to know the guidelines for managing students discussed in Unit B. The road conditions also affect your ability to concentrate, however, drivers usually will concentrate better on days when the weather is bad. Don’t forget to pay careful attention when the weather is good too; others will be enjoying the
nice weather and may not be paying attention either. Your physical condition also affects your ability to drive safely. Be sure to get plenty of sleep and only drive the school bus if you are in good physical and mental health. Finally, be as familiar with the route as possible. The more you know the roads, the more time you will be able to spend concentrating on the important things.

At times when the distractions are the greatest, you will need to find ways to maintain your concentration. Listed below are a few suggestions that may help. Your own methods for keeping your mind on safe driving or methods that you learn from other drivers may work just as well.

- Observe traffic defensively—always be on the lookout for what the other driver might do.
- Visualize the route and what you are going to do.
- Make a concentrated effort to keep extra space between you and the vehicle ahead of you.
- Have a pattern of mirror checks that you always follow.
- Keep watch to maintain a safety circle around the bus.
- Remind yourself of the responsibility you have transporting students.
- Drive mindfully, not mindlessly—keep tuned to the bus and all the sounds it makes and how it feels.
- Count the students as they get off the bus and watch where they all go.

### REVIEW QUESTIONS

1. What is defensive driving?
2. What factors affect your ability to drive?
3. How does alcohol affect your body with regard to driving?
4. What type of attitude will help you be a better driver?
5. What effect does concentration have on your ability to spot hazards?
6. Discuss methods for effective monitoring of critical sources of information while driving?

### VEHICLE CONDITIONS

You must be aware of vehicle conditions before driving and constantly monitor your vehicle as you drive.

### PRE-TRIP CONDITIONS

Is the school bus you are assigned to drive in safe operating condition? Will it respond instantly and effectively to all controls? Have you checked it over? Did you report deficiencies to your supervisor and have them corrected? You are the driver. Refuse to drive an unsafe bus. You are responsible for the vehicle you are driving. Remember, if these reported deficiencies are not corrected, you can report them to the area supervisor, school principal, school superintendent, state board of education, or state police. You may feel you are being disloyal by doing this, but where is your greatest responsibility?
Follow local pre-trip inspection procedures. You have to use and take advantage of all vehicle components; it is your responsibility to see that they are complete, operational, and safe. Correct deficiencies before your run, or if you are suspicious of a potential mechanical problem, report it and have it checked.

**ON-THE-ROAD CONDITIONS**

Mechanical problems that will create potentially hazardous conditions may develop during your run. Good defensive drivers use all their senses to constantly check the mechanical operation of the bus.

- **Sight:** constantly check all gauges for proper readings, check lights, and check for fire.
- **Smell:** constantly check for telltale odors of smoke, exhaust fumes, gasoline, oil, and burning rubber.
- **Sound:** listen for unusual noises such as engine knocking or clashing gears.
- **Touch:** often you will feel the first sign of trouble. Be alert for loss of steering, brakes, transmission, power, or other vehicle functions.

If you identify a mechanical problem during your run, you should be prepared to act. If you are at all uncertain whether the problem constitutes a safety hazard, stop the bus and look for help.

**ENVIRONMENTAL CONDITIONS**

During the course of a school year, you will face a variety of hazardous conditions that will demand alert and skillful action. Some of the natural conditions are rain, ice, snow, mud, fog, flood waters, bright sun, and high winds. While these conditions rarely cause accidents, they make driving more hazardous than normal.

You may be driving over the same route twice a day during the school year. You’ll become thoroughly acquainted with the route and, after a short time, may begin to take the road for granted. But conditions change rapidly; potholes develop overnight, grades wash away, shoulders become soft, railroad crossing approaches appear different depending on the time of day, loose gravel and fallen rock appear, and slick spots develop through accumulations of snow and ice or oil deposits. Conditions are different each day and you must be alert to detect these changes before it is too late. Road conditions do not cause accidents. Accidents related to road conditions usually occur because drivers fail to adjust their driving to road conditions.

**SEEING AHEAD**

To be a safe driver you need to know what’s going on all around your vehicle. Not looking carefully is a major cause of accidents.

All drivers look ahead; but many don’t look far enough ahead.

**Importance of Looking Far Enough Ahead**

Because stopping or changing lanes can take a lot of distance, knowing what the traffic is doing on all sides of you is very important. You need to look well ahead to make sure you have room to make these moves safely.
Know How Far Ahead to Look
You should look 12 to 15 seconds ahead. That means looking ahead the distance you will travel in 12 to 15 seconds. At lower speeds, that’s about one block. At highway speeds, it’s about a quarter of a mile. If you’re not looking that far ahead, you may have to stop too quickly or make quick lane changes. Looking 12 to 15 seconds ahead doesn’t mean paying no attention to things that are closer. Shift your attention back and forth, near and far. Always follow the vehicle in front of you by a minimum of 4 seconds.

Look for Traffic
Look for vehicles coming onto the highway, coming into your lane, or turning. Watch for brake lights from slowing vehicles. By seeing these things far enough ahead, you can change your speed or change lanes if necessary to avoid a problem.

Check Mirrors
When you use your mirrors while driving on the road, check quickly. Look back and forth between the mirrors and the road ahead. Don’t focus on the mirrors for too long. Otherwise, you will travel quite a distance without knowing what’s happening ahead.

DRIVING ON SLIPPERY SURFACES
A natural condition that drivers often must deal with is a slippery road surface. Expert drivers can safely control a vehicle on extremely slippery surfaces. By following proper procedures before, during, and after your trips, you also can maintain vehicle control on slippery surfaces.

Before Your Trip
• Start on time, but adjust driving to conditions; safety first; schedule second.
• Check that chains are secure for snow and icy conditions.
• If the bus has sanders, check to be sure they are full.

While on the Road
• Maintain your equipment properly.
  - Use windshield wipers at all times in rain, snow, sleet, and heavy fog. Use of headlights is mandatory.
  - Check brakes immediately after driving through deep puddles or standing water. If they fail to work properly, pump the brakes to help dry them while the vehicle is moving. For air brakes, cautiously apply steady pressure.
• Set a regular speed.
  - Start the bus in the lowest appropriate gear for better traction if ice or wet snow is on the ground. Loss of traction due to spinning the wheels during starting may cause the drive wheels to become even more firmly stuck. If on a crowned road or hillside, the bus may actually start to slide or fishtail off the road.
  - To avoid getting stuck or spinning the wheels, try to keep the bus moving slowly and steadily forward in gear. If the wheels start to spin, let up slightly on the accelerator to allow them to take hold. If the bus stops, do not continue to spin the wheels in the hope of pulling out. In mud and soft sand, this will only dig the wheels in deeper.
  - Drive slower than posted speed limits for dry road conditions, especially on bridges and in tunnels.
- When approaching intersections and when stopping, pump the brakes once or twice so that the wheels won’t lock on the ice. With air brakes, use gentle but steady pressure. Make turns smoothly; avoid applying the brake.

- Avoid Skids.
  - Plan ahead for expected hazardous areas of the route. These include icy bridges, stretches of road that have been slippery in the past, uphill stops, and intersections.
  - Be alert for wet leaves or standing water on the roadway because this can be as slippery as ice.
  - Do not disengage the clutch until the bus is almost completely stopped.
  - Maintain a greater than normal distance from other vehicles. When pulling onto the highway, allow for greater stopping time.

After Your Trip
- Sweep water or snow from the bus, including the steps.
- Clear mud or snow from windows, mirrors, lights, and reflectors.

### REDUCED VISIBILITY

#### Weather Conditions
When you think of bad weather you probably think of bad road conditions. Rain, snow, fog, and smog also reduce visibility. Adjust your driving accordingly, and take the following precautions:

- Follow local pre-trip inspection guidelines.
- Keep the windshield clear. If snow or ice builds up on front or rear windows, stop the bus and remove it.
- Don’t hesitate to leave the roadway at a safe spot to sit out a heavy shower, snow squall, or thick fog.

#### Bright, Glaring Sunlight
While bright sun or glare may not be considered bad weather, they can create serious hazards for motorists. Don’t be caught unprepared. Take the following special precautions for safe driving in bright sun:

- Carry sunglasses and use them when necessary.
- Adjust visors to block out direct sun.
- Avoid looking directly at the sun, bright reflections, or glare; they can affect your vision for several seconds.
- Clean the windshield inside/outside.

#### Night Driving
Long winter nights are a serious hazard to winter driving. As nights grow longer, so does your exposure to the perils of night driving. Unlike the temporary hazards associated with snow and ice, the dangers of night driving exist all winter and, to a lesser extent, all year.

The death rate per miles driven is almost four times higher at night than during the day. Despite reduced traffic volume during the night, 60 percent of all accidents occur at night. Night accidents are not only more frequent, they are usually more severe.

Why is night driving so dangerous? Obviously, it’s a matter of reduced vision. The best eyes are only 75 percent as efficient at night as in the day. Also slight eye disorders are magnified by darkness. A person with 20/20 vision requires twice the light on the same object as a 20-year-old with the same vision.
Even if your eyes could function equally well at night as in the day, night driving would still be perilous because of night lighting. Artificial light can’t compare in efficiency to natural light, and the narrow beams of light from headlights give you an automatic case of tunnel vision. Daytime visual cues, such as colors, are nearly worthless at night.

Drivers tend to be overconfident of their ability to drive at night. While visual perception decreases dramatically in the nighttime, certain cues, such as reflective road signs and markers, lead drivers to overestimate their driving capabilities. This overestimation leads to many nighttime accidents. At night, take the following driving precautions:

• Change your driving methods at night. Don’t overdrive your headlights. If you are driving 55 mph, it will take you up to 300 feet to stop. Average headlights will illuminate only 250 feet ahead. Simple arithmetic tells you that if something or someone gets in your way, you will stop over 100 feet too late.

• Remember that speed and distance perception are more difficult to judge at night.

• Be careful. It takes time for the average eye to adjust to night vision. Drive with special caution during this critical adjustment period. Avoid highway hypnosis caused by prolonged and forced staring.

• Don’t look directly at oncoming lights. Visibility is affected considerably by oncoming headlights at distances of 3,000 feet or more. Staring at oncoming headlights will also distort your vision for up to seven seconds. That translates to a distortion lasting a distance of 565 feet when traveling at 55 mph.

• Don’t look off into the darkness, because your eyes will have trouble adjusting to the road lights again. You may be able to learn to steer by the side light cast by cars ahead of you.

• Read lane strips and reflector posts. They form a corridor of reflected light in which a stalled car or pedestrian will show up as a blank spot.

• Wear your sunglasses if exposed to bright sunlight during the day. Bright sunlight increases the time it takes your eyes to adjust to night lighting and impairs your night vision considerably.

**EQUIPMENT ADJUSTMENTS**

• Keep headlights clean and make sure your windshield is clean both inside and outside. Any reduction in the amount of light available to your eyes reduces your night vision.

• Always use low beams on sharp curves. Your bright lights can blot out the warning glow of cars coming around the curve toward you. Also, keep headlights on low beam in cities or towns and in fog or haze.

• Keep your instrument panel lights dim. If too bright, they produce unnecessary glare and distraction.

• If oncoming drivers fail to dim their lights, don’t blind them with your high beams. This creates a hazard to yourself and your passengers. You may flick your high beams once as a reminder.

• Don’t tailgate.

• Remember, drinking is a factor in more than half of all fatal accidents. Be particularly cautious of vehicles being driven erratically, especially on days preceding weekends and holidays.

• If it is necessary to stop the bus on the shoulder of an open highway at night, choose a spot visible for at least 500 feet to oncoming and following traffic (see Figure G-1). Turn off the headlights, but leave parking lights and/or hazard warning lights on.
HEAVY WIND
While loss of traction and limited visibility are the most common weather-related problems you will face, you should be aware of and ready for potential hazards caused by heavy wind. The side of the bus acts like a sail, and a strong crosswind at the top of a hill or at the end of a tunnel, or even gusting winds on an open straight section of highway, can cause an unprepared driver to lose control of the bus. Passing large vehicles also may expose you to a sudden burst of a crosswind. Large vehicles can cause drafts; be careful when driving near them on the open highway.

REVIEW QUESTIONS

1. What can you do to make sure your bus is in proper condition to drive?
2. What do each of your senses contribute to detecting hazards?
3. How far ahead on the road must you be able to see clearly?
4. What are some things you can do to increase visibility?
5. List 5 things you should do differently on slippery roads.
6. What differences are there between nighttime driving and daytime driving?
7. At what locations should you be particularly cautious of heavy winds?

OTHER HAZARDS
Of all potential hazards facing the school bus driver, man-made conditions are the most difficult to defend against. You must be alert to hazards caused by the highway itself, pedestrians, and other vehicles. The key to your defense is timely recognition and avoidance. Always try to leave yourself an escape route.
Most of the clues that help you recognize potential hazards are visual. So, before examining what clues to look for, it is important to know how to look. Listed below are some suggestions for proper visual surveillance.

- Have a clean windshield and properly adjusted mirrors.
- Develop the habit of scanning 360 degrees around the bus—to the front, sides, and rear.
- Don’t stare too long at a particular object, as you will be less aware of clues from your larger field of indirect vision.
- Focus farther ahead as your speed increases and slow down if your view becomes limited by hills or curves.

The remainder of this unit deals with identifying potentially hazardous man-made conditions and the visual clues to help you detect and avoid them.

HIGHWAY HAZARDS

The shape, surface, and roadside conditions of the highways you drive on each day can cause potential hazards. Whether you drive on major highways, country roads, city streets, or some combination of these, you must be prepared for potential hazards arising from these conditions.

Shape of the Road

Pay attention to the shape of the road and the potential for unseen hazards around curves, over hills, or in dips. By scanning the road ahead, watching road signs, and observing the lay of the land, good drivers can detect and plan ahead for such changes by slowing down to get a better view. When rounding a curve or down shifting on a long downgrade, increase your following distance and travel at a reduced speed. Reduce speed and keep to the right when approaching the crest of hills and at highway dips.

Road Surface

A second type of potential highway hazard is the road surface. Always scan ahead for changes in surface conditions that may require evasive maneuvering to avoid the loss of steering or braking control. The three most common problems are rough, slippery, and loose surfaces.

- **Rough Surfaces.** Detect surface irregularities on asphalt and concrete, such as potholes or cracked pavement. On a wooden surface, look for holes, bumps, cracks, loose boards, and slippery spots. Approach metal bridges slowly, as they tend to reduce steering control.
- **Slippery Surfaces.** Anticipate the smoothness of concrete or asphalt road surfaces at intersections or other steering or stopping areas. Recognize areas of the highway that are soaked with oil or grease. Remember, the early part of a rainfall is the most dangerous. Estimate depth and extent of standing water partially or totally covering the roadway. When driving on snow- or ice-covered highways, judge the effect of traffic and temperature on road surface friction by noting whether other vehicles are skidding. Remember, bridges freeze before the road surface. If ice is melting on the highway, be alert for ice patches near underpasses, tree-lined areas, buildings, or other shaded areas. Note spots where direct sunlight may have accelerated melting, and look for additional ice patches ahead on the highway.

You must drive slower to be able to stop in the same distance as on a dry road. Wet roads can double the stopping distance of your bus. Reduce speed by about one third (e.g., slow from 55 to
about 35 mph) on a wet road. On packed snow, reduce speed by one half or more. If the surface is icy, reduce to a crawl and stop driving as soon as you can safely do so.

• **Black Ice.** Black ice is a thin layer that is clear enough that you can see the road underneath it. It makes the road look wet instead of icy. Any time the temperature is below freezing and the road looks wet, watch out for black ice.

• **Hydroplaning.** In some weather, water or slush collects on the road. When this happens, your vehicle can hydroplane. It’s like water skiing; the tires lose their contact with the road and have little or no traction. You may not be able to steer or brake. You can regain control by releasing the accelerator and pushing in the clutch. This will slow your vehicle and let the wheels turn freely. If your bus is hydroplaning, do not use the brakes to slow down. If the drive wheels start to skid, push in the clutch to let them turn freely. It does not take a lot of water to cause hydroplaning. Hydroplaning can occur at speeds as low as 30 mph if there is a lot of water. Hydroplaning is more likely if tire pressure is low or the tread is worn. (The grooves in a tire carry away the water; if they aren’t deep they don’t work well.) Be especially careful when driving through puddles. The water is often deep enough to cause hydroplaning.

• **Loose Surfaces.** Detect and slow down for loose surfaces such as gravel, soft sand, soft shoulders, and wet leaves.

**Roadside Conditions**

The third type of potential highway hazard is caused by conditions on the side of the road. These include width and surface of shoulders, sign posts, guardrails, telephone poles, culverts, wires, and other obstacles. Under normal driving circumstances these should pose no problem. They should, however, be included in your scanning as you drive, and they should be evaluated for potential hazards if you need to leave the highway suddenly.

**PEDESTRIAN HAZARDS**

The presence of pedestrians, bicyclists, sledders, roller skaters, and animals on the highway increases the need for close scanning. School bus stops are dangerous areas—approach them cautiously and alertly. When near playgrounds, residential areas, and schools, be alert for children playing or darting into the path of your bus from behind vehicles, structures, or trees and bushes. Look for children sledding or playing in the snow or on the ice.

When driving on side streets, be alert for pedestrians entering or crossing the traffic aisle from any direction. When making left and especially right turns at intersections, check carefully for pedestrians crossing the street into the path of the bus and for vehicles making right turns on red lights.

Be alert for animals that may cross into the path of the bus. Animals are much like children in their unpredictable behavior along roads. Wherever possible, slow down to avoid hitting them; do not swerve to avoid them. Such action may cause partial or complete loss of control of the bus. (See Figures G-2 and G-3.)
Figure G-2. Some Rural Pedestrian Hazards

Figure G-3. Some Urban Pedestrian Hazards
VEHICLE HAZARDS

In general, when sharing the road with other vehicles, observe the driving behaviors of the other drivers. Scan 360 degrees around your bus for clues to any potentially hazardous conditions.

Drivers in a Hurry
Drivers may feel your school bus is preventing them from getting where they want to go on time. Such drivers may pass you without a safe gap in the oncoming traffic, cutting too close in front of you. Drivers entering the road may pull in front of you in order to avoid being stuck behind you, causing you to brake. Be aware of this and watch for drivers who are in a hurry.

Losing Control
Recognize clues indicating that another driver may lose proper vehicle control. Surface conditions like gravel, slippery surface, ruts, or deep snow might reduce the oncoming driver’s control. Notice movements of the other vehicles, for example, an oncoming driver turning too sharply after and off-road recovery, or another driver approaching too fast from the side to stop or turn. Movements of your bus or another vehicle also may affect other drivers (such as stopping too quickly to allow a following vehicle enough time to stop).

Lack of Communication by Other Drivers
Look for clues to situations where the driver of another vehicle may execute a maneuver without signaling. A vehicle slowing down may be about to turn. A parked car with a driver in the driver’s seat, engine running, or turned wheels may be about to pull out from the curb. Pickup and delivery vehicles with backup lights on may be about to back into another street or driveway. When another driver does signal, check other clues to verify that it is the proper signal. Any turn signal may have been left on from a previous maneuver. Remember that you, too, can fail to communicate. Always signal your intentions.

Failure of the Other Driver to Observe
Watch for clues that another driver has not observed the bus and therefore may not be prepared to yield the right-of-way. These clues include the following:

- Other driver not responding to an upcoming intersection or to your signals.
- Dirty windows, posts, trees, buildings, bright sunlight, or other objects obscuring or restricting the other driver’s view.
- Other driver’s vehicle being detectable to you only by reflection, headlight glow, or dust cloud.

Inadequate Adjustment by the Other Driver
Look for indications that another driver is not adjusting properly to a situation. Be aware of hazardous situations arising when another driver fails to adjust for the following:

- Obstructions.
- Surface Conditions.
- Pedestrians.
- Other vehicles.
- Shape of the road.

Failure to adjust for these conditions may cause another driver to make potentially hazardous maneuvers. Know areas of your route where these situations are likely to occur, and exercise caution in these places.
**Slow-Moving or Stopping Vehicles**
Watch for indications that another vehicle is slowing or may stop suddenly. Examples of slow-moving vehicles are farm vehicles, under-powered vehicles, horse-drawn vehicles, and trucks on hills. (See Figure G-4.) Frequently stopping vehicles include buses, trucks carrying flammables at railroad crossings, garbage trucks, and postal and other delivery vehicles. Also watch for vehicles engaged in turning, exiting or entering the roadway, merging with other vehicles, or approaching controlled intersections or railroad crossings.

![Image of slow-moving vehicles]

*Table G-4. Slow-Moving Vehicles*

**Multiple Vehicle Hazards**
You should be able to recognize clues in a traffic pattern that may indicate potential conflict. Vehicles entering the highway from side roads, driveways, ramps, or parking spaces may cause another driver to change lanes or stop suddenly. A vehicle slowing or stopping may prompt another driver to steer around it. One vehicle may limit another’s visibility, allowing the other driver to enter a potential conflict, as when an oncoming driver turns left.

**COMBINATION OF VEHICLE AND HIGHWAY HAZARDS**
You should be able to identify potential hazards arising out of the interaction between vehicles and highway. Any point in the highway where drivers are confronted with decisions represents a potential point of conflict. For example, a vehicle starting to exit from a freeway may suddenly return to the freeway, or drivers unfamiliar with route signs may be in the wrong lane and change lanes suddenly as two major routes split. A point where the highway becomes narrower also represents a potential source of conflict. At points where four lanes become two, other vehicles may change lanes suddenly.

**Work Zones**
Bus crashes often occur at intersections. Use caution, even if a signal or a stop sign controls other traffic. Remember the clearance your bus needs, and watch for poles and tree limbs. Know the size of the gap your bus needs to accelerate and merge with traffic. When pulling out, never assume that other drivers will brake to give you room.

Whenever people are working on the road it is a hazard. Road construction may cause narrower lanes, sharp turns, or uneven surfaces. Other drivers are often distracted and drive unsafely. Workers and construction vehicles may get in the way. Drive slowly and carefully near work zones. Use your four-way flashers or brake lights to warn drivers behind you.
CONTROLLING SPEED

Driving too fast is a major cause of fatal crashes. You must adjust your speed depending on driving conditions. These include traction, curves, visibility, traffic, and hills.

SPEED AND STOPPING DISTANCE

Three things add up to total stopping distance:

\[
\text{Total Stopping Distance} = \text{Perception Distance} + \text{Reaction Distance} + \text{Braking Distance}
\]

Briefly, these components are:

- **Perception Distance.** The distance your vehicle travels from the time your eyes see a hazard until your brain recognizes it. For an alert driver, this is about 3/4 second, or about 55 feet of travel at 50 mph.
- **Reaction Distance.** The distance traveled from the time your brain tells your foot to move from the accelerator until your foot is actually pushing the brake pedal. This is also about 3/4 second and adds 55 feet of travel at 50 mph.
- **Braking Distance.** The distance it takes to stop once the brakes are activated. On dry pavement at 50 mph, with good brakes, this is at least 125 feet.

The total stopping time, adding the above is at least 6 seconds at 50 mph, under the best conditions. The vehicle will easily travel the length of a football field in this time. If you double your speed, it will take about four times as much distance to stop. The vehicle will also have four times the destructive power in a crash. By slowing down, you can greatly decrease the stopping distance of a school bus, and greatly increase the safety of pupil transportation. In the same manner, reducing a vehicle’s weight will also enhance safety by reducing the work done by the brakes. School bus brakes, tires, springs, and shock absorbers are generally designed to work well under full loads.

SPEED AND TRAFFIC FLOW

When you’re driving in heavy traffic, the safest speed is the speed of other vehicles. Vehicles going the same direction at the same speed are not likely to run into one another. Drive at the speed of the traffic, if you can do this without going at an illegal or unsafe speed. Keep a safe following distance.

The main reason drivers exceed speed limits is to save time. But anyone trying to drive faster than the speed of traffic will not be able to save much time. The risks involved are not worth it.

If you go faster than the speed of other traffic:

- You’ll have to keep passing other vehicles. This increases the chance of a crash.
- It is more tiring. Fatigue increases the chance of a crash.
- Going with the flow of traffic is safer and easier.
1. Why are man-made hazards particularly hazardous?
2. What three things can you do to identify hazards and changes in the shape of the road?
3. What effect does road surface have on stopping distance?
4. When is hydroplaning likely to occur?
5. Where should you be particularly alert for pedestrian hazards?
6. Why must you be observant of other vehicles’ behavior?
7. Explain the factors that make up total stopping distance.
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UNIT H
CRASH AND EMERGENCY PROCEDURES

INTRODUCTION

Professional drivers don’t depend on their skill to get them out of potentially dangerous situations. They depend on their judgment to avoid these situations. It’s a lot easier to stay out of potentially dangerous situations than to get out of them. However, if you’re involved in a crash or emergency situation, you will need to take certain emergency actions.

This unit is divided into two major sections. The first describes emergency driving techniques that you can use as a last effort to avoid crashes. The second covers crash and emergency procedures, except for first aid, which is covered in Unit I (Student Emergencies).

EMERGENCY DRIVING TECHNIQUES

As a good defensive driver, you will be able to avoid most potentially dangerous situations through good driving habits, use of safe equipment, and proper observation. However, you may find yourself confronted with one of these five emergency driving conditions:

• Skid.
• Tire blowout.
• Loss of brakes.
• Sudden loss of visibility.
• Objects, pedestrians, and obstructions in the path of the bus.

Under these conditions, you must know what emergency driving techniques to use. Your responses must become automatic; you will not have much time to think about what you should do. The procedures in this unit are “last ditch” measures to prevent a crash if at all possible.

SKID CONTROL

Many factors can cause a school bus to go into a skid. During a skid, the tires lose proper traction with the road surface. Normal means of controlling the bus, including steering, braking, and accelerating, won’t work as usual—you must learn specific anti-skid techniques.

You must be able to detect a loss of traction in time to maintain or regain control of the bus. Loss of traction may include:

• Skids caused when tires fail from under-inflation or from a blowout.
• Front wheel skids resulting from faulty brakes, slippery road surfaces, or driving too fast for conditions.
• Rear wheel skids resulting from faulty brakes, driving too fast, accelerating too quickly on curves, or rough or slippery surfaces.
• A four-wheel locked brake skid resulting from jamming too hard on the brakes.
• Hydroplaning resulting from traveling too fast on a water-covered highway or from driving in water with under-inflated or worn tires.
• Skidding resulting from oil film, wet leaves, loose surfaces, ice, or other slippery conditions.
Once you lose traction and the bus goes into a skid, you must be able to regain directional control. Controlling a skid requires controlled steering, smooth deceleration, and controlled braking.

1. **Steering**
   In the event of a skid, immediately apply controlled steering, followed by controlled countersteering, to dampen fishtailing until you reestablish steering control. Controlled countersteering means to turn the wheels in the direction of the skid. Your steering corrections should decrease in severity as control is re-established. Steering action must be smooth and not jerky.

2. **Slowing Down**
   When skidding starts, gradually lift your foot from the accelerator smoothly, not suddenly. Do not accelerate again until you regain steering control.

3. **Braking**
   Don’t panic and jam on the brakes. Don’t brake at all or apply only light breaking pressure until you regain steering control.
   - On a bus with hydraulic brakes, light braking requires you to pump the brakes softly to slow the bus in a controlled manner.
   - On a bus with air brakes, use no brakes at all in a skid if possible—never pump the brakes. The brakes may catch or come on too quickly, further adding to the problem. You should learn the proper method of fanning the brakes to gain control.

**TIRE BLOWOUT**
If a tire blows out:
1. Grip the steering wheel firmly and steer your vehicle straight down the center of your traffic lane.
2. Accelerate for a short period to help maintain steering. Once steering is controlled, let up on the accelerator and let the bus slow down.
3. Do not jam on the brakes; apply them slowly only after you have regained control of the steering. If the bus starts to skid, follow skid control procedures outlined above.
4. Activate right turn signal, move toward the right slowly out of the traffic lane, and stop. Be sure to activate the hazard warning lights, not the school bus eight-way warning system.

**LOSS OF BRAKES**
Anytime you lose your brakes, slow down as described below, attempt to maneuver the bus out of traffic before it comes to a stop. If this is impossible and the bus stops on the highway, activate hazard warning lights, place appropriate warning markers on the roadway, and evacuate the bus. Emergency parking and evacuation procedures are described later in this unit.
   - If your bus has a hydraulic braking system and you are with a partial or total loss of brakes, pump the brake pedal firmly and very rapidly several times, and sound the horn. Downshift to the lowest possible gear; gradually apply the parking brake.
   - If your bus has air brakes, a warning buzzer will alert you to the loss of air pressure and to the possibility of the rear brakes locking when air pressure drops to approximately 30 psi. If locking should occur, causing the bus to go into a skid, follow skid control procedures.
Finding an Escape Route on Level Terrain or Upgrades
While slowing the bus, look for an escape route—an open field, side street or escape ramp. Turning uphill is a good way to slow and stop the bus. Make sure the bus does not start rolling backward after you stop. Put it in low gear, apply the parking brake, and if necessary roll back into some obstacle that will stop the bus.

Finding and Escape Route on Downgrades
Going slowly enough and braking properly will almost always prevent brake failure on long downgrades. Once the brakes have failed, however, you are going to have to look outside your bus for something to stop it.

• Your best hope is an escape ramp provided on many highways with dangerous downgrades. If there is one, there will be signs telling you about it. Use it. Ramps are usually located a few miles from the top of the downgrade. Every year, hundreds of drivers avoid injury to themselves or damage to their vehicles by using escape ramps. Some escape ramps use a soft gravel that resists the motion of the vehicle and brings it to a stop. Others turn uphill, using the hill to stop the bus and soft gravel to hold it in place. Be prepared to use an escape ramp if necessary. If your route includes a long downgrade with an escape ramp be sure you know where it is.

• If there is an upgrade within the clear distance ahead, stay on the road and allow the upgrade to slow the bus. Then select a path for leaving the highway. If no upgrade is within the clear distance ahead, select a path for leaving the highway that will minimize injuries and property damage.

• If no escape ramp is available, and no upgrade is within clear distance ahead, take the least hazardous escape route you can—such as an open field, or a side road that flattens out or turns uphill. Make the move as soon as you know your brakes don’t work. The longer you wait, the faster the bus will go and the harder it will be to stop.

Sudden Loss of Visibility
The following can cause a sudden loss of visibility while driving:

• Water splashed on the windshield.
• Windshield wiper failure.
• Headlight failure.
• Hood flying up.
• Patch of fog.

Until you regain normal visibility, you must use cues other than normal visual ones to help you control the bus.

Water Splashed on the Windshield
If water is splashed on the windshield:

1. Remove your foot from the accelerator and turn on the wipers.
2. While doing so, apply the brakes cautiously.
3. Look out the side windows to keep sight of the road.
Windshield Wiper Failure
If windshield wipers fail during rain, sleet, or snow:
   1. Look out the side windows to keep sight of the road.
   2. Apply the brakes cautiously.
   3. Activate your turn signal to get off the road and stop. Activate hazard warning lights.

Headlight Failure
If the headlights fail, immediately:
   1. Hit the dimmer switch to determine if a portion of your lights may be functional.
   2. Activate the hazard warning lights.
   4. Steer out of traffic lane, and stop.
Try to use available light along the way to keep sight of the road. In an extreme emergency, a good source of available light would be the amber flashing lights of the school bus eight-way light system.

Hood Flying Up
If the hood flies up:
   1. Look out the left and right windows to help keep your sense of direction.
   2. Apply brakes moderately.
   3. Activate your turn signal.
   4. Steer out of the traffic lane to stop.
   5. When stopped, activate the hazard warning lights, not the school bus eight-way warning lights.

Patch of Fog
If you enter a patch of thick fog that limits your vision:
   1. Activate the low beams and hazard warning lights and slow down.
   2. Use the center or edge lines on the highway to guide you.
   3. If the fog is severe, steer the bus off the road and park as far from the road surface as possible.
Under no circumstances should you park your vehicle on the highway. In fog it is especially important to watch for other vehicles that may have slowed abruptly or stopped on or near the road.

OBJECTS, PEDESTRIANS, AND OBSTRUCTIONS IN THE PATH OF THE BUS
When you suddenly see a pedestrian, ball, vehicle, construction barrier, or other obstruction in the direct path of the bus or approaching it, you must take evasive action. Evasive action is simply the exercise of your fundamental driving maneuvers under conditions of stress—limited time, space, and distance. You must decide which of the following evasive actions you should perform:
   • Proper use of brakes.
• Steering to avoid collision
  - Quick maneuvering, with or without braking.
  - Leaving the highway for an alternate escape route that is free from other more hazardous obstacles.
• Choosing a lesser collision.

**Proper Braking**

Generally, drivers tend to apply the brakes at the first sign of trouble. While effective in many instances, braking can lock the wheels and cause loss of steering control, making it impossible to steer away from a collision. For effective evasive action, you must avoid the temptation to jam on the brakes.

On the other hand, you may decide that braking to a stop is the best evasive action you can take to avoid the obstruction. This will depend on how fast you are going, how far away you are from the object, how good your tires are, and whether the road is wet or dry.

**Steering to Avoid Collision**

If it’s not instantly obvious that you can stop in time, you must choose to steer the bus in an alternative path. You must be able to quickly recognize the best escape route. At a glance, decide if a possible escape path is free from other, more hazardous obstacles. You should avoid swerving the bus for small animals, as sudden swerves can be very dangerous, risking your passengers’ safety. Because the bus is so big and heavy, it can’t swerve sharply to avoid an object or leave the pavement with any great degree of control. Swerving risks overturning the bus. Steer firmly and as gradually as possible to clear the obstruction, and use the brakes when necessary as outlined in the previous sections. If possible, avoid steering left, into the opposite lane of traffic.

**Deciding Where to Steer**

If an oncoming driver has drifted into your lane, a move to your right is best. If that driver realizes what has happened, the natural response will be to return to his or her own lane. If something is blocking your path, the best direction to steer will depend on the situation.

• If you have been using your mirrors, you’ll know which lane is empty and is safe to use.
• If the shoulder is clear, going right may be best. No one is likely to be driving on the shoulder, but someone may be passing you on the left. Again, you will know if you have been using your mirrors.
• If you are blocked on both sides, a move to the right may be best. At least you won’t force anyone into an opposing traffic lane and a possible head-on collision.

**Choosing a Lesser Collision**

In any case where collision is absolutely unavoidable, try to reduce speed as much as possible. Avoid a head-on collision; collision at an angle reduces the force of impact. Remember, you’re more likely to avoid hitting any obstruction in the path of the bus if you always anticipate the unexpected. Mentally practice effective evasive action until it becomes automatic.
REVIEW QUESTIONS

1. What are some of the causes of skidding and how can you control them?
2. What procedures should you follow if a tire blows out?
3. What should you do if your bus loses its brakes?
4. Name several ways your visibility may be suddenly impaired.
5. List the options you have when an obstacle appears in your path.

EMERGENCY PROCEDURES

Crashes are parts of events that usually cause unintended injury, death, or property damage. If you have a crash or find yourself in some other emergency situation, you should know the proper procedures to follow and the proper use of emergency equipment on the bus.

As a bus driver, you must be prepared for any kind of emergency situation. It doesn’t happen very often, but there is always the possibility of a crash, mechanical breakdown, or other emergency. In any case, your first priority is to see that all students are as safe as possible. It is important in an emergency to remain calm. Some rules to remember if your bus is involved in an accident are represented by the word “KNOW.”

K = Keep all students on the bus calm. It is safe for the students to remain on the bus if there is no other immediate danger.

N = Notify authorities. Always call for help. If you have a cellular phone, two-way radio, or other communication device on your bus, know who you should call and how to do so. If you do not have any means of communication on the bus, you may use a nearby phone or send a bystander to get help. Be familiar with where public phones are located on your route so that you are prepared if you need them.

O = Off the road. If you break down, try to position the bus completely off the road and away from other dangers. If it is not possible to do this, remember to evacuate the students and take them to a safer location.

W = Warning devices. Use flares or warning flags to warn other motorists of your position on the road.

CRASH PROCEDURES

If you have a crash, carry out the local policy procedures as quickly as possible. These include bus-related and scene-related procedures. The following should serve as a guide.

1. Bus-Related Procedures
   Immediately after a crash, your first actions take place in and around the bus.
   
   A. Assess the Situation. You should immediately do the following:
1. Stop the bus in as safe a place as possible.
2. Set the parking brake, turn off all lights and electrical switches, and turn off the ignition switch.
3. Remain calm, assess the situation, plan your actions, and reassure the students. Refer to Unit I on Student Emergencies.

B. Be Alert for Fire. If fire is present or might erupt, evacuate the students. Extinguish the fire, if possible. Evacuation procedures and use of fire extinguishers are described later in this unit. In determining the potential for fire, check for the following:
   1. Ruptured fuel tank or fuel lines.
   2. Hot tires, which may catch fire.
   4. Possible electrical fire or sparks.

C. Be Alert for Hazardous Materials. Check for and identify any possible hazardous materials that present or may present a danger to you and your passengers. Evacuate the students if a danger exists from the following hazardous materials:
   1. Chemicals.
   2. Vapors.
   3. Other Toxic substances.

D. Assess the Students. Check for injury to students. Keep the students on the bus unless conditions such as the possibility of fire or other dangers warrant their removal. This is the easiest way to account for all students.

2. Crash Scene Procedures
   Once you have taken the above procedures, your next steps should consider the crash scene.

A. Notify Authorities. Notify state or local police and summon medical aid if required; notify school administrators as required by local school policy. In most cases you should not leave the bus unattended to go for help. Ask several passing motorists or pedestrians to notify the proper authorities. In an emergency, always follow local school policy, especially in regard to sending students to obtain assistance. You should use the “Three W’s” when communicating:
   • Who: bus number, number of students, types of vehicles involved.
   • Where: location of bus or directions to the scene.
   • What: what kind of help is needed, nature of problems.

B. Protect the Scene. Protect the students and the bus from further crashes and injuries by placing warning devices to warn other drivers, evacuating the bus, or both. Protect the scene from traffic and people so that evidence is not destroyed. Under normal circumstances, the vehicle(s) involved should not be moved until advised by law enforcement officers.

C. Cooperate with the Crash Investigation. After you have handled all potential dangers to your passengers, cooperate with officials investigating the crash. You should discuss the facts of the crash only with those officially concerned (police, school officials,
insurance personnel). Do not discuss the crash with other motorists or passersby. Be patient, evaluate questions, and give clear and concise answers to any questions asked by officials. Only respond to the questions asked; don’t add your own opinion.

State law requires that you carry a list of every student passenger’s name on the bus in case of a crash or emergency. Provide this information, along with any relevant information about the school bus (e.g., make, model, vehicle number, owner, insurance information), to officials investigating the crash. All such information, including emergency telephone numbers, a seating chart of all passengers, and local directives covering crashes and emergencies should be contained in an emergency packet carried on the bus.

A driver involved in a crash is required to give his or her own name, address, driver’s license number, and other pertinent information to any other driver involved, and to obtain the same information from any other driver(s) involved in the crash. If witnesses other than bus passengers were present, get their names, addresses, and license numbers.

A school bus driver involved in a crash is also required to submit to testing for alcohol and controlled substances. (The driver’s employer is responsible to pay for this testing.)

**D. Keep Students at the Scene.** During the crash investigation, do not release any of your students to anyone unless instructed by school administration officials or unless medical aid is required. Always keep students on the bus unless the situation requires emergency evacuation.

**REPORTING PROCEDURES**

**Crash Reporting**
In addition to any local accident reports, the owner or operator of any school bus involved in a crash is required by state law:

- Within 24 hours, to report the crash to the chief school administrator or the authorized representative of the school district, private school, or parochial school that either employs or contracts the service of the owner or operator.
- Within 5 days, school bus accident report DL-739 must be completed whenever there is any injury or property damage, regardless of how slight. Complete the form even when students aren’t on the bus at the time of the crash. After completion of the form, submit it to the Department.

**Incident Reporting**
Because of the possibility of liability suits, drivers are responsible for reporting any incidents that occur in or around their buses during their daily runs. Incidents include such occurrences as bumped heads with no apparent injury; crashes near, but not involving, the bus; suspicious vehicles near schools or bus stops; any suspicions or evidence of child abuse or molestation; abnormal road conditions; or striking a domestic animal. Remember, your passengers are your first responsibility in any crash or incident. You should report an incident to your supervisor after you have finished your run. He or she will take any appropriate action, if necessary.

**MECHANICAL FAILURE OR BREAKDOWN**
In the event of a mechanical breakdown, know what to do, how to do it, and when it should be done. The following is a suggested procedure:

1. Stop the bus as far to the right of the road as possible or on the shoulder of the road.
2. Keep the students on the bus. However if the location of the bus is unsafe, remove the students to a safer location (see evacuation procedures in the next section).

3. Activate hazard warning lights and place warning devices on the highway (see the section on using emergency equipment later in this unit).

4. Contact the proper school authorities and give the location of the bus and a description of the breakdown.

5. See that arrangements are made for all students to be delivered to their destination.

6. Make repairs, if possible, according to local regulations.

7. Complete maintenance repair reports as dictated by local regulations.

**EVACUATING THE BUS**

In certain crash and emergency situations you may need to evacuate the students from the bus. You should know when to evacuate the bus and the procedures for evacuating a bus. These procedures are practiced in required evacuation drills.

**WHEN TO EVACUATE**

Usually, students remain on the bus during an emergency. Three situations, however, require that you evacuate the bus—fire or danger of fire, presence of hazardous materials, or unsafe position of the bus.

**Fire or Danger of Fire**

Stop the bus and evacuate it immediately if the engine or any portion of the bus is on fire. An existing fire near the bus or the presence of gasoline or other combustible material is considered as “danger of fire.” Evacuate students as described below.

Evacuate students through the door farthest from the fire or potential source of fire. Evacuate students closest to the danger first. Tell students to move a distance of 100 feet or more from the bus and the fire until you have determined that no danger remains.

**Presence of Hazardous Materials**

If any hazardous materials are present in or near the bus, evacuate the students. This includes vapors or fumes, which may enter the bus from outside sources and may be dangerous to the passengers.

**Unsafe Position**

In the event that the bus is stopped due to a crash, mechanical failure, road conditions, or human failure, determine immediately whether it is safer for the passengers to remain in the bus or to evacuate. You must evacuate when:

- The final stopping point of the bus is in the path of any train or adjacent to any railroad tracks.
- The position of the bus might change and increase the danger. For example, evacuate if a bus comes to rest near a body of water or cliff where it could still move and go into the water or over the cliff.
- The location of the bus creates the danger of collision. In normal traffic conditions, the bus should be visible for a distance of 300 feet or more. A position over a hill or around a curve where such visibility does not exist should be considered reason for evacuation (see Figure H-1).
In all these cases, carry out the evacuation as safely as possible.

![Figure H-1. Dangerous Location](image)

EVACUATION DRILLS

In an emergency, the emergency door may become jammed by everyone trying to get out at the same time. State law requires each student who is transported in a school bus or school vehicle to participate in emergency evacuation drills in the first week of school and in March of every school year. This includes students who only ride a bus on special trips. In fact, drills should be conducted more frequently.

Everyone involved in drills should keep these points in mind:

- Safety of the students is of the utmost importance and must be considered first. Getting them off the bus safely, quickly, and in an orderly fashion is the objective.

- All drills should be supervised by the principal or by persons assigned to act in a supervisory capacity and held on school property. You are responsible for conducting the drill in an organized manner.

- In a real emergency, you might be incapacitated and unable to direct the student emergency evacuation. Include some drills directed by school patrol members, appointed students, or adult monitors. Be sure to assign regular substitutes. School officials may enlist your aid in selecting and training students for bus patrol. Don’t assign a student as a leader without written consent from a parent or legal guardian.

- During the drill, students should be instructed how and where to get help if the driver is unable to do so. Instructions and telephone numbers should be posted or otherwise carried in the bus. Students should be instructed to enlist several bystanders to go for help, since some of those asked might not want to get involved in the situation.

- Follow local policies in conducting evacuation drills and emergency procedures.
Explain to all passengers the procedures to be followed if an evacuation is necessary. The following recommended procedures may be adapted to your local situation.

**Front Door Evacuation Drill**

In the interest of safety, all drivers should regularly conduct an emergency evacuation drill through the front door with each bus load of students, when they unload at school (see Figure H-2). This approach does not take any more time than regular unloading procedures. Follow these steps:

1. Stop the bus at the normal unloading location or preselected location on the school grounds.
2. Set parking brake, turn off engine, and remove ignition key.
3. In buses with a manual transmission, select either the first gear or reverse position. In buses with automatic transmissions, select either the park position or neutral with the parking brake on.
4. Stand, open the front door, face the students, and get their attention.
5. Tell them, “Do what I say—remain absolutely quiet.”
6. Then say, “Front door emergency evacuation drill—remain seated.”
7. Direct two student helpers (appointed at the beginning of the year or each month) to their positions. Assign one helper to lead the students to a designated location 100 feet or more from the bus where the students quietly remain in order. Assign the other helper to stay outside the front door to count and assist passengers as they leave.
8. Instruct students to leave all belongings such as books and lunch containers on the bus and tell them that they can be retrieved after the drill is completed.
9. Turn and face the front of the bus, standing between the first row of occupied seats.
10. Starting with the right-hand seat, tap the shoulder of the student nearest the aisle to indicate that those occupants should move out. Say, “Walk—don’t run. Use hand rails.” At the same time, hold your hand before the occupants in the left-hand seat in a restraining gesture.
11. When the pupils in the right-hand seat have moved far enough to clear the aisle, dismiss the occupants of the left-hand seat.
12. Continue this procedure as described, right and left seats alternately, until the bus is empty.
13. When the last seat is empty, walk to the front of the bus and check to be sure that everyone is out.
14. Leave the bus and take the helper at the front door with you and join the passengers and the other helper.
15. Evaluate the evacuation drill, pointing out improvements needed and commending students on activities well done.
16. Have students return to the bus in an orderly manner to retrieve their belongings before entering the school. Have students who are to continue to another school remain on the bus, and proceed on your route.
17. Complete any reports as required by local policy.
Rear Emergency Door Evacuation Drill
The rear emergency door evacuation drill should be practiced as often as possible with elementary and secondary students (see Figure H-3). In some cases, the rear emergency door evacuation drill may be used for demonstration purposes only and not practiced by students.

1. Follow steps 1-3 of the Front Door Evacuation Drill.

2. Stand facing the students, get their attention and tell them, “Do what I say—remain absolutely quiet.”

3. Then say, “Rear door emergency evacuation drill—remain seated.”

4. Instruct students to leave all belongings such as books and lunch containers on the bus and tell them that they can be retrieved after the drill is completed.

5. Walk to the rear of the bus and face rear door.

6. Use left hand to restrain occupants of right rear seat.

7. Open the rear emergency door.

8. Assign three helpers to sit in the left rear seat. Have the helpers jump out the rear emergency door. Assign two helpers to assist passengers getting out of the bus: one helper holds the door open and the other assists the passengers as they jump from the bus. Assign the third helper to lead passengers to a designated location 100 feet from the bus where they remain quietly in order.

9. Face the doorway and move between the left rear seats to clear the aisle.

10. Command students in right rear seats to leave the bus. Have them assume a semi-squat position as they jump from the bus. Instruct helpers to grasp a passengers’ right wrist or forearm with their right hand and to place their left hand under a passengers’ right shoulder as the passenger jumps out of the bus. Caution students not to bump their heads when leaving through the rear door.

11. Tell students in the next left seat to leave the bus. Keep control at the rear door to prevent any pushing or shoving. Students who are injured, disabled, or in a condition that may be aggravated by jumping out of the bus (e.g., overweight, pregnant) should not be required to
participate in the drill. They should leave the bus with the driver through the front door and join the other students when the drill is completed.

12. Continue the above procedure, alternating left and right seats until the bus is empty.

13. When the last student has jumped, walk to the front of the bus and check to make sure that everyone is out.

14. Join the students and conclude the drill as described in steps 15-17 of the Front Door Evacuation Drill.

A combination of the procedures used for the front door and rear door evacuations also can be used for an evacuation drill in which students leave the bus through both the front and rear doors (see Figure H-4). Procedures for the front door evacuation are used for students in the front half of the bus; and procedures for the rear door evacuation are used for students in the rear half of the bus. The only exception to using these procedures as described above would be the command given at the beginning of the drill: “Front and rear door emergency evacuation drill—remain seated.” In a real emergency, this type of evacuation would require the shortest amount of time to get the passengers off the bus. However, it is dependent upon both doors being available for safe evacuation. This drill should be used for both elementary and secondary students. Student helpers should be properly instructed on how to assist students out of the rear of the bus. Helpers should reach up and lift students down as they exit the rear emergency door. Again, this drill may be performed as a demonstration only.
Other Emergency Evacuation Procedures
In an actual emergency it might be necessary to evacuate students through the bus windows or roof vent. Maintain order as much as possible in these situations and work to evacuate all passengers as quickly and safely as possible. Before leaving the bus, you should always check under all seats to make sure that no students are on the floor. This applies to all types of evacuations.

USING EMERGENCY EQUIPMENT
When an emergency or crash happens, it’s too late to learn how and where to use emergency equipment. All school buses are required to carry the following:

- First aid kit.
- Reflectors, flags, or flares.
- Wrecking bar.
- Fire extinguisher.
- Tire chains (optional for buses manufactured after September 1, 1983).
- List of student names with their assigned pick-up and delivery times.
- Spare electrical fuses unless the bus has circuit breakers.

You should know the location and operation of this equipment. Except for the first aid kit, which is discussed in the next unit, the use of emergency devices is discussed below.
REFLECTORS OR FLARES
Most buses in service are equipped with triangular reflectors, which serve as warning devices. They are encased in a container in the driver’s compartment. You will use three reflectors as described below to warn oncoming vehicles of a disabled bus. Older buses may be equipped with round reflectors, red flags, or flares, which should be placed according to the procedures given below for reflectors (see Figure H-5).

1. First Reflector
   Place the first reflector along the roadway side of the bus within 10 feet of the front or rear corner to mark the location of the bus.

2. Second Reflector
   Place the second reflector about 100 feet behind the bus on the shoulder or lane you are stopped in. If there is a hill or curve that prevents oncoming traffic from seeing the bus, place the reflector up to 500 feet behind the bus.

3. Third Reflector
   Place the third reflector about 100 feet in front of the bus again using greater distances if conditions warrant.

   ![Figure H-5. Placement of Flares](image)

WRECKING BAR
The wrecking bar is located close to the driver’s compartment. Use it to pry open doors, windows, or other parts in the event of a crash where damage to the vehicle prevents easy exit by normal means.

FIRE EXTINGUISHER
A portable fire extinguisher is located in an accessible location in the driver’s compartment of every school bus. Fire extinguishers work by either cooling the burning substance or by cutting off the supply of oxygen to it.
Before using a fire extinguisher, make sure it is properly charged. A gauge is mounted at the top of the extinguisher to indicate air pressure. If the needle on the indicator stays in the charged area, the extinguisher is properly charged. If the needle is in the overcharged or undercharged areas, report it to your mechanic.

If possible, stand upwind from the burning material to prevent standing in smoke and heat. Do not walk into unburned material that could catch fire in a backflash and cause injury to you.

To operate a fire extinguisher:
1. Remove it from the bracket.
2. Pull the safety pin by breaking the seal.
3. Hold it in an upright position.
4. Aim it at the base of the fire.
5. Squeeze the handle to discharge the powder.
6. Turn it on and off as desired to control the fire.

The extinguisher will only last approximately 8 seconds. No matter how much you use it, you must recharge the fire extinguisher or replace it with a substitute before the next run.

These instructions are applicable to most fire extinguishers, but you should check and be familiar with the instructions for the extinguisher on your bus. You should have actual hands-on use of the fire extinguisher during training.

TIRE CHAINS
In addition to their normal use on snow-covered roads, tire chains also may be used for traction when the bus is stuck in mud or other loose surface. You should be given proper instruction for the installation of chains during training.

LIST OF STUDENT NAMES
Every bus must have a list of names for all students who ride the bus and the appropriate pick-up and delivery time for each student. This list can be used to account for the students in an emergency. Although not required, a seating chart for students on the bus is strongly recommended. It can also be helpful in emergency situations.

SPARE ELECTRICAL FUSES
All buses should carry the proper spare electrical fuses in case a fuse is blown. If the bus is equipped with circuit breakers, this is not necessary.

OPTIONAL EQUIPMENT
Although not required, the following equipment should be carried on every school bus, especially those used to transport exceptional students:
• Vomit odor absorbent, basin or pail (water in jug), sponge, and plastic bags.
• Tissues and paper towels.
• Plastic or other waterproof material for seats.
• Blankets and sheets to use as protection in cold weather.
• Sand or other substance for traction on ice.
• Clean rugs, gloves, or pads for motor check-up en route in case of suspected trouble.

**REVIEW QUESTIONS**

1. What are the first actions you should take in a crash?
2. Name the potential sources of fire.
3. What information should be given to the emergency personnel when requesting assistance?
4. What are the reporting procedures in your school district?
5. What should you do if a mechanical breakdown occurs?
6. Under what circumstances must you evacuate the school bus?
7. List the procedures for conducting each type of evacuation drill.
8. Where should the reflectors be placed in an emergency?
9. What does “KNOW” stand for?
UNIT I
STUDENT EMERGENCIES

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UNIT I
STUDENT EMERGENCIES
INTRODUCTION

Part of your responsibility as a school bus driver requires that you be prepared to act appropriately in emergency and crash situations. Your actions in these situations can mean the difference between life and death for one or more of the students on your bus.

FIRST AID AND EMERGENCY CARE ARE ONLY TEMPORARY STEPS TAKEN UNTIL MORE ADVANCED TREATMENT CAN BE OBTAINED, EITHER AT THE SCENE OF AN INCIDENT OR AT A HOSPITAL.

First aid is defined by the American National Red Cross as the immediate and temporary care given to the victims of crashes and sudden illness until the services of a physician can be obtained.

Emergency care is a process which involves assessment, priority setting, and continual reassessment. Other important aspects of emergency care include clearly describing what happened and know how to use the supplies and equipment used in performing this care.

Your top priority in the event of a crash or sudden illness is to keep the situation from getting worse until help arrives. You must perform only those emergency procedures for which you are properly trained, but remember that your most important responsibility is to maintain the overall scene until help arrives. In some situations, the time it takes for help to arrive may allow you to maintain the scene and provide emergency care to one or more injured persons. However, do not become so involved in specific problems that you are unable to manage the entire scene. You need to learn procedures that will enable you to do the following:

• Control hazards at the scene.
• Evaluate injuries or illnesses.
• Enlist the help of others.
• Contract the emergency medical services system in your area.
• Maintain control of non-injured students during the crisis.
• Control access to your students. Release students only to authorized persons. Keep students at the scene until evaluated.

While this unit provides a basic overview of emergency care procedures, further training and certification are strongly recommended.

MEDICAL LIABILITY

THE GOOD SAMARITAN ACT

Anyone who gives first aid should be concerned about their liability when emergency care is necessary. The basic legal principle which most directly applies to you as a bus driver is the
good Samaritan concept. In Pennsylvania and many other states, specific legislation has been passed to provide first-aiders with an exclusion from civil liability. A copy of Pennsylvania’s Good Samaritan Act is reprinted here for your reference.

![Pennsylvania Good Samaritan Act](image)

As you can see, the legal protection provided by Pennsylvania’s Good Samaritan Act requires that you be currently certified in emergency care by the American National Red Cross, the American Heart Association, or in a similar course approved by the Pennsylvania Department of Health.

This unit is intended only to present some basic guidelines concerning your actions in a medical emergency; it is not a first aid course. To meet the criteria described in the Good Samaritan Act, you need to successfully complete one of the following courses:

- Multi-Media First Aid (American National Red Cross)
- Standard First Aid and Personal Safety (American National Red Cross)
- Advanced First Aid and Emergency Care (American National Red Cross)
- Basic Cardiac Life Support or Cardiopulmonary Resuscitation (American Heart Association or American National Red Cross)
- First Responder (Pennsylvania Department of Health)
- Emergency Medical Technician (Pennsylvania Department of Health)
There have been no successful lawsuits in Pennsylvania against anyone acting as a good Samaritan. The good Samaritan concept generally refers to a series of actions taken by an individual who attempts to help someone in need. If you try to help someone and treat that person as you would like to be treated in the same situation, the legal authorities of emergency medical services generally agree that you will have taken one of the best steps available to reduce your chances of a negligence suit.

Successfully completing one or more of the certification programs mentioned above is in your best interest, as well as that of your employer, and most of all, anyone you find requiring first aid. You are strongly encouraged to enroll in an American National Red Cross first aid course and become certified. Become familiar with your local policy before you render any type of first aid.

**FIRST AID PROCEDURES**

This section describes priority setting and procedures in emergency situations.

**SETTING PRIORITIES**

First aid and emergency care are techniques that are applied to one or more victims of a crash or illness. As a school bus driver, you cannot focus all of your attention solely on the ill or injured student(s). You must consider many other factors including:

- Hazards that could make the situation worse.
- Obtaining emergency medical assistance, if necessary.
- The seriousness of the injuries or illnesses.
- The safety of all healthy passengers.
- Your own safety.

**Hazard Control**

In unit H (Crash and Emergency Procedures), you learned about many situations which could affect the health and safety of everyone on your bus. Prevention and prompt action are the key elements in keeping minor emergencies from developing into serious problems. Remember what you have already learned about safely parking and evacuating the bus, fire control, and safety in maneuvering the bus.

**Specific Hazards.** Be aware of these Hazards:

- Fire: few crashes result in fire or explosion, but you must always be alert to the presence of combustible fuel and ignition sources.
- Hazardous Materials: identify any chemicals, vapors, or other toxic substances which present a danger to you and the others involved.
- Unsafe Site: if an injury or crash occurs, be sure to park the bus in the safest position possible to avoid another crash.
- Distractions: if other circumstances don’t prevent it, keep all passengers on the bus to make it easier to control them.

**Obtaining Emergency Medical Assistance**

Once hazards are controlled, you need to get an idea of the nature of the crash, a rough estimate of how many students or others are injured, and the relative seriousness of their injuries. You should do this quickly and call for help or send someone to get help so that it can
get to the scene as soon as possible.

How you contact the emergency medical services system varies considerably from one location to another in Pennsylvania. If you have a two-way radio or cellular phone in your bus, you may need only to use it to call for ambulance, rescue, fire, or police services. If you don’t have one of these in your bus, calling for help can be more difficult. Who is going to make the call? Where will the call be made and what will be said? Since you should avoid leaving the bus and its passengers, you need to identify a responsible bystander to make a call for assistance (see Figure I-1.) give specific instructions concerning the items below. The following is a priority listing:

1. What telephone number to call (not every community has the 911 emergency telephone number).
2. The exact location of or precise directions to your location.
3. The exact nature of the problem, illness, or injury (to the extent possible).
4. The number of people injured.
5. A description of the type of vehicles involved (in the case of a crash).

Sometimes it’s a good idea to send two bystanders to call the emergency services system. This increases the chance that an accurate call will be made. Sometimes the second person may provide a calming influence.

Use Responsible Helpers. It should be clear by now that you have many areas of concern in an emergency situation. Adult bystanders and responsible students can be very important resources you may need to use. Knowing your passengers can be a big advantage if you find yourself in a situation requiring immediate assistance. Make it a point to know the students on your bus. Selecting the right helper in an emergency is always difficult, but the more you know about your students, the better your chances are of making a good choice. You should follow local school policy when using student helpers in emergency situations. This is especially important when making the decision to send students to get assistance in an emergency. Do so only if local policy permits and the situation warrants it. Ambulance crews often need the help of bystanders so it is reasonable to think that you might need help, too.

Figure I-1. Send bystanders for help
**Treatment Priorities**

Once help has been summoned, assess the injuries or illnesses of each student. Do not treat students unless you have become certified through one of the previously mentioned courses.

You will find two situations where it is necessary to help set treatment priorities:

- When you have one student with more than one injury, the injury that is treated first may be important.
- When you have more than one student injured, you must select the order in which you can begin to help everyone in need. **You must be organized and do one thing at a time.**

**Performing Triage.** In either case, you need to evaluate all injuries or illnesses quickly to determine where help is needed most. This process is called triage and is necessary in evaluating multiple problems in one individual or in evaluating multiple injured/ill persons. After a brief evaluation of each injury or illness, you can decide what to do first.

While performing triage, it is important that you do not treat any injury until you have found all problems requiring help. If more than two or three students are injured, you should spend no more than 15 or 20 seconds in the evaluation of each injured person.

**TREATMENT PROCEDURES**

**Seizures**

Seizures often are a frightening symptom of a variety of central nervous system problems. There are several levels of seizure activity, but the type of seizure that is most important to you is when the patient becomes unconscious. In addition to losing consciousness, the muscles of seizure patients alternately flex and contract. This creates the jerking, sometimes violent, motion often described as “fits.”

Your main concern is to maintain an open airway so the patient can breathe and to protect the patient from injuring themselves. If a student has a seizure, perform the following steps:

1. Lay the patient down if they are not already on the floor.
2. Monitor their airway and position their body to permit the adequate exchange of air.
3. Do not put fingers or other objects in the patient’s mouth during a seizure.
4. Support the patient’s body in such a way as to lightly restrain major muscle movement, reducing the chance of self injury (e.g., guide their arms through the range of motion but don’t try to restrain them).

Most seizures are brief and may only last a minute or two. After the seizure is over, place the victim on their side and treat them as any other unconscious patient, with one notable exception. When consciousness returns after a seizure, the patient may be quite confused and disoriented. Be very considerate of their emotional state by providing as quiet and private a recovery environment as possible, given the circumstances.

Be aware that many seizure patients refuse ambulance transportation because seizures often are self limiting, and the individual may have experienced seizures before. If the individual has a history of seizures, they may be quite familiar with their own seizures and post seizure behaviors.
Fractures
Any break or crack in a bone is defined as a fracture. While fractures may cause other complications like bleeding and shock, any fracture by itself is not a life threatening emergency. The location of a fractured bone may complicate other important body functions like breathing. When any part of the spine is fractured, there is a danger of paralysis as a result of associated spinal cord damage.

If you see any of the following signs or symptoms, suspect that the underlying bone might be fractured:
• Pain at the site of injury.
• Pain on movement.
• Swelling.
• Discoloration.
• Crooked or misaligned bones.

Remember, even if someone can walk on an injured ankle or move an injured arm, a bone may still be fractured. The only sure way to determine if a bone is fractured is to X-ray the area of injury and to have the X-ray and the injury evaluated by a physician.

If you suspect a fracture of a bone which makes it difficult or impossible for the individual to move, call the emergency medical services system. Without proper training and splint materials, your options are limited until further help arrives.

Since, as stated earlier, fractures are not generally life threatening, you have time to take control of the situation and to keep it from worsening. The basic objective of fracture care is to prevent the movement of joints above and below a fracture site. In most cases, you don't need splint materials to accomplish this, as long as you do not have to move the injured person. If help is on the way and the injured person is in a safe location, there is no immediate threat to life and no reason to move them.

If there is great urgency to move an injured person, as in the case of a fire, drag them along the long axis of their body. Pull the victim by their outstretched hands or shoulders. If possible, place the injured person on a coat or blanket to make dragging him or her easier.

Allergic Reaction (Anaphylactic Shock)
There are many types of shock, caused by a variety of circumstances ranging from emotional crisis to massive blood loss. One of the most unusual and fast-acting types of shock is the type that occurs after an extremely allergic reaction. This type of shock is called anaphylactic shock and is commonly caused by bee stings.

If a person experiences an allergic reaction of any kind, it may quickly turn into a life threatening emergency. Anaphylactic shock can cause, within minutes, swelling in the airway to a degree that an individual will not be able to breathe. The only way this condition can be corrected is through medication. Many seriously allergic people always carry their own medication with them. If this medication is not present or if there is no one to administer it, you must do everything possible to see that the allergic person immediately gets to an emergency department or to paramedics with the necessary drugs. A few minutes may mean the difference between life and death. Do not give injections. Learn local policy regarding what to do in the case of allergic reactions.

Anaphylactic shock is somewhat unusual as compared to most other shock conditions you may
encounter. Most shock conditions are more gradual in their onset and should be anticipated in all injuries. By being aware that shock may develop, you may be able to prevent it by treating for it before you see clear signs or symptoms.

REPORT ALL INCIDENTS
Report all medical problems which occur on your bus to the proper authorities as dictated by local policy. Reporting incidents is important from a liability point of view because students may fail to tell the school nurse or their parents of problems requiring attention. Know your students and any pre-existing problems which they might have so you may be better prepared to deal with them. Careful observation of your students may indicate the presence of medical problems of which you have not been informed. While many parents will inform you of their child’s medical problems, others wish to keep such information confidential. Follow local policy when trying to obtain information about student medical conditions. When possible, inform substitute drivers of any medical problems of students on your route.

FIRST AID EQUIPMENT
First aid supplies and equipment are important in providing the best care possible. The first aid kit on your bus should be supplied with anything you might need in an emergency. The contents of your first aid kit may vary according to local regulations; however, current regulations require that the first aid kit on a school bus must contain at least 12 items including:

1. 1 inch x 2 1/2 yards adhesive tape—1 single unit.
2. Sterile gauze pads 3 inches x 3 inches—1 single unit.
3. 3/4 inch x 3 inches adhesive bandage—1 single unit.
4. 2 inch bandage compress—1 single unit.
5. 3 inch bandage compress—1 single unit.
6. 2 inches x 6 yards sterile gauze roller bandage—1 single unit.
7. Non-sterile triangular bandage approximately 40 inches x 36 inches x 54 inches with 2 safety pins—1 single unit.
8. Sterile gauze 36 inches x 36 inches (U.S.P. 2428 count)—1 single unit.
9. Sterile eye pad—1 single unit.
10. 1 pair of rounded end scissors.
11. 1 pair non-latex gloves.
12. 1 mouth barrier.

The kit should be mounted in full view and in an accessible place in the driver’s compartment. Its location should be clearly marked and you should check its contents often. The pre-trip inspection described in Unit E (Preventive Maintenance) calls for a daily check of the first aid kit. It is your responsibility to replace any of the contents immediately after you use them or after noticing something has been removed. Consult your supervisor about procedures for obtaining new first aid supplies.
BODY FLUID CLEAN-UP KIT

Every school bus is required to have a removable and moisture proof body fluid clean-up kit. It must be securely placed or mounted in an easily accessible location and labeled as a Body Fluid Clean-Up Kit.

REVIEW QUESTIONS

1. What are some of the factors you must consider in an emergency where one or more students are injured?
2. Name specific hazards that could make an emergency situation worse.
3. What is the method of obtaining emergency medical assistance in your school district?
4. What information should be given to emergency personnel when you call for help?
5. If you are certified in first aid, what should be your first actions following a crash?
6. What is your main concern when a student is having a seizure?
7. What signs might indicate a fractured bone?
8. What should you do, according to local policy, for a student with anaphylactic shock?
9. In your school district, what are the procedures for reporting an incident?
INTRODUCTION

This unit covers several areas that you need to know to pass the Commercial Driver License (CDL) knowledge examination. Areas that you will need to know include cargo, passengers, air brakes, and the basics of safe commercial driving skills. The information in the cargo section pertains to transporting cargo safely. The passenger section give you information to transport passengers on commercial buses. The air brakes section is required for vehicles with air brakes. Since a school bus driver by license classification will meet the licensing requirements to drive any commercial vehicle, you are required to know the information in all of these areas as well as the information presented in previous units.

The following sections have been extracted from the Commercial Driver's Manual. The sections include:

- Section 1 .......... Introduction
- Section 2 .......... Driving Safely
- Section 3 .......... Transporting Cargo Safely
- Section 4 .......... Transporting Passengers
- Section 5 .......... Air Brakes
- Section 10 ........ Pre-Trip Vehicle Inspection Test
- Section 11 ........ Basic Vehicle Control Skills Test
- Section 12 ........ On Road Driving Test
Section 1

✧ Introduction

✧ KNOWLEDGE TESTS

✧ CDL ✧ GVWR

✧ Serious Traffic Violations

THIS SECTION IS FOR ALL COMMERCIAL DRIVERS
As a result of the Federal Commercial Motor Vehicle Safety Act of 1986, Pennsylvania established a Commercial Driver Licensing Program. This program has been developed to improve driver quality, ensure that commercial drivers have the skills needed to operate commercial vehicles, and to prevent drivers from having more than one driver's license. The Program requires you to have a Commercial Driver’s License (CDL) if you operate, or plan to operate any of the following Commercial Motor Vehicles (CMV’s):

a) A combination of vehicles with a gross vehicle weight rating of 26,001 pounds or more, provided the vehicle being towed is in excess of 10,000 pounds.
b) A single vehicle with a gross vehicle weight rating (GVWR) of 26,001 or more pounds.
c) A vehicle designed to transport 16 or more persons, including the driver.
d) A school bus designed to carry 11 passengers or more, including the driver.
e) Any size vehicle which transports hazardous materials and is required to be placarded in accordance with Department regulations.

Exemptions: You do not need a Commercial Driver's License (CDL) to drive military equipment while in military uniform, certain fire and emergency equipment owned by a fire company, or recreational vehicles, implements of husbandry, or certain motorized construction equipment.

This section examines the requirements of the Commercial Driver's License (CDL) and how you can get your CDL.

For information on CDLs, please call:
1-800-932-4600
Out-Of-State: (717) 391-6190
TDD: 1-800-228-0676
Monday through Friday
7:00 a.m. - 9:00 p.m.

or write: Bureau of Driver Licensing
CDL Program
P.O. Box 68679
Harrisburg, PA 17106-8679

(you must have your CDL Permit to schedule your Skills Test)
1.1 THE COMMERCIAL DRIVER’S LICENSE

CLASSIFICATIONS
With the implementation of the Commercial Driver Licensing Program, Pennsylvania adopted a new classification system. CDL classifications include:

CLASS A
A Class A license is issued to those persons 18 years of age or older who have demonstrated their qualifications to operate any combination of vehicles with a gross vehicle weight rating of 26,001 pounds or more, provided the gross vehicle weight rating of the vehicle or vehicles being towed is in excess of 10,000 pounds. The holder of a Class A license is qualified to operate vehicles for which a Class B or Class C license is issued. Where required, appropriate endorsements must be obtained.

CLASS B
A Class B license is issued to those persons 18 years of age or older who have demonstrated their qualifications to operate any single vehicle with a gross vehicle weight rating of 26,001 pounds or more or any such vehicle towing a vehicle having a gross vehicle weight rating of not more than 10,000 pounds. The holder of a Class B license is qualified to operate vehicles for which a Class C license is issued. Where required, appropriate endorsements must be obtained.

CLASS C
A Class C license is issued to those persons 18 years of age or older who have demonstrated their qualifications to operate any single vehicle with a gross vehicle weight rating of not more than 26,000 pounds or any combination of vehicles, except combination vehicles involving motorcycles, that does not meet the definition of a Class A or Class B vehicle. Where required, appropriate endorsements must be obtained.

NOTE: You must be 21 years of age or older to operate a Commercial Motor Vehicle interstate. This applies to ALL classes.

In addition to the CDL classes, there are also special endorsements and restrictions that you must have to drive certain types of commercial vehicles. They are:

ENDORSEMENTS/RESTRICTIONS

ENDORSEMENTS
H - Required to drive a vehicle with hazardous materials placards (*you must be 21 years of age*).
N - Required to drive a tank vehicle.
T - Required to drive double and triple trailers.
P - Required to drive a vehicle designed to carry passengers (*buses*).
S - Required to drive a school bus.
X - Represents a combination of the hazardous materials and tank vehicle endorsements (*you must be 21 years of age*).

RESTRICTIONS
L - Restricts the driver to vehicles not equipped with air brakes.
B - Passenger endorsement restriction—cannot drive Class A buses.
C - Passenger endorsement restriction—cannot drive Class A or B buses.
1.2 CDL TESTS

To get a CDL you must pass Knowledge and Skills tests. There are seven separate knowledge tests. The number of tests you take depends on the type of vehicle you want to be licensed to operate. You must pass your knowledge test before receiving your permit to take the skills testing. The CDL Knowledge Tests include:

**KNOWLEDGE**

**GENERAL KNOWLEDGE TEST:**
Taken by all applicants who want to operate a commercial vehicle with a Class B or C commercial license.

**COMBINATION VEHICLE TEST**
Taken by all individuals applying for a Class A license. This test is the General Knowledge Test for Class A drivers.

**AIR BRAKE TEST**
Required if you operate a vehicle that has air brakes.

**HAZARDOUS MATERIALS TEST**
Required if you want to haul hazardous material or waste when placarding is required.

**TANKER TEST**
Required if you want to drive a tank vehicle.

**DOUBLES/TRIPLES TEST**
Required if you want to pull double or triple trailers.

**PASSENGER TRANSPORT TEST**
Required by all bus drivers.

**SKILLS TEST**
The CDL Skills Test is made up of the following three (3) parts: the pre-trip inspection test, the basic Control Skills Test and the Road Test. You must take these tests in the type of vehicle you wish to be licensed to drive. After receiving your learner’s permit, Pennsylvania law requires that you wait 30 days before you may take your skills testing.

**PRE-TRIP INSPECTION**

*Purpose*
To see if you know whether the vehicle is safe to drive.

*Test Procedure*
The applicant and examiner will perform a walk around safety inspection of the test vehicle. The vehicle safety inspection shall consist of checking all exterior lights and reflectors, tires, exterior mirrors and any major leaks. The examiner will instruct the examinee to enter the vehicle and operate the following controls: headlights, marker lights, wiper/washer, turn signals, hazard warning lights, taillights, brake lights, horn(s), emergency safety equipment and air brakes.

**BASIC CONTROL SKILLS TEST**

*Purpose*
To evaluate your basic skills in controlling the vehicle.
**Set-Up**

A test course will be set-up consisting of six (6) various exercises marked out by lines, traffic cones, or something similar. The exercises may include the following maneuvers: moving the vehicle forward and backward, turning, and parking. You will be required to perform at least four of the six exercises.

The examiner will tell you which exercises to perform and explain how each exercise is to be done. You will be scored on how well you stay within the exercise boundaries and how many pull-ups you make. The basic control skills may be administered on an on-road or off-road course based on the layout of the test site.

**ROAD TEST**

**Purpose**

To evaluate your ability to drive safely in a variety of on-the-road situations.

**Test Procedure**

The test drive will be taken over a route specified by the examiner. It may include left and right turns, intersections, railway crossings, curves, up and down grades, rural or semi-rural roads, city multi-lane streets and expressway driving.

You will drive over the test route following instructions given by the examiner. The examiner will score specific tasks such as turns, merging into traffic, lane changes and speed control at specific places along the route. The examiner will also score whether you correctly do tasks such as signalling, searching for hazards, controlling speed and lane positioning.

This manual will help you pass the CDL test. To find out which parts of the manual to study, see figure 1-1 at the end of this section. If you need the school bus "S" endorsement, you need to also study the School Bus Driver Manual, Pub. 117 and passenger vehicle information in Section 4 of this manual.

When you have completed all of your required CDL knowledge and skills tests, you will be issued a CDL camera card. Upon receipt of your camera card, you should go to a Photo License Center and have your picture taken and receive you "CDL" license. You will need to take acceptable proof of identification to the Photo License Technician.

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**HOW TO GET YOUR CDL**

**APPLYING FOR A CDL WHEN YOU ARE ALREADY LICENSED IN PENNSYLVANIA**

If you are licensed as a non-commercial driver and wish to obtain a CDL, you would apply for your permit(s) using form DL-31CD, Application for Commercial Learner’s Permit. The most current version of this application can be found on our website at: [www.state.pa.us](http://www.state.pa.us) (PA Keyword - dmv forms). Forms are also available at our Driver Examination Centers, and at most messenger services and auto clubs in Pennsylvania. The DL-31CD is also used by licensed PA CDL drivers to upgrade to additional CDL privileges.

When making application for the permits needed to upgrade your non-commercial license to a CDL, you will need to pay an increased annual license fee and a photo fee, in addition to the permit fees for any privileges requested. The increase fee required as part of your higher annual fee will be prorated based on how many years, full or partial, are remaining on your current non-commercial license.

The actual license for a CDL must always contain the correct information for the driver. While you may have received an endorsement card when information changed on your non-commercial
license, once you pass your testing for your CDL, you will receive a new photo license to reflect your new CDL status. (This requirement also means that if you hold a CDL and have a change of name or address, you will need to apply for a duplicate driver's license to record your change.)

The fee for your CDL permit(s) will be based on how many privileges you apply for as part of your application. There are fees for each class, endorsement, and restriction removal you wish to become licensed for.

Any knowledge testing required must be completed prior to you being eligible for skills testing. When your application is processed, you will be issued a knowledge test authorization if any privileges applied for require a knowledge test. Once you successfully complete your knowledge test, the Driver Examination Center will issue you the skill permit(s) for your skills testing.

**APPLYING FOR A PA CDL WHEN LICENSED IN ANOTHER STATE**

If you are a new resident and wish to apply for a Pennsylvania Commercial Driver's License (CDL), you must surrender all valid driver's licenses issued to you by any other state(s). The Commercial Motor Vehicle Safety Act requires that no person shall have more than one valid driver's license at any time. Pennsylvania can prohibit issuance of driver license products to an out-of-state address.

To surrender your out-of-state driver's license and to apply for a Pennsylvania Driver's License, you should go to PENNDOT Driver License Center and take the following documents with you:

1. your valid out-of-state driver's license,
2. your Social Security Card,
3. proof of identity, and
4. two proofs of residency
   
   *(non-U.S. citizens will have additional requirements.)*

Acceptable proof of identity includes:

- Birth Certificate with raised seal *(U.S. issued by an authorized government agency, including U.S. Territories or Puerto Rico. Non-U.S. birth certificates will not be accepted)*
- Certificate of U.S. Citizenship *(INS N-560)*
- Certificate of Naturalization *(INS N-550 or N-570)*
- PA Photo ID Card
- PA Photo Driver's License
- Valid U.S. Passport
- U.S. Military Photo ID Card

**NOTE:** Only valid passports and original documents will be accepted.

Acceptable documents for proof of residency include:

- Current Utility Bills *(water, gas, electric, cable, etc.)*
- Tax Records
- Lease Agreements
- Mortgage Documents
- W-2 Form
- Current Weapons Permit

If the driver's license you surrender is a valid "CDL," you will then be required to undergo a vision screening. Additional testing will be required to be licensed to transport hazardous material or drive a school bus.

If the driver's license you surrender is not a "CDL," you will be issued a non-CDL driver's license and you will have to apply for the proper learner's permit before you will be permitted to operate a commercial motor vehicle in Pennsylvania. The learner's permit entitles you to drive only the type of
vehicle for which you have applied. To drive with a commercial learner's permit, you must be accompanied by a person who has a valid driver's license for the type of vehicle you are driving. This person must occupy the seat beside you and be 21 years of age.

**HOW TO OBTAIN A CDL PERMIT WHEN NOT LICENSED IN PA OR ANOTHER STATE**

If you were never licensed, before you can apply for a CDL permit. You must pass a vision screening, a knowledge test and a physical examination.

The vision screening and knowledge tests are given at PENNDOT Driver Examination Centers. The vision screening will measure your vision with or without glasses. The knowledge test will measure your knowledge of traffic signs and the operation of your commercial motor vehicle. Study this manual and the "Pennsylvania Driver's Manual" carefully before taking the test.

To apply for a Pennsylvania driver's license, you should go to a PENNDOT Driver License Center and take the following documents with you:

1. your valid out-of-state driver's license,
2. your Social Security Card,
3. proof of identity, and
4. two proofs of residency
   *(non-U.S. citizens will have additional requirements.)*

Acceptable proof of identity includes:

- Birth Certificate with raised seal *(U.S. issued by an authorized government agency, including U.S. Territories or Puerto Rico. Non-U.S. birth certificates will not be accepted)*
- Certificate of Citizenship *(INS N-560)*
- Certificate of Naturalization *(INS N-550 or N-570)*
- PA Photo ID Card
- PA Photo Driver's License
- Valid U.S. Passport
- U.S. Military Photo ID Card

**NOTE:** Only valid passports and original documents will be accepted.

Acceptable documents for proof of residency include:

- Current Utility Bills *(water, gas, electric, cable, etc.)*
- Tax Records
- Lease Agreements
- Mortgage Documents
- W-2 Form
- Current Weapons Permit

The examiner will complete part of the application form and give you a vision screening and knowledge test. The other part of the form must be filled out by you and your physician and presented along with all required fees to PENNDOT.

You should receive your knowledge test authorization at the PENNDOT site when they process your application. The knowledge test authorization will be valid for one (1) year from the date it is issued.
When you arrive for the knowledge examination, make sure you have the following items:

- PA Driver's license;
- Your Social Security Card (*signed and not laminated*)

Once you successfully complete your knowledge testing, the driver examination center will issue you the skills permit(s) for any skills testing that may be required. You must wait 30 days before you may take your skills testing.

When you are ready, you may schedule your skills test online via the PA PowerPort at: www.state.pa.us PA Keyword: Driver Test, or contact 1-800-423-5542 for an appointment. Most centers are closed on Sundays, Mondays, and on all legal holidays in Pennsylvania. For the days and hours of operation of a Driver License Center near you, please call 1-800-932-4600.

Learner's permits cannot be laminated (*covered in plastic*). This is because the driver license examiner cannot stamp a laminated permit when you successfully pass the skills test.

When you arrive for the skills examination, make sure you have the following four items:

- Your valid learner's permit;
- The registration card for the vehicle you plan to drive for the skills test;
- Proof that the vehicle is insured; and,
- The driver's license of the person accompanying you. The license must be for the class of vehicle you are going to drive and the accompanying driver must be at least 21 years of age.

You may also take the skills test through a third party tester. Monthly flyers issued with your learner's permit list the companies and locations.

When you have completed all of your testing, PENNDOT will issue you a new photo license.

**If you fail any part of the CDL skills test, you must make an appointment to be retested. You only need to be retested on the part(s) that you fail.**

If you fail the test three times or if your learner's permit expires, you can obtain an application (*Form DL-31CD*) for an extension of your learner's permit privileges from all Photo License Centers or the Bureau of Driver Licensing. Send this form, along with the appropriate fee, to the Bureau of Driver Licensing, P.O. Box 68272, Harrisburg, PA 17106-8272.

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### 1.3 OTHER SAFETY ACT RULES

There are other Commercial Motor Vehicle Safety Act rules which affect drivers. They are:

- You cannot have more than one driver's license. If you break this rule, a court may fine you up to $5,000 and put you in jail. Keep only your home state driver's license and return any and all others.
- You must notify your employer within 30 days of a conviction for any traffic violation (*except parking*). This is true no matter what type of vehicle you were driving at the time of the violation.
- You must notify PENNDOT within 30 days if you are convicted in any other State of any traffic violation (*except parking*). This is true no matter what type of vehicle you were driving at the time of the violation.
- You must notify your employer by the close of business on the next business day if your driver's license is suspended, revoked, or cancelled, or if your commercial driving privilege is disqualified.
• You must give your employer information on all driving jobs you have held for the past ten (10) years. You must do this when you apply for a commercial driving job.

• No one can drive a commercial motor vehicle in Pennsylvania without a CDL. If you do, you may be fined up to $5,000 or put in jail for violating this rule.

• Your employer may not let you drive a commercial motor vehicle if you have more than one driver’s license or if your CDL is suspended, revoked, cancelled, or disqualified. Your employer may be fined up to $5,000 or put in jail for violating this rule.

• Each state is connected to one computerized system to share information about CDL drivers. The states will check on drivers’ records to be sure that drivers don’t have more than one Commercial Driver’s License.

• You will lose your CDL for at least one (1) year for a first offense if you are convicted for:
  - Driving a commercial motor vehicle (CMV) while under the influence of alcohol or a controlled substance (for example, illegal drugs).
  - Accidents involving death or personal injury while driving a CMV.
  - Accidents involving damage to unattended vehicle or property while driving a CMV.
  - Driving a CMV while your driving privilege is suspended, revoked, cancelled or recalled or while subject to disqualification of an out-of-state service order.
  - Using a CMV to commit a felony.

Subsequent offenses will carry stiffer penalties.

If the offense occurs while you are operating a CMV that is placarded for hazardous materials, you will lose your CDL for at least three (3) years for the first offense. You will lose your CDL for life for a second offense. You will also lose your CDL for life if you use a CMV to commit a felony involving controlled substances.

• You will lose your CDL:
  - For at least 60 days if you have committed two serious traffic violations within a 3-year period involving a CMV.
  - For at least 120 days for three (3) serious traffic violations within a 3-year period.
  “Serious traffic violations” include but are not limited to traffic offenses committed in a CMV in connection with fatal traffic accidents, excessive speeding, reckless driving, or eluding the police.

• If you drive a school vehicle or school bus when your blood alcohol concentration (BAC) is 0.02 percent or more, you are driving under the influence of alcohol. If you drive any other type of commercial vehicle and your BAC is 0.04% or more, you are driving under the influence. You will lose your CDL for one year for your first offense. If your blood alcohol concentration is less than 0.02 percent for school bus and school vehicle drivers, or less than 0.04 percent for other commercial motor vehicle drivers, but you have any detectable amount, you can be placed out-of-service for up to 30 days.

**PENNSYLVANIA’S IMPLIED CONSENT LAW**

The "Implied Consent" law is very important to you as a CDL driver. If the police officer has reasonable ground to believe you were driving a CMV while having any alcohol in your system and you refuse to take one or more chemical tests of breath, blood or urine, your driving privilege will be automatically suspended for one (1) year in addition to the driving privilege suspension imposed for a conviction or ARD for driving while under the influence. Altogether, a conviction plus refusal, could result in a two (2) year driving privilege suspension.
The law covering chemical testing says that you have agreed to take such a test just by being licensed to drive in Pennsylvania. Even if you are found not guilty of driving while under the influence, your driving privilege will be suspended for one (1) year if you refuse to take a blood, breath or urine test. If you are driving a motor carrier vehicle, bus, school bus, or a vehicle transporting hazardous materials, the police officer investigating the accident will always request you be tested for alcohol and controlled substances.

These rules will improve highway safety for you and all highway users.

NOTE: The penalties identified in this publication may be revised, in whole or in part, by the General Assembly prior to your receipt of a subsequent notice. Please refer to Title 75 PA vehicle Code for specific regulations.
## REQUIRED LICENSE AND STUDY AID CHART

<table>
<thead>
<tr>
<th>IF YOU WANT TO DRIVE</th>
<th>TYPE OF CDL YOU NEED</th>
<th>STUDY SECTION(S)</th>
</tr>
</thead>
</table>
| Any combination of vehicles with a GVWR of 26,001 or more pounds, provided the GVWR of the vehicle(s) being towed is in excess of 10,000 pounds | **CLASS A** | Section 2: Driving Safely  
Section 3: Transporting Cargo Safely  
Section 6: Combination Vehicles |
| * With Double or Triple Trailers | T endorsement | Section 7: Double or Triple Trailers |
| * Tank Vehicle | N endorsement | Section 8: Tank Vehicles |
| * Hazardous Materials | H endorsement | Section 9: Hazardous Materials |
| * With Air Brakes | | Section 5: Air Brakes |
| * Without Air Brakes | L restriction | |
| Any single vehicle with a GVWR of 26,001 or more pounds, or any bus or school bus, or any such vehicle towing a vehicle not in excess of 10,000 pounds | **CLASS B** | Section 2: Driving Safely  
Section 3: Transporting Cargo Safely |
| * Tank Vehicle | N endorsement | Section 8: Tank Vehicles |
| * Carrying Passengers | P endorsement | Section 4: Transporting Passengers |
| * Hazardous Materials | H endorsement | Section 9: Hazardous Materials |
| * With Air Brakes | | Section 5: Air Brakes |
| * Without Air Brakes | L restriction | |
| Any single vehicle with a GVWR of less than 26,001 pounds or any such vehicle towing a vehicle not in excess of 10,000 pounds, including any bus designed to transport 16 or more passengers including the driver, or a school bus designed to transport 11 or more passengers including the driver. | **CLASS C** | Section 2: Driving Safely  
Section 3: Transporting Cargo Safely |
| * Carrying Passengers | P endorsement | Section 4: Transporting Passengers |
| * Hazardous Materials | H endorsement | Section 9: Hazardous Materials |
| * With Air Brakes | | Section 5: Air Brakes |
| * Without Air Brakes | L restriction | |

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**FIGURE 1-1**
This section contains knowledge and safe driving information that all commercial drivers should know. You must pass a test on this information to get a CDL.

This section does NOT have specific information on air brakes, combination vehicles, doubles, or passenger vehicles. You must read other sections of this manual to learn about them.

This section does have basic information on hazardous materials (HazMat) that all drivers should know. If you need a HazMat endorsement, you should study Section 9.

2.1 VEHICLE INSPECTION

WHY INSPECT?
Safety is the most important reason you inspect your vehicle. Safety for yourself and for other road users.

A vehicle defect found during an inspection could save you problems later. You could have a breakdown on the road that will cost time and dollars, or even worse, a crash caused by the defect.

Federal and state laws require that drivers inspect their vehicles. Federal and state inspectors also may inspect your vehicles. If they judge the vehicle to be unsafe, they will put it "out of service" until it is fixed.

TYPES OF VEHICLE INSPECTION

PRE-TRIP INSPECTION
A pre-trip inspection will help you find problems that could cause a crash or breakdown.

DURING A TRIP
For safety you should:

• Watch gauges for signs of trouble.
• Use your senses to check for problems (look, listen, smell, feel).
• Check critical items when you stop:
  - Tires, wheels and rims.
  - Brakes.
  - Lights and reflectors.
  - Brake and electrical connections to trailer.
  - Trailer coupling devices.
  - Cargo securement devices.
AFTER-TRIP INSPECTION AND REPORT
You should do an after-trip inspection at the end of the trip, day, or tour of duty on each vehicle you operated. It may include filling out a vehicle condition report listing any problems you find. The inspection report helps the motor carrier know when the vehicle needs repairs.

WHAT TO LOOK FOR

TIRE PROBLEMS
- Too much or too little air pressure.
- Bad wear. You need at least 4/32 inch tread depth in every major groove on front tires. You need 2/32 inch on other tires. No fabric should show through the tread or sidewall.
- Cuts or other damage.
- Tread separation.
- Dual tires that come in contact with each other or parts of the vehicle.
- Mismatched sizes.
- Radial and bias-ply tires used together.
- Cut or cracked valve stems.
- Regrooved, recapped, or retreaded tires on the front wheels of a bus. These are prohibited.

WHEEL AND RIM PROBLEMS
- Damaged rims.
- Rust around wheel nuts may mean the nuts are loose–check tightness. After a tire has been changed, stop a short while later and re-check tightness of nuts.
- Missing clamps, spacers, studs, or lugs means danger.
- Mismatched, bent, or cracked lock rings are dangerous.
- Wheels or rims that have had welding repairs are not safe.

BAD BRAKE DRUMS OR SHOES
- Cracked drums.
- Shoes or pads with oil, grease, or brake fluid on them.
- Shoes worn dangerously thin, missing, or broken.

STEERING SYSTEM DEFECTS (see figure 2-1)
- Missing nuts, bolts, cotter keys, or other parts.
- Bent, loose, or broken parts, such as steering column, steering gear box, or tie rods.
- If power steering equipped–hoses, pumps, and fluid level; check for leaks.
- Steering wheel play of more than ten (10) degrees (approximately two (2) inches movement at the rim of a 20-inch steering wheel) can make it hard to steer.

Figure 2-1
Examples of Steering System Key Parts
SUSPENSION SYSTEM DEFECTS
The suspension system holds up the vehicle and its load. It keeps the axles in place. Therefore, broken suspension parts can be extremely dangerous. Look for:

- Spring hangers (figure 2-2) that allow movement of axle from proper position.
- Cracked or broken spring hangers.
- Missing or broken leaves in any leaf spring. If one fourth or more are missing, it will put the vehicle "out of service" but any defect could be dangerous (figure 2-3).
- Broken leaves in a multi-leaf spring or leaves that have shifted so they might hit a tire or other part.
- Leaking shock absorbers (figure 2-4).
- Torque rod or arm, U-bolts, spring hangers, or other axle positioning parts that are cracked, damaged, or missing (figure 2-2).
- Air suspension systems that are damaged and/or leaking (figure 2-4).
- Any loose, cracked, broken, or missing frame members.

Figure 2-2
Key Suspension Parts

Figure 2-3
Safety Defect:
Broken Leaf in Leaf Spring

Figure 2-4
Air Suspension Parts
EXHAUST SYSTEM DEFECTS
A broken exhaust system can let poisonous fumes into the cab or sleeper berth. Look for:
• Loose, broken, or missing exhaust pipes, mufflers, tailpipes, or vertical stacks.
• Loose, broken, or missing mounting brackets, clamps, bolts, or nuts.
• Exhaust system parts rubbing against fuel system parts, tires, or other moving parts of vehicle.
• Exhaust system parts that are leaking.

EMERGENCY EQUIPMENT
Vehicles must be equipped with emergency equipment. Look for:
• Fire extinguisher(s).
• Spare electrical fuses (unless equipped with circuit breakers).
• Warning devices for parked vehicles (for example, three reflective warning triangles).

CARGO (TRUCKS)
You must make sure the truck is not overloaded and the cargo is balanced and secured before each trip. If the cargo contains hazardous materials, you must inspect for proper papers and placarding.

<table>
<thead>
<tr>
<th>TEST YOUR KNOWLEDGE</th>
</tr>
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<tbody>
<tr>
<td>1. What is the most important reason for doing a vehicle inspection?</td>
</tr>
<tr>
<td>2. What things should you check during a trip?</td>
</tr>
<tr>
<td>3. Name some key steering system parts.</td>
</tr>
<tr>
<td>4. Name some suspension system defects.</td>
</tr>
<tr>
<td>5. What three kinds of emergency equipment must you have?</td>
</tr>
<tr>
<td>6. What is the minimum tread depth for front tires?</td>
</tr>
<tr>
<td>7. For other tires?</td>
</tr>
</tbody>
</table>

✦     ✦     ✦
These questions may be on the test.
If you can't answer them all, re-read the previous Section 2 information.

CDL PRE-TRIP VEHICLE INSPECTION TEST
In order to obtain a CDL you will be required to pass a pre-trip vehicle inspection test. You will be tested to see if you know whether your vehicle is safe to drive. You may be asked to do a pre-trip inspection of your vehicle and explain to the examiner what you would inspect and why. Section 10 of this manual tells you what to inspect and how to inspect it.

A SEVEN-STEP INSPECTION METHOD
METHOD OF INSPECTION
You should do a pre-trip inspection the same way each time so you will learn all the steps and be less likely to forget something. The following seven-step method should be useful.
APPROACHING THE VEHICLE
Notice general condition. Look for damage or vehicle leaning to one side. Look under the vehicle for fresh oil, coolant, grease, or fuel leaks. Check the area around the vehicle for hazards to vehicle movement (people, other vehicles, objects, low hanging wires, limbs, etc.).

STEP 1: VEHICLE OVERVIEW
Review Last Vehicle Inspection Report
Drivers may have to make a vehicle inspection report in writing each day. The motor carrier must repair any item in the report that affects safety and certify on the report that repairs were made or were unnecessary. You must sign the report only if defects were noted and certified to be repaired or not needed to be repaired.

STEP 2: CHECK ENGINE COMPARTMENT
Check That The Parking Brakes Are On And/Or Wheels Chocked
You may have to raise the hood, tilt the cab (secure loose things so they don't fall and break something), or open the engine compartment door. Check the following:
• Engine oil level.
• Coolant level in radiator; condition of hoses.
• Power steering fluid level; hose condition (if so equipped).
• Windshield washer fluid level.
• Battery fluid level, connections and tie downs (battery may be located elsewhere).
• Automatic transmission fluid level (may require engine to be running).
• Check belts for tightness and excessive wear (alternator, water pump, air compressor)—learn how much "give" the belts should have when adjusted right, and check each one.
• Leaks in the engine compartment (fuel, coolant, oil, power steering fluid, hydraulic fluid, battery fluid).
• Cracked, worn electrical wiring insulation.
Lower and secure hood, cab, or engine compartment door.

STEP 3: START ENGINE AND INSPECT INSIDE THE CAB
Get In And Start Engine
• Make sure parking brake is on.
• Put gearshift in neutral (or "park" if automatic).
• Start engine; listen for unusual noises.

Look At The Gauges
• Oil pressure should come up to normal within seconds after the engine is started.
• Ammeter and/or voltmeter should be in normal range(s).
• Coolant temperature should begin gradual rise to normal operating range.
• Engine oil temperature should begin gradual rise to normal operating range.
• Warning lights or buzzers for oil, coolant, and charging circuit should go out right away.

Check Condition Of Controls
Check all of the following for looseness, sticking, damage, or improper setting:
• Steering wheel.
• Clutch.
• Accelerator ("gas pedal”).
• Brake controls:
  - Foot brake.
- **Trailer brake (if vehicle has one).**
- **Parking brake.**
- **Retarder controls (if vehicle has them).**

  - Transmission controls.
  - Interaxle differential lock *(if vehicle has one).*
  - Horn(s).
  - Windshield wiper/washer.

  - **Lights:**
    - Headlights.
    - Dimmer switch.
    - Turn signal.
    - 4-Way flashers.
    - Clearance, identification, marker light switch(es).

**Check Mirrors And Windshield**

- Inspect mirrors and windshield for cracks, dirt, illegal stickers, or other obstructions to seeing. Clean and adjust as necessary.

**Check Emergency Equipment**

- Check for safety equipment:
  - Spare electrical fuses *(unless vehicle has circuit breakers).*
  - Three (3) red reflective triangles.
  - Properly charged and rated fire extinguisher.

- Check for optional items such as:
  - Tire chains *(where winter conditions require them).*
  - Tire changing equipment.
  - List of emergency phone numbers.
  - Accident reporting kit (packet).

**STEP 4: TURN OFF ENGINE AND CHECK LIGHTS**

Be safe, make sure the parking brake is set, turn off the engine, and take the key with you so no one else can start the vehicle. Turn on headlights (low beams) and 4-way flashers, and get out.

**STEP 5: DO WALK-AROUND INSPECTION**

- Go to front of vehicle and check that low beams are on and both of the 4-way flashers are working.
- Push dimmer switch and check that high beams work.
- Turn off headlights and 4-way, hazard warning flashers.
- Turn on parking, clearance, side-marker and identification lights.
- Turn on right turn signal, and start walk-around inspection.

**General**

- Walk around and inspect.
- Clean all lights, reflectors and glass as you go along.

**Left Front Side**

- Driver's door glass should be clean.
- Door latches or locks work properly.
• Left front wheel:
  - Conditions of wheel and rim—missing, bent, broken studs, clamps, lugs, any signs of misalignment.
  - Condition of tires—properly inflated, valve stem and cap OK, no serious cuts, bulges, tread wear.
  - Use wrench to test rust-streaked lug nuts, indicating looseness.
  - Hub oil level OK, no leaks.

• Left front suspension:
  - Condition of spring, spring hangers, shackles, U-bolts.
  - Shock absorber condition.

• Left front brake:
  - Condition of brake drum.
  - Condition of hoses.

Front

• Condition of front axle.

• Condition of steering system:
  - No loose, worn, bent, damaged or missing parts.
  - Must grab steering mechanism to test for looseness.

• Condition of windshield:
  - Check for damage and clean if dirty.
  - Check windshield wiper arms for proper spring tension.
  - Check wiper blades for damage, "stiff" rubber, and securement.

• Lights and reflectors:
  - Parking, clearance and identification lights are clean, operating, and proper color (amber at front).
  - Reflectors are clean and proper color (amber at front).

• Right front turn signal light clean, operating, and proper color (amber or white on signals facing forward).

Right Side

• Right front: check all items as done on left front.

• Primary and secondary safety cab locks engaged (if cab-over-engine design).

• Right fuel tank(s):
  - Securely mounted, not damaged or leaking.
  - Fuel crossover line secure.
  - Tank(s) contain enough fuel.
  - Cap(s) on and secure.

• Condition of visible parts:
  - Rear of engine—not leaking.
  - Transmission—not leaking.
  - Exhaust system—secure, not leaking, not touching wires, fuel, or air lines.
  - Frame and cross members—no bends, cracks.
  - Air lines and electrical wiring—secured against snagging, rubbing, wearing.
  - Spare tire carrier or rack not damaged (if so equipped).
  - Spare tire and/or wheel securely mounted in rack.
  - Spare tire and wheel adequate (proper size, properly inflated).
• Cargo securement (trucks):
  - Cargo properly blocked, braced, tied, chained, etc.
  - Header board adequate, secure (if required).
  - Side boards, stakes strong enough, free of damage, properly set in place (if so equipped).
  - Canvas or tarp (if required) properly secured to prevent tearing, billowing, or blocking of mirrors.
  - If oversize, all required signs (flags, lamps, and reflectors) must be safely and properly mounted and all required permits in driver's possession.
  - Curbside cargo compartment doors securely closed, latched/locked, required security seals in place.

Right Rear
• Condition of wheels and rims—no missing, bent, broken spacers, studs, clamps, lugs.
• Condition of tires—properly inflated, valve stems and caps OK, no serious cuts, bulges, tread wear, tires not rubbing each other and nothing stuck between them.
• Tires same type, e.g., not mixed radial and bias types.
• Tires evenly matched (same sizes).
• Wheel bearing/seals not leaking.
• Suspension:
  - Condition of spring(s), spring hangers, shackles, and U-bolts.
  - Axle secure.
  - Powered axles(s) not leaking lube (gear oil).
  - Condition of torque rod arms, bushings.
  - Condition of shock absorber(s).
  - If retractable axle equipped, check condition of lift mechanism. If air powered, check for leaks.

• Brakes:
  - Brake adjustment.
  - Condition of brake drum(s).
  - Condition of hoses—look for any wear due to rubbing.

• Lights and reflectors:
  - Side-marker lights clean, operating, and proper color (red at rear, others amber).
  - Side-marker reflectors clean and proper color (red at rear, others amber).

Rear
• Lights and reflectors:
  - Rear clearance and identification lights clean, operating, and proper color (red at rear).
  - Reflectors clean and proper color (red at rear).
  - Taillights clean, operating and proper color (red at rear).
  - Right rear turn signal operating and proper color (red, yellow, or amber at rear).

• License plate(s) present, clean and secured.
• Splash guards present, not damaged, properly fastened, not dragging on ground or rubbing tires.
• Cargo secure (trucks):
  - Cargo properly blocked, braced, tied, chained, etc.
  - Tailboards up and properly secured.
  - End gates free of damage, properly secured in stake sockets.
  - Canvas or tarp (if required) properly secured to prevent tearing, or billowing to block either the rearview mirrors or to cover rear lights.
- If over-length or over-width, make sure all signs and/or additional lights/flags are safely and properly mounted and all required permits are in driver's possession.
- Rear doors securely closed, latched/locked.

**Left Side**

- Check all items as done on right side, plus:
  - Battery(s) *(if not mounted in engine compartment).*
  - Battery(s) box securely mounted to vehicle.
  - Box has secure cover.
  - Battery(s) secured against movement.
  - Battery(s) not broken or leaking.
  - Fluid in battery(s) at proper level *(except maintenance-free type).*
  - Cell caps present and securely tightened *(except maintenance-free type).*
  - Vents in cell caps free of foreign material *(except maintenance-free type).*

**STEP 6: CHECK SIGNAL LIGHTS**

**Get In And Turn Off Lights**

- Turn off all lights.
- Turn on stop lights *(apply trailer hand brake or have a helper put on the brake pedal).*
- Turn on left turn signal lights.

**Get Out And Check Lights**

- Left front turn signal light clean, operating and proper color *(amber or white on signals facing the front).*
- Left rear turn signal light and both stop lights clean, operating, and proper color *(red, yellow, or amber).*

**Get In Vehicle**

- Turn off lights not needed for driving.
- Check for all required papers, trip manifests, permits, etc.
- Secure all loose articles in cab *(they might interfere with operation of the controls or hit you in a crash).*
- Start the engine.

**STEP 7: START THE ENGINE AND CHECK BRAKE SYSTEM**

**Test For Hydraulic Leaks**

If the vehicle has hydraulic brakes, pump the brake pedal three times. Then apply firm pressure to the pedal and hold for five seconds. The pedal should not move. If it does, there may be a leak or other problem. Get it fixed before driving.

If the vehicle has air brakes, do the checks described in Sections 5 and 6 of this manual.

**Test Parking Brake**

- Fasten seat belt.
- Allow vehicle to move forward slowly.
- Apply parking brake.
- If it doesn’t stop vehicle, it is faulty; get it fixed.

**Test Service Brake Stopping Action**

- Go about five *(5)* miles per hour.
• Push brake pedal firmly.
• "Pulling" to one (1) side or the other can mean brake trouble.
• Any unusual brake pedal "feel" or delayed stopping action can mean trouble.

THIS COMPLETES THE PRE-TRIP INSPECTION

IF YOU FIND ANYTHING UNSAFE DURING THE PRE-TRIP INSPECTION, GET IT FIXED.

FEDERAL AND STATE LAWS FORBID OPERATING AN UNSAFE VEHICLE.

INSPECTION DURING A TRIP

CHECK VEHICLE OPERATION REGULARLY

You should check:
• Instruments.
• Air pressure gauge (if you have air brakes).
• Temperature gauges.
• Pressure gauges.
• Ammeter/voltmeter.
• Mirrors.
• Tires.
• Cargo, cargo covers.

If you see, hear, smell, or feel anything that might mean trouble, check it out.

Safety Inspection
• Drivers of trucks and truck tractors, when transporting cargo, must inspect the securement of the cargo within the first 25 miles of a trip and every 150 miles or every three (3) hours (whichever comes first) afterward.

AFTER-TRIP INSPECTION AND REPORT

You may have to make a written report each day on the condition of the vehicle(s) you drove. Report anything affecting safety or possibly leading to mechanical breakdown.

The vehicle inspection report tells the motor carrier about problems that may need fixing. Keep a copy of your report in the vehicle for one day. That way, the next driver can learn about any problems you have found.
## TEST YOUR KNOWLEDGE

1. Name some things you should check on the front of your vehicle during the walk-around inspection.
2. What should wheel bearing seals be checked for?
3. How many red reflective triangles should you carry?
4. How do you test hydraulic brakes for leaks?
5. Why put the starter switch key in your pocket during the pre-trip inspection?

✦✦✦

_These questions may be on the test._

*If you can't answer them all, re-read about the Seven-Step Inspection Method._

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### 2.2 BASIC CONTROL OF YOUR VEHICLE

Two (2) important skills necessary in controlling the speed and direction of your commercial vehicle safely are accelerating and steering.

**ACCELERATING**

Don't roll back when you start. You may hit someone behind you. Partly engage the clutch before you take your right foot off the brake. Put on the parking brake whenever necessary to keep from rolling back. Release the parking brake only when you have applied enough engine power to keep from rolling back. On a tractor-trailer equipped with a trailer brake hand valve, the hand valve can be applied to keep from rolling back.

Speed up smoothly and gradually so the vehicle does not jerk. Rough acceleration can cause mechanical damage. When pulling a trailer, rough acceleration can damage the coupling.

Speed up very gradually when traction is poor, as in rain or snow. If you use too much power, the drive wheels may spin. You could lose control. If the drive wheels begin to spin, take your foot off the accelerator.
STEERING

HOLD THE WHEEL PROPERLY
Hold the steering wheel firmly with both hands. Your hands should be on opposite sides of the wheel. If you hit a curb or a pothole (chuckhole), the wheel could pull away from your hands unless you have a firm hold.

BACKING SAFELY
Because you cannot see everything behind your vehicle, backing is always dangerous. Avoid backing whenever you can. When you park, try to park so you will be able to pull forward when you leave. When you have to back, here are a few simple safety rules:

- Look at your path.
- Back slowly.
- Back and turn toward the driver's side whenever possible.
- Use a helper whenever possible.

These rules are discussed in turn below.

Look At Your Path
Look at your line of travel before you begin. Get out and walk around the vehicle. Check your clearance to the sides and overhead in and near the path your vehicle will take.

Back Slowly
Always back as slowly as possible. Use the lowest reverse gear. That way you can more easily correct any steering errors. You also can stop quickly if necessary.

Back And Turn Toward The Driver's Side
Back to the driver's side so you can see better. Backing toward the right side is very dangerous because you can't see as well. If you back and turn toward the driver's side, you can watch the rear of your vehicle by looking out the side window. Use driver-side backing—even if it means going around the block to put your vehicle in this position. The added safety is worth it.

Use A Helper
Use a helper when you can. There are blind spots you can't see. That's why a helper is important.

The helper should stand near the back of your vehicle where you can see the helper. Before you begin backing, work out a set of hand signals that you both understand. Agree on a signal for "stop."

BACKING WITH A TRAILER
When backing a car, straight truck, or bus, you turn the top of the steering wheel toward the direction you want to go. When backing a trailer, you turn the steering wheel in the opposite direction. Once the trailer starts to turn, you must turn the wheel the other way to follow the trailer.

Whenever you back with a trailer, try to position your vehicle so you can back in a straight line. If you must back on a curved path, back to the driver's side so you can see.

Back Slowly
This will let you make corrections before you get too far off course.

Use The Mirrors
The mirrors will help you see whether the trailer is drifting to one side or the other.
**Correct Drift Immediately**

As soon as you see the trailer getting off the proper path, correct it by turning the top of the steering wheel in the direction of the drift.

**Pull Forward**

When backing a trailer, make pull-ups to re-position your vehicle as needed.

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### TEST YOUR KNOWLEDGE

1. Why should you back toward the driver's side?
2. What is a pull-up?
3. If stopped on a hill, how can you start moving without rolling back?
4. When backing, why is it important to use a helper?
5. What's the most important hand signal that you and the helper should agree on?

✦     ✦     ✦

*These questions may be on the test.*

*If you can't answer them all, re-read Section 2.2: Basic Control of Your Vehicle.*

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### 2.3 SHIFTING GEARS

Correct shifting of gears is important. If you can't get your vehicle into the right gear while driving, you will have less control.

**MANUAL TRANSMISSIONS**

**BASIC METHOD FOR SHIFTING UP**

Most heavy vehicles with manual transmissions require double clutching to change gears. This is the basic method:

1. Release accelerator, push in clutch and shift to neutral at the same time.
2. Release clutch.
3. Let engine and gears slow down to the RPM required for the next gear (this takes practice).
4. Push in clutch and shift to the higher gear at the same time.
5. Release clutch and press accelerator at the same time.

Shifting gears using double clutching requires practice. If you remain too long in neutral, you may have difficulty putting the vehicle into the next gear. If so, don't try to force it. Return to neutral, release clutch, increase engine speed to match road speed, and try again.

**KNOWING WHEN TO SHIFT UP**

There are two ways of knowing when to shift:

**Use Engine Speed (RPM)**

Study the driver's manual for your vehicle and learn the operating RPM range. Watch your
tachometer, and shift up when your engine reaches the top of the range. *(Some newer vehicles use “progressive” shifting: the RPM at which you shift becomes higher as you move up in the gears. Find out what's right for the vehicle you will operate.)*

**Use Road Speed (MPH)**

Learn what speeds each gear is good for. Then by using the speedometer, you'll know when to shift up.

With either method, you may learn to use engine sounds to know when to shift.

**BASIC PROCEDURE FOR SHIFTING DOWN**

1. Release accelerator, push in clutch and shift to neutral at the same time.
2. Release clutch.
3. Press accelerator, **increase** engine and gear speed to the RPM required in the lower gear.
4. Push in clutch and shift to the lower gear at the same time.
5. Release clutch and press accelerator at the same time.

Downshifting, like upshifting, requires knowing when to shift. Use either the tachometer or the speedometer and downshift at the right RPM or road speed.

Special conditions where you should downshift are:

**Before Starting Down A Hill**

Slow down and shift down to a speed that you can control without using the brakes hard. Otherwise, the brakes can overheat and lose their braking power. Downshift **before** starting down the hill. Make sure you are in a low enough gear, usually lower than the gear required to climb the same hill.

**Before Entering A Curve**

Slow down to a safe speed, and downshift to the right gear before entering the curve. This lets you use some power through the curve to help the vehicle be more stable while turning. It also lets you speed up as soon as you are out of the curve.

**MULTI-SPEED REAR AXLES AND AUXILIARY TRANSMISSIONS**

Multi-speed rear axles and auxiliary transmissions are used on many vehicles to provide extra gears. You usually control them by a selector knob or switch on the gearshift lever of the main transmission. There are many different shift patterns. Learn the right way to shift gears in the vehicle you will drive.

**AUTOMATIC TRANSMISSIONS**

Some vehicles have automatic transmissions. You can select a low range to get greater engine braking when going down grades. The lower ranges prevent the transmission from shifting up beyond the selected gear *(unless the governor RPM is exceeded)*. It is very important to use this braking effect when going down grades.

**RETARDERS**

Some vehicles have "retarders." Retarders help slow a vehicle, reducing the need for using your brakes. They reduce brake wear and give you another way to slow down. There are many types of retarders *(exhaust, engine, hydraulic, electric)*. All retarders can be turned on or off by the driver. On some the retarding power can be adjusted. When turned "on," retarders apply their braking power *(to the drive wheels only)* whenever you let up on the accelerator pedal all the way.
Caution: When your drive wheels have poor traction, the retarder may cause them to skid. Therefore, you should turn the retarder off whenever the road is wet, icy, or snow covered.

<table>
<thead>
<tr>
<th>TEST YOUR KNOWLEDGE</th>
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<tbody>
<tr>
<td>1. What are the two (2) special conditions where you should downshift?</td>
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<tr>
<td>2. When should you downshift automatic transmissions?</td>
</tr>
<tr>
<td>3. Retarders keep you from skidding when the road is slippery. True or False?</td>
</tr>
<tr>
<td>4. What are the two ways to know when to shift?</td>
</tr>
</tbody>
</table>

✦ ✦ ✦

These questions may be on the test.
If you can't answer them all, re-read Section 2.3: Shifting Gears.

2.4 SEEING

SEEING AHEAD
To be a safe driver you need to know what's going on all around your vehicle. Not looking properly is a major cause of accidents.

All drivers look ahead; but many don't look far enough ahead.

IMPORTANCE OF LOOKING FAR ENOUGH AHEAD
Because stopping or changing lanes can take a lot of distance, knowing what the traffic is doing on all sides of you is very important. You need to look well ahead to make sure you have room to make these moves safely.

HOW FAR AHEAD TO LOOK
Most good drivers look 12 to 15 seconds ahead. That means looking ahead the distance you will travel in 12 to 15 seconds. At lower speeds, that's about one block. At highway speeds it's about a quarter of a mile. If you're not looking that far ahead, you may have to stop too quickly or make quick lane changes. Looking 12 to 15 seconds ahead doesn't mean not paying attention to things that are closer. Good drivers shift their attention back and forth, near and far.

LOOK FOR TRAFFIC
Look for vehicles coming onto the highway, into your lane, or turning. Watch for brake lights from slowing vehicles. By seeing these things far enough ahead, you can change your speed or change lanes if necessary to avoid a problem.

LOOK FOR ROAD CONDITIONS
Look for hills and curves—anything you'll have to slow or change lanes for. Pay attention to traffic signals and signs. If a light has been green for a long time, it will probably change before you get
there. Start slowing down and be ready to stop. Traffic signs may alert you to road conditions where you may have to change speed.

**SEEING TO THE SIDES AND REAR**

It's important to know what's going on behind and to the sides. Check your mirrors regularly. Check more often in special situations.

**MIRROR ADJUSTMENT**

Mirror adjustment should be checked prior to the start of any trip and can only be checked accurately when the trailer(s) are straight. You should check and adjust each mirror as needed.

**REGULAR CHECKS**

You need to make regular checks of your mirrors to be aware of traffic and to check your vehicle.

**TRAFFIC**

Check your mirrors for vehicles on either side and in back of you. In an emergency, you may need to know whether you can make a quick lane change. Use your mirrors to spot overtaking vehicles. There are "blind spots" that your mirrors cannot show you. Check your mirrors regularly to know where other vehicles are around you, and to see if they move into your blind spots.

**CHECK YOUR VEHICLE**

Use the mirrors to keep an eye on your tires. It's one way to spot a tire fire. If you're carrying open cargo, you can use the mirrors to check it. Look for loose straps, ropes or chains. Watch for a flapping or ballooning tarp.

**SPECIAL SITUATIONS**

Special situations require more than regular mirror checks. These are lane changes, turns, merges, and tight maneuvers.

**Lane Changes**

You need to check your mirror to make sure no one is alongside you or about to pass you. Check your mirrors:

- Before you change lanes to make sure there is enough room.
- After you have signaled to check that no one has moved into your blind spot.
- Right after you start the lane change to double-check that your path is clear.
- After you complete the lane change.

**Turns**

In turns, check your mirrors to make sure the rear of your vehicle will not hit anything.

**Merges**

When merging, use your mirrors to make sure the gap in traffic is large enough for you to enter safely.

**Tight Maneuvers**

Any time you are driving in close quarters, check your mirrors often. Make sure you have enough clearance.

**How To Use Mirrors**

Use mirrors correctly by checking them quickly and understanding what you see.
Checking Quickly
When you use your mirrors while driving on the road, check quickly. Look back and forth between the mirrors and the road ahead. Don't focus on the mirrors for too long. Otherwise, you will travel quite a distance without knowing what's happening ahead.

Understanding What You See
Many large vehicles have curved (convex, "fisheye," "spot," "bugeye") mirrors that show a wider area than flat mirrors. This is often helpful. But everything appears smaller in a convex mirror than it would if you were looking at it directly. Things also seem farther away than they really are. It's important to realize this and to allow for it.

2.5 COMMUNICATING

SIGNAL YOUR INTENTIONS
Other drivers can't know what you are going to do until you tell them.

Signaling what you intend to do is important for safety. Here are some general rules for signaling:

TURNS
There are three good rules for using turn signals:

1. Signal early. Signal well before you turn. It is the best way to keep others from trying to pass you.
2. Signal continuously. You need both hands on the wheel to turn safely. Don't cancel the signal until you have completed the turn.
3. Cancel your signal. Don't forget to turn off your turn signal after you've turned (if you don't have self-canceling signals).

LANE CHANGES
Put your turn signal on before changing lanes. Change lanes slowly and smoothly. That way a driver you didn't see may have a chance to honk his/her horn or avoid your vehicle.

SLOWING DOWN
Warn drivers behind you when you see you'll need to slow down. A few light taps on the brake pedal—enough to flash the brake lights—should warn following drivers. Use the 4-way emergency flashers for times when you are driving very slow or are stopped. Warn other drivers in any of the following situations:

Trouble Ahead
The size of your vehicle may make it hard for drivers behind you to see hazards ahead. If you see a hazard that will require slowing down, warn the drivers behind by flashing your brake lights.

Tight Turns
Most car drivers don't know how slow you have to go to make a tight turn in a large vehicle. Give drivers behind you warning by braking early and slowing gradually.

Stopping On The Road
Truck and bus drivers sometimes stop in the road to unload cargo or passengers or to stop at a railroad crossing. Warn following drivers by flashing your brake lights. Don't stop suddenly.
Driving Slowly
Drivers often do not realize how fast they are catching up to a slow vehicle until they are very close. If you must drive slowly, alert following drivers by turning on your emergency flashers if it is legal. *(Laws regarding the use of flashers differ from one state to another. Check the laws of the states where you will drive.)*

DON'T DIRECT TRAFFIC
Some drivers try to help out others by signaling when it is safe to pass. You should not do this. You could cause an accident. You could be blamed and it could cost you many thousands of dollars.

COMMUNICATING YOUR PRESENCE
Other drivers may not notice your vehicle even when it's in plain sight. Let them know you're there to help prevent accidents.

WHEN PASSING
Whenever you are about to pass a vehicle, pedestrian or bicyclist, assume they don't see you. They could suddenly move in front of you. When it is legal, tap the horn lightly or, at night, flash your lights from low to high beam and back. And drive carefully enough to avoid a crash even if they don't see or hear you.

WHEN IT'S HARD TO SEE
At dawn or dusk or in the rain or snow, you need to make yourself easier to see. If you are having trouble seeing other vehicles, other drivers will have trouble seeing you. Turn on your lights. Use the headlights, not just the identification or clearance lights. Use the low beams; high beams can bother people in the daytime the same as at night.

WHEN PARKED AT THE SIDE OF THE ROAD
When you pull off the road and stop, be sure to turn on the 4-way emergency flashers. This is important at night. Don't trust the taillights to give warning. Drivers have crashed into the rear of a parked vehicle because they thought it was moving normally.

If you must stop on a road or the shoulder of any road, you must put out your emergency warning devices as soon as possible, but in any event within ten minutes. Place your warning devices at the following locations:

- If you stop on a 2-lane road carrying traffic in both directions or on an undivided highway, place warning devices within ten (10) feet of the front or rear corners to mark the location of the vehicle and 100 feet behind and ahead of the vehicle, on the shoulder or in the lane you stopped in *(see figure 2-5).*
- Back beyond any hill, curve, or other obstruction that prevents other drivers from seeing the vehicle within 500 feet *(see figure 2-6).*
- If you must stop on or by a one-way or divided highway, place warning devices ten (10) feet, 100 feet, and 200 feet toward the approaching traffic *(see figure 2-7).*

When putting out the triangles, hold them between yourself and the oncoming traffic for your own safety. *(So other drivers can see you).*

USE YOUR HORN WHEN NEEDED
Your horn can let others know you're there. It can help to avoid a crash. Use your horn when needed. However, it can startle others and could be dangerous when used unnecessarily.
Figure 2-5
Warning Device Placement:
Two-Lane (traffic in both directions) or Undivided Highway

Figure 2-6
Warning Device Placement:
Obstructed View

Figure 2-7
Warning Device Placement:
One Way or Divided Highway
2.6 CONTROLLING SPEED

Driving too fast is a major cause of fatal crashes. You must adjust your speed depending on driving conditions. These include traction, curves, visibility, traffic, and hills.

SPEED AND STOPPING DISTANCES
There are three things that add up to total stopping distance:

- Perception Distance
- + Reaction Distance
- + Braking Distance
- = Total Stopping Distance

Perception Distance
This is the distance your vehicle travels from the time your eyes see a hazard until your brain recognizes it. The perception time for an alert driver is about 3/4 second. At 55 mph, you travel 60 feet in 3/4 second.

Reaction Distance
The distance traveled from the time your brain tells your foot to move from the accelerator until your foot is actually pushing the brake pedal. The average driver has a reaction time of 3/4 second. This accounts for an additional 60 feet traveled at 55 mph.

Braking Distance
The distance it takes to stop once the brakes are put on. At 55 mph on dry pavement with good brakes it can take a heavy vehicle about 170 feet to stop. It takes about 4 1/2 seconds.

Total Stopping Distance
At 55 mph it will take about 6 seconds to stop and your vehicle will travel about the distance of a football field. (60 + 60 + 170 = 290 feet.)

THE EFFECT OF SPEED ON STOPPING DISTANCE
Whenever you double your speed, it takes about four times as much distance to stop and your vehicle will have four (4) times the destructive power if it crashes. High speeds increase stopping distances greatly. By slowing down a little, you can gain a lot in reduced braking distance.

THE EFFECT OF VEHICLE WEIGHT ON STOPPING DISTANCE
The heavier the vehicle, the more work the brakes must do to stop it and the more heat they absorb. But the brakes, tires, springs, and shock absorbers on heavy vehicles are designed to work best when the vehicle is fully loaded. Empty trucks require greater stopping distances, because an empty vehicle has less traction. It can bounce and lock up its wheels, giving much poorer braking. (This is not usually the case with buses.)

MATCHING SPEED TO THE ROAD SURFACE
You can't steer or brake a vehicle unless you have traction. Traction is friction between the tires and the road. There are some road conditions that reduce traction and call for lower speeds.

SLIPPERY SURFACES
It will take longer to stop and it will be harder to turn without skidding when the road is slippery. You must drive slower to be able to stop in the same distance as on a dry road. Wet roads can double stopping distance. Reduce speed by about one third (e.g., slow from 55 to about 35 mph) on a wet
road. On packed snow, reduce speed by a half or more. If the surface is icy, reduce speed to a crawl and stop driving as soon as you can safely do so.

IDENTIFYING SLIPPERY SURFACES
Sometimes it's hard to know if the road is slippery. Here are some signs of slippery roads:

Shaded Areas
Shady parts of the road will remain icy and slippery long after open areas have melted.

Bridges
When the temperature drops, bridges will freeze before the road will. Be especially careful when the temperature is close to 32 degrees F.

Melting Ice
Slight melting will make ice wet. Wet ice is much more slippery than ice that is not wet.

Black Ice
Black ice is a thin layer that is clear enough that you can see the road underneath it. It makes the road look wet. Anytime the temperature is below freezing and the road looks wet, watch out for black ice.

Vehicle Icing
An easy way to check for ice is to open the window and feel the front of the mirror, mirror support, or antenna. If there's ice on these, the road surface is probably starting to ice up.

Just After Rain Begins
Right after it starts to rain, the water mixes with oil left on the road by vehicles. This makes the road very slippery. If the rain continues, it will wash the oil away.

Hydroplaning
In some weather, water or slush collects on the road. When this happens, your vehicle can hydroplane. It's like water skiing: the tires lose their contact with the road and have little or no traction. You may not be able to steer or brake. You can regain control by releasing the accelerator and pushing in the clutch. This will slow your vehicle and let the wheels turn freely. If the vehicle is hydroplaning, do not use the brakes to slow down. If the drive wheels start to skid, push in the clutch to let them turn freely.

It does not take a lot of water to cause hydroplaning. Hydroplaning can occur at speeds as low as 30 mph if there is a lot of water. Hydroplaning is more likely if tire pressure is low or the tread is worn. (The grooves in a tire carry away the water; if they aren't deep, they don't work well.) Be especially careful driving through puddles. The water is often deep enough to cause hydroplaning.

SPEED AND CURVES
Drivers must adjust their speed for curves in the road. If you take a curve too fast, two things can happen. The tires can lose their traction and continue straight ahead, so you skid off the road. Or, the tires may keep their traction and the vehicle rolls over. Tests have shown that trucks with a high center of gravity can roll over at the posted speed limit for a curve.

Slow to a safe speed before you enter a curve. Braking in a curve is dangerous because it is easier to lock the wheels and cause a skid. Slow down as needed. Don’t ever exceed the posted speed limit for the curve. Be in a gear that will let you accelerate slightly in the curve. This will help you keep control.

SPEED AND DISTANCE AHEAD
You should always be able to stop within the distance you can see ahead. Fog, rain or other conditions may require that you slow down to be able to stop in the distance you can see. At night,
SPEED AND TRAFFIC FLOW
When you're driving in heavy traffic, the safest speed is the speed of other vehicles. Vehicles going the same direction at the same speed are not likely to run into one another. Drive at the speed of the traffic, if you can without going at an illegal or unsafe speed. Keep a safe following distance.

The main reason drivers exceed speed limits is to save time. But anyone trying to drive faster than the speed of traffic will not be able to save much time. The risks involved are not worth it. If you go faster than the speed of other traffic, you'll have to keep passing other vehicles. This increases the chance of a crash; and it is more tiring. Fatigue increases the chance of a crash. Going with the flow of traffic is safer and easier.

SPEEDS ON DOWNGRADES
Your vehicle's speed will increase on downgrades because of gravity. Your most important objective is to select and maintain a speed that is not too fast for the following:

- Total weight of the vehicle and cargo.
- Length of the grade.
- Steepness of the grade.
- Road Conditions.
- Weather.

If a speed limit is posted, or there is a sign indicating "Maximum Safe Speed," never exceed the speed shown. Also, look for and heed warning signs indicating the length and steepness of the grade. You must use the braking effect of the engine as the principal way of controlling your speed on downgrades. The braking effect of the engine is greatest when it is near the governed RPMs and the transmission is in the lower gears. Save your brakes so you will be able to slow or stop as required by road and traffic conditions. Shift your transmission to a low gear before starting down the grade and use the proper braking techniques. Please read carefully the section on going down long steep downgrades safely in "Mountain Driving."

<table>
<thead>
<tr>
<th>TEST YOUR KNOWLEDGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Why should you be in the proper gear before starting down a hill?</td>
</tr>
<tr>
<td>2. How far ahead does the manual say you should look?</td>
</tr>
<tr>
<td>3. What are two main things to look for ahead?</td>
</tr>
<tr>
<td>4. What's your most important way to see the sides and rear?</td>
</tr>
<tr>
<td>5. What does &quot;communicating&quot; mean in safe driving?</td>
</tr>
<tr>
<td>6. Where should your reflectors be placed when stopped on a divided highway?</td>
</tr>
<tr>
<td>7. What three things add up to total stopping distance?</td>
</tr>
<tr>
<td>8. If you go twice as fast, will your stopping distance increase by twice or four times?</td>
</tr>
<tr>
<td>9. Empty trucks have the best braking. True or False?</td>
</tr>
<tr>
<td>10. What is hydroplaning?</td>
</tr>
<tr>
<td>11. What is &quot;black ice&quot;?</td>
</tr>
</tbody>
</table>

These questions may be on the test.
If you can't answer them all, re-read Sections 2.4, 2.5, and 2.6.
To be a safe driver, you need space all around your vehicle. When things go wrong, space gives you time to think and to take action.

To have space available when something goes wrong, you need to manage space. While this is true for all drivers, it is very important for large vehicles. They take up more space and they require more space for stopping and turning.

**SPACE AHEAD**

Of all the space around your vehicle, it is the area ahead of the vehicle—the space you're driving into—that is most important.

**THE NEED FOR SPACE AHEAD**

You need space ahead in case you must suddenly stop. According to accident reports, the vehicle that trucks and buses most often run into is the one in front of them. The most frequent cause is following too closely. Remember, if the vehicle ahead of you is smaller than yours, it can probably stop faster than you can. You may crash if you are following too closely.

**HOW MUCH SPACE?**

How much space should you keep in front of you? One good rule says you need at least one second for each ten (10) feet of vehicle length at speeds below 40 mph. At greater speeds, you must add one second for safety. For example, if you are driving a 40-foot vehicle, you should leave four (4) seconds between you and the vehicle ahead. In a 60-foot rig, you’ll need six (6) seconds. Over 40 mph, you’d need five (5) seconds for a 40-foot vehicle and seven (7) seconds for a 60-foot vehicle.

To know how much space you have, wait until the vehicle ahead passes a shadow on the road, a pavement marking or some other clear landmark. Then count off the seconds like this: “one thousand-and-one, one thousand-and-two” and so on until you reach the same spot. Compare your count with the rule of one second for every ten (10) feet of length. If you are driving a 40-foot truck and only counted up to two (2) seconds, you're too close. Drop back a little and count again until you have four (4) seconds of following distance (or five (5) seconds, if you're going over 40 mph). After a little practice, you will know how far back you should be. Remember to add one second for speeds above 40 mph. Also remember that when the road is slippery, you need much more space to stop.

**SPACE BEHIND**

You can’t stop others from following you too closely. But there are things you can do to make it safer.

**STAY TO THE RIGHT**

Heavy vehicles are often tailgated when they can't keep up with the speed of traffic. This often happens when you're going uphill. If a heavy load is slowing you down, stay in the right lane if you can. Going uphill, you should not pass another slow vehicle unless you can get around quickly and safely.

**DEALING WITH TAILGATERS SAFELY**

In a large vehicle, it's often hard to see whether a vehicle is close behind you. You may be tailgated:

- When you are traveling slowly. Drivers trapped behind slow vehicles often follow closely.
- In bad weather. Many car drivers follow large vehicles closely during bad weather, especially when it is hard to see the road ahead.

If you find yourself being tailgated, here are some things you can do to reduce the chances of a crash:
• Avoid quick changes. If you have to slow down or turn, signal early and reduce speed very gradually.
• Increase your following distance. Opening up room in front of you will help you to avoid having to make sudden speed or direction changes. It also makes it easier for the tailgater to get around you.
• Don't speed up. It's safer to be tailgated at a low speed than a high speed.
• Avoid tricks. Don't turn on your taillights or flash your brake lights. Follow the suggestions above.

SPACE TO THE SIDES
Commercial vehicles are often wide and take up most of a lane. Safe drivers will manage what little space they have. You can do this by keeping your vehicle centered in your lane, and avoid driving alongside others.

STAYING CENTERED IN A LANE
You need to keep your vehicle centered in the lane to keep safe clearance on either side. If your vehicle is wide, you have little room to spare.

TRAVELING NEXT TO OTHERS
There are two dangers in traveling alongside other vehicles:
• Another driver may change lanes suddenly and turn into you.
• You may be trapped when you need to change lanes.

Find an open spot where you aren't near other traffic. When traffic is heavy, it may be hard to find an open spot. If you must travel near other vehicles, try to keep as much space as possible between you and them. Also, drop back or pull forward so that you are sure the other driver can see you.

STRONG WINDS
Strong winds make it difficult to stay in your lane. The problem is usually worse for lighter vehicles. This problem can be especially bad coming out of tunnels. Don't drive alongside others if you can avoid it.

SPACE OVERHEAD
Hitting overhead objects is a danger. Make sure you always have overhead clearance.
• Don't assume that the heights posted at bridges and overpasses are correct. Re-paving or packed snow may have reduced the clearances since the heights were posted.
• The weight of a vehicle changes its height. An empty van is higher than a loaded one. The fact that you got under a bridge when you were loaded does not mean that you can do it when you are empty.
• If you doubt you have safe space to pass under an object, go slowly. If you aren't sure you can make it, take another route. Warnings are often posted on low bridges or underpasses, but sometimes they are not.
• Some roads can cause a vehicle to tilt. There can be a problem clearing objects along the edge of the road, such as signs, trees or bridge supports. Where this is a problem, drive a little closer to the center of the road.
• Before you back into an area, get out and check for overhanging objects, such as trees, branches, or electric wires. It’s easy to miss seeing them while you are backing. (Also check for other hazards at the same time.)

**SPACE BELOW**
Many drivers forget about the space under their vehicles. That space can be very small when a vehicle is heavily loaded. Railroad tracks can stick up several inches. This is often a problem on dirt roads and in unpaved yards where the surface around the tracks can wear away. Don’t take a chance on getting hung up halfway across. Drainage channels across roads can cause the end of some vehicles to drag. Cross such depressions carefully.

**SPACE FOR TURNS**
The space around a truck or bus is important in turns. Because of wide turning and offtracking, large vehicles can hit other vehicles or objects during turns.

**Right Turns**
Here are some rules to help prevent right-turn crashes:

• Turn slowly to give yourself and others more time to avoid problems.
• If you are driving a truck or bus that cannot make the right turn without swinging into another lane, turn wide as you complete the turn, as shown in figure 2-8. Keep the rear of your vehicle close to the curb. This will stop other drivers from passing you on the right.
• Don’t turn wide to the left as your start the turn, as shown in figure 2-9. A following driver may think you are turning left and try to pass you on the right. You may crash into the other vehicle as you complete your turn.
• If you must cross into the oncoming lane to make a turn, watch out for vehicles coming toward you. Give them room to go by or to stop. However, don’t back up for them, because you might hit someone behind you.

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Figure 2-8
**Do This**

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Figure 2-9
**Don’t Do This**
**Left Turns**

On a left turn, make sure you have reached the center of the intersection before you start the left turn. If you turn too soon, the left side of your vehicle may hit another vehicle because of offtracking.

If there are two turning lanes, always take the right-hand turn lane, as shown in figure 2-10. Don't start in the inside lane because you may have to swing right to make the turn. Drivers on your left can be more readily seen.

![Figure 2-10](image)

*If there are two left turn lanes, use the right-hand lane*

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**SPACE NEEDED TO CROSS OR ENTER TRAFFIC**

Be aware of the size and weight of your vehicle when you cross or enter traffic. Here are some important things to keep in mind:

- Because of slow acceleration and the space large vehicles require, you may need a much larger gap to enter traffic than you would in a car.
- Acceleration varies with the load. Allow more room if your vehicle is heavily loaded.
- Before you start across a road, make sure you can get all the way across before traffic reaches you.
TEST YOUR KNOWLEDGE

1. How do you find out how many seconds of following distance space you have?
2. If you are driving a 30-foot vehicle at 55 mph, how many seconds of following distance should you allow?
3. You should decrease your following distance if somebody is following you too closely. True or False?
4. If you swing wide to the left before turning right, another driver may try to pass you on the right. True or False?

These questions may be on the test.
If you can't answer them all, re-read Section 2.7: Managing Space

2.8 DRIVING AT NIGHT

IT'S MORE DANGEROUS

You are at greater risk when you drive at night. Drivers can't see hazards as soon as in daylight, so they have less time to respond. Drivers caught by surprise are less able to avoid a crash.

The problems of night driving involve the driver, the roadway, and the vehicle. We will discuss each of these factors.

DRIVER FACTORS

VISION

People can't see as sharply at night or in dim light. Also, their eyes need time to adjust to seeing in dim light. Most people have noticed this when walking into a dark movie theater.

GLARE

Drivers can be blinded for a short time by bright light. It takes time to recover from this blindness. Older drivers are especially bothered by glare. Most people have been temporarily blinded by camera flash units or by the high beams of an oncoming vehicle. It can take several seconds to recover from glare. Even two seconds of glare blindness can be dangerous. A vehicle going 55 mph will travel more than half the distance of a football field during that time. Don't look directly at bright lights when driving. Look at the right side of the road. Watch the sidelines when someone coming toward you has very bright lights.

FATIGUE AND LACK OF ALERTNESS

Fatigue (being tired) and lack of alertness are bigger problems at night. The body's need for sleep is beyond a person's control. Most people are less alert at night, especially after midnight. This is particularly true if you have been driving for a long time. Drivers may not see hazards as soon or react as quickly, so the chance of a crash is greater. If you are sleepy, the only safe cure is to get off the road and get some sleep. If you don't, you risk your life and the lives of others.
ROADWAY FACTORS

POOR LIGHTING
In the daytime there is usually enough light to see well. This is not true at night. Some areas may have bright street lights, but many areas will have poor lighting. On most roads you will probably have to depend entirely on your headlights.

Less light means you will not be able to see hazards as well as in daytime. Road users who do not have lights are hard to see. There are many accidents at night involving pedestrians, joggers, bicyclists, and animals.

Even when there are lights, the road scene can be confusing. Traffic signals and hazards can be hard to see against a background of signs, shop windows, and other lights.

Drive slower when lighting is poor or confusing. Drive slowly enough to be sure you can stop in the distance you can see ahead.

DRUNK DRIVERS
Drunk drivers and drivers under the influence of drugs are a hazard to themselves and to you. Be especially alert around the closing times for bars and taverns. Watch for drivers who have trouble staying in their lane or maintaining speed, stop without reason, or show other signs of being under the influence of alcohol or drugs.

VEHICLE FACTORS
HEADLIGHTS
At night your headlights will usually be the main source of light for you to see and for others to see you. You can't see nearly as much with your headlights as you can see in the daytime. With low beams you can see ahead about 250 feet and with high beams about 350-500 feet. You must adjust your speed to keep your stopping distance within your sight distance. This means going slow enough to be able to stop within the range of your headlights. Otherwise, by the time you see a hazard, you will not have time to stop.

Night driving can be more dangerous if you have problems with your headlights. Dirty headlights may give only half the light they should. This cuts down your ability to see, and makes it harder for others to see you. Make sure your lights are clean and working. Headlights can be out of adjustment. If they don't point in the right direction, they won't give you a good view and they can blind other drivers. Have a qualified person make sure they are adjusted properly.

OTHER LIGHTS
In order for you to be seen easily, the following must be clean and working properly:

- Reflectors
- Marker lights
- Clearance lights
- Taillights
- Identification lights

TURN SIGNALS AND BRAKE LIGHTS
At night your turn signals and brake lights are even more important for telling other drivers what you intend to do. Make sure you have clean, working turn signals and stop lights.

WINDSHIELD AND MIRRORS
It is more important at night than in the daytime to have a clean windshield and clean mirrors. Bright
lights at night can cause dirt on your windshield or mirrors to create a glare of its own, blocking your view. Most people have experienced driving toward the sun just as it has risen or is about to set and found that they can barely see through a windshield that seemed to look OK in the middle of the day. Clean your windshield on the inside and outside for safe driving at night.

**NIGHT DRIVING PROCEDURES**

**PRE-TRIP PROCEDURES**

Make sure you are rested and alert. If you are drowsy, **sleep** before you drive! Even a nap can save your life or the lives of others. If you wear eyeglasses, make sure they are clean and unscratched. Don't wear sunglasses at night. Do a complete pre-trip inspection of your vehicle. Pay attention to checking all lights and reflectors and cleaning those you can reach.

**AVOID BLINDING OTHERS**

Glare from your headlights can cause problems for drivers coming towards you. They can also bother drivers going in the same direction you are, when your lights shine in their rearview mirrors. Dim your lights before they cause glare for other drivers. Dim your lights within 500 feet of an oncoming vehicle and when following another vehicle within 500 feet.

**AVOID GLARE FROM ONCOMING VEHICLES**

Do not look directly at lights of oncoming vehicles. Look slightly to the right at a right lane or edge marking, if available. If other drivers don't put their low beams on, don't try to "get back at them" by putting your own high beams on. This increases glare for oncoming drivers and increases the chance of a crash.

**USE HIGH BEAMS WHEN YOU CAN**

Some drivers make the mistake of always using low beams. This seriously cuts down on their ability to see ahead. Use high beams when it is safe and legal to do so. Use them when you are not within 500 feet of an approaching vehicle. Also, don't let the inside of your cab get too bright. This makes it harder to see outside. Keep the interior light off and adjust your instrument lights as low as you can and still be able to read the gauges.

**IF YOU GET SLEEPY, STOP DRIVING AT THE NEAREST SAFE PLACE**

People often don't realize how close they are to falling asleep even when their eyelids are falling shut. If you can safely do so, look at yourself in a mirror. If you look sleepy, or you just feel sleepy, **stop driving**! You are in a very dangerous condition. The only safe cure is to sleep.

---

**2.9 DRIVING IN FOG**

The best advice for driving in fog is don't. It is preferable that you pull off the road into a rest area or truck stop until visibility is better. If you must drive, be sure to consider the following:

- Obey all fog-related warning signs.
- Slow before you enter fog.
- Turn on all your lights. (*Headlights should be on low beams.*)
- Be prepared for emergency stops.
2.10 DRIVING IN WINTER

VEHICLE CHECKS
Make sure your vehicle is ready before driving in winter weather. You should make a regular pre-trip inspection, paying extra attention to the following items:

COOLANT LEVEL AND ANTIFREEZE AMOUNT
Make sure the cooling system is full and there is enough anti-freeze in the system to protect against freezing. This can be checked with a special coolant tester.

DEFROSTING AND HEATING EQUIPMENT
Make sure the defrosters work. They are needed for safe driving. Make sure the heater is working, and that you know how to operate it. If you use other heaters and expect to need them (e.g., mirror heaters, battery box heaters, fuel tank heaters) check their operation.

WIPERS AND WASHERS
Make sure the windshield wiper blades are in good condition. Make sure the wiper blades press against the window hard enough to wipe the windshield clean. Otherwise they may not sweep off snow properly. Make sure the windshield washer works and there is washing fluid contained in the washer reservoir. Use windshield washer antifreeze to prevent freezing of the washer liquid. If you can't see well enough while driving (for example, if your wipers fail), stop safely and fix the problem.

TIRES
Make sure you have enough tread on your tires. The drive tires must provide traction to push the rig over wet pavement and through snow. The steering tires must have traction to steer the vehicle. Enough tread is especially important in winter conditions. You must have at least 4/32 inch tread depth in every major groove on front tires and at least 2/32 inch on other tires. More would be better. Use a gauge to determine if you have enough tread for safe driving.

TIRE CHAINS
You may find yourself in conditions where you can't drive without chains, even to get to a place of safety. Carry the right number of chains and extra cross links. Make sure they will fit your drive tires. Check the chains for broken hooks, worn or broken cross links, and bent or broken side chains. Learn how to put the chains on before you need to do it in snow and ice.

LIGHTS AND REFLECTORS
Make sure the lights and reflectors are clean. Lights and reflectors are especially important during bad weather. Check from time to time during bad weather to make sure they are clean and working right.

WINDOWS AND MIRRORS
Remove any ice, snow, etc., from the windshield, windows, and mirrors before starting. Use a windshield scraper, snow brush, and windshield defroster as necessary.

HAND HOLDS, STEPS, AND DECK PLATES
Remove all ice and snow from hand holds, steps, and deck plates which you must use to enter the cab or to move about the vehicle. This will reduce the danger of slipping.

RADIATOR SHUTTERS AND WINTERFRONT
Remove ice from the radiator shutters. Make sure the winterfront is not closed too tightly. If the shutters freeze shut or the winterfront is closed too much, the engine may overheat and stop.
EXHAUST SYSTEM
Exhaust system leaks are especially dangerous when cab ventilation may be poor (windows rolled up, etc.). Loose connections could permit poisonous carbon monoxide to leak into your vehicle. Carbon monoxide gas will cause you to be sleepy. In large enough amounts it can kill you. Check the exhaust system for loose parts and for sounds and signs of leaks.

DRIVING

SLIPPERY SURFACES
Drive slowly and smoothly on slippery roads. If it is very slippery, you shouldn't drive at all. Stop at the first safe place.

The following are some safety guidelines:

Start Gently and Slowly
When first starting, get the feel of the road. Don't hurry.

Adjust Turning and Braking To Conditions
Make turns as gentle as possible. Don't brake any harder than necessary, and don't use the engine brake or speed retarder. (They can cause the driving wheels to skid on slippery surfaces.)

Adjust Speed To Conditions
Don't pass slower vehicles unless necessary. Go slow and watch far enough ahead to keep a steady speed. Avoid having to slow down and speed up. Take curves at slower speeds and don't brake while in curves. Be aware that as the temperature rises to the point where ice begins to melt, the road becomes even more slippery. Slow down more.

Adjust Space To Conditions
Don't drive alongside other vehicles. Keep a longer following distance. When you see a traffic jam ahead, slow down or stop to wait for it to clear. Try hard to anticipate stops early and slow down gradually.

Wet Brakes
When driving in heavy rain or deep standing water, your brakes will get wet. Water in the brakes can cause the brakes to be weak, to apply unevenly, or to grab. This can cause lack of braking power, wheel lockups, pulling to one side or the other, and jackknife if you pull a trailer.

Avoid driving through deep puddles or flowing water if possible. If not, you should:

- Slow down.
- Place transmission in a low gear.
- Gently put on the brakes. This presses linings against brake drums or discs and keeps mud, silt, sand, and water from getting in.
- Increase engine RPM and cross the water while keeping light pressure on the brakes.
- When out of the water, maintain light pressure on the brakes for a short distance to heat them up and dry them out.
- Make a test stop when safe to do so. Check behind to make sure no one is following, then apply the brakes to be sure they work right. If not, dry out further as described above. (CAUTION: Do no apply too much brake pressure and accelerator at the same time or you can overheat brake drums and linings.)
VEHICLE CHECKS

Do a normal pre-trip inspection, but pay special attention to the following items:

TIRES
Check the tire mounting and air pressure. Inspect the tires every two hours or every 100 miles when driving in very hot weather. Air pressure increases with temperature. Do not let air out or the pressure will be too low when the tires cool off. If a tire is too hot to touch, remain stopped until the tire cools off. Otherwise the tire may blow out or catch fire.

ENGINE OIL
The engine oil helps keep the engine cool, as well as lubricating it. Make sure there is enough engine oil. If you have an oil temperature gauge, make sure the temperature is within the proper range while you are driving.

ENGINE COOLANT
Before starting out, make sure the engine cooling system has enough water and antifreeze according to the engine manufacturer's directions. (Antifreeze helps the engine under hot conditions as well as cold conditions.) When driving, check the water temperature or coolant temperature gauge from time to time. Make sure that it remains in the normal range. If the gauge goes above the highest safe temperature, there may be something wrong that could lead to engine failure and possibly fire. Stop driving as soon as safely possible and try to find out what is wrong.

Some vehicles have sight glasses, see-through coolant overflow containers or coolant recovery containers. These permit you to check the coolant level while the engine is hot. If the container is not part of the pressurized system, the cap can be safely removed and coolant added even when the engine is at operating temperature.

Never remove the radiator cap or any part of the pressurized system until the system has cooled. Steam and boiling water can spray under pressure and cause severe burns. If you can touch the radiator cap with your bare hand, it is probably cool enough to open.

If coolant has to be added to a system without a recovery tank or overflow tank, follow these steps:

- Shut engine off.
- Wait until engine has cooled.
- Protect hands (use gloves or a thick cloth).
- Turn radiator cap slowly to the first stop, which releases the pressure seal.
- Step back while pressure is released from cooling system.
- When all pressure has been released, press down on the cap and turn it further to remove it.
- Visually check level of coolant and add more coolant if necessary.
- Replace cap and turn all the way to the closed position.

ENGINE BELTS
Learn how to check V-belt tightness on your vehicle by pressing on the belts. Loose belts will not turn the water pump and/or fan properly. This will result in overheating. Also, check belts for cracking or other signs of wear.

HOSES
Make sure coolant hoses are in good condition. A broken hose while driving can lead to engine failure and even fire.
DRIVING

WATCH FOR BLEEDING TAR
Tar in the road pavement frequently rises to the surface in very hot weather. Spots where tar "bleeds" to the surface are very slippery.

GO SLOW ENOUGH TO PREVENT OVERHEATING
High speeds create more heat for tires and the engine. In desert conditions the heat may build up to the point where it is dangerous. The heat will increase chances of tire failure or even fire, and engine failure.

<table>
<thead>
<tr>
<th>TEST YOUR KNOWLEDGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. You should use low beams whenever you can. True or False?</td>
</tr>
<tr>
<td>2. What should you do before you drive if you are drowsy?</td>
</tr>
<tr>
<td>3. What effects can wet brakes cause? How can you avoid these problems?</td>
</tr>
<tr>
<td>4. You should let air out of hot tires so the pressure goes back to normal. True or False?</td>
</tr>
<tr>
<td>5. You can safely remove the radiator cap as long as the engine isn't overheated. True or False?</td>
</tr>
</tbody>
</table>

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These questions may be on the test.
If you can't answer them all, re-read Sections 2.8, 2.9, 2.10, and 2.11.

2.12 RAILROAD CROSSINGS

Railroad crossings are always dangerous. Every such crossing must be approached with the expectation that a train is coming.

NEVER RACE A TRAIN TO A CROSSING
Never attempt to race a train to a crossing. It is extremely difficult to judge the speed of an approaching train.

REDUCE SPEED
Speed must be reduced in accordance with your ability to see approaching trains in any direction, and speed must be held to a point which will permit you to stop short of the tracks in case a stop is necessary.

DON'T EXPECT TO HEAR A TRAIN
Because of noise in the cab, you cannot expect to hear the train horn until the train is dangerously close to the crossing.

DON'T RELY ON SIGNALS
You should not rely solely upon the presence of warning signals, gates, or flagmen to warn of the approach of trains.
Double tracks require a double check. Remember that a train on one track may hide a train on the other track. Look both ways before crossing. After one train has cleared a crossing, be sure no other trains are near before starting across the tracks.

Yard areas and roads crossings in cities and towns are just as dangerous as rural grade crossings. Approach them with as much caution.

**STOP REQUIREMENTS**
A full-stop is required at grade crossings whenever:

- The nature of the cargo makes a stop mandatory under state or federal regulations.
- Such a stop is otherwise required by law

**CROSSING THE TRACKS**
Railroad crossings with steep approaches can cause your unit to hang up on the tracks.

Never permit traffic conditions to trap you in a position where you have to stop on the tracks. Be sure you can get all the way across the tracks before you start across.

Do not shift gears while crossing railroad tracks.

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### 2.13 MOUNTAIN DRIVING

In mountain driving, gravity plays a major role. On any upgrade, gravity slows you down. The steeper the grade, the longer the grade, and/or the heavier the load—the more you will have to use lower gears to climb hills or mountains. In coming down, long steep downgrades, gravity causes the speed of your vehicle to increase. You must select an appropriate safe speed, then use a low gear, and use proper braking techniques. You should plan ahead and obtain information about any long steep grades along your planned route of travel. If possible, talk to other drivers who are familiar with the grades to find out what speeds are safe.

You must go slow enough so your brakes can hold you back without getting too hot. If the brakes become too hot, they may start to “fade.” This means you have to apply them harder and harder to get the same stopping power. If you continue to use the brakes hard, they can keep fading until you cannot slow down or stop at all.

**SELECT A "SAFE" SPEED**
Your most important consideration is to select a speed that is not too fast for the:

- Total weight of the vehicle and cargo.
- Length of the grade.
- Steepness of the grade.
- Road conditions.
- Weather.

If a speed limit is posted, or there is a sign indicating "Maximum Safe Speed," never exceed the speed shown. Also, look for and heed warning signs indicating the length and steepness of the grade.

You must use the braking effect of the engine as the principal way of controlling your speed. The braking effect of the engine is greatest when it is near the governed RPMs and the transmission is in
the lower gears. Save your brakes so you will be able to slow or stop as required by road and traffic conditions.

**BE IN THE RIGHT GEAR BEFORE STARTING DOWN THE GRADE**

Shift the transmission to a low gear before starting down the grade. Do not try to downshift after your speed has already built up. You will not be able to shift into a lower gear. You may not even be able to get back into any gear and all engine braking effect will be lost. Forcing an automatic transmission into a lower gear at high speed could damage the transmission and also lead to loss of all engine braking effect.

With older trucks, a rule for choosing gears is to use the same gear going down a hill that you would need to climb the hill. However, new trucks have low friction parts and streamlined shapes for fuel economy. They may also have more powerful engines. This means they can go up hills in higher gears and have less friction and air drag to hold them back going down hills. For that reason, drivers of modern trucks may have to use lower gears going down a hill than would be required to go up the hill. You should know what is right for your vehicle.

**BRAKE FADING OR FAILURE**

Brakes are designed so brake shoes or pads rub against the brake drum or disks to slow the vehicle. Braking creates heat, but brakes are designed to take a lot of heat. However, brakes can fade or fail from excessive heat caused by using them too much and not relying on the engine braking effect.

Brake fade is also affected by adjustment. To safely control a vehicle, every brake must do its share of the work. Brakes out of adjustment will stop doing their share before those that are in adjustment. The other brakes can then overheat and fade, and there will not be enough braking available to control the vehicle. Brakes can get out of adjustment quickly, especially when they are used a lot; also, brake linings wear faster when they are hot. Therefore, brake adjustment must be checked frequently.

**SNUB BRAKING TECHNIQUE**

**REMEMBER:** The use of brakes on a long and/or steep downgrade is only a supplement to the braking effect of the engine. Once the vehicle is in the proper low gear, the following describes snub braking, which is the proper braking technique for long and/or steep downgrades:

1. Apply the brakes just hard enough to feel a definite slowdown.

2. When your speed has been reduced to approximately 5 mph below your "safe" speed, release the brakes (*this brake application should last for about three (3) seconds*).

3. When your speed has increased to your "safe" speed, repeat steps 1 and 2.

For example, if your "safe" speed is 40 mph, you would not apply the brakes until your speed reaches 40 mph. You now apply the brakes hard enough to gradually reduce your speed to 35 mph and then release the brakes. Repeat this as often as necessary until you have reached the end of the downgrade.

Escape ramps have been built on many steep mountain downgrades. Escape ramps are made to stop runaway vehicles safely without injuring drivers and passengers. Escape ramps use a long bed of loose soft material to slow a runaway vehicle, sometimes in combination with an upgrade.

Know escape ramp locations on your route. Signs show drivers where ramps are located. Escape ramps save lives, equipment, and cargo. Use them if you lose your brakes.
2.14 SEEING HAZARDS

IMPORTANCE OF SEEING HAZARDS

What Is A Hazard?
A hazard is any road condition or other road user (driver, bicyclist, pedestrian) that is a possible
danger. For example, a car in front of you is headed towards the freeway exit, but his brake lights
come on and he begins braking hard. This could mean that the driver is uncertain about taking
the offramp. He might suddenly return to the highway. This car is a hazard. If the driver of the car
cuts in front of you, it is no longer just a hazard; it is an emergency.

Seeing Hazards Lets You Be Prepared
You will have more time to act if you see hazards before they become emergencies. In the
example above, you might make a lane change or slow down to prevent a crash if the car
suddenly cuts in front of you. Seeing this hazard gives you time to check your mirrors and signal
a lane change. Being prepared reduces the danger. A driver who did not see the hazard until the
slow car pulled back on the highway in front of him would have to do something very suddenly.
Sudden braking or a quick lane change is much more likely to lead to a crash.

Learning To See Hazards
There are often clues that will help you see hazards. The more you drive, the better you can get
at seeing hazards. This section will talk about hazards that you should be aware of.

HAZARDOUS ROADS
Slow down and be very careful if you see any of the following road hazards:

WORK ZONES
When people are working on the road, it is a hazard. There may be narrower lanes, sharp turns, or
uneven surfaces. Other drivers are often distracted and drive unsafely. Workers and construction
vehicles may get in the way. Drive slowly and carefully near work zones. Use your 4-way flashers
and brake lights to warn drivers behind you. By law, you must turn on your headlights. Penalties are
increased for violations in work zones!

DROP OFF
Sometimes the pavement drops off sharply near the edge of the road. Driving too near the edge can
tilt your vehicle toward the side of the road. This can cause the top of your vehicle to hit roadside
objects (signs, tree limbs). Also, it can be hard to steer as you cross the drop off, going off the road,
or coming back on.

FOREIGN OBJECTS
Things that have fallen on the road can be hazards. They can be a danger to your tires and wheel
rims. They can damage electrical and brake lines. They can be caught between dual tires and
cause severe damage. Some obstacles which appear to be harmless can be very dangerous. For
example, cardboard boxes may be empty, but they may also contain some solid or heavy material
capable of causing damage. The same is true of paper and cloth sacks. It is important to remain
alert for objects of all sorts, so you can see them early enough to avoid them without making
sudden, unsafe moves.

OFFRAMPS/ONRAMPS
Freeway and turnpike exits can be particularly dangerous for commercial vehicles. Offramps and
onramps often have speed limit signs posted. Remember, these speeds may be safe for
automobiles, but may not be safe for larger vehicles or heavily loaded vehicles. Exits which go
downhill and turn at the same time can be especially dangerous. The downgrade makes it difficult to
reduce speed. Braking and turning at the same time can be a dangerous practice. Make sure you are going slow enough before you get on the curved part of an offramp or onramp.

**DRIVERS WHO ARE HAZARDS**

In order to protect yourself and others, you must know when other drivers may do something hazardous. Some clues to this type of hazard are discussed below.

**BLOCKED VISION**

People who can't see others are a very dangerous hazard. Be alert for drivers whose vision is blocked. Vans, loaded station wagons, and cars with the rear window blocked are examples. Rental trucks should be watched carefully. Their drivers are often not used to the limited vision they have to the side and rear of the truck. In winter, vehicles with frosted, ice covered, or snow covered windows are hazards.

Vehicles may be partly hidden by blind intersections or alleys. If you only can see the rear or front end of a vehicle but not the driver, then he or she can't see you. Be alert because he/she may back out or enter into your lane. Always be prepared to stop.

Delivery trucks can present a hazard. The driver's vision is often blocked by packages, or vehicle doors. Drivers of step vans, postal vehicles, and local delivery vehicles often are in a hurry and may suddenly step out of their vehicle or drive their vehicle into the traffic lane.

Parked vehicles can be hazards, when the people start to get out. Or, they may suddenly start up and drive into your way. Watch for movement inside the vehicle or movement of the vehicle itself that shows people are inside. Watch for brake lights or backup lights, exhaust, and other clues that a driver is about to move.

Be careful of a stopped bus. Passengers may cross in front of or behind the bus, and they often can't see you.

Pedestrians and bicyclists can also be hazards. Walkers, joggers, and bicyclists may be on the road with their back to the traffic, so they can't see you. Sometimes, they wear portable stereos with headsets, so they can't hear you either. This can be dangerous. On rainy days, pedestrians may not see you because of hats or umbrellas. They may be hurrying to get out of the rain and may not pay attention to the traffic.

**DISTRACTIONS**

People who are distracted are hazards. Watch for where they are looking. If they are looking elsewhere, they can't see you. But be alert even when they are looking at you. They may believe that they have the right of way.

**CHILDREN**

Children tend to act quickly without checking traffic. Children playing with one another may not look for traffic and are a serious hazard.

**TALKERS**

Drivers or pedestrians talking to one another may not be paying close attention to the traffic.

**WORKERS**

People working on or near the roadway are a hazard clue. The work creates a distraction for other drivers and the workers themselves may not see you.

**ICE CREAM TRUCK**

Someone selling ice cream is a hazard clue. Children may be nearby and may not see you.
DISABLED VEHICLE
Drivers changing a tire or fixing an engine often do not pay attention to the danger that roadway traffic is to them. They are often careless. Jacked up wheels or raised hoods are hazard clues.

ACCIDENTS
Accidents are particularly hazardous. People involved in the accident may not look for traffic. Passing drivers tend to look at the accident. People often run across the road without looking. Vehicles may slow or stop suddenly.

SHOPPERS
People in and around shopping areas are often not watching traffic because they are looking for stores or looking into store windows.

CONFUSED DRIVERS
Confused drivers often change direction suddenly or stop without warning. Confusion is common near freeway or turnpike interchanges and major intersections. Tourists unfamiliar with the area can be very hazardous. Clues to tourists include car-top luggage and out-of-state license plates. Unexpected actions *(stopping in the middle of a block, changing lanes for no apparent reason, backup lights suddenly going on)* are clues to confusion. Hesitation is another clue, including driving very slowly, using brakes often, or stopping in the middle of an intersection. You may also see drivers who are looking at street signs, maps, and house numbers. These drivers may not be paying attention to you.

SLOW DRIVERS
Motorists who fail to maintain normal speed are hazards. Seeing slow moving vehicles early can prevent a crash. Some vehicles, by their nature, are slow and seeing them is a hazard clue *(mopeds, farm machinery, construction machinery, tractors, etc.)*. Some of these will have the "slow moving vehicle" symbol to warn you. This is a red triangle with an orange center. Watch for it.

Drivers signaling a turn may be a hazard. Drivers signaling a turn may slow more than expected or stop. If they are making a tight turn into an alley or driveway, they may go very slow. If they are blocked by pedestrians or other vehicles, they may have to stop on the roadway. Vehicles turning left may have to stop for oncoming vehicles.

DRIVERS IN A HURRY
Drivers may feel your commercial vehicle is preventing them from getting where they want to go on time. Such drivers may pass you without a safe gap in the oncoming traffic, cutting too close in front of you. Drivers entering the road may pull in front of you in order to avoid being stuck behind you, causing you to brake. Be aware of this and watch for drivers who are in a hurry.

IMPAIRED DRIVERS
Drivers who are sleepy, have had too much to drink, on drugs, or who are ill are hazards. Some clues to these drivers are:
- Weaving across the road or drifting from one side to another.
- Leaving the road *(dropping right wheels onto the shoulder or bumping across a curb in a turn).*
- Stopping at the wrong time *(stopping at a green light, or waiting for too long at a stop).*
- Open window in cold weather.
- Speeds up or slows down suddenly, driving too fast or too slow.

Be alert for drunk drivers and sleepy drivers late at night.
DRIVER BODY MOVEMENT AS A CLUE
Drivers look in the direction they are going to turn. You may sometimes get a clue from a driver's head and body movements that a driver may be going to make a turn even though the turn signals aren't on. Drivers making over-the-shoulder checks may be going to change lanes. These clues are most easily seen in motorcyclists and bicyclists. Watch other road users and try to tell whether they might do something hazardous.

CONFLICTS
You are in conflict when you have to change speed and/or direction to avoid hitting someone. Conflicts occur at intersections where vehicles meet, at merges (such as turnpike on ramps) and where there are needed lane changes (such as the end of a lane, forcing a move to another lane of traffic). Other situations include slow moving or stalled traffic in a traffic lane, and accident scenes. Watch for other drivers who are in conflict because they are a hazard to you. When they react to this conflict, they may do something that will put them in conflict with you.

ALWAYS HAVE A PLAN
You should always be looking for hazards. Continue to learn to see hazards on the road. However, don't forget why you are looking for the hazards: they may turn into emergencies. You look for the hazards in order to have time to plan a way out of any emergency. When you see a hazard, think about the emergencies that could develop and figure out what you would do. Always be prepared to take action based on your plans. In this way, you will be a prepared, defensive driver who will improve not only your own safety but the safety of all road users.

TEST YOUR KNOWLEDGE

| 1. What factors determine your selection of a "safe" speed when going down a long, steep downgrade? |
| 2. Why should you be in the proper gear before starting down a hill? |
| 3. Describe the proper braking technique when going down a long, steep downgrade. |
| 4. What is a hazard? |
| 5. Why make emergency plans when you see a hazard? |

These questions may be on the test. If you can't answer them all, re-read Sections 2.12, 2.13, and 2.14

2.15 EMERGENCIES
Traffic emergencies occur when two vehicles are about to collide. Vehicle emergencies occur when tires, brakes, or other critical parts fail. Following the safety practices in this manual can help prevent emergencies. But if an emergency does happen, your chances of avoiding a crash depend upon how well you take action. Actions you can take are discussed below.
STEERING TO AVOID A CRASH
Stopping is not always the safest thing to do in an emergency. When you don't have enough room to stop, you may have to steer away from what's ahead. Remember, you can almost always turn to miss an obstacle more quickly than you can stop. (However, top-heavy vehicles and tractors with multiple trailers may flip over.)

KEEP BOTH HANDS ON THE STEERING WHEEL
In order to turn quickly, you must have a firm grip on the steering wheel with both hands. The best way to have both hands on the wheel, if there is an emergency, is to keep them there all the time.

HOW TO TURN QUICKLY AND SAFELY
A quick turn can be made safely, if it's done the right way. Here are some points that safe drivers use:

• Do not apply the brake while you are turning. It's very easy to lock your wheels while turning. If that happens, you may skid out of control.
• Do not turn any more than needed to clear whatever is in your way. The more sharply you turn, the greater the chances of a skid or rollover.
• Be prepared to "countersteer," that is, to turn the wheel back in the other direction, once you've passed whatever was in your path. Unless you are prepared to countersteer, you won't be able to do it quickly enough. You should think of emergency steering and countersteering as two parts of one driving action.

WHERE TO STEER
If an oncoming driver has drifted into your lane, a move to your right is best. If that driver realizes what has happened, the natural response will be to return to his or her own lane.

If something is blocking your path, the best direction to steer will depend on the situation.

• If you have been using your mirrors, you'll know which lane is empty and can be safely used.
• If the shoulder is clear, going right may be best. No one is likely to be driving on the shoulder but someone may be passing you on the left. You will know if you have been using your mirrors.
• If you are blocked on both sides, a move to the right may be best. At least you won't force anyone into an opposing traffic lane and a possible head-on collision.

LEAVING THE ROAD
In some emergencies, you may have to drive off the road. It may be less risky than facing a collision with another vehicle.

Most shoulders are strong enough to support the weight of a large vehicle and therefore, offer an available escape route. Here are some guidelines, if you do leave the road:

Avoid Braking
If possible, avoid using the brakes until your speed has dropped to about 20 mph. Then brake very gently to avoid skidding on a loose surface.

Keep One Set Of Wheels On The Pavement If Possible
This helps to maintain control.

Stay On The Shoulder
If the shoulder is clear, stay on it until your vehicle has come to a stop. Signal and check your mirrors before pulling back onto the road.

Returning To The Road
If you are forced to return to the road before you can stop, use the following procedure:

• Hold the wheel tightly and turn sharply enough to get right back on the road safely. Don't try to
edge gradually back on the road. If you do, your tires might grab unexpectedly and you could lose control.

- When both front tires are on the paved surface, countersteer immediately. The two turns should be made as a single "steer-countersteer" move.

**HOW TO STOP QUICKLY AND SAFELY**

If somebody suddenly pulls out in front of you, your natural response is to hit the brakes. This is a good response if there’s enough distance to stop and you use the brakes correctly.

You should brake in a way that will keep your vehicle in a straight line and allow you to turn if it becomes necessary. You can use the "controlled braking" method or the "stab braking" method.

**CONTROLLED BRAKING**

With this method, you apply the brakes as hard as you can without locking the wheels. Keep steering wheel movements very small while doing this. If you need to make a larger steering adjustment or if the wheels lock, release the brakes. Reapply the brakes as soon as you can.

**STAB BRAKING**

- Apply your brakes all the way.
- Release brakes when wheels lock up.
- As soon as the wheels start rolling, apply the brakes fully again. *(It can take up to one second for the wheels to start rolling after you release the brakes. If you re-apply the brakes before the wheels start rolling, the vehicle won’t straighten out.)*

**DON’T JAM ON THE BRAKES**

Emergency braking does not mean pushing down on the brake pedal as hard as you can. That will only keep the wheels locked up and cause a skid. If the wheels are skidding, you cannot control the vehicle.

**Note:** If you drive a vehicle with anti-lock brakes, you should read and follow the directions found in the Owners Manual for stopping quickly.

**BRAKE FAILURE**

Brakes kept in good condition rarely fail. Most **hydraulic** brake failures occur for one of two reasons: *(air brakes are discussed in Section 5)*

- Loss of hydraulic pressure.
- Brake fade on long hills.

**LOSS OF HYDRAULIC PRESSURE**

When the system won’t build up pressure, the brake pedal will feel spongy or go to the floor. Here are some things you can do:

**Downshift**

Putting the vehicle into a lower gear will help to slow the vehicle.

**Pump the Brakes**

Sometimes pumping the brake pedal will generate enough hydraulic pressure to stop the vehicle.

**Use The Parking Brake**

The parking or emergency brake is separate from the hydraulic brake system. Therefore, it can be used to slow the vehicle. However, be sure to press the release button or pull the release lever at the same time you use the emergency brake so you can adjust the brake pressure and keep the wheels from locking up.


**Find An Escape Route**

While slowing the vehicle, look for an escape route—an open field, side street, or escape ramp. Turning uphill is a good way to slow and stop the vehicle. Make sure the vehicle does not start rolling backward after you stop. Put it in low gear, apply the parking brake, and, if necessary, roll back into some obstacle that will stop the vehicle.

**BRAKE FAILURE ON DOWNGRADES**

Going slow enough and braking properly will almost always prevent brake failure on long downgrades. Once the brakes have failed, however, you are going to have to look outside your vehicle for something to stop it.

Your best hope is an escape ramp. If there is one, there will be signs telling you about it. Use it. Ramps are usually located a few miles from the top of the downgrade. Every year, hundreds of drivers avoid injury to themselves or damage to their vehicles by using escape ramps. Some escape ramps use soft gravel that resists the motion of the vehicle and brings it to a stop. Others turn uphill, using the hill to stop the vehicle and soft gravel to hold it in place.

Any driver who loses brakes going downhill should use an escape ramp if it's available. If you don't use it, your chances of having a serious crash may be much greater.

If no escape ramp is available, take the least hazardous escape route you can—such as an open field or a side road that flattens out or turns uphill. Make the move as soon as you know your brakes don't work. The longer you wait, the faster the vehicle will go and the harder it will be to stop.

**TIRE FAILURE**

**RECOGNIZE TIRE FAILURE**

Quickly knowing you have a tire failure will let you have more time to react. Having just a few seconds to remember what it is you're supposed to do can help you. The major signs of tire failure are:

**SOUND**

The loud "bang" of a blowout is an easily recognized sign. Because it can take a few seconds for your vehicle to react, you might think it was some other vehicle. But any time you hear a tire blow, you'd be safest to assume it was yours.

**VIBRATION**

If the vehicle thumps or vibrates heavily, it may be a sign that one of the tires has gone flat. With a rear tire, that may be the only sign you get.

**FEEL**

If the steering feels "heavy," it is probably a sign that one of the front tires has failed. Sometimes, failure of a rear tire will cause the vehicle to slide back and forth or "fishtail." However, dual rear tires usually prevent this.

Any of these signs is a warning of possible tire failure. You should do the following things:

**Hold The Steering Wheel Firmly**

If a front tire fails, it can twist the steering wheel out of your hand. The only way to prevent this is to keep a firm grip on the steering wheel with both hands at all times.

**Stay Off The Brake**

It's natural to want to brake in an emergency. However, braking when a tire has failed could cause loss of control. Unless you're about to run into something, stay off the brake until the vehicle has slowed down. Then brake very gently, pull off the road, and stop.
Check The Tires
After you've come to a stop, get out and check all the tires. Do this even if the vehicle seems to be handling all right. If one of your dual tires goes, the only way you may know it is by getting out and looking at it.

2.16 SKID CONTROL AND RECOVERY

A skid happens whenever the tires lose their grip on the road. This is caused in one of four ways:

OVER-BRAKING
Braking too hard and locking up the wheels. Skids also can occur when using the speed retarder when the road is slippery.

OVER-STEERING
Turning the wheels more sharply than the vehicle can turn.

OVER-ACCELERATION
Supplying too much power to the drive wheels, causing them to spin

DRIVING TOO FAST
Most serious skids result from driving too fast for road conditions. Drivers who adjust their driving to conditions don't over-accelerate and don't have to over-brake or over-steer from too much speed.

DRIVE-WHEEL SKIDS
By far the most common skid is one in which the rear wheels lose traction through excessive braking or acceleration. Skids caused by acceleration usually happen on ice or snow. They can be easily stopped by taking your foot off the accelerator. (If it is very slippery, push the clutch in. Otherwise, the engine can keep the wheels from rolling freely and regaining traction.)

Rear wheel braking skids occur when the rear drive wheels lock. Because locked wheels have less traction than rolling wheels, the rear wheels usually slide sideways in an attempt to "catch up" with the front wheels. In a bus or straight truck, the vehicle will slide sideways in a "spin out." With vehicles towing trailers, a drive-wheel skid can let the trailer push the towing vehicle sideways, causing a sudden jackknife (see figure 2-11).
CORRECTING A DRIVE-WHEEL BRAKING SKID

Do the following to correct a drive-wheel braking skid:

STOP BRAKING
This will let the rear wheels roll again, and keep the rear wheels from sliding any further. If on ice, push in the clutch to let the wheels turn freely.

TURN QUICKLY
When a vehicle begins to slide sideways, quickly steer in the direction you want the vehicle to go—down the road. You must turn the wheel quickly.

COUNTERSTEER
As a vehicle turns back on course, it has a tendency to keep right on turning. Unless you turn the steering wheel quickly the other way, you may find yourself skidding in the opposite direction.

Learning to stay off the brake, turn the steering wheel quickly, push in the clutch, and counter-steer in a skid takes a lot of practice. The best place to get this practice is on a large driving range or "skid pad."

FRONT-WHEEL SKIDS
Most front-wheel skids are caused by driving too fast for conditions. Other causes are: lack of tread on the front tires and cargo loaded so not enough weight is on the front axle. In a front-wheel skid, the front end tends to go in a straight line regardless of how much you turn the steering wheel. On a very slippery surface, you may not be able to steer around a curve or turn.

When a front-wheel skid occurs, the only way to stop the skid is to let the vehicle slow down. Stop turning and/or braking so hard. Slow down as quickly as possible without skidding.

TEST YOUR KNOWLEDGE

| 1. Stopping is not always the safest thing to do in an emergency. True or False? |
| 2. What are some advantages of going right instead of left around an obstacle? |
| 3. What is an "escape ramp"? |
| 4. If a tire blows out, you should put the brakes on hard to stop quickly. True or False? |

✦     ✦     ✦

These questions may be on the test.
If you can't answer them all, re-read Sections 2.15 and 2.16.

2.17 ACCIDENT PROCEDURES

When you're in an accident and not seriously hurt, you need to act to prevent further damage or injury. The basic steps to be taken at any accident are to:

- Protect the area.
• Notify authorities.
• Care for the injured.

PROTECT THE AREA
The first thing to do at an accident scene is to keep another accident from happening at the same spot. To protect the accident area:
• If your vehicle is involved in the accident, try to get it to the side of the road. This will help prevent another accident and allow traffic to move.
• If you’re stopping to help, park away from the accident. The area immediately around the accident will be needed for emergency vehicles.
• Put on your flashers.
• Set out reflective triangles to warn other traffic. Make sure they can be seen by other drivers in time for them to avoid the accident.

NOTIFY AUTHORITIES
If you have a CB, put out a call over the emergency channel before you get out of your vehicle. If not, wait until after the accident scene has been properly protected, then phone or send someone to phone the police. Try to determine where you are so you can give the exact location.

CARE FOR THE INJURED
If a qualified person is at the accident and helping the injured, stay out of the way unless asked to assist. Otherwise, do the best you can to help any injured parties. Here are some simple steps to follow in giving assistance:
• Don’t move a severely injured person unless the danger of fire or passing traffic makes it necessary.
• Stop heavy bleeding by applying direct pressure to the wound.
• Keep the injured person warm.

2.18 FIRES
Truck fires can cause damage and injury. Learn the causes of fires and how to prevent them. Know what to do to extinguish fires.

CAUSES OF FIRE
The following are some causes of vehicle fires:

AFTER ACCIDENTS
Spilled fuel, improper use of flares.

TIRES
Under-inflated tires and duals that touch.

ELECTRICAL SYSTEM
Short circuits due to damaged insulation, loose connections.

FUEL
Driver smoking, improper fueling, loose fuel connections.
CARGO
Flammable cargo, improperly sealed or loaded, poor ventilation.

FIRE PREVENTION
Pay attention to the following:

PRE-TRIP INSPECTION
Make a complete inspection of the electrical, fuel and exhaust systems, tires, and cargo. Be sure to check that the fire extinguisher is charged.

ENROUTE INSPECTION
Check the tires, wheels, and truck body for signs of heat whenever you stop during a trip.

FOLLOW SAFE PROCEDURES
Follow correct safety procedures for fueling the vehicle, using brakes, handling flares, and other activities that can cause a fire.

MONITORING
Check the instruments and gauges often for signs of overheating and use the mirrors to look for signs of smoke from tires or the vehicle.

CAUTION
Use normal caution in handling anything flammable.

FIREFIGHTING
Knowing how to fight fires is important. Fires have been made worse by drivers who didn't know what to do. Know how the fire extinguisher works. Study the instructions printed on the extinguisher before you need it. Here are some procedures to follow in case of fire:

PULL OFF THE ROAD
The first step is to get the vehicle off the road and stop. In doing so:
• Park in an open area, away from buildings, trees, brush, other vehicles, or anything that might catch fire.
• Don't pull into a service station!
• Notify emergency services of your problem and your location.

KEEP THE FIRE FROM SPREADING
Before trying to put out the fire, make sure that it doesn't spread any further.
• With an engine fire, turn off the engine as soon as you can. Don't open the hood if you can avoid it. Shoot extinguishers through louvers, radiator or from the underside of the vehicle.
• For a cargo fire in a van or box trailer, keep the doors shut, especially if your cargo contains hazardous materials. Opening the van doors will supply the fire with oxygen and can cause it to burn very fast.

USE THE RIGHT FIRE EXTINGUISHER
• The B:C type fire extinguisher is designed to work on electrical fires and burning liquids. The A:B:C type is designed to work on burning wood, paper and cloth as well.
• Water can be used on wood, paper or cloth, but don't use water on an electrical fire (you could get shocked) or a gasoline fire (it will just spread the flames).
• A burning tire must be cooled. Lots of water may be required.
• If you’re not sure what to use, especially on a hazardous materials fire, wait for qualified firefighters.

**EXTINGUISH THE FIRE**

Here are some rules to follow in putting out a fire:

• Only try to extinguish a fire if you know what you are doing and it is safe to do so.
• When using the extinguisher, stay as far away from the fire as possible.
• Aim at the source or base of the fire, not up in the flames.
• Position yourself upwind. Let the wind carry the extinguisher to the fire rather than carrying the flames to you.
• Continue until whatever was burning has been cooled. Absence of smoke or flame does not mean the fire is completely out or cannot restart.

### TEST YOUR KNOWLEDGE

1. What are some things to do at an accident scene to prevent another accident?
2. Name two causes of tire fires.
3. What kinds of fires is a B:C extinguisher not good for?
4. When using your extinguisher, should you get as close as possible to the fire?
5. Name some causes of vehicle fires.

✦     ✦     ✦

*These questions may be on the test.*

*If you can't answer them all, re-read Sections 2.17 and 2.18.*

---

**2.19 STAYING ALERT AND FIT TO DRIVE**

Driving a vehicle for long hours is tiring. Even the best of drivers will become less alert. However, there are things that good drivers do to help stay alert and safe. Here are a few suggestions:

**BE READY TO DRIVE**

**GET ENOUGH SLEEP**

Leaving on a long trip when you're already tired is dangerous. If you have a long trip scheduled, make sure that you get enough sleep before you go. Most people require 7-8 hours of sleep every 24 hours.

**SCHEDULE TRIPS SAFELY**

Your body gets used to sleeping during certain hours. If you are driving during those hours, you will be less alert. If possible, try to schedule trips for the hours you are normally awake. Many heavy motor vehicle accidents occur between midnight and 6 a.m. Tired drivers can easily fall asleep at
these times, especially if they don't regularly drive at those hours. Trying to push on and finish a long
trip at these times can be very dangerous.

**AVOID MEDICATION**
Many medicines can make you sleepy. Those that do have a label warning against operating
vehicles or machinery. The most common medicine of this type is an ordinary cold pill. If you have to
drive with a cold, you are better off suffering from the cold than from the effects of the medicine.

**KEEP COOL**
A hot, poorly ventilated cab can make you sleepy. Keep the window or vent cracked or use the air
conditioner, if you have one.

**TAKE BREAKS**
Short breaks can keep you alert. But the time to take them is before you feel really drowsy or tired.
Stop often. Walk around and inspect your vehicle. It may help to do some physical exercises.

**WHEN YOU DO BECOME SLEEPY**
When you are sleepy, trying to "push on" is far more dangerous than most drivers think. It is a major
cause of fatal accidents. Here are some important rules to follow:

**STOP TO SLEEP**
When your body needs sleep, sleep is the only thing that will work. If you have to make a stop
anyway, make it whenever you feel the first signs of sleepiness, even if it is earlier than you planned.
By getting up a little earlier the next day, you can keep on schedule without the danger of driving
while you are not alert.

**TAKE A NAP**
If you can't stop for the night, at least pull off at a safe place, such as a rest area or truck stop and
take a nap. A nap as short as a half-hour will do more to overcome fatigue than a half-hour coffee
stop.

**AVOID DRUGS**
There are no drugs that can overcome being tired. While they may keep you awake for a while, they
won't make you alert. And eventually, you'll be even more tired than if you hadn't taken them at all.
Sleep is the only thing that can overcome fatigue.

**ALCOHOL AND DRIVING**
Drinking alcohol and then driving is a very serious problem. People who drink alcohol are involved in
traffic accidents resulting in over 20,000 deaths every year. You should know:

- How alcohol works in the human body.
- How it affects driving.
- Laws regarding drinking and driving.
- Legal, financial, and safety risks of drinking and driving.

**THE TRUTH ABOUT ALCOHOL**
There are many dangerous ideas about the use of alcohol. The driver who believes in these wrong
ideas will be more likely to get into trouble. Here are some examples:
FALSE | THE TRUTH
---|---
Alcohol increases your ability to drive | Alcohol is a drug that will make you less alert and reduce your ability to drive safely
Some people can drink a lot and not be affected | Everyone who drinks is affected by alcohol
If you eat a lot first, you won't get drunk | Food will not keep you from getting drunk
Coffee and a little fresh air will help a drinker sober up | Only time will help a drinker sober up—other methods just don't work
Stick with beer—it's not as strong as wine or whiskey | A few beers are the same as a few shots of whiskey or a few glasses of wine

WHAT IS A DRINK?
It is the alcohol in drinks that affects human performance. It doesn't make any difference whether that alcohol comes from "a couple of beers" or from two glasses of wine or two shots of hard liquor.

All of the following drinks contain the same amount of alcohol:
- A 12 ounce glass of 5% beer.
- A 5 ounce glass of 12% wine.
- A 1 1/2 ounce shot of 80 proof liquor.

HOW ALCOHOL WORKS
Alcohol goes directly from the stomach into the blood stream. A drinker can control the amount of alcohol which he or she takes in, by having fewer drinks or none. However, the drinker cannot control how fast the body gets rid of alcohol. If you have drinks faster than the body can get rid of them, you will have more alcohol in your body and your driving will be more affected. The amount of alcohol in your body is commonly measured by the Blood Alcohol Concentration (BAC).

WHAT DETERMINES BLOOD ALCOHOL CONCENTRATION
BAC is determined by the amount of alcohol you drink (more alcohol means higher BAC), how fast you drink (faster drinking means higher BAC), and your weight (a small person doesn't have to drink as much to reach the same BAC).

ALCOHOL AND THE BRAIN
Alcohol affects more and more of the brain as BAC builds up. The first part of the brain affected controls judgement and self-control. One of the bad things about this is it can keep drinkers from knowing they are getting drunk. Of course, good judgement and self-control are absolutely necessary for safe driving.

As blood alcohol concentration continues to build up, muscle control, vision and coordination are affected more and more. Eventually, a person will pass out.

HOW ALCOHOL AFFECTS DRIVING
All drivers are affected by drinking alcohol. Alcohol affects judgement, vision, coordination and reaction time. It causes serious driving errors, such as:
- Increased reaction time to hazards.
- Driving too fast or too slow.
• Driving in the wrong lane.
• Running over the curb.
• Weaving.
• Straddling lanes.
• Quick, jerky starts.
• Not signaling, failure to use lights.
• Running stop signs and red lights.
• Improper passing.

These effects mean increased chances of a crash and chances of losing your driver's license. Accident statistics show that the chance of a crash is much greater for drivers who have been drinking than for drivers who were not.

OTHER DRUGS
Besides alcohol, other legal and illegal drugs are being used more often. Laws prohibit possession or use of many drugs while on duty. They prohibit being under the influence of any "controlled substance" an amphetamine (including "pep pills" and "bennies"), narcotics, or any other substance which can make the driver unsafe. This could include a variety of prescription and over-the-counter drugs (cold medicines) which may make the driver drowsy or otherwise affect safe driving ability. However, possession and use of a drug given to a driver by a doctor is permitted if the doctor informs the driver that it will not affect safe driving ability.

Pay attention to warning labels of legitimate drugs and medicines and to doctor's orders regarding possible effects. Stay away from illegal drugs. Don't use any drug that hides fatigue—the only cure for fatigue is rest. Alcohol can make the effects of other drugs much worse. The safest rule is don't mix drugs with driving at all.

Use of drugs can lead to traffic accidents resulting in death, injury and property damage. Furthermore, it can lead to arrest, fines and jail sentences. It can also mean the end of a person's driving career.

ILLNESS
Once in a while, you may become so ill that you cannot operate a motor vehicle safely. If this happens to you, you must not drive. However, in case of an emergency you may drive to the nearest place where you can safely stop.

2.20 HAZARDOUS MATERIALS
RULES FOR ALL COMMERCIAL DRIVERS

All drivers should know something about hazardous materials. You must be able to recognize hazardous cargo, and you must know whether or not you can haul it without having a Hazardous Materials endorsement to your CDL license.

WHAT ARE HAZARDOUS MATERIALS
Hazardous Materials are products that pose a risk to health, safety, and property during transportation. Figure 2-12 is the hazardous material table found in the federal rules. This table lists the nine (9) different hazard classes.
WHY ARE THERE RULES?
You must follow the many rules about transporting them. The intent of the rules is to:

- Contain the product.
- Communicate the risk.
- Ensure safe drivers and equipment.

TO CONTAIN THE PRODUCT
Many hazardous products can injure or kill on contact. To protect drivers and others from contact, the rules tell shippers how to package safely. Similar rules tell drivers how to load, transport and unload bulk tanks. These are containment rules.

TO COMMUNICATE THE RISK
The shipper uses a shipping paper and package labels to warn dockworkers and drivers of the risk. Shipping orders, bills of lading and manifests are all examples of shipping papers.

The shipping paper describes the hazardous materials being transported. Shipping orders, bills of lading and manifests are all shipping papers. Shippers put (4) four-inch diamond shaped hazard warning labels on most hazardous materials packages. These labels inform others of the hazard. If the diamond label won't fit on the container, shippers put the label on a tag. For example, compressed gas cylinders that will not hold a label will have tags or decals. Labels look like the examples shown in figure 2-13.

<table>
<thead>
<tr>
<th>Class</th>
<th>Division</th>
<th>Name of Class or Division</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.1</td>
<td>Mass Explosives</td>
<td>Dynamite</td>
</tr>
<tr>
<td></td>
<td>1.2</td>
<td>Projection Hazards</td>
<td>Flares</td>
</tr>
<tr>
<td></td>
<td>1.3</td>
<td>Mass Fire Hazards</td>
<td>Display Fireworks</td>
</tr>
<tr>
<td></td>
<td>1.4</td>
<td>Minor Hazards</td>
<td>Ammunition</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>Very Inensitive</td>
<td>Blasting Agents</td>
</tr>
<tr>
<td></td>
<td>1.6</td>
<td>Extremely Inensitive</td>
<td>Explosive Devices</td>
</tr>
<tr>
<td>2</td>
<td>2.1</td>
<td>Flammable Gases</td>
<td>Propane</td>
</tr>
<tr>
<td></td>
<td>2.2</td>
<td>Non-Flammable Gases</td>
<td>Helium</td>
</tr>
<tr>
<td></td>
<td>2.3</td>
<td>Poisonous/Toxic Gases</td>
<td>Fluorine, Compressed</td>
</tr>
<tr>
<td>3</td>
<td>–</td>
<td>Flammable Liquids</td>
<td>Gasoline</td>
</tr>
<tr>
<td>4</td>
<td>4.1</td>
<td>Flammable Solids</td>
<td>Ammonium Picrate, Wetted</td>
</tr>
<tr>
<td></td>
<td>4.2</td>
<td>Spontaneously Combustible</td>
<td>White Phosphorous</td>
</tr>
<tr>
<td></td>
<td>4.3</td>
<td>When Wet</td>
<td>Sodium</td>
</tr>
<tr>
<td>5</td>
<td>5.1</td>
<td>Oxidizers</td>
<td>Ammonium Nitrate</td>
</tr>
<tr>
<td></td>
<td>5.2</td>
<td>Organic Peroxides</td>
<td>Methyl Ethyl Ketone Peroxide</td>
</tr>
<tr>
<td>6</td>
<td>6.1</td>
<td>Poison (Toxic Material)</td>
<td>Potassium Cyanide</td>
</tr>
<tr>
<td></td>
<td>6.2</td>
<td>Infectious Substances</td>
<td>Anthrax Virus</td>
</tr>
<tr>
<td>7</td>
<td>–</td>
<td>Radioactive</td>
<td>Uranium</td>
</tr>
<tr>
<td>8</td>
<td>–</td>
<td>Corrosives</td>
<td>Battery Fluid</td>
</tr>
<tr>
<td>9</td>
<td>–</td>
<td>Miscellaneous Hazardous Materials</td>
<td>Polychlorinated Biphenyls (PCB)</td>
</tr>
<tr>
<td>None</td>
<td>–</td>
<td>ORM-D (Other Regulated Material-Domestic)</td>
<td>Food Flavorings, Medicines</td>
</tr>
<tr>
<td>None</td>
<td>–</td>
<td>Combustible Liquids</td>
<td>Fuel Oil</td>
</tr>
</tbody>
</table>
After an accident or hazardous material spill or leak, you may be injured and unable to communicate the hazards of the materials you are transporting. Firefighters and police can prevent or reduce the amount of damage or injury at the scene if they know what hazardous materials are being carried. Your life, and the lives of others, may depend on quickly locating the hazardous materials shipping papers. For that reason, you must tab shipping papers related to hazardous materials or keep them on top of other shipping papers. You must also keep shipping papers:

- In a pouch on the driver's door, or
- In clear view within reach while driving, or
- On the driver's seat when out of the vehicle.

LISTS OF REGULATED PRODUCTS

PLACARDS

Placards are used to warn others of hazardous materials. Placards are signs put on the outside of a vehicle which identify the hazard class of the cargo. A placarded vehicle must have at least 4 identical placards. They are put on the front, rear, and both sides (see figure 9-3). Placards must be readable from all four directions. They are 10 3/4 inches square, turned upright on a point, in a diamond shape. Cargo tanks and other bulk packaging display the I.D. number of their contents on placards or orange panels.

Not all vehicles carrying hazardous materials need to have placards. The rules about placards are given in Section 9 of this driver's manual. You can drive a vehicle that carries hazardous materials if it does not require placards. If it requires placards, you must not drive it unless your driver's license has the hazardous materials endorsement.

TO ENSURE SAFE DRIVERS AND EQUIPMENT

The rules require all drivers of placarded vehicles to learn how to safely load and transport hazardous products. They must have a commercial driver's license with the hazardous materials endorsement.

To get the required endorsement, you must pass a written test on material found in Section 9 of this manual. You also will need a tank endorsement if you transport hazardous products in a cargo tank on a truck larger than 26,000 pounds, gross vehicle weight rating.
Drivers who need the hazardous materials endorsement must learn the placard rules. If you do not know if your vehicle needs placards, ask your employer. **Never drive a vehicle needing placards unless you have the hazardous materials endorsement.** To do so is a crime. When stopped, you will be cited and you will not be allowed to drive your truck further. It will cost you time and money. A failure to placard when needed will risk your life and others if you have an accident. Emergency help will not know of your hazardous cargo.

Hazardous materials drivers must also know which products they can load together, and which they cannot. These rules are also in Section 9. Before loading a truck with more than one type of product, you must know if it is safe to load them together. If you do not know, ask your employer.

<table>
<thead>
<tr>
<th>TEST YOUR KNOWLEDGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Common medicines for colds can make you sleepy. True or False?</td>
</tr>
<tr>
<td>2. What should you do if you do become sleepy while driving?</td>
</tr>
<tr>
<td>3. Coffee and a little fresh air will help a drinker sober up. True or False?</td>
</tr>
<tr>
<td>4. What is a hazardous materials placard?</td>
</tr>
<tr>
<td>5. Why are placards used?</td>
</tr>
</tbody>
</table>

✦ ✦ ✦

These questions may be on the test.

*If you can't answer them all, re-read Sections 2.19 and 2.20*
TRANSPORTING CARGO SAFELY

THIS SECTION IS FOR ALL COMMERCIAL DRIVERS
This section tells you about hauling cargo safely. You must understand basic cargo safety rules to get a CDL.

If you load cargo wrong or do not secure it, it can be a danger to others and yourself. Loose cargo that falls off a vehicle can cause traffic problems and others could be hurt or killed. Loose cargo could hurt or kill you during a quick stop or crash. Your vehicle could be damaged by an overload. Steering could be affected by how a vehicle is loaded, making it more difficult to control the vehicle.

Whether or not you load and secure the cargo yourself, you are responsible for:

- Inspecting your cargo.
- Recognizing overloads and poorly balanced weight.
- Knowing your cargo is properly secured.

These are discussed below.

If you intend to carry hazardous material that requires placards on your vehicle, you will also have to have a hazardous materials endorsement. Section 9 of this manual has the information you need to pass the hazardous materials test.

3.1 INSPECTING CARGO

As part of your pre-trip inspection, make sure the truck is not overloaded and the cargo is balanced and secured properly.

BEFORE STARTING

Inspect the cargo and its securing devices again within 25 miles after beginning a trip. Make any adjustments needed. Check the cargo and securing devices as often as necessary during a trip to keep the load secure. A good habit is to inspect again:

- After you have driven for 3 hours or 150 miles.
- After every break you take during driving.

Federal, state, and local regulations for commercial vehicle weight, securing cargo, covering loads, and where you can drive large vehicles vary from place to place. Know the rules where you will be driving.
3.2 WEIGHT AND BALANCE

You are responsible for not being overloaded. Here are some definitions of weight you should know:

**DEFINITIONS YOU SHOULD KNOW**

**GROSS VEHICLE WEIGHT (GVW)**
The total weight of a single vehicle plus its load.

**GROSS COMBINATION WEIGHT (GCW)**
The total weight of a powered unit plus trailer(s) plus the cargo.

**GROSS VEHICLE WEIGHT RATING (GVWR)**
The maximum GVW specified by the manufacturer for a single vehicle plus its load.

**GROSS COMBINATION WEIGHT RATING (GCWR)**
The maximum GCW specified by the manufacturer for a specific combination of vehicles plus its load.

**AXLE WEIGHT**
The weight transmitted to the ground by one axle or one set of axles.

**TIRE LOAD**
The maximum safe weight a tire can carry at a specified pressure. This rating is stated on the side of each tire.

**SUSPENSION SYSTEM**
Suspension systems have a manufacturer’s weight capacity rating.

**COUPLING DEVICE CAPACITY**
Coupling devices are rated for the maximum weight they can pull and/or carry.

**LEGAL WEIGHT LIMITS**
You must keep weights within legal limits. States have maximums for GVWs, GCWs and axle weights. Often, maximum axle weights are set by a bridge formula. A bridge formula permits less maximum axle weight for axles that are closer together. This is to prevent overloading bridges and roadways.

Overloading can have bad effects on steering, braking, and speed control. Overloaded trucks have to go very slow on upgrades. Worse, they may gain too much speed on downgrades. Stopping distance increases. Brakes can fail when forced to work too hard.

During bad weather or in mountains, it may not be safe to operate at legal maximum weights. Take this into account before driving.

**DON'T BE TOP-HEAVY**
The height of the vehicle’s center of gravity is very important for safe handling. A high center of gravity (*cargo piled up high or heavy cargo on top*) means you are more likely to tip over. It is most dangerous in curves or if you have to swerve to avoid a hazard. It is very important to distribute the cargo so it is as low as possible. Put the heaviest parts of the cargo under the lightest parts.

**BALANCE THE WEIGHT**
Poor weight balance can make vehicle handling unsafe. Too much weight on the steering axle can cause hard steering. It can damage the steering axle and tires. Underloaded front axles (caused by
shifting weight too far to the rear) can make the steering axle weight too light to steer safely. Too little weight on the driving axles can cause poor traction. The drive wheels may spin easily. During bad weather, the truck may not be able to keep going. Weight that is loaded so there is a high center of gravity causes greater chance of rollover. On flat bed vehicles, there is also a greater chance that the load will shift to the side or fall off. Figure 3-1 shows examples of the right and wrong way to balance cargo weight.

**Figure 3-1**
Always load cargo the right way!

---

**TEST YOUR KNOWLEDGE**

1. For what three things related to cargo are drivers responsible?
2. How often must you stop while on the road to check your cargo?
3. How is *Gross Combination Weight Rating* different from *Gross Combination Weight*?
4. Name two situations where legal maximum weights may not be safe.
5. What can happen if you don't have enough weight on the front axle?

✦ ✦ ✦

These questions may be on the test.

*If you can’t answer them all, re-read Sections 3.1 and 3.2.*
3.3 SECURING CARGO

BLOCKING AND BRACING
Blocking is used in the front, back, and/or sides of a piece of cargo to keep it from sliding. Blocking is shaped to fit snugly against cargo. It is secured to the cargo deck to prevent cargo movement. Bracing is also used to prevent movement of cargo. Bracing goes from the upper part of the cargo to the floor and/or walls of the cargo compartment.

CARGO TIEDOWN
On flatbed trailers or trailers without sides, cargo must be secured to keep it from shifting or falling off. In closed vans, tiedowns can also be important to prevent cargo shifting that may affect the handling of the vehicle. Tiedowns must be of the proper type and proper strength. The combined strength of all cargo tiedowns must be strong enough to lift one and one-half times the weight of the piece of cargo tied down. Proper tiedown equipment must be used, including ropes, straps, chains, and tensioning devices (winches, ratchets, clinching components). Tiedowns must be attached to the vehicle correctly (hook, bolt, rails, rings).

Cargo should have at least one tiedown for each ten (10) feet of cargo. Make sure you have enough tiedowns to meet this need. No matter how small the cargo, it should have at least two tiedowns holding it.

There are special requirements for securing various heavy pieces of metal. Find out what they are if you are to carry such loads.

HEADER BOARDS
Front end header boards ("headache racks") protect you from your cargo in case of a crash or emergency stop. Make sure the front end structure is in good condition. The front end structure should block the forward movement of any cargo you carry.

COVERING CARGO
There are two basic reasons for covering cargo: (1) to protect people from spilled cargo and (2) to protect the cargo from weather. Spill protection is a safety requirement in many states. Be familiar with the laws in the states you drive in.

You should look at your cargo covers in the mirrors from time to time while driving. A flapping cover can tear loose, uncovering the cargo, and possibly block your view or someone else’s.

You cannot inspect sealed loads, but you should check that you don’t exceed gross weight and axle weight limits.

SEALED AND CONTAINERIZED LOADS
Containerized loads generally are used when freight is carried part way by rail or ship. Delivery by truck occurs at the beginning and/or end of the journey. Some containers have their own tiedown devices or locks that attach directly to a special frame. Others have to be loaded onto flat bed trailers. They must be properly secured just like any other cargo.
3.4 OTHER CARGO NEEDING SPECIAL ATTENTION

DRY BULK
Dry bulk tanks require special care because they often have a high center of gravity and the load can shift. Be extremely cautious *(slow and careful)* going around curves and making sharp turns.

HANGING MEAT
Hanging meat *(suspended beef, pork, lamb)* in a refrigerated truck can be a very unstable load with a high center of gravity. Particular caution is needed on sharp curves such as off ramps and on ramps. Go slow.

LIVESTOCK
Livestock can move around in a trailer, causing unsafe handling. With less than a full load, use false bulkheads to keep livestock bunched together. Even when bunched, special care is necessary because livestock can lean on curves. This shifts the center of gravity and makes rollover more likely.

OVERSIZED LOADS
Over length, over width, and/or over weight loads require special transit permits. Driving is usually limited to certain times. Special equipment may be necessary such as "wide load" signs, flashing lights, flags, etc. Such loads may require a police escort or pilot vehicles bearing warning signs and/or flashing lights. These special loads require special driving care.

<table>
<thead>
<tr>
<th>TEST YOUR KNOWLEDGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What is the minimum number of tiedowns for any flat bed load?</td>
</tr>
<tr>
<td>2. What is the minimum number of tiedowns for a 20 foot load?</td>
</tr>
<tr>
<td>3. Name the two basic reasons for covering cargo on an open bed.</td>
</tr>
<tr>
<td>4. What must you check before transporting a sealed load?</td>
</tr>
<tr>
<td>✦ ✦ ✦</td>
</tr>
</tbody>
</table>

*These questions may be on the test.*

*If you can’t answer them all, re-read Sections 3.3 and 3.4.*
PART TWO

4. Transporting Passengers
5. Air Brakes
6. Combination Vehicles
7. Doubles and Triples
8. Tank Vehicles
9. Hazardous Materials

DETERMINE WHICH OF THESE SECTIONS YOU NEED TO STUDY
TRANSPORTING PASSENGERS

THIS SECTION IS FOR DRIVERS NEEDING A PASSENGER ENDORSEMENT
Bus drivers must have a commercial driver's license if they drive a vehicle designed to seat more than 15 persons, including the driver.

Bus drivers must have a passenger endorsement on their commercial driver's license. To get the endorsement you must pass a knowledge test on Sections 2 and 4 of this manual. (If your bus has air brakes, you must also pass a knowledge test on Section 5.) You must also pass the skills tests required for the class of vehicle you drive.

**4.1 PRE-TRIP INSPECTION**

Before driving your bus, you must be sure it is safe. You must review the inspection report made by the previous driver. Only if defects reported earlier have been certified as repaired or not needed to be repaired, should you sign the previous driver's report. This is your certification that the defects reported earlier have been fixed.

**VEHICLE SYSTEMS**

Make sure these things are in good working order before driving:

- Service brakes, including air hose couplings (if your bus has a trailer or semi-trailer).
- Parking brake.
- Steering mechanism.
- Lights and reflectors.
- Tires (front wheels must not have recapped or regrooved tires).
- Horn.
- Windshield wiper or wipers.
- Rear-vision mirror or mirrors.
- Coupling devices (if present).
- Wheels and rims.
- Emergency equipment.

**ACCESS DOORS AND PANELS**

As you check the outside of the bus, close any open emergency exits. Also, close any open access panels (for baggage, restroom service, engine, etc.) before driving.
**BUS INTERIOR**
People sometimes damage unattended buses. Always check the interior of the bus before driving to ensure rider safety. Aisles and stairwells should always be clear. The following parts of your bus must be in safe working condition:

- Each handhold and railing.
- Floor covering.
- Signaling devices, including the restroom emergency buzzer, if the bus has a restroom.
- Emergency exit handles.

The seats must be safe for riders. All seats must be securely fastened to the bus.

Never drive with an open emergency exit door or window. The “Emergency Exit” sign on an emergency door must be clearly visible. If there is a red emergency door light, it must work. Turn it on at night or any other time you use your outside lights.

**ROOF HATCHES**
You may lock some emergency roof hatches in a partly open position for fresh air. Do not leave them open as a regular practice. Keep in mind the bus's higher clearance while driving with them open.

**EMERGENCY EQUIPMENT**
Make sure your bus has the fire extinguisher and emergency reflectors required by law. The bus must also have spare electrical fuses, unless equipped with circuit breakers.

**USE YOUR SEATBELT!**
The driver's seat should have a seat belt. Always use it for safety.

---

**4.2 LOADING AND TRIP START**

Do not allow riders to leave carry-on baggage in a doorway or aisle. There should be nothing in the aisle that might trip other riders. Secure baggage and freight in ways that avoid damage and:

- Allow the driver to move freely and easily.
- Allow riders to exit by any window or door in an emergency.
- Protect riders from injury if carry-ons fall or shift.

**HAZARDOUS MATERIALS**
Watch for cargo or baggage containing hazardous materials. Most hazardous materials cannot be carried on a bus.

The Federal Hazardous Materials Table show which materials are hazardous. They pose a risk to health, safety and property during transportation. The rules require shippers to mark containers of hazardous material with the material's name, ID number, and hazard label. There are nine (9) different 4-inch, diamond-shaped hazard labels like the examples shown in figure 4-1. Watch for the diamond-shaped labels. Do not transport any hazardous material unless you are sure the rules allow it.
Buses may carry small-arms ammunition labeled ORM-D, emergency hospital supplies and drugs. You can carry small amounts of some other hazardous materials if the shipper cannot send them any other way. Buses must never carry:

**FORBIDDEN HAZARDOUS MATERIALS**

- Class 2 poison, liquid Class 6 poison, tear gas, irritating material.
- More than 100 pounds of solid Class 6 poisons.
- Explosives in the space occupied by people, except small arms ammunition.
- Labeled radioactive materials in the space occupied by people.
- More than 500 pounds total of allowed hazardous materials and no more than 100 pounds of any one class.

Riders sometimes board a bus with an unlabeled hazardous material. They may not know it is unsafe. Do not allow riders to carry on common hazards such as car batteries or gasoline.

**STANDEE LINE**

No rider may stand forward of the rear of the driver's seat. Buses designed to allow standing must have a two (2) inch line on the floor or some other means of showing riders where they cannot stand. This is called the standee line. All standing riders must stay behind it.

**AT YOUR DESTINATION**

When arriving at the destination or intermediate stops announce:

- The location.
- Reason for stopping.
- Next departure time.
- Bus number.

Remind riders to take carry-ons with them if they get off the bus. If the aisle is on a lower level than the seats, remind riders of the step-down. It is best to tell them before coming to a complete stop.

Charter bus drivers should not allow riders on the bus until departure time. This will help prevent theft or vandalism of the bus.
TEST YOUR KNOWLEDGE

1. Name some things to check in the interior of a bus during a pre-trip inspection.
2. What are some hazardous materials you can transport by bus?
3. What are some hazardous materials you can't transport by bus?
4. What is a standee line?

✦     ✦     ✦

These questions may be on the test.
If you can't answer them all, re-read Sections 4.1 and 4.2.

4.3 ON THE ROAD

PASSENGER SUPERVISION

Many charter and intercity carriers have passenger comfort and safety rules. Mention rules about smoking, drinking or use of radio and tape players at the start of the trip. Explaining the rules at the start will help to avoid trouble later on.

While driving, scan the interior of your bus as well as the road ahead, to the sides and to the rear. You may have to remind riders about rules or to keep arms and heads inside the bus.

AT STOPS

Riders can stumble when getting on or off and when the bus starts or stops. Caution riders to watch their step when leaving the bus. Wait for them to sit down or brace themselves before starting. Starting and stopping should be as smooth as possible to avoid rider injury.

Occasionally, you may have a drunk or disruptive rider. You must ensure this rider's safety as well as that of others. Don't discharge such riders where it would be unsafe for them. It may be safer at the next scheduled stop or a well-lighted area where there are other people. Many carriers have guidelines for handling disruptive riders.

COMMON ACCIDENTS

The most common bus crashes often happen at intersections. Use caution, even if a signal or stop sign controls other traffic. School and mass transit buses sometimes scrape off mirrors or hit passing vehicles when pulling out from a bus stop. Remember the clearance your bus needs, and watch for poles and tree limbs at stops. Know the size of the gap your bus needs to accelerate and merge with traffic. Wait for the gap to open before leaving the stop. Never assume other drivers will brake to give you room when you signal or start to pull out.

SPEED ON CURVES

Crashes on curves that kill people and destroy buses result from excessive speed, often when rain or snow has made the road slippery. Every banked curve has a safe "design speed." In good weather, the posted speed is safe for cars but it may be too high for many buses. With good traction, the bus may roll over; with poor traction, it might slide off the curve. Reduce speed for curves! If your bus leans toward the outside on a banked curve, you are driving too fast.
RAILROAD CROSSING STOPS

Stop at RR crossings. Stop your bus between 15 and 50 feet before railroad crossings. Listen and look in both directions for trains. You should open your forward door if it improves your ability to see or hear an approaching train. Before crossing after a train has passed, make sure there isn't another train coming in the other direction on other tracks. If your bus has a manual transmission, never change gears while crossing the tracks.

You do not have to stop, but must slow down and carefully check for other vehicles:

- At street car crossings.
- At railroad tracks used only for industrial switching within a business district.
- Where a policeman or flagman is directing traffic.
- If a traffic signal shows green.
- At crossings marked as "exempt" or "abandoned."

DRAWBRIDGES

Stop at drawbridges. Stop at drawbridges that do not have a signal light or traffic control attendant. Stop at least 50 feet before the draw of the bridge. Look to make sure the draw is completely closed before crossing. You do not need to stop, but must slow down and make sure it's safe, when:

- There is a traffic light showing green.
- The bridge has an attendant or traffic officer that controls traffic whenever the bridge opens.

4.4 AFTER-TRIP VEHICLE INSPECTION

Inspect your bus at the end of each shift. If you work for an interstate carrier, you must complete a written inspection report for each bus driven. The report must specify each bus and list any defect that would affect safety or result in a breakdown. If there are no defects, the report should say so.

Riders sometimes damage safety-related parts such as hand-holds, seats, emergency exits, and windows. If you report this damage at the end of a shift, mechanics can make repairs before the bus goes out again. Mass transit drivers should also make sure passenger signaling devices and brake-door interlocks work properly.

4.5 PROHIBITED PRACTICES

Avoid fueling your bus with riders on board unless absolutely necessary. Never refuel in a closed building with riders on board.

Don't talk with riders, or engage in any other distracting activity, while driving.

Do not tow or push a disabled bus with riders aboard the vehicle, unless getting off would be unsafe. Only tow or push the bus to the nearest safe spot to discharge passengers. Follow your employer's guidelines on towing or pushing disabled buses.
Urban mass transit coaches may have a brake and accelerator interlock system. The interlock applies the brakes and holds the throttle in idle position when the rear door is open. The interlock releases when you close the rear door. Do not use this safety feature in place of the parking brake.

### TEST YOUR KNOWLEDGE

1. Does it matter where you make a disruptive passenger get off the bus?
2. How far from a railroad crossing should you stop?
3. When must you stop before crossing a drawbridge?
4. Describe from memory the "prohibited practices" listed above.
5. The rear door of a transit bus has to be open to put on the parking brake. True or False?

✦ ✦ ✦

*These questions may be on the test.*

*If you can't answer them all, re-read Sections 4.3, 4.4, 4.5, and 4.6.*
THIS SECTION IS FOR DRIVERS WHO DRIVE VEHICLES WITH AIR BRAKES
This section tells you about air brakes. If you want to drive a truck or bus with air brakes, or pull a trailer with air brakes, you need to read this section. If you want to pull a trailer with air brakes, you also need to read Section 6: Combination Vehicles.

Air brakes use compressed air to make the brakes work. Air brakes are a good and safe way of stopping large and heavy vehicles, but the brakes must be well maintained and used properly.

Air brakes are really three different braking systems: service brake, parking brake and emergency brake systems.

- The service brake system applies and releases the brakes when you use the brake pedal during normal driving.
- The parking brake system applies and releases the parking brakes when you use the parking brake control.
- The emergency brake system uses parts of the service and parking brake systems to stop the vehicle in the event of a brake system failure.

The parts of these systems are discussed in greater detail below.

## 5.1 THE PARTS OF AN AIR BRAKE SYSTEM

There are many parts to an air brake system. You should know about the parts discussed here.

### AIR COMPRESSOR

The air compressor pumps air into the air storage tanks (reservoirs). The air compressor is connected to the engine through gears or a V-belt. The compressor may be air cooled or may be cooled by the engine cooling system. It may have its own oil supply or be lubricated by engine oil. If the compressor has its own oil supply, check the oil level before driving.

### AIR COMPRESSOR GOVERNOR

The governor controls when the air compressor will pump air into the air storage tanks. When air tank pressure rises to the "cut-out" level (around 125 pounds per square inch or "psi"), the governor stops the compressor from pumping air. When the tank pressure falls to the "cut-in" pressure (around 100 psi), the governor allows the compressor to start pumping again.

### AIR STORAGE TANKS

Air storage tanks are used to hold compressed air. The number and size of air tanks varies among vehicles. The tanks will hold enough air to allow the brakes to be used several times even if the compressor stops working.
AIR TANK DRAINS
Compressed air usually has some water and some compressor oil in it which is bad for the air brake system. For example, the water can freeze in cold weather and cause brake failure. The water and oil tend to collect in the bottom of the air tank. Be sure that you drain the air tanks completely. Each air tank is equipped with a drain valve in the bottom. There are two types:

- Manually operated by turning a quarter turn, shown in figure 5-1, or by pulling a cable. You must drain the tanks yourself at the end of each day of driving.
- Automatic—the water and oil is automatically expelled. They may be equipped for manual draining as well.

The automatic types are available with electric heating devices. These help prevent freeze up of the automatic drain in cold weather.

ALCOHOL EVAPORATOR
Some air brake systems have an alcohol evaporator to put alcohol into the air system. This helps to reduce the risk of ice in air brake valves and other parts during cold weather. Ice inside the system can make the brakes stop working.

Check the alcohol container and fill up as necessary, every day during cold weather. Daily air tank drainage is still needed to get rid of water and oil (unless the system has automatic drain valves).

SAFETY VALVE
A safety relief valve is installed in the first tank the air compressor pumps air to. The safety valve protects the tank and the rest of the system from too much pressure. The valve is usually set to open at 150 psi. If the safety valve releases air, something is wrong. Have the fault fixed by a mechanic.

THE BRAKE PEDAL
You put on the brakes by pushing down the brake pedal. (It is also called the foot valve or treadle valve.) Pushing the pedal down harder applies more air pressure. Letting up on the brake pedal reduces the air pressure and releases the brakes. Releasing the brakes lets some compressed air go out of the system, so the air pressure in the tanks is reduced. It must be made up by the air compressor. Pressing and releasing the pedal unnecessarily can let air out faster than the compressor can replace it. If the pressure gets too low, the brakes won't work.

FOUNDATION BRAKES
Foundation brakes are used at each wheel. The most common type is the S-cam drum brake,
shown in figure 5-2. The parts of the brake are discussed below:

**BRAKE DRUMS, SHOES, AND LININGS**

Brake drums are located on each end of the vehicle’s axles. The wheels are bolted to the drums. The braking mechanism is inside the drum. To stop, the brake shoes and linings are pushed against the inside of the drum. This causes friction which slows the vehicle (*and creates heat*). The heat a drum can take without damage depends on how hard and how long the brakes are used. Too much heat can make the brakes stop working.

**S-CAM BRAKES**

When you push the brake pedal, air is let into each brake chamber (see figure 5-2). Air pressure pushes the rod out, moving the slack adjuster (*an adjustable device used to compensate for brake shoe wear*), thus twisting the brake cam shaft. This turns the S-cam (*so called because it is shaped like the letter "S"*). The S-cam forces the brake shoes away from one another and presses them against the inside of the brake drum. When you release the brake pedal, the S-cam rotates back and a spring pulls the brake shoes away from the drum, letting the wheels roll freely again.

**WEDGE BRAKES**

In this type brake, the brake chamber push rod pushes a wedge directly between the ends of two brake shoes. This shoves them apart and against the inside of the brake drum. Wedge brakes may have a single brake chamber, or two brake chambers, pushing wedges in at both ends of the brake shoes. Wedge type brakes may be self-adjusting or may require manual adjustment.

**DISC BRAKES**

In air-operated disc brakes, air pressure acts on a brake chamber and slack adjuster, like S-cam brakes. But instead of the S-cam, a "power screw" is used. The pressure of the brake chamber on the slack adjuster turns the power screw. The power screw clamps the disc or rotor between the brake lining pads of a caliper, similar to a large C-clamp.

Wedge brakes and disc brakes are less common than S-cam brakes.

**SUPPLY PRESSURE GAUGES**

All air-braked vehicles have a pressure gauge connected to the air tank. If the vehicle has a dual air...
brake system, there will be a gauge for each half of the system. *(Or a single gauge with two needles.)* Dual systems will be discussed later. These gauges tell you how much pressure is in the air tanks.

**APPLICATION PRESSURE GAUGE**

This gauge shows how much air pressure you are applying to the brakes. *(This gauge is not on all vehicles.)* Increasing application pressure to hold the same speed means the brakes are fading. You should slow down and use a lower gear. The need for increased pressure can also be cause by brakes out of adjustment, air leaks or mechanical problems.

**LOW AIR PRESSURE WARNING**

A low air pressure warning signal is required on vehicles with air brakes. A warning signal you can see must come on before the air pressure in the tanks falls below 60 psi. *(Or one half the compressor governor cutout pressure on older vehicles.)* The warning is usually a red light. A buzzer may also come on.

Another type of warning is the "wig wag." This device drops a mechanical arm into your view when the pressure in the system drops below 60 psi. An automatic wig wag will rise out of your view when the pressure in the system goes above 60 psi. The manual reset type must be placed in the "out of view" position manually. It will not stay in place until the pressure in the system is above 60 psi.

On large buses it is common for the low pressure warning devices to signal at 80-85 psi.

**STOP LIGHT SWITCH**

Drivers behind you must be warned when you put your brakes on. The air brake system does this with an electric switch that works by air pressure. The switch turns on the brake lights when you put on the air brakes.

**FRONT BRAKE LIMITING VALVE**

Some older vehicles *(made before 1975)* have a front brake limiting valve and a control in the cab. The control is usually marked "normal" and "slippery." When you put the control in the "slippery" position, the limiting valve cuts the "normal" air pressure to the front brakes by half. Limiting valves were used to reduce the chance of the front wheels skidding on slippery surfaces. However, they actually reduce the stopping power of the vehicle. Front wheel braking is good under all conditions. Tests have shown front wheel skids from braking are not likely even on ice. **Make sure the control is in the "normal" position to have normal stopping power.**

Many vehicles have automatic front wheel limiting valves. They reduce the air to the front brakes except when the brakes are put on vary hard *(60 psi or more application pressure).* These valves cannot be controlled by the driver.

**SPRING BRAKES**

All trucks, truck tractors, and buses must be equipped with emergency brakes and parking brakes. They must be held on by mechanical force *(because air pressure can eventually leak away).* Spring brakes are usually used to meet these needs. When driving, powerful springs are held back by air pressure. If the air pressure is removed, the springs put on the brakes. A parking brake control in the cab allows the driver to let the air out of the spring brakes. This lets the springs put the brakes on. A leak in the air brake system which causes all the air to be lost will also cause the springs to put on the brakes.

Tractor and straight truck spring brakes will come fully on when air pressure drops to a range of 20 to 40 psi *(typically 20 to 30 psi).* Do not wait for the brakes to come on automatically. When the low air pressure warning light and buzzer first come on, bring the vehicle to a safe stop right away, while you can still control the brakes.
The braking power of spring brakes depends on the brakes being in adjustment. If the brakes are not adjusted properly, neither the regular brakes nor the emergency/parking brakes will work right.

**PARKING BRAKE CONTROLS**

In newer vehicles with air brakes, you put on the parking brakes using a **diamond-shaped, yellow, push-pull control knob**. You pull the knob out to put the parking brakes (spring brakes) on, and push it in to release them. On older vehicles, the parking brakes may be controlled by a lever. Use the parking brakes whenever you park.

**Caution:** Never push the brake pedal down when the spring brakes are on. If you do, the brakes could be damaged by the combined forces of the springs and the air pressure. Many brake systems are designed so this will not happen, but not all systems are set up that way and those that are may not always work. It is much better to develop the habit of not pushing the brake pedal down when the spring brakes are on.

**MODULATING CONTROL VALVES**

In some vehicles a control handle on the dashboard may be used to apply the spring brakes gradually. This is called a modulating valve. It is spring loaded so you have a feel for the braking action. The more you move the control lever, the harder the spring brakes come on. They work this way so you can control the spring brakes if the service brakes fail. When parking a vehicle with a modulating control valve, move the lever as far as it will go and hold it in place with the locking device.

**DUAL PARKING CONTROL VALVES**

When main air pressure is lost, the spring brakes come on. Some vehicles, such as buses, have a separate air tank which can be used to release the spring brakes. This is so you can move the vehicle in an emergency. One of the valves is a push-pull type and is used to put on the spring brakes for parking. The other valve is spring loaded in the "out" position. When you push the control in, air from the separate air tank releases the spring brakes so you can move. When you release the button, the spring brakes come on again. There is only enough air in the separate tank to do this a few times. Therefore, plan carefully when moving. Otherwise, you may be stopped in a dangerous location when the separate air supply runs out.

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### TEST YOUR KNOWLEDGE

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Why must air tanks be drained?</td>
<td></td>
</tr>
<tr>
<td>2. What is a supply pressure gauge used for?</td>
<td></td>
</tr>
<tr>
<td>3. All vehicles with air brakes must have a low air pressure warning signal. True or False?</td>
<td></td>
</tr>
<tr>
<td>4. What are spring brakes?</td>
<td></td>
</tr>
<tr>
<td>5. Front wheel brakes are good under all conditions. True or False?</td>
<td></td>
</tr>
</tbody>
</table>

✦ ✦ ✦

*These questions may be on the test.*

*If you can’t answer them all, re-read Section 5.1.*
5.2 DUAL AIR BRAKE

Most newer heavy-duty vehicles use dual air brake systems for safety. A dual air brake system has two separate air brake systems which use a single set of brake controls. Each system has its own air tanks, hoses, lines, etc. One system typically operates the regular brakes on the rear axle or axles. The other system operates the regular brakes on the front axle (and possibly one rear axle). Both systems supply air to the trailer (if there is one). The first system is called the "primary" system. The other is called the "secondary" system.

Before driving a vehicle with a dual air system, allow time for the air compressor to build up a minimum of 100 psi pressure in both the primary and secondary systems. Watch the primary and secondary air pressure gauges (or needles, if the system has two needles in one gauge). Pay attention to the low air pressure warning light and buzzer. The warning light and buzzer should shut off when air pressure in both systems rises to a value set by the manufacturer. This value must be greater than 60 psi.

The warning light and buzzer should come on before the air pressure drops below 60 psi in either system. If this happens while driving, you should stop right away and safely park the vehicle. If one air system is very low on pressure, either the front or the rear brakes will not be operating fully. This means it will take you longer to stop. Bring the vehicle to a safe stop and have the air brakes system fixed.

5.3 INSPECTING AIR BRAKE SYSTEMS

You should use the basic seven-step inspection procedure described in Section 2 to inspect your vehicle. There are more things to inspect on a vehicle with air brakes than one without them. We discuss these things below, in the order that they fit into the seven-step method.

DURING STEP 2: ENGINE COMPARTMENT CHECKS
CHECK AIR COMPRESSOR DRIVE BELT (if compressor is belt driven)
If the air compressor is belt-driven, check the condition and tightness of the belt. The belt should be in good condition.

DURING STEP 5: WALK AROUND INSPECTION
CHECK MANUAL SLACK ADJUSTERS ON S-CAM BRAKES
Park on level ground and chock the wheels to prevent the vehicle from moving. Turn off the parking brakes so you can move the slack adjusters. Use gloves and pull hard on each slack adjuster that you can get to. If a slack adjuster moves more than about one inch where the push rod attaches to it, it probably needs adjustment. Adjust it or have it adjusted. Vehicles with too much brake slack can be very hard to stop. Out-of-adjustment brakes are the most common problem found in roadside inspection. Be safe, check the slack adjusters.

CHECK BRAKE DRUMS (OR DISCS), LININGS, AND HOSES
Brake drums (or discs) must not have cracks longer than one half the width of the friction area. Linings (friction material) must not be loose or soaked with oil or grease. They must not be dangerously thin. Mechanical parts must be in place, not broken or missing. Check the air hoses connected to the brake chambers to make sure they aren't cut or worn due to rubbing.
STEP 7: FINAL AIR BRAKE CHECK
Do the following checks instead of the hydraulic brake check shown in Section 2 "Step 7: Check Brake System."

TEST AIR LEAKAGE RATE
With a fully-charged air system (typically 125 psi), turn off the engine, release the parking brake and time the air pressure drop. The loss rate should be less than two (2) psi in one minute for single vehicles and less than three (3) psi in one (1) minute for combination vehicles. Then apply 90 psi or more with the brake pedal. After the initial pressure drop, if the air pressure falls more than three (3) psi in one minute for single vehicles (more than 4 psi for combination vehicles), the air loss rate is too much. Check for air leaks and fix before driving the vehicle. Otherwise, you could lose your brakes while driving.

TEST LOW PRESSURE WARNING SIGNAL
Shut the engine off when you have enough air pressure so that the low pressure warning signal is not on. Turn the electrical power on and step on and off the brake pedal to reduce air tank pressure. The low air pressure warning signal must come on before the pressure drops to less than 60 psi in the air tank (or tank with the lowest air pressure, in dual air systems).

If the warning signal doesn't work, you could lose air pressure and you would not know it. This could cause sudden emergency braking in a single circuit air system. In dual systems the stopping distance will be increased. Only limited braking can be done before the spring brakes come on.

CHECK THAT THE SPRING BRAKES COME ON AUTOMATICALLY
Chock the wheels, release the parking brakes when you have enough air pressure to do it, and shut the engine off. Step on and off the brake pedal to reduce the air tank pressure. The "parking brake" knob should pop out when the air pressure falls to the manufacturer's specification (usually in a range between 20-40 psi). This causes the spring brakes to come on.

CHECK RATE OF AIR PRESSURE BUILDUP
When the engine is at operating RPM, the pressure should build from 85 to 100 psi within 45 seconds in dual air systems. (If the vehicle has larger than minimum air tanks, the buildup time can be longer and still be safe. Check the manufacturer's specifications.). In single air systems (pre-1975), typical requirements are pressure buildup from 50 to 90 psi within three (3) minutes with the engine at an idle speed of 600-900 RPM.

If air pressure does not build up fast enough, your pressure may drop too low during driving, requiring an emergency stop. Don't drive until you get the problem fixed.

CHECK AIR COMPRESSOR GOVERNOR CUT-IN AND CUT-OUT Pressures
Pumping by the air compressor should start at about 100 psi and stop at about 125 psi. (Check manufacturer's specifications.) Run the engine at a fast idle. The air governor should cut-out the air compressor at about the manufacturer's specified pressure. The air pressure shown by your gauge(s) will stop rising. With the engine idling, step on and off the brake to reduce the air tank pressure. The compressor should cut-in at about the manufacturer's specified cut-in pressure. The pressure should begin to rise.

If the air governor does not work as described above, it may need to be fixed. A governor that does not work properly may not keep enough air pressure for safe driving.

TEST PARKING BRAKE
Stop the vehicle, put the parking brake on and gently pull against it in a low gear to test that the parking brake will hold.

TEST SERVICE BRAKES
Wait for normal air pressure, release the parking brake, move the vehicle forward slowly (about five
(5) mph) and apply the brakes firmly using the brake pedal. Note any vehicle "pulling" to one side, unusual feel or delayed stopping action.

This test may show you problems which you otherwise wouldn't know about until you needed the brakes on the road.

<table>
<thead>
<tr>
<th>TEST YOUR KNOWLEDGE</th>
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<tbody>
<tr>
<td>1. What is a dual air brake system?</td>
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<tr>
<td>2. What are the slack adjusters?</td>
</tr>
<tr>
<td>3. How can you check slack adjusters?</td>
</tr>
<tr>
<td>4. How can you test the low pressure warning signal?</td>
</tr>
<tr>
<td>5. What can you check that the spring brakes come on automatically?</td>
</tr>
<tr>
<td>6. What are the maximum leakage rates?</td>
</tr>
</tbody>
</table>

✦ ✦ ✦

These questions may be on the test.

If you can't answer them all, re-read Sections 5.2 and 5.3.

5.4 USING AIR BRAKES

NORMAL STOPS
Push the brake pedal down. Control the pressure so the vehicle comes to a smooth, safe stop. If you have a manual transmission, don't push the clutch in until the engine RPM is down close to idle. When stopped, select a starting gear.

EMERGENCY STOPS
If somebody suddenly pulls out in front of you, your natural response is to hit the brakes. This is a good response if there's enough distance to stop and you use the brakes correctly.

You should brake in a way that will keep your vehicle in a straight line and allow you to turn if it becomes necessary. You can use the "controlled braking" method or the "stab braking" method.

CONTROLLED BRAKING
With this method, you apply the brakes as hard as you can without locking the wheels. Keep steering wheel movements very small while doing this. If you need to make a larger steering adjustment or if the wheels lock, release the brakes. Reapply the brakes as soon as you can.

STAB BRAKING
• Apply your brakes all the way.
• Release brakes when wheels lock up.
• As soon as the wheels start rolling, apply brakes fully again. (It can take up to one (1) second for the wheels to start rolling after you release the brakes. If you re-apply the brakes before the wheels start rolling, the vehicle won't straighten out.)
Note: If you drive a vehicle with anti-lock brakes, you should read and follow the directions found in the owner’s manual for stopping quickly.

**STOPPING DISTANCE**

We talked about stopping distance in Section 2 under "Speed and Stopping Distance." With air brakes there is an added delay: the time required for the brakes to work after the brake pedal is pushed. With hydraulic brakes *used on cars and light/medium trucks*, the brakes work instantly. However, with air brakes, it takes a little time *(one half second or more)* for the air to flow through the lines to the brakes. This is referred to as **Brake Lag**. Thus, the total stopping distance for vehicles with air brake systems is made up of four different factors.

\[
\text{Perception Distance} + \text{Reaction Distance} + \text{Brake Lag Distance} + \text{Effective Braking Distance} = \text{Total Stopping Distance}
\]

The air brake lag distance at 55 mph on dry pavement adds about 32 feet. So at 55 mph for an average driver under good traction and brake conditions, the total stopping distance is over 300 feet. This is longer than a football field.

**BRAKE FADING OR FAILURE**

Brakes are designed so brake shoes or pads rub against the brake drum or disks to slow the vehicle. Braking creates heat, but brakes are designed to take a lot of heat. However, brakes can fade or fail from excessive heat caused by using them too much and not relying on the engine braking effect.

Excessive use of the service brakes result in overheating and leads to brake fade. Brake fade results from excessive heat causing chemical changes in the brake lining which reduce friction and also causes expansion to the brake drums. As the overheated drums expand, the brake shoes and linings have to move farther to contact the drums, and the force of this contact is also reduced. Continued overuse may increase brake fade until the vehicle cannot be slowed down or stopped at all.

Brake fade is also affected by adjustment. To safely control a vehicle, every brake must do its share of the work. Brakes out of adjustment will stop doing their share before those that are in adjustment. The other brakes can then overheat and fade and there will not be sufficient braking available to control the vehicle(s). Brakes can get out of adjustment quickly, especially when they are hot. Therefore, brake adjustment must be checked frequently.

**SNUB BRAKING TECHNIQUE (OR SNUBBING)**

**REMEMBER**

The use of brakes on a long and/or steep downgrade is only a supplement to the braking effect of the engine. Once the vehicle is in the proper low gear, the following is the proper braking technique:

- Apply the brakes just hard enough to feel a definite slowdown.
- When your speed has been reduced to approximately five (5) mph below your "safe" speed, release the brakes. *(This brake application should last for about three (3) seconds.)*
- When your speed has increased to your "safe" speed, repeat steps 1 and 2.

For example, if your "safe" speed is 40 mph, you would not apply the brakes until your speed reaches 40 mph. You now apply the brakes hard enough to gradually reduce your speed to 35 mph.
and then release the brakes. Repeat this action as often as necessary until you have reached the end of the downgrade.

**LOW AIR PRESSURE**

If the low air pressure warning comes on, **stop and safely park your vehicle as soon as possible**. There might be an air leak in the system. Controlled braking is possible only while enough air remains in the air tanks. The spring brakes will come on when the air pressure drops into the range of 20 to 40 psi. A heavily loaded vehicle will take a long distance to stop because the spring brakes do not work on all axles. Lightly loaded vehicles or vehicles on slippery roads may skid out of control when the spring brakes come on. It is much safer to stop while there is enough air in the tanks to use the foot brakes.

**PARKING BRAKES**

Any time you park, use the parking brakes, except as noted below. Pull the parking brake control knob out to apply the parking brakes, push it in to release them. The control will be a yellow, diamond-shaped knob labeled “parking brakes” on newer vehicles. On older vehicles, it may be a round blue knob or some other shape (including a lever that swings from side to side or up and down).

Don't use the parking brakes if the brakes are very hot (from just having come down a steep grade) or if the brakes are very wet in freezing temperatures. If they are used while they are very hot, they can be damaged by the heat. If they are used in freezing temperatures when the brakes are very wet, they can freeze so the vehicle cannot move. Use wheel chocks to hold the vehicle. Let hot brakes cool before using the parking brakes. If the brakes are wet, use the brakes lightly while driving in a low gear to heat and dry them.

If your vehicle does not have automatic air tank drains, drain your air tanks at the end of each working day to remove moisture and oil. Otherwise, the brakes could fail.

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**Never leave your vehicle unattended without applying the parking brakes or chocking the wheels.**

**Your vehicle might roll away and cause injury and damage.**

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**TEST YOUR KNOWLEDGE**

1. What factors can cause brakes to fade or fail?
2. The use of brakes on a long steep downgrade is only a supplement to the braking effect of the engine. True or False?
3. If you are away from your vehicle only a short time, you don’t need to use the parking brake. True or False?
4. How often should you drain air tanks?

✦ ✦ ✦

*These questions may be on the test.*

*If you can’t answer them all, re-read Section 5.4.*
PART THREE

10. *Pre-Trip Vehicle Inspection Test*

11. *Basic Vehicle Control Skills Test*

12. *On Road Driving Test*

THIS PART IS FOR DRIVERS WHO NEED TO TAKE A SKILLS TEST
THIS SECTION WILL ASSIST ALL COMMERCIAL DRIVERS IN TAKING THE PRE-TRIP VEHICLE INSPECTION TEST
SECTION 10:
PRE-TRIP VEHICLE INSPECTION TEST

THIS SECTION COVERS
• Internal and External Inspections

During the pre-trip inspection, you must show that the vehicle is safe to drive. You may have to walk around the vehicle and point to or touch each item and explain to the examiner what you are checking and why. You will NOT have to check under the hood or under the vehicle.

10.1 ALL VEHICLES

During the pre-trip inspection study the following vehicle parts for the type of vehicle you will be using during the CDL Skills Test. You should be able to operate each part under the vehicle. With the recent revisions in the testing procedures, when being administered the pre-trip inspection, you may be required to verbalize all of the following information listed in this section.

EMERGENCY EQUIPMENT
• Check for spare electrical fuses.
• Check for three red reflective triangles.
• Check for a properly charged and rated fire extinguisher.

Note: If the vehicle is not equipped with electrical fuses, you must mention this to the examiner.

WIPERS/WASHERS
• Check that wiper arms and blades are secure, not damaged and operate smoothly.
• If equipped, windshield washers must operate correctly.

HORN
• Check that air horn and/or electric horn work.

PARKING BRAKE
• Apply parking brake only and make sure that it will hold the vehicle by shifting into a lower gear and gently pulling against the brake.

SERVICE BRAKE
• Wait for normal air pressure, release the parking brake, move the vehicle forward slowly (about five [5] mph), apply the brakes firmly using the brake pedal. Note any vehicle “pulling” to one side, unusual feel or delayed stopping action.

This test may show you problems, which you otherwise wouldn’t know about until you needed the brakes on the road.

HYDRAULIC BRAKE
• Pump the brake pedal three times, then hold it down for five seconds. The brake pedal should not move (depress) during the five seconds.
• If equipped with a hydraulic brake reserve (back-up) system, with the key off, depress the brake pedal and listen for the sound of the reserve system electric motor.
• Check that the warning buzzer or light is off.

AIR BRAKE (AIR BRAKE EQUIPPED VEHICLE ONLY)

• Failure to perform an air brake check will result in an automatic failure of the Vehicle Inspection Test. Air brake safety devices vary. However, this procedure is designed to see that any safety device operates correctly as air pressure drops from normal to a low air condition. For safety purposes, in areas where an incline is present, you will use wheel chocks during the air brake check. The proper procedures for inspecting the air brake system are as follows:
  - With the engine running, build the air pressure to governed cut-out (typically 100-125 psi). Shut off the engine. Turn on the key but do not start the engine, chock your wheels, if necessary, release the parking brake(s). Check the air gauge to see if the air pressure drops more than two (2) psi in one minute for single vehicles and more than three (3) psi in one minute for combination vehicles.
  - Then, fully apply pressure to the foot brake and hold for one (1) minute. Check the air gauge to see if the air pressure drops more than three (3) psi in one (1) minute for single vehicles and four (4) psi in one (1) minute for combination vehicles. If the air loss is greater, check for leaks and fix before driving the vehicle. You could lose your brakes while driving.
  - Begin fanning off the air pressure by rapidly applying and releasing the foot brake. Low air warning devices (buzzer, light, flag) should activate before air pressure drops below 60 PSI.
  - Continue to fan off the air pressure. At approximately 40 PSI on a tractor-trailer combination vehicle, the tractor protection valve and parking brake valve should close (pop out). On other combination vehicle types and single vehicle types, the parking brake valve should close (pop out).
  - Check rate of air pressure buildup. When the engine is at operating RPM, the pressure should build from 85 to 100 psi within 45 seconds in dual air systems. (If the vehicle has larger than minimum air tanks, the buildup time can be longer and still be safe. Check the manufacturer's specifications.)

SAFETY BELT

• Check that the safety belt is securely mounted, adjusts, and latches properly.

LIGHTS/REFLECTORS

• Check that all external lights and reflective equipment are clean and functional. Light and reflector checks include:
  - Clearance lights (red on rear, amber elsewhere).
  - Headlights (high and low beams).
  - Taillights.
  - Turn signals.
  - 4-way flashers.
  - Brake lights.
  - Red reflectors (on rear) and amber reflectors (elsewhere).

  Note: Checks of brake, turn signal and 4-way flashers functions must be done separately.

AIR/ELECTRICAL CONNECTORS

• Connect air supplies and electrical power to trailer.
• Check that trailer air connectors are sealed and in good condition.
• Check that glad hands are locked in place and there are no audible air leaks.
• Check that trailer electrical plug is firmly seated and locked in place.
LEAKS
• Check for signs of fluid puddles or dripping on the ground under the engine and under the fuel tank.

TIRES
• Check tread depth (minimum on front tires 4/32 and 2/32 on rear tires), check inflation, tread evenly worn, look for cuts or other damage on the treads or sidewalls. Valve caps and stems not missing, broken, or damaged. Retread not separating from tire (no regrooved tires on front wheels).

10.2 SCHOOL BUS ONLY

EMERGENCY EQUIPMENT
• In additions to checking for spare electrical fuses (if equipped), three (3) portable emergency warning devices and a properly charged and rated fire extinguisher, school bus drivers must also:
  - Produce and inspect a twelve (12) item first aid kit, and
  - A wrecking or pry bar.

LIGHTING INDICATORS
• In addition to checking the lighting indicators listed in this manual, school bus drivers must also check the following lighting indicators (internal panel lights):
  - Alternately flashing amber lights indicator, if equipped.
  - Alternately flashing red lights indicator.
  - Strobe light indicator, if equipped.

LIGHTS/REFLECTORS
• In addition to checking the lights and safety devices, school bus drivers must also check the following (external) safety devices:
  - Strobe light, if equipped.
  - Stop arm light.
  - Alternately flashing amber lights.
  - Alternately flashing red lights.
  - Crossing control arm, if equipped.

STOP ARM
• Check the stop arm to see that it is mounted securely to the frame of the vehicle. Also, check for loose fittings and damage.

PASSENGER ENTRY/LIFT
• Check that the entry door is not damaged, operates smoothly and closes securely from the inside.
• Hand rails are secure and the step light is working, if equipped.
• The entry steps must be clear with the treads not loose or worn excessively.
• If equipped with a handicap lift, look for leaking, damaged or missing parts and explain how lift should be checked for correct operation. Lift must be fully retracted and latched securely.

**EMERGENCY EXIT**

• Make sure that all emergency exits are not damaged, operate smoothly, and close securely from the **inside**.
• Check that any emergency exit warning devices are working.

**SEATING**

• Look for broken seat frames and check that seat frames are firmly attached to the floor.
• Check that seat cushions are attached securely to the seat frames.

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**10.3 COACH/TRANSIT BUS**

**PASSENGER ENTRY/LIFT**

• Check that entry doors operate smoothly and close securely from the **inside**.
• Check that hand rails are secure and, if equipped, that the step light(s) are working.
• Check that the entry steps are clear, with the treads not loose or worn excessively.
• If equipped with a handicap lift, look for any leaking, damaged or missing part, and explain how it should be checked for correct operation.
• Lift should be fully retracted and latched securely.

**EMERGENCY EXITS**

• Make sure that all emergency exits are not damaged, operate smoothly and close securely from the **inside**.
• Check that any emergency exit warning devices are working.

**PASSENGER SEATING**

• Look for broken seat frames and check that seat frames are firmly attached to the floor.
• Check that seat cushions are attached securely to the seat frames.

**DOORS/MIRRORS**

• Check that the entry/exit doors are not damaged and operate smoothly from the **outside**. Hinges should be secure with seals intact.
• Make sure that the passenger exit mirrors and all external mirrors and mirror brackets are not damaged and are mounted securely with no loose fittings.
Section 11

BASIC VEHICLE CONTROL SKILLS TEST

THIS SECTION WILL ASSIST ALL COMMERCIAL DRIVERS IN TAKING THE BASIC VEHICLE CONTROL SKILLS TEST
SECTION 11: BASIC VEHICLE CONTROL SKILLS TEST

THIS SECTION COVERS

- Skills Test Exercises
- Skills Test Scoring

The basic control skills test is composed of methods and procedures which enable the examiner to determine the applicants ability to control the vehicle and judge the position of the vehicle in relationship to other objects. Your basic control skills could be tested using one or more of the following exercises off-road or somewhere on the street during the road test, depending on the layout of the test site:

- Forward stop.
- Straight line backing.
- Alley dock.
- Parallel park (driver side).
- Parallel park (conventional).
- Right turn.
- Backward serpentine.

These exercises are shown in figures 11-1 through 11-7.

11.1 SCORING

CROSSING BOUNDARIES

The examiner will score the number of times you touch or cross over an exercise boundary line with any portion of your vehicle. Each encroachment will count as an error.

PULL-UPS

In some of the exercises, the examiner will also score the number of times you stop and change direction or pull-up during the exercise. Errors will be explained to you prior to the beginning of each exercise.

11.2 EXERCISES

FORWARD STOP

You may be asked to drive forward between two rows of cones and bring your vehicle to a complete stop as close as you can to the exercise boundary marked by an end line or set of cones (without going beyond the line or cones. (See figure 11-1).
STRAIGHT LINE BACKING
You may be asked to back your vehicle in a straight line between two rows of cones without touching or crossing over the exercise boundaries. *(See figure 11-2.)*

ALLEY DOCK
You may be asked to sight-side back your vehicle into an alley, bringing the rear of your vehicle as close as possible to the rear of the alley without going beyond the exercise boundary marked by a line or row of cones. *(See figure 11-3.)*

PARALLEL PARK (DRIVER SIDE)
You may be asked to park in a parallel parking space that is on your left. You are to drive past the parking space and back into it bringing the rear of your vehicle as close as possible to the rear of the space without crossing side or rear boundaries marked by cones. You are to try to get your vehicle *(or trailer, if combination vehicle)* completely into the space. *(See figure 11-4.)*

PARALLEL PARK (CONVENTIONAL)
You may be asked to park in a parallel parking space that is on your right. You are to drive past the parking space and back into it bringing the rear of your vehicle as close as possible to the rear of the space without crossing side or rear boundaries marked by cones. You are to try to get your vehicle *(or trailer, if combination vehicle)* completely into the space. *(See figure 11-5.)*

RIGHT TURN
You may be asked to drive forward and make a right turn around a cone. You should try to bring the right rear wheel(s) of your vehicle as close to the base of the cone as possible without hitting it. *(See figure 11-6.)*

BACKWARD SERPENTINE
You may be asked to drive you vehicle through a 3-cone serpentine without touching any cones or crossing over the exercise *(side)* boundaries marked by cones. *(See figure 11-7.)*

Remember: If you fail either the Pre-Trip Vehicle Inspection or the Basic Control Skills Test, it is at the discretion of the examiner to administer the road test.
Figure 11-1
Forward Stop

Figure 11-2
Straight Line Backing
**Figure 11-5**

*Parallel Park (Conventional)*

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**Figure 11-6**

*Right Turn*
Figure 11-7

Backward Serpentine

START

FINISH
THIS SECTION WILL ASSIST DRIVERS
IN TAKING THE ON ROAD DRIVING TEST
THIS SECTION COVERS

• How You Will Be Tested

The on-road driving test is to evaluate your ability to operate a Commercial Motor Vehicle safely in most on-road conditions and is administered behind the wheel over a predetermined route.

During the driving test, the examiner will be scoring you on specific driving maneuvers as well as on your general driving behavior. You will follow the directions of the examiner. Directions will be given to you so you will have plenty of time to do what the examiner has asked. You will not be asked to drive in an unsafe manner.

If your test route does not have certain traffic situations, you may be asked to simulate a traffic situation. You will do this by telling the examiner what you are or would be doing, if you were in that traffic situation.

12.1 HOW YOU WILL BE TESTED

TURNS

You have been asked to make a turn:

• Check traffic in all directions.
• Use turn signals and safely get into the lane needed for the turn.

As you approach the turn:

• Use turn signals to warn others of your turn.
• Slow down smoothly, change gears as needed to keep power but do not coast unsafely. Unsafe coasting occurs when your vehicle is out of gear (clutch depressed or gearshift in neutral) for more than the length of your vehicle.

If you must stop before making the turn:

• Come to a smooth stop without skidding.
• Come to a complete stop behind the stop line, crosswalk or stop sign.
• If stopping behind another vehicle, stop where you can see the rear tires on the vehicle ahead of you (safe gap).
• Do not let your vehicle roll.
• Keep the front wheels aimed straight ahead.

When ready to turn:

• Check traffic in all directions.
• Keep both hands on the steering wheel during the turn.
• Do not change gears during the turn.
• Keep checking your mirror to make sure the vehicle does not hit anything on the inside of the turn.
• Vehicle should not move into oncoming traffic.
• Vehicle should finish turn in correct lane.

After turn:
• Make sure turn signal is off.
• Get up to speed of traffic, use turn signal and move into right-most lane when safe to do so (if not already there).

INTERSECTIONS
As you approach an intersection:
• Check traffic thoroughly in all directions.
• Decelerate gently.
• Brake smoothly and, if necessary, change gears.
• If necessary, come to a complete stop (no coasting) behind any stop signs, signals, sidewalks or stop lines maintaining a safe gap behind any vehicle in front of you.
• Your vehicle must not roll forward or backward.

When driving through an intersection:
• Check traffic thoroughly in all directions.
• Decelerate and yield to any pedestrians and traffic in the intersection.
• Do not change lanes or shift gears while proceeding through the intersection.
• Keep your hands on the wheel.

Once through the intersection:
• Continue checking traffic.
• Accelerate smoothly and change gears as necessary.

URBAN/RURAL STRAIGHT
During this part of the test, you are expected to make regular traffic checks and maintain a safe following distance. Your vehicle should be centered in the proper lane (right-most lane) and you should keep up with the flow of traffic but not exceed the posted speed limit.

URBAN/RURAL LANE CHANGES
During the multiple lane portion of the urban and rural sections, you will be asked to change lanes to the left and then back to the right. You should make the necessary traffic checks first, then use proper signals and smoothly change lanes when it is safe to do so.

EXPRESSWAY
Before entering the expressway:
• Check traffic.
• Use proper signals.
• Merge smoothly into the proper lane of traffic.

Once on the expressway:
• Maintain proper lane positioning, vehicle spacing and vehicle speed.
• Continue to check traffic thoroughly in all directions.
You will be instructed to change lanes:
- You must make necessary traffic checks.
- Use proper signals.
- Change lanes smoothly when it is safe to do so.

When exiting the expressway:
- Make necessary traffic checks.
- Use proper signals.
- Decelerate smoothly in the exit lane.
- Once on the exit ramp, you must continue to decelerate within the lane markings and maintain adequate spacing between your vehicle and other vehicles.

**STOP/START**
For this maneuver, you will be asked to pull your vehicle over to the side of the road and stop as if you were going to get out and check something on your vehicle. You must check traffic thoroughly in all directions and move to the right-most lane or shoulder of the road.

As you prepare for the stop:
- Check traffic.
- Activate your right turn signal.
- Decelerate smoothly, brake evenly and change gears as necessary.
- Bring your vehicle to a full stop without coasting.

Once stopped:
- Vehicle must be parallel to the curb or shoulder of the road and safely out of the traffic flow.
- Vehicle should not be blocking driveways, fire hydrants, intersections, signs, etc.
- Cancel your turn signal.
- Activate your four-way emergency flashers.
- Apply the parking brake.
- Move the gear shift to neutral or park.
- Remove your feet from the brake and clutch pedals.

When instructed to resume:
- Check traffic and your mirrors thoroughly in all directions.
- Turn off your four-way flashers.
- Activate the left turn signal.
- When traffic permits, you should release the parking brake and pull straight ahead.
- Do not turn the wheel before your vehicle moves.
- Check traffic from all directions, especially to the left.
- Steer and accelerate smoothly into the proper lane when safe to do so.
- Once your vehicle is back into the flow of traffic, cancel your left turn signal.

**CURVE**
When approaching a curve:
- Check traffic thoroughly in all directions.
- **Before** entering the curve, reduce speed so further braking or shifting is not required in the curve.
• Keep vehicle in the lane.
• Continue checking traffic in all directions.

UPGRADE
As you approach the upgrade:
• Select the proper gear to maintain speed and not lug the engine.
• Check traffic thoroughly in all directions and move to the right-most or curb lane.
• If legal to do so, use four-way flashers if traveling too slowly for the flow of traffic.

DOWNGRADE
Before starting down the grade:
• Downshift as needed to help control engine speed and test brakes by gently applying the foot brake to ensure they are functioning properly. As your vehicle moves down the grade, continue checking traffic in all directions, stay in the right-most or curb lane; and if legal to do so, use 4-way flashers if your vehicle is moving too slowly for traffic. Increase following distance and observe the following downhill braking procedures:
  - Select a "safe" speed, one that is not too fast for the weight of the vehicle, length and steepness of the grade, weather and road conditions.
  - Once a "safe" speed has been reached, apply the brake hard enough to feel a definite slowdown.
  - When speed has been reduced to 5 mph below the "safe" speed, release the brakes (This application should last for about three (3) seconds.)
  - Once speed has increased to the "safe" speed, repeat the procedure.

For example: If your "safe" speed is 40 mph, you should apply the brakes once your vehicle speed reaches 40 mph. Your brakes should be applied hard enough to reduce your speed to 35 mph. Once your vehicle speed reaches 35 mph, release your brakes. Repeat this procedure as often as necessary until you have reached the end of the downgrade. This braking technique is called "snubbing."

When operating any commercial vehicle, do not ride the clutch, race the engine, change gears or coast while driving down the grade. At the bottom of the grade, be sure to cancel your 4-way flashers.

Not all test routes will contain an area of sufficient grade to test your skill adequately. Therefore, you may be asked to simulate (verbally) driving up and down a steep hill. You must be familiar with the upgrade/downgrade procedures so that you can explain and/or demonstrate them to the examiner at any time during the driving test.

RAILROAD CROSSING
Before reaching the crossing, all commercial drivers should:
• Decelerate, brake smoothly and shift gears as necessary.
• Look and listen for the presence of trains.
• Check traffic in all directions.

Do not stop, change gears, pass another vehicle or change lanes while any part of your vehicle is in the crossing.

If you are driving a bus, a school bus or a vehicle displaying placards, you should be prepared to observe the following procedures at every railroad crossing (unless the crossing is exempt):
• As the vehicle approaches a railroad crossing, activate the 4-way flashers.
• Stop the vehicle within 50 feet but not less than 15 feet from the nearest rail.
• Listen and look in both directions along the track for an approaching train and for signals indicating the approach of a train. If operating a bus, you may also be required to open the window and door prior to crossing the tracks.
• Keep hands on the steering wheel as the vehicle crosses the tracks.
• Do not stop, change gears or change lanes while any part of your vehicle is proceeding across the tracks.
• Four-way flashers should be deactivated after the vehicle crosses the tracks.

Not all driving road test routes will have a railroad crossing. You will be asked to explain and demonstrate the proper railroad crossing procedures to the examiner at a simulated location.

BRIDGE/OVERPASS/SIGN
After driving under an overpass, you may be asked to tell the examiner what the posted clearance or height was. After going over a bridge, you may be asked to tell the examiner what the posted weight limit was. If your test route does not have a bridge or overpass, you may be asked about another traffic sign. When asked, be prepared to identify and explain to the examiner any traffic sign which may appear on the route.

DURING THE TEST YOU MUST:
• Wear your seat belt.
• Obey all traffic signs, signals and laws.
• Complete the test without an accident or moving violation.

You will be scored on your overall performance in the following general driving behavior categories:

CLUTCH USAGE (FOR MANUAL TRANSMISSION)
• Always use clutch to shift.
• Double-clutch if vehicle is equipped with non-synchronized transmission.
• Do not rev or lug the engine.
• Do not ride clutch to control speed, coast with the clutch depressed, or "pop" the clutch.

GEAR USAGE (FOR MANUAL TRANSMISSION)
• Do not grind or clash gears.
• Select gear that does not rev or lug engine.
• Do not shift in turns and intersections.

BRAKE USAGE
• Do not ride or pump brake
• Do not brake harshly. Brake smoothly using steady pressure.

LANE USAGE
• Do not put vehicle over curbs, sidewalks or lane markings.
• Stop behind stop lines, crosswalks or stop signs.
• Complete a turn in the proper lane on a multiple lane road (vehicle should finish a left turn in the lane directly to the right of the center line).
• Finish a right turn in the right-most (curb) lane.
• Move to or remain in right-most lane unless lane is blocked.