DOCUMENT RESUME

ED 094 468 EA 006 314

TITLE	School Bus Driver Instructional Program. Trainee Study Guide -- Advanced Unit.
INSTITUTION	Department of Transportation, Washington, D.C. National Highway Safety Bureau.
REPORT NO	DOT-HS-801-088
PUB DATE	Jun 74
NOTE	277p.; Related documents are EA 006 238, EA 006 269, and EA 006 311 through 313
AVAILABLE FROM	Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Stock Number 5003-00161, $4.45)
EDRS PRICE	MF-$0.75 HC-$13.80 PLUS POSTAGE
DESCRIPTORS	*Driver Education; *Instructional Materials; Instructional Programs; Job Training; Programed Units; *School Buses; Student Transportation; *Traffic Safety; Training Objectives
IDENTIFIERS	*Bus Driver Training

ABSTRACT

A standardized and comprehensive school bus driver instructional program has been developed under contract with the Federal Government. The course has been organized to provide in one package a program for developing the minimum skills and knowledge which the proficient driver might require. This guide contains the materials presented in eight units for the supplemental (or advanced) skills and knowledge which the proficient school bus driver might require. The units cover the following topics: (1) emergency driving techniques, (2) first aid, (3) field trips, (4) transporting exceptional students, (5) detecting hazards, (6) controlling the position of the bus, (7) driving under special conditions, and (8) preventive maintenance of the bus. (Author)

DOT HS 801 088

SCHOOL BUS DRIVER INSTRUCTIONAL PROGRAM

trainee study guide—advanced unit

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
WASHINGTON, D.C. 20590

June 1974

GENERAL TABLE OF CONTENTS

ADVANCED UNIT A

EMERGENCY DRIVING TECHNIQUES

TABLE OF CONTENTS

OBJECTIVES

By the end of this unit, you should be able to select appropriate driving techniques to maintain or regain control of the bus under five emergency conditions:

1. Skid

2. Tire blowout

3. Brake loss

4. Obstruction in path of bus

5. Sudden loss of visibility

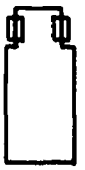
NOTES	CONTENT
	Expert drivers don't depend on their skill to get them out of tight spots. They depend on their judgment to avoid tight spots. IT'S A LOT EASIER TO STAY OUT OF TIGHT SPOTS THAN TO GET OUT OF THEM.* However, you may find yourself confronted with one of these five emergency conditions: 1. Skid 2. Tire blowout 3. Brake loss 4. Obstruction in the path of the bus 5. Sudden loss of visibility Under these conditions, you must know what emergency driving techniques to use. Your responses must become automatic because you will not have much time to think about what you should do. The procedures in this unit are "last ditch" measures to avoid an accident if at all possible. Since it is impossible to completely eliminate human error in the performance of routine driving tasks, your ability to take appropriate and immediate action under emergency conditions becomes critical. *From state of Arkansas (2)

SKID CONTROL*

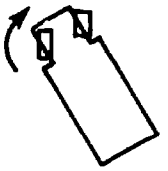
NOTES	CONTENT
	Any number of factors can cause a school bus to go into a skid. During a skid, the tires lose proper traction with the road surface. The normal means of controlling the bus are affected--steering, braking, decelerating, and accelerating. You must be able to detect a loss of traction in time to maintain or regain control of the bus. Loss of traction may include: • Skids caused by tire failure resulting from under inflation or sudden deflation from a blowout. • Front wheel skids resulting from faulty brakes. • Rear wheel skids resulting from faulty brakes, excessive acceleration or speed on curves, rough or slippery surfaces. • Four wheel locked brake skid resulting from inappropriate application of brake pressure. • Hydroplaning resulting from traveling too fast on a water covered roadway with lack of attention given to tires, tread, and pressure. • Skids caused by oil on the road after the first few minutes of rain. NOTES: *Adapted from NHTSA Driver Education Curriculum (8)

NOTES	CONTENT
	Once you lose traction and the bus goes into a skid, you must be able to regain directional control: 1. STEERING--Immediately apply controlled steering (turn into the skid--usually this means steer the wheels in the direction you want to go). Follow by controlled counter-steering to dampen fishtailing until steering control is re-established. 2. BRAKING--Apply no brake pressure or only modified braking, as appropriate, until steering control is re-established. 3. DECELERATION--Remove pressure from the accelerator smoothly (not suddenly) and do not accelerate again until steering control is re-established. 4. ACCELERATION--Once steering control is re-established, shift to a lower gear and accelerate gradually to maintain traction. NOTES:

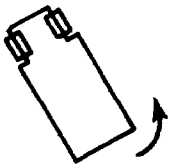
(Read illustration from bottom to top)

7. 

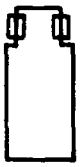
Steering control is re-established.

6. 

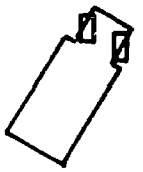
To control fishtailing in the opposite direction, you'd countersteer right to help you get back on course.

5. 

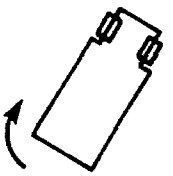
The back end fishtails to the right.

4. 

The bus is back on course.

3. 

You'd steer left, in the direction you want the bus to go relative to the way it's facing.

2. 

The back end of bus skids around to left (the bus is still moving forward on an angle).

1. 

The bus is going straight.

Figure 1. Steering to Get Out of a Skid

NOTES	CONTENT
	To control a skid you must remember what to do about steering, braking, deceleration, and acceleration. Describe the procedure in your own words. STEERING: BRAKING: DECELERATION: ACCELERATION: Discuss your answers with the class.

WHAT WOULD YOU DO?

NOTES	CONTENT
	Suppose you're driving your bus on a road that's mostly dry with some wet spots. As you start up a hill, you hit a wet and oily spot. Your rear wheels spin and the rear of your bus slides toward the right side of the road. What would you do? Discuss your answer with the class.

PROBABILITY OF SKIDDING

NOTES	CONTENT
	Check which condition in each set is more likely to get you into a skid: ENVIRONMENTAL CONDITIONS A. ____ wet road or ____ dry road. B. ____ wet road or ____ icy road. C. ____ cindered/sanded road or ____ snow-covered road. D. ____ loose gravel or ____ smooth road surface. E. ____ curved road or ____ straight road. F. ____ level road or ____ hilly road. G. ____ bridge or ____ solid ground. BUS CONDITION H. ____ bald tires or ____ tires with good tread. I. ____ tire with slow leak or ____ tire blowout. J. ____ tire with low pressure or ____ tire with chains. YOUR ACTIONS K. ____ locking the brakes or ____ modulated braking. L. ____ smooth acceleration or ____ sudden acceleration. M. ____ smooth deceleration or ____ sudden deceleration. N. ____ driving fast or ____ driving slow.

NOTES	CONTENT
	WHAT IS THE MAIN THING YOU SHOULD DO WHEN YOU THINK A SKID IS PROBABLE? NOTES:

TIRE BLOWOUT*

NOTES	CONTENT
	1. Grip the steering wheel firmly and steer your vehicle straight down the center of your lane. 2. Do not apply your brakes. 3. Take your foot off accelerator. If bus starts to skid, follow skid procedure. 4. Activate right turn signal, move right slowly, out of the lane of traffic and stop. Watch out for soft shoulders which could make the control of the bus even more difficult. 5. Activate 4-way hazard lamps, not red flashing warning lights. 6. Decide whether to evacuate your children while the repair is being made. 7. Follow procedures for Mechanical Breakdown. NOTES:

*Adapted from state of Missouri (7)

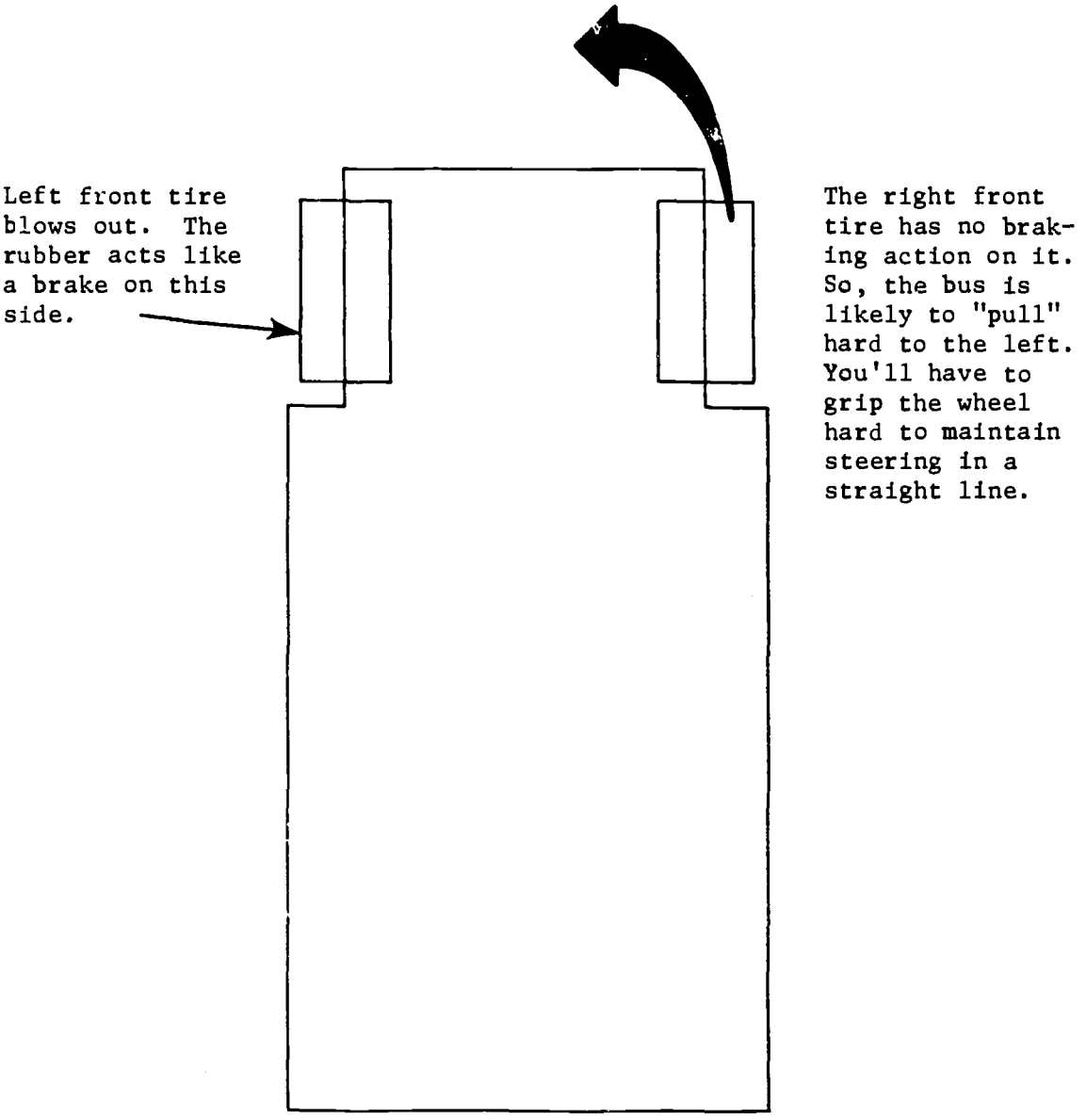


Figure 2. Left-front Tire Blowout

NOTES	CONTENT
	You're driving along an expressway at 50 mph when suddenly your right front tire blows out. HOW WILL YOU KNOW IT? WHAT WOULD YOU DO? Steering: Braking: Stopping: Discuss your answers with the class.

LOSS OF BRAKES

NOTES	CONTENT
	If you're ever confronted with a partial or total loss of brakes: 1. Pump the brake pedal and sound horn, flash headlights, etc. 2. Downshift to lowest gear possible. 3. If there is an upgrade within the assured clear distance ahead, stay on the road and allow the upgrade to slow the bus. Then select a path for leaving the roadway. 4. If no upgrade is within the assured clear distance ahead, select a path for leaving roadway that will minimize injuries and property damage. If you must go into a bank, turn into it at an angle. Otherwise, bus may flip over. NOTES:

PRACTICE

NOTES	CONTENT
	You should remember four things if you lose your brakes. Describe them in your own words. BRAKE PEDAL, HORN, AND LIGHTS: SHIFTING: IF CLEAR UPGRADE: IF NO CLEAR UPGRADE: Discuss your answers with the class.

NOTES	CONTENT
	You are following 100 feet behind another school bus, going 25 mph, down a steep grade. At the bottom of the hill is a stop sign. The road comes to a T-intersection with a highway which has a medium amount of traffic going in both directions. Across the highway is a wooden-fenced field. On your right is a concrete retainer wall. There are houses on the left side of the road. There are no vehicles in the oncoming lane. You apply your brakes and nothing happens. WHAT WOULD YOU DO? Discuss your answers with the class.

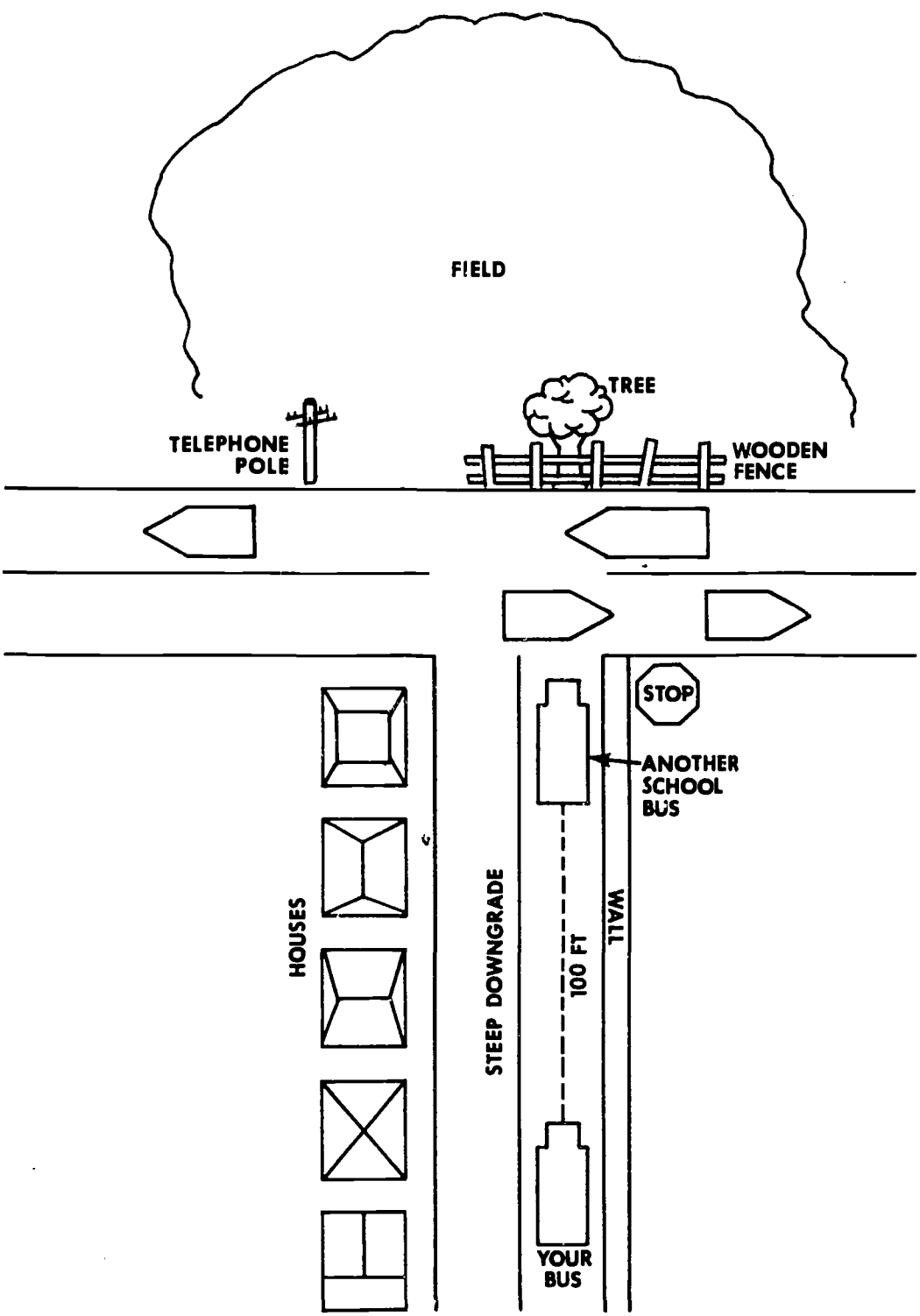


Figure 3. Brake Loss

OBSTRUCTION IN PATH OF BUS*

NOTES	CONTENT
	When you suddenly see an obstruction--a pedestrian, ball, another vehicle, construction barrier, etc.,--in the direct path of the bus, you must take evasive action to avoid hitting it. 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 these evasive actions you should perform to avoid hitting the obstruction. 1. Modulated braking. 2. Quick steering to the right, with or without braking. 3. Leaving the paved portion of roadway, with or without roadside hazards present. For effective evasive action, you must be able to inhibit the tendency to slam on the brakes. 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. 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're going, how far away the object is, how good your tires are, and whether the road is wet or dry.

*Adapted from NHTSA Driver Education Curriculum (8)

NOTES	CONTENT
	Recall the stopping distances for a bus under ideal conditions:

Maximum Safe Stopping Distances for TRUCKS and BUSES In Accordance with ICC Regulations

Speed Miles Per Hour	Feet Per Second	Vehicle Travels (One Second) Reaction Time	Braking Distance	Total Stopping Distance
20	29	29	30	59
30	44	44	67	111
40	59	59	120	178
50	73	73	188	261
60	88	88	270	358
Speed of vehicle.	No. of feet covered per second by vehicle.	Distance traveled in one second before brake can be applied after seeing danger (in feet).	Distance required to stop after brake is applied with good pavement and fair brakes (in feet).	Total feet covered after seeing danger (in feet). Reaction time plus stopping distance.

Because the obstruction is an emergency, you won't have time to do lengthy calculations. If it's not instantly obvious that you can stop in time, you must choose to steer the bus in an alternate path. You must be able to recognize quickly the best "escape route." At a glance, decide:

- Whether a possible escape path is free of hazardous obstacles.

NOTES	CONTENT
	• Whether clearances are sufficient to allow the bus to pass through them. • Whether an off-roadway surface will permit steering control. • Whether the obstruction is likely to move into your escape path. • Whether one escape route is safer than another. The size and weight of the bus limits its ability to swerve sharply to avoid an object or to leave the pavement with any great degree of control. Overturning is a danger. STEER FIRMLY AND AS GRADUALLY AS POSSIBLE TO STILL CLEAR THE OBSTRUCTION. USE ONLY MODULATED BRAKING. It can't be stressed enough that your decision will probably have to be a split-second one. Rehearse these points so that you can decide what evasive action is best. • If you're traveling as fast as 40 mph, the obstruction has to be <u>at least</u> 200 feet away for you to stop safely. That's 2/3 of a football field! Any closer, and you'd better steer around it, or off the road. • Behind every rolling ball, there's likely to be a running child. Just because the ball clears your path in time doesn't mean you're out of danger. • If you're in a tight spot, hitting the obstacle might be the safest thing to do. For example, with heavy oncoming traffic,

NOTES	CONTENT
	heavy pedestrian traffic on sidewalk to your right, suppose a construction warning sign is the unexpected obstacle less than 10 feet away in your lane. You're going 25 mph. You can't stop in time, and steering left or right would create a worse collision. You may assess the relative dangers and decide it's better to demolish the sign. IN ANY CASE WHERE COLLISION IS ABSOLUTELY UNAVOIDABLE, TRY TO: • Avoid a head-on collision; collision at an angle reduces force of impact. • Avoid hitting human beings, especially young children. If you have a choice, it's better to hit inanimate objects than people or animals. Remember: You're more likely to avoid hitting any obstruction in the path of the bus if you always anticipate the unusual and practice effective evasive action so it becomes as automatic as possible. NOTES:

NOTES	CONTENT
	What three basic forms of evasive action can you take to avoid hitting an obstruction in the path of the bus? 1. 2. 3. What things influence your decision? Discuss your answers with the class.

NOTES	CONTENT
	DISCUSSION QUESTION Suppose you were approaching a freeway exit as shown in Figure 4. The ramp goes down under the freeway. The guard rail to your right protects a steep drop off. You are traveling 30 mph and have entered the deceleration lane. In the lane to your left a car is passing you at 60 mph. Suddenly you spot a disabled vehicle 60 feet ahead on the exit ramp. A person beside it is changing a tire. (It would require 67 feet for you to stop.) What evasive action would you take? Why? a. Indicate evasive action on Figure 4. b. Explain why here:

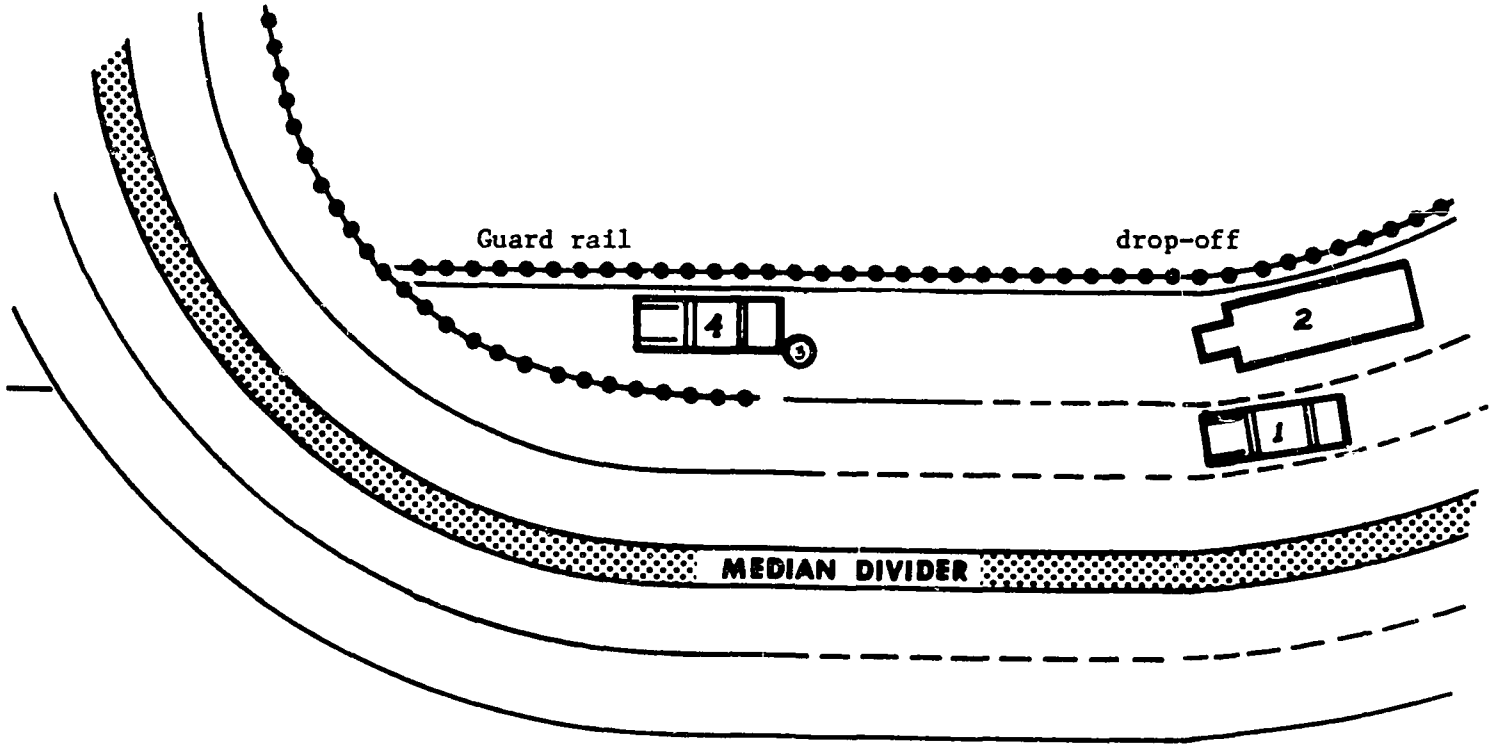


Figure 4. Obstruction in Path of the Bus

SUDDEN LOSS OF VISIBILITY*

NOTES	CONTENT
	Several things can cause sudden loss of visibility--water splashed onto windshield, headlight failure, hood flies up, etc. You must know how to control the vehicle until you can regain normal visibility. You'll have to use clues other than the usual visual clues. IF THE HOOD FLIES UP: 1. Lower your head and try to look through the gap at the hinge. 2. Look out the left and right windows to help keep your sense of direction. 3. Apply brakes moderately. 4. Activate your right turn signal. 5. Steer out of the traffic lane and stop. 6. Activate four-way hazard lights (not red flashing warning lights). NOTES: IF THE HEADLIGHTS FAIL: 1. Immediately hit dimmer switch. 2. Activate right turn signal, four-way hazards. 3. Use available environmental light to keep sight of road.

*Adapted from NHTSA Driver Education Curriculum (8)

NOTES	CONTENT
	4. Brake slowly and steer out of traffic lane and stop. NOTES: IF WATER/SLUSH IS SPLASHED ON WINDSHIELD: 1. Apply brakes cautiously, look out side windows to keep sight of road. 2. Turn on wipers. NOTES: IF WINDSHIELD WIPERS FAIL DURING RAIN/SLEET/SNOW: 1. Look out side windows to keep sight of road. 2. Apply brakes cautiously. 3. Activate right turn signal. 4. Pull over as far to the right as possible, or off road, and stop. NOTES:

NOTES	CONTENT
	If you suddenly lose your normal visibility through the windshield, what clues help you maintain directional control? How should you brake? When is it necessary to pull off the road? Discuss your answers with the class.

PRACTICE – WHAT WOULD YOU DO?

NOTES	CONTENT

Read each situation and write the letter of the ACTION you'd take.

SITUATIONS	ACTIONS
You are driving a bus and this happens:	You should:
__ 1. You are at the bottom of a snow-covered hill and you see cars stopped upon the hill.	a. Drive slower.
__ 2. You notice wet leaves all across the street.	b. Start up slowly
__ 3. You see a snowdrift in your lane (4-lane divided highway).	c. Speed up a little
__ 4. You are following another bus and the road begins to be icy.	d. Stop the bus
__ 5. You are starting up at a traffic signal. There is freezing rain.	e. Increase following distance
__ 6. You are approaching a long, snow-covered hill.	f. Drive around it
__ 7. You are on a highway in the rain. Your bus begins to hydroplane.	g. Pump brakes rapidly
__ 8. You turn on your windshield washers and an ice glaze forms on your windshield, making it impossible to see.	h. Turn more slowly
__ 9. You are approaching a city intersection where you want to turn. It has just started to rain.	i. Ease up on the accelerator
__10. You are on packed snow and an accident happens just ahead.	j. Look out side windows to keep sight of road; gradually brake and pull off.

ADVANCED UNIT A
REVIEW QUESTIONS

Check the answer you think is most correct.

1. What's the best reason for not driving fast when there is a thin layer of water on the roadway?

   ___ a. The water on the roadway is more slippery than wet pavement.
   ___ b. Your tires will tend to ride on top of the water.
   ___ c. Spray from other cars will make it hard to see clearly.
   ___ d. The spray may cause the engine to stop.

2. You are driving down an icy residential street with some dry patches. Suddenly there is trouble a block ahead and you have to stop. You are going 20 mph. What should you do?

   ___ a. Take foot off accelerator and allow engine to slow the bus.
   ___ b. Apply the brakes and wait till you hit dry pavement.
   ___ c. Pump the brake hard several times.
   ___ d. Shift into "low" gear.

3. On a cold, wet day, the road is generally the most slippery:

   ___ a. On a curve.
   ___ b. On a hill.
   ___ c. In a tunnel.
   ___ d. On a bridge.

4. A little loose sand or gravel on dry pavement:

   ___ a. Gives you better traction.
   ___ b. May lead to a skid.
   ___ c. Is particularly dangerous when the road is wet.
   ___ d. Means there is construction ahead.

5. If you suddenly lose your hydraulic brakes, going 35 mph, you should first pump your brakes, sound horn, and flash your lights. Then:

___ a. Activate red flashing warning lamps.
___ b. Drive off the road.
___ c. Immediately downshift to 2nd gear.
___ d. Try to shift to a lower gear.

6. The rear of your bus has skidded to the right. You have turned your wheel to the right and the bus is beginning to fishtail to the left. You should:

___ a. Straighten the wheel when you get back on course.
___ b. Brake to help you get back on course.
___ c. Countersteer left to help you get back on course.
___ d. Countersteer right to help you get back on course.

7. You have just been forced to pull onto a firm shoulder to avoid an oncoming car. After the car passes, you see a highway sign directly in your path. You are going 30 mph. If you cannot stop in time, you should make sure the road is now clear and:

___ a. Turn sharply back onto the roadway.
___ b. Turn gradually back onto the roadway.
___ c. Brake gently and turn sharply back onto the roadway.
___ d. Brake gently and turn slowly back onto the roadway.

8. As you come over the top of a hill at 40 mph, you see a car stalled in your lane right in front of you. You cannot stop in time. In the oncoming lane is a pickup truck. The shoulder is clear and wide enough for the bus. What should you do?

___ a. Hit the brake hard and if you still can't stop, take foot off brake and try to steer onto the shoulder.

___ b. Apply steady hard pressure to the brake and try to steer around the right of the car and onto the shoulder.

___ c. Pump the brake and try to steer left between the car and truck.

___ d. Leave your foot off the brake and try to steer right around the car onto the shoulder.

9. You are driving at a high speed. Suddenly you hear a loud "pow" and the front of your bus begins to shake. You should:

___ a. Brake hard.

___ b. Brake gradually.

___ c. Keep your foot off the brake.

___ d. Turn off the roadway quickly.

10. You are in the passing lane of a four-lane road with traffic on both sides. Suddenly an oncoming car crosses the center line and heads right for you. You first try to get that driver's attention with horn, etc. Then:

___ a. Hit the brake and brace yourself for a head-on collision.

___ b. Brake and steer right.

___ c. Brake and steer left.

___ d. Dodge oncoming car by crossing centerline, then steering back to your lane.

ADVANCED UNIT B

FIRST AID

TABLE OF CONTENTS

OBJECTIVES

By the end of this unit, you should be able to:

1. Set priorities for treating severe injuries.

2. Recognize and treat symptoms of severe bleeding, stoppage of breath, and shock.

NOTES	CONTENT
	BUS DRIVER SAVES A LIFE
	YOUR RESPONSIBILITY TO RENDER FIRST AID* The first objective of first aid is to save life. You must know how to apply the principles of first aid. First aid is the immediate and temporary care given to the victim of an accident or sudden illness until the services of a physician can be obtained. A victim will respond much more readily to treatment if he recognizes that a competent person is administering that treatment. Practicing the procedures in this unit will increase your competence in rendering first aid. Common sense and a few simple rules are the keys to effective first aid. It is as important to know what not to do, as to know what to do. In case of an emergency, making mistakes could be disastrous to the injured person. You are more likely to act promptly and correctly if you learn only a few simple principles but learn them well. Emphasis is placed on problems you may confront on the road. The procedures in this unit include: 1. Evaluation of injury and setting of priorities for treatment. *Adapted from state of Ohio (10)

NOTES	CONTENT
	2. Evaluation and treatment of bleeding. 3. Maintenance of airway and respiration. 4. Evaluation and control of shock. Other first aid topics that are important but not urgent in the saving of life will be discussed only briefly to provide you with a general knowledge of first aid. Little attention has been given the contents of the first aid kit and its use, because the most important equipment you have is your knowledge of first aid, not the number and types of splints, bandages, and ointments in the first aid kit. Where references are made to bandages or other equipment, use the cleanest materials available but do not delay first aid if clean bandages are not available. However, the first aid kit should contain a supply of 4" x 4" pads and similar clean bandages for covering wounds and stopping bleeding.* *Adapted from state of California (4)

FIRST AID KIT

NOTES	CONTENT
	CONTENTS LOCATION WHERE TO GET NEW SUPPLIES

SETTING OF PRIORITIES FOR TREATMENT*

NOTES	CONTENT
	You must make three evaluations in establishing priorities for treatment: condition of scene, types of injuries, and need for immediate treatment. EVALUATION OF THE SCENE Several types of situations require high priority action. For example, if fire is present, the most urgent action is to remove everyone from its danger. Don't give any first aid treatment until everyone is safe. If someone has been electrocuted, the most urgent action for a first aider is to remove him from the electrical source while simultaneously protecting himself and others from also being electrocuted. Use a completely dry stick to lift off an offending wire. Do not touch the injured until he is removed from contact with the electrical source. If a person has drowned or is in the presence of a dangerous gas, such as chlorine or ammonia, do not attempt to rescue him unless you are sure that you can do so without becoming a victim yourself. Often, a few seconds delay will give you enough time to find an alternate, safer way to rescue the person. EVALUATION OF INJURIES At least three types of injuries require prompt attention: 1. *Severe bleeding.* If a person is bleeding profusely, he may be dead in less than two minutes. *Adapted from state of California (4)

NOTES	CONTENT
	2. *Blocked airway or stoppage of breath.* Most people can be saved if they start breathing on their own or artificially within two minutes. If breathing has been stopped for five minutes, there is only a 25 percent chance of saving the victim. It is, therefore, important to note the time at which breathing stopped. 3. *Shock.* In shock the vital body functions are depressed. Death may result if not treated promptly, even though the injury which caused the shock is not severe enough to cause death. PRIORITY FOR TREATMENT A school bus accident may involve injury to a number of people. If several people are injured and the scene permits you to begin treatment promptly, treat severe bleeding first, then move quickly to those who have stopped breathing and still have a chance for survival. Then, move to less urgent injuries. Whenever possible, treat a person where he is found. Before you move any sick or injured person, bleeding should be stopped, breathing should be established, and shock should be treated. If there is great urgency to move an injured person, drag him on the long axis of his body pulling him by his hands (stretched back behind his head), or by the shoulders. If possible, place beneath him a coat or a blanket on which he can ride or be pulled.

NOTES	CONTENT
	There is always the possibility that you may be injured in the accident also. You should, therefore, be able to direct students in first aid practices in the event you are injured. Decide which of your regular passengers might be most capable of assisting you during an emergency. NOTES:

EVALUATION AND TREATMENT OF BLEEDING*

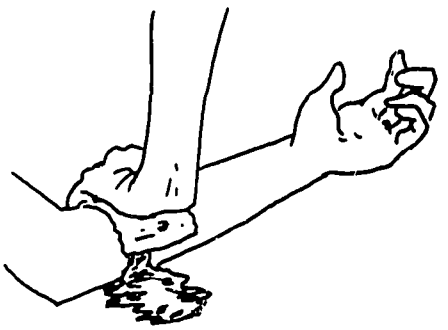
NOTES	CONTENT
	Use the following procedures in the evaluation and treatment of bleeding. EVALUATION OF BLEEDING When treating a bleeding injury, determine the type of bleeding and the amount of blood lost. You must be able to recognize three types of external bleeding: 1. *Capillary oozing.* Injuries to capillaries or small veins is indicated by a steady ooze of dark-colored blood. 2. *Venous bleeding.* Bleeding from a vein is indicated by a flow of dark-colored blood at a steady rate. 3. *Arterial bleeding.* Bleeding from an artery is indicated by bright red blood, flowing swiftly in spurts or jets. This may sometimes be mixed with venous bleeding, in which case the blood will be slightly darker in color. When evaluating the severity of bleeding, remember: • Blood dripping slowly from the wound is generally not serious and can be controlled. • Blood flowing in a small, steady stream or in small spurts may be serious and can be controlled. • Blood flowing in a heavy stream or in large spurts indicates a serious condition, and a

*Adapted from state of California (4)

NOTES	CONTENT
	first aider must attempt to bring it under control immediately. Bleeding needs immediate attention. Even the loss of small amounts of blood will produce weakness and can cause shock. The loss of as much as a pint of blood by a child, or a quart of blood by an adult, may have disastrous results. CONTROL OF BLEEDING *Direct pressure*. The main step in controlling bleeding is for the first aider to exert direct pressure over the wound area. This is done by placing the cleanest material available (preferably a pad of sterile gauze) against the bleeding point and applying firm pressure with the hand until a bandage can be applied. To bring bleeding under control, follow these steps: 1. Apply dressing or pad directly over wound. 2. Apply direct, even pressure, using bare hand if necessary when bleeding is serious and when dressing is not immediately available. 3. Leave dressing in place. 4. Continue pressure by applying bandage. 5. Secure bandage in place, checking to be sure bandage is not too tight and thus cutting off circulation. 6. Elevate limb above heart level except when there is a possible broken bone.

To stop bleeding, apply a dressing pad or a bare hand directly over the wound and apply pressure.

Continue the pressure until the bleeding has stopped or slowed to the point that you will be able to apply a bandage. Do not hurry to remove the pressure.



Then apply a bandage over the dressing to continue the pressure and thus control the bleeding. Check the bandage after the knot is tied to be sure it is not too tight and is not cutting off the circulation.

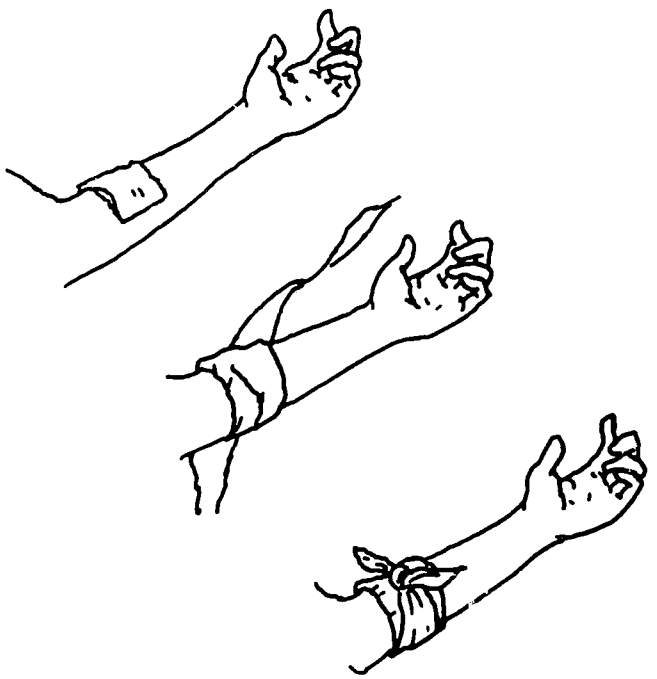


Figure 1. Using Direct Pressure to Control Bleeding*

*Adapted from state of California (4)

NOTES	CONTENT
	7. Treat for shock. 8. If blood soaks through dressing, do not remove but apply more dressings NOTES: *Pressure points.* If direct pressure does not control bleeding, pressure on an artery (pressure point) close to the wound is necessary. The point selected must be between the heart and the injury. To control bleeding in this manner, find one of these pressure points: 1. *Temporal artery.* The temporal artery is located in the hollow just in front of the ear. 2. *Facial artery.* The facial artery is located in the small crevice about one inch from the angle of the jaw. 3. *Carotid artery.* The carotid artery is located deep and back on each side of the Adam's apple. 4. *Subclavian artery.* The subclavian artery is located deep and down in the hollow near the collarbone. 5. *Brachial artery.* The brachial artery is located on the inner side of the upper arm about three inches below the armpit.

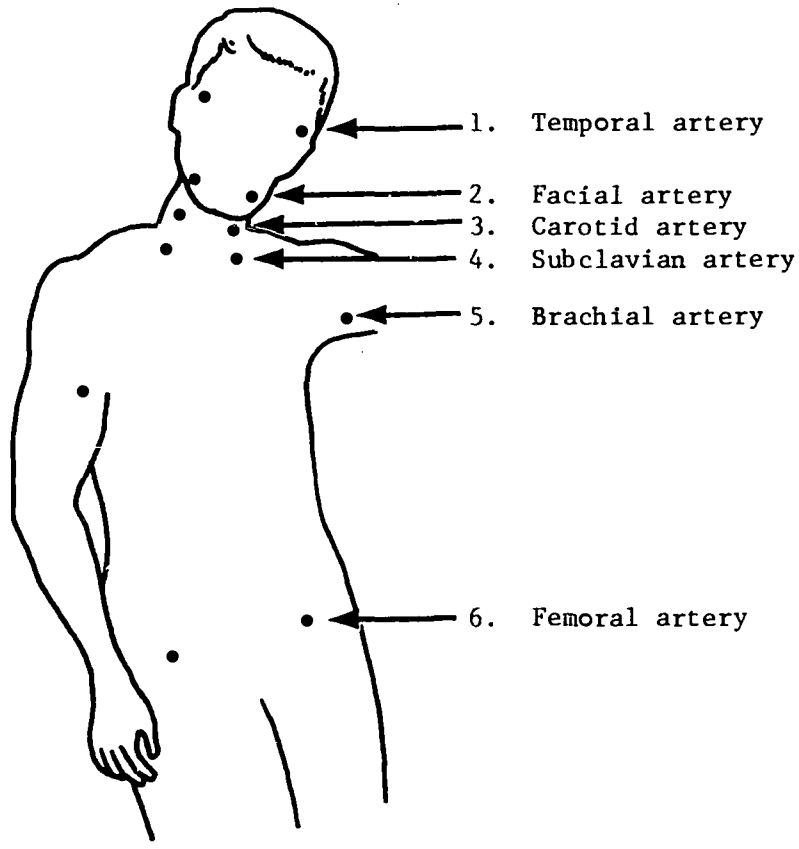


Figure 2. Pressure Points for Applying Arterial Pressure

NOTES	CONTENT
	6. *Femoral artery*. The femoral artery is located midway in the groin, between the crotch and the hip. *Tourniquet warning*. A tourniquet applied to control bleeding is mentioned here principally to discourage its use. It is dangerous to apply, dangerous to leave on, and dangerous to remove. It will cause tissue injury and stoppage of the entire supply of blood to the part below it. This causes gangrene and, subsequently, could cause loss of limb. A tourniquet is rarely required and should be used only for severe, life-threatening hemorrhage that cannot be controlled with direct pressure or arterial pressure. *Applying the bandage*. After bleeding has been controlled, do not remove the dressing used to apply direct pressure, even though blood may have saturated it. Apply additional layers of cloth to form a good-sized covering; then bandage the wound snugly and firmly. A bandage that is too tight can cause further injury. Therefore, check the bandage periodically. Look for swelling around the wound. If it seems that the bandage is interfering with the circulation of the blood, loosen it. *Treating for shock*. Anyone who has lost much blood will need treatment for shock. Even if the symptoms of shock are not evident, the patient should be kept warm and quiet. NOTES:

PRACTICE IN CONTROLLING BLEEDING

NOTES	CONTENT
	Your instructor will first demonstrate the control of bleeding using direct pressure. Watch how he does it. Now observe the location of the six pressure points and how to apply arterial pressure. Now you practice each method on another class member. Suppose you notice a student with severe arterial bleeding at the wrist. Demonstrate what you would do to control bleeding. NOTES:

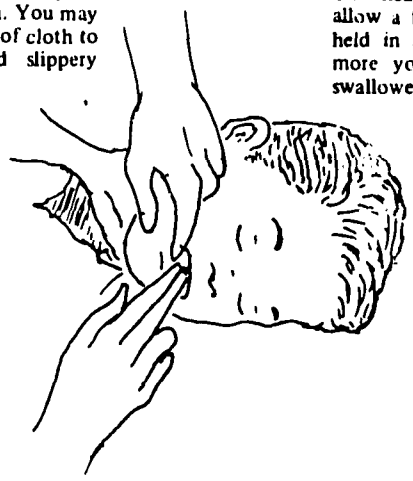
NOTES	CONTENT
	Breathing may stop for three reasons: 1. The mouth or windpipe is blocked (by the tongue, blood, or mucus). 2. The brain centers that control breathing have stopped (drowning, electrocution, head injury, or poisoning). 3. There is a sucking sound of the chest that prevents the lungs from expanding (obvious by looking at the chest). With the first two, the person may be blue in color and respiration may appear to have stopped, or he may be choking. ARTIFICIAL RESPIRATION Most persons can live about six minutes after breathing stops. Therefore, artificial respiration must begin as soon as possible after natural breathing has been interrupted, or when natural breathing is so irregular or so shallow as to be ineffective. Artificial respiration is a method of getting air into and out of a person's lungs until he can breathe for himself. *Mouth-to-mouth method*. One of the simplest and most effective ways to give artificial respiration is by the mouth-to-mouth (or mouth-to-nose) method. This method is effective for both children and adults and can be used even when there are injuries to the chest and arms. Follow these steps: 1. Place the person who has stopped breathing on his back. *Adapted from state of California (4)

NOTES	CONTENT
	2. Open his mouth and clear out foreign matter (food, dirt, and so forth) with the fingers. If the person has false teeth, remove them. 3. Tilt his head back so that his chin points upward and tilt his lower jaw beneath and behind so that it juts out. This moves the base of the tongue away from the back of the throat so it does not block the air passage to the lungs. Unless this air passage is open, no amount of effort will get air in. 4. Blow air into a person's lungs through either his mouth or nose. Open your mouth wide and place it tightly over the person's mouth. Pinch his nostrils shut. Or close the victim's mouth and place your mouth over his nose. With an infant or small child, place your mouth over both his nose and mouth making an airproof seal. Air can be blown into a person's mouth even through clenched teeth. 5. Blow into the mouth or nose, continuing to hold the unconscious person's lower jaw so that it juts out to keep the air passage open. 6. Remove your mouth from the patient's mouth. Turn your head to the side and listen for the return outflow of air coming from the patient's lungs. If you hear it, you will know that an exchange of air has occurred.

NOTES	CONTENT
	7. Continue breathing for the patient. Blow vigorously into his mouth or nose about 12 times each minute. Remove your mouth after each breath and listen for the exchange of air. In the case of an infant or child, blow less vigorously, using shallower breaths about 20 times a minute. 8. If there is not an exchange of air, turn the person on his side and strike him several times between the shoulder blades, using considerable force. This will help dislodge any obstruction in the air passages. Check the position of the head and jaw. Finally, make sure there is no foreign matter in his mouth. Normal breathing may begin again after 15 minutes of artificial respiration. But if it does not, continue the procedure until medical aid arrives. Alternate with other persons, if possible, to maintain maximum efficiency. Cases of electric shock and drug or carbon monoxide poisoning may require artificial respiration for longer periods. The first sign of restored breathing may be a sigh or a gasp. Breathing may be irregular at first; therefore, artificial respiration should be continued until regular breathing resumes. When normal breathing resumes, the person usually recovers rapidly. However, be prepared in case he stops breathing again. NOTES:

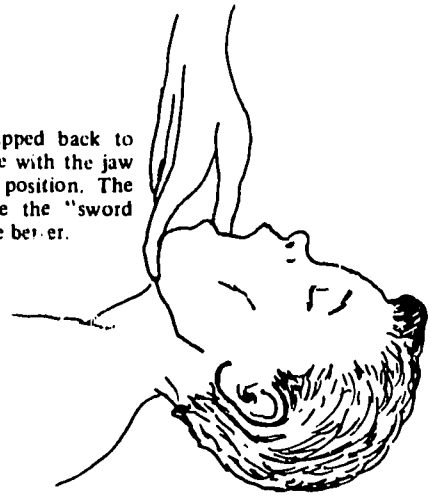
A

Before starting any type of artificial respiration be sure that the mouth and throat are completely clear of mucus and foreign objects. Use your fingers to clean the mouth. You may cover fingers with a piece of cloth to help remove mucus and slippery objects.



B

The head must be tipped back to allow a free air passage with the jaw held in a jutting-out position. The more you can achieve the "sword swallower" position the better.



C

Remember – Don't blow too hard. Your mouth and the mouth of the person receiving treatment should be wide open with a complete seal between them. Inhale more than usual before exhaling into person's mouth. In this way he will get more oxygen.

D

Pinching the nostrils prevents air from escaping through the nose. With your right hand be sure to hold the jaw in the jutting-out position. Your fingers, held like a claw, should be hooked behind the jawbone to hold it in the correct position.

E

This is the mouth-to-nose type of respiration with the lips being sealed by the two fingers of the right hand. This would be used when an obstruction in the mouth cannot be removed or a severe mouth injury prevents proper contact.

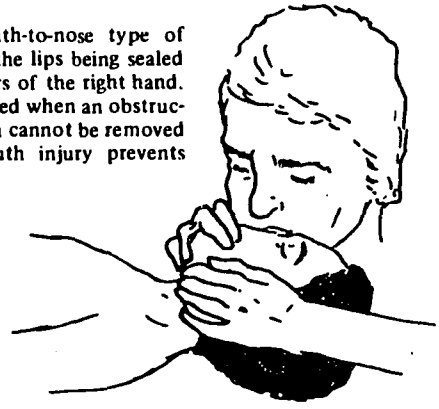
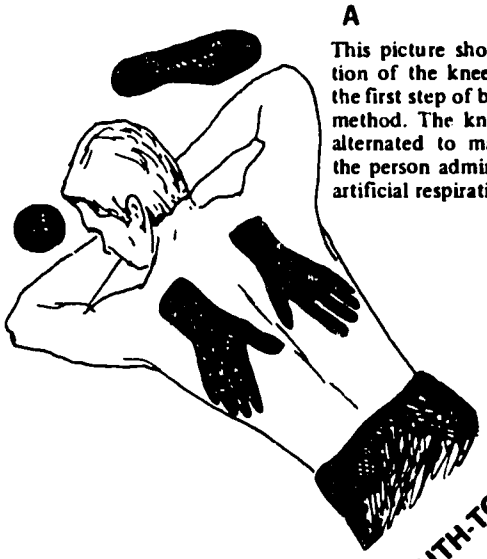


Figure 3. Mouth-to-Mouth and Mouth-to-Nose Method*

*Adapted from state of California (4)

NOTES	CONTENT
	Back-pressure, arm-lift method. This is the second most desirable method of artificial respiration. It should be used only when injuries to the head or face prevent the use of mouth-to-mouth or mouth-to-nose method. If a person has injuries both to the face and chest so you cannot use either method, one should not hesitate to open the victim's mouth and keep the windpipe clear of blood, mucus, broken teeth, or obstructing tongue. It is better to move a broken jaw, broken nose, or broken teeth and keep the person alive by letting him breathe than to keep the broken bones from moving and have the person die. NOTES:



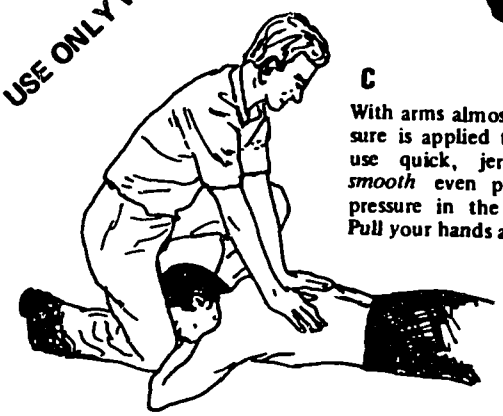
A

This picture shows the correct position of the knee, foot, and hands in the first step of back-pressure arm-lift method. The knee and foot may be alternated to make it less tiring for the person administering this type of artificial respiration.

USE ONLY WHEN MOUTH-TO-MOUTH METHOD IS NOT POSSIBLE

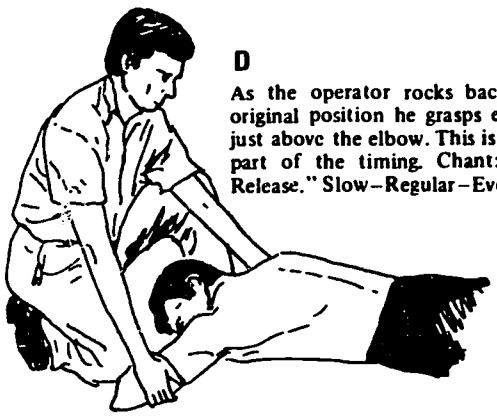
B

With hands in correct position the operator starts a rocking forward motion. Note that elbows are straight and stiff. This is when you start the timing. Chant: "Press–Release" - "Lift–Release." Say it in time to your own breathing.



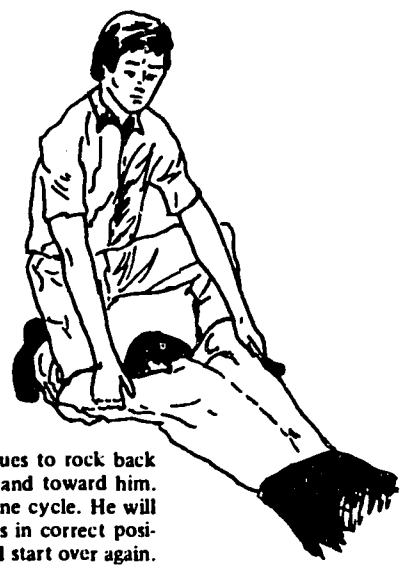
C

With arms almost vertical direct pressure is applied to the back. *Do not* use quick, jerking pressure. Use *smooth* even pressure. Release the pressure in the same smooth way. Pull your hands away slowly.



D

As the operator rocks back to his original position he grasps each arm just above the elbow. This is the next part of the timing. Chant: "Lift–Release." Slow–Regular–Even.



E

The operator continues to rock back lifting the arms up and toward him. This is the end of one cycle. He will next place his hands in correct position on the back and start over again.

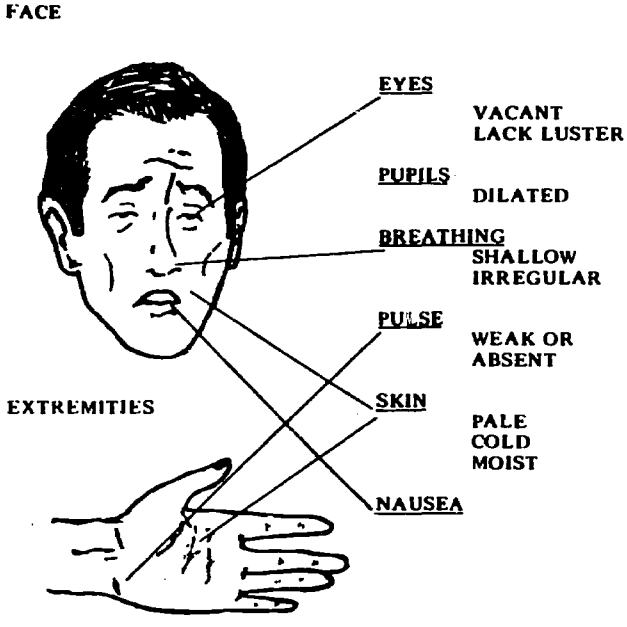
Figure 4. Back-Pressure Arm-Lift Method*

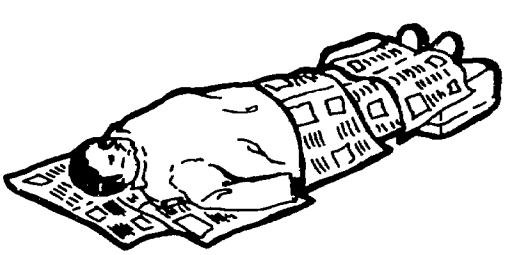
*Adapted from state of California (4)

PRACTICE IN ARTIFICIAL RESPIRATION

NOTES	CONTENT
	Your instructor will now show you the two methods of artificial respiration. When would you use the back-pressure arm-lift method? How does the mouth-to-mouth method differ when the injured person is a small child? Now you take turns practicing each method with another member of the class. Your instructor will be around to observe. NOTES:

EVALUATION AND CONTROL OF SHOCK*

NOTES	CONTENT
	Shock may cause death if not treated promptly, even though the injury which caused it may not itself be enough to cause death. The three most common causes of severe shock are inadequate breathing, excessive bleeding, and unsplinted fractures. Correction of these will do much to correct the shock. RECOGNIZING SHOCK Shock is easily recognized: The skin is pale and clammy with small drops of sweat particularly around the lips and forehead; the person may complain of nausea and dizziness; the pulse may be fast and weak and the breathing shallow and irregular; the eyes may be dull with enlarged pupils. A person may be unconscious or unaware of the seriousness of the injury, and then suddenly collapse.  *Adapted from state of California (4)

NOTES	CONTENT
	You should treat all seriously injured persons for shock, even though all of these symptoms have not appeared and the person seems normal and alert. CONTROL OF SHOCK When treating for shock, follow these steps: 1. Have the injured person lie down. 2. Elevate his feet and legs 12 inches or more. This helps the flow of blood to his heart and head. If the person has received a head or chest injury, or if he has difficulty breathing, elevate his head and chest rather than his feet. 3. Keep the person warm, but not hot. Place a coat, jacket, newspapers, or any available covering under him. Depending on the weather, also cover him. Avoid getting him so hot that he perspires, because this draws blood to the skin and away from the interior of his body where it is needed. On warm days or in a hot room, no covering is necessary. 

NOTES	CONTENT
	4. If water is available, give him some every 15 minutes in small amounts if his condition permits. If he is unconscious, do not attempt to give anything to drink. If he vomits or is nauseated, postpone giving liquid until the nausea disappears. 5. Keep the person quiet. See that bleeding is controlled and injured parts are kept still. Assure him that he will get the best care you can give. Reassurance is a potent medicine. NOTES:

PRACTICE IN TREATING SHOCK

NOTES	CONTENT
	Your instructor will now show you how to treat an injured person who has gone into shock (or who is in danger of going into shock). Now, you practice the treatment on another class member. NOTES:

GUIDELINES ON OTHER INJURIES AND CONDITIONS

NOTES	CONTENT
	Can you think of any injuries or conditions that have not been covered?

ADVANCED UNIT B
REVIEW QUESTIONS

Complete these sentences:

1. Before you can set priorities for treatment, you must evaluate:

   a. the scene for _____ _____

   b. types of _____

   c. need for immediate _____

2. Two types of injuries that require prompt treatment are:

   a. _____bleeding

   b. blocked _____or stoppage of _____

3. Which of the following conditions would you treat <u>first</u>:

   ____ not breathing

   ____ unconscious

   ____ bleeding heavily

4. When might you have to move an injured person <u>before</u> you administer first aid?

5. With any serious injury, you should also treat the person for _____.

Check A, B, or C:

6. Treating for shock, you should:

   Place a coat, jacket, etc. under victim A ____

   Put coat, jacket, etc. under and over sparingly according to temperature B ____

   Put coat, jacket, etc. under and over and apply external heat C ____

7. If a car hits a power pole, what would you check for first?

Hot wires	A ____
Injuries	B ____
Remove victims	C ____

8. If a victim is not breathing, you should:

Call a doctor and wait	A ____
Check airway, give artificial respiration	B ____
Take victim to hospital	C ____

9. If a victim has possible chest injuries and is not breathing, what method would you use?

Back-pressure arm-lift	A ____
Mouth-to-mouth	B ____
Rush to hospital	C ____

True or False:

10.	To minimize the effects of shock, keep the victim lying down and make him comfortable.	T ____ F ____
11.	The tourniquet should be used only for severe life-threatening hemorrhage that cannot be controlled by other means.	T ____ F ____
12.	Whenever possible, a person should be treated right where he is found.	T ____ F ____
13.	If blood soaks through a dressing, remove dressing and apply another dressing.	T ____ F ____

ADVANCED UNIT C

FIELD TRIPS

TABLE OF CONTENTS

OBJECTIVES

By the end of this unit, you should be able to list how driving on a field trip or special assignment may differ from driving a normal bus route, including what you should do about:

1. Learning an unfamiliar route.

2. Working with chaperones.

3. Students unfamiliar with bus rules of conduct.

4. Excesses in behavior due to nature of the trip.

5. Extra and oversize equipment.

NOTES	CONTENT
	You may be called on to make special trips with various groups. Several things about driving on a field trip are different from the things you do on your regular route. Consider two examples of these special trips. FIELD TRIP OVERNIGHT ACTIVITY TRIP TO FOOTBALL GAME How many differences can you spot?

NOTES	CONTENT
	Consider at least these five differences. You may have to know what to do about: 1. An unfamiliar route. 2. Chaperones and their responsibilities. 3. Students who aren't familiar with bus riding rules. 4. Excesses in behavior due to the nature of the trip. 5. Extra and oversize equipment. What do these five differences imply for you as the bus driver? 1. 2. 3. 4. 5.

SPECIAL FIELD TRIP PROCEDURES*

NOTES	CONTENT
	1. Review route of trip, mentally, by use of a map, or by driving a private vehicle to the destination prior to the trip. 2. Prepare special trip AUTHORIZATION REPORT including on it: a. Destination and date. b. Nature and purpose of trip. c. Departure and expected return times. d. Number of pupils to be transported. e. Rest stops and overnight arrangements, if any. f. Signature of appropriate supervisory person for authorization. 3. When loading for special trips, check to see that only students and authorized adults get on the bus. 4. If band instruments or other large items must be transported, store them in the proper space under the bus; if there is no storage area, check that all items are kept on the bus away from the front, behind the stanchion bars, and not blocking the emergency door(s). 5. Request chaperones to be responsible for maintaining order on the bus. 6. When destination has been reached, make sure that all students know which bus they are to board and at what time. *Adapted from NHTSA Task Description (9)

SPECIAL TRIP AUTHORIZATION REPORT

School District: _____ Bus Number: _____

Destination: _____ Bus Driver: _____

_____

_____

Date of Trip: _____

Nature and Purpose of Trip: _____

_____

_____

Departure Time: _____ Expected Time of Arrival: _____

Expected Return Departure Time: _____ Expected Time of Return: _____

Number of Pupils to be Transported: _____

Rest stops, if any: _____

Overnight Arrangements, if any: _____

_____

Chaperones, if any: _____

_____

_____

Supervisory Person Authorizing Trip: _____
(Signature)

Problems Encountered:

(use back of sheet, if necessary)

Total Mileage: _____ I hereby verify that trip was completed as authorized.

Return Time: _____ _____
(Bus Driver's Signature)

Figure 1. Sample Special Trip Authorization Report Form

NOTES	CONTENT
	7. Check that no student(s) board the bus at any time unless authorized by you or by a chaperone. 8. When the trip has been completed, enter the following information on the special trip AUTHORIZATION REPORT: a. Mileage. b. Time returned. c. Problems encountered, if any. d. Signature beneath statement that the trip was completed as authorized. NOTES:

NOTES	CONTENT
	HOW TO ADAPT TO AN UNFAMILIAR ROUTE Reported Hazards, Conditions Use of Maps Dry Runs HOW TO WORK WITH CHAPERONES Their Responsibility-- Your Responsibility--

NOTES	CONTENT
	HOW TO MANAGE STUDENTS WHO ARE UNFAMILIAR WITH RULES FOR SCHOOL BUS CONDUCT Special Instructions-- HOW TO MANAGE EXCESSES IN BEHAVIOR DUE TO NATURE OF TRIP Cheering-- Singing-- Rocking the Bus-- Leaning Out Windows-- Other--

NOTES	CONTENT
	HOW TO HANDLE EXTRA OR OVERSIZE EQUIPMENT Loading-- Securing for Transport (aisles and exits clear)-- OTHER POLICIES IN EFFECT IN YOUR DISTRICT

LOCAL RECORDS

NOTES	CONTENT
	INSTRUCTIONS ON RIDERS, DESTINATION, SCHEDULE, FOOD/ REST STOPS, BUSES IN CONVOY, ETC.
	NUMBER OF HOURS AND MILES DRIVEN
	TRIP REPORTS

PLANNING FOR FIELD TRIPS

NOTES	CONTENT
	Your instructor will give you a field trip "assignment." YOUR PLAN:

ADVANCED UNIT C
REVIEW QUESTIONS

1. When driving on a field trip, you may be expected to drive a(n) _____route.

   ____ a. hazardous
   ____ b. longer than usual
   ____ c. unfamiliar
   ____ d. all of the above

2. It may be your responsibility to prepare a trip _____report.

   ____ a. accident
   ____ b. evaluation
   ____ c. chaperone
   ____ d. authorization

3. If band instruments or other large items are to be transported on a field trip, they should be:

   ____ a. stored in a storage space under the bus.
   ____ b. kept behind the stanchion bars if carried in passenger compartment.
   ____ c. kept out of the aisles and away from the emergency door(s).
   ____ d. any of the above.

4. You should check that no students board the bus at any time during the field trip unless authorized by you or by a(n) _____.

   ____ a. chaperone
   ____ b. parent
   ____ c. another bus driver
   ____ d. none of the above

5. The final authority over student conduct while on the bus going on a field trip rests with:

   ____ a. parents
   ____ b. you
   ____ c. chaperones
   ____ d. your supervisor

6. Students who are unfamiliar with the bus' rules of conduct may have to be given special _____

____ a. consideration
____ b. instructions
____ c. privileges
____ d. badges

7. The best way to learn an unfamiliar route is to:

____ a. use a map
____ b. play it "by ear"
____ c. travel the route in your car prior to field trip
____ d. all of the above

8. A field trip to a destination which takes over an hour to reach may also have:

____ a. sightseeing
____ b. overnight lodging requirements
____ c. rest stops
____ d. both b. and c. above

9. Which of the following student behavior must <u>not</u> be permitted on a field trip?

____ a. leaning out windows
____ b. rocking the bus
____ c. both a. and b. above
____ d. singing/cheering

10. Excesses in student behavior must be restrained because:

____ a. they're getting graded
____ b. you must concentrate on your driving
____ c. chaperones can't help with discipline
____ d. all of the above

ADVANCED UNIT D

TRANSPORTING EXCEPTIONAL STUDENTS

TABLE OF CONTENTS

OBJECTIVES

By the end of this unit, you should be able to:

1. Identify the physical characteristics and behavioral tendencies of different types of exceptional students.

2. Describe special loading/unloading procedures.

3. Describe special methods of controlling exceptional children.

4. State ways of communicating with parents of exceptional children.

NOTES	CONTENT
	Attitude. The success of programs for exceptional children depends upon the people who have daily contact with the children. Such people should possess characteristics which are different in kind and degree from the average. They should have extra patience, mental alertness, flexibility, resourcefulness, enthusiasm, emotional stability, personal warmth, friendliness, understanding, and sympathy. As a bus driver, you should be able to develop and maintain rapport with children, and be able to exercise mature judgment in relation to both the care of exceptional children and the responsibilities of driving. You should be aware of, and be willing to conform to, the objectives of the child's therapeutic needs. You should be able to accept the exceptional child and his problems as you would accept any child. You should treat exceptional children as you would want your own children to be treated. The daily bus ride to school can be an important part of a child's progress toward independence. The child will learn how to leave his home to meet the bus, how to cross a street, and how to behave on the bus. You will explain the bus rules to him and the child will learn to obey them. You play an important role in determining behavior patterns of children. In fact, you can start the child's day off right or wrong. The bus ride to and from school can be a pleasant experience which a child anticipates eagerly or it can become a dreaded experience. You should be thoughtful and careful about such routine matters as assigning a seat or seatmate, the presentation and purpose of a seatbelt, and about using discipline.

NOTES	CONTENT
	Remember, however, that your primary purpose is to take children to and from school safely and dependably. Therefore, while you make allowances for specific problems of exceptional children, a child's social adjustment will be of less importance than getting to school on time and the safety of the bus, driver, and other children.

NOTES	CONTENT
	Qualifications. Besides driver qualifications regarding age, health, past experience, knowledge of vehicles and maintenance, safe driving practices, etc., you should be able to operate specially equipped or adapted vehicles. You should have a knowledge of first aid and be familiar with the use of wheelchairs, braces, crutches, etc. Information. You should be aware of the problems of each of the children who ride your bus; you should be familiar with the medical and physical aspects of disabilities of each child. You should, through communication with school personnel and parents, know when a child is on medication and what the effects of the medication will be. You should be able to determine when a child is behaving abnormally for his condition. You have the responsibility of reporting to the school authorities or to parents specific incidents, attitudes, etc., which may be significant in the treatment of the child. You should know what special steps to take in case of a traffic accident or breakdown because the comfort and emotional well-being of these children are your responsibility while they are in your charge. You may spend much time learning how to care for each child under the many circumstances that might occur while the children are on your bus.

COMMONLY USED SPECIAL EDUCATION TERMS*

NOTES	CONTENT
	Acting out - overt expression of strong feelings, nature of which is not always understood by the child. Aggression - a forceful action, usually directed toward another, often unprovoked, and out of proportion to the situation. Antisocial - behavior which is hostile to the well-being of society. Anxiety - feeling of apprehension, the source of which is frequently unrecognized. Aphasia - defect or loss of the power of expression by speech, writing, or signs, or of comprehending spoken or written language, due to injury or disease of the brain centers. Birth injuries - injuries occurring in the organism at birth. The central nervous system is more commonly affected, but bones, joints, and muscles may be involved. Brain-injured child (Strauss Syndrome) - a child who before, during, or after birth has received injury to or suffered infection of the brain. As a result of such organic impairment there may or may not be defects of the neuro-motor system but this child may show disturbance in perception, thinking, and emotional behavior. These disturbances may occur alone or in combination. C.N.S. - central nervous system. Cerebral palsy - a condition resulting from neurological damage occurring before, at, or shortly after birth, which interferes with normal control of the motor system.

*From state of Michigan (6)

NOTES	CONTENT
	Convulsion - violent involuntary contraction of muscles. Distractibility - an abnormal variation of attention. Inability to fix attention on any one subject for an appropriate amount of time, due to C.N.S. impairment which prohibits necessary monitoring of stimuli. Dull-normal child - an individual at the lower end of the average range of intelligence. Can function as majority of children except in academic subjects. Usually 1-2 years retarded according to age grade level. Educable mentally retarded - mentally retarded children whose retardation ranges from mild to moderate. Usually have I.Q. scores between 50-75. Most of these children can be taught useful reading and number skills and some academic content. Usually will not achieve beyond 4th or 5th grade academically. Capable of integration in society and becoming at least partially self-sustaining. Encephalitis - inflammation of the brain. There are many types, most of which are due to virus infections and which can damage one or many parts of the brain. It is a frequent cause of learning and behavior disorders because of the resultant brain dysfunctioning. Epilepsy - a chronic functional nervous disorder, characterized by attacks of unconsciousness or convulsions or both. Exceptional child - term refers to a child who is different from the average child. A child showing abnormality either physical or mental could be considered in this category. Sometimes the term "exceptional" is used to designate a child of more

NOTES	CONTENT
	than usual ability. May include the handicapped and gifted who deviate from the average to such an extent that they require specialized treatment. Hearing impairment - a sensory neuro loss resulting in slight to profound hearing loss and learning difficulties. The hearing loss is often associated with language retardation and speech difficulties. Hydrocephalus - (a clinical type) an enlarged cranium is a clinical sign of this condition which involves an accumulation of cerebro-spinal fluid, within the ventricles of the brain. Degree of mental defect depends upon degree of cortical destruction, not size of skull. Hyperactive (hyperkinesis) - a characteristic of brain-injured children. Abnormally increased motor activity. Hypoactivity - abnormally diminished motor activity or function. Intelligence quotient (IQ) - expressed mental development in relation to chronological age; obtained by dividing mental age by the chronological age and multiplying by 100. The chronological age is often fixed at a certain maximum, most commonly 16 years, when growth of intelligence due to maturation has been assured to cease; this may vary in different tests, however, from 14 to 18 years. Kinesthetic - pertaining to the sense by which muscular motion, weight, position, space orientation, etc., are perceived. Laterality - the tendency, in voluntary motor acts, to use preferentially the organs (hands, feet, ears, eyes) of the same side.

NOTES	CONTENT
	Mental age (MA) - the level of a person's mental ability expressed in terms of norms based on the median mental age of a group of persons having the same chronological age; thus, if a child's mental ability is equal to that of the average nine-year-old, he has a mental age of nine years, regardless of his actual chronological age. In class, the teacher should teach on basis of MA, not IQ. Mentally retarded - usually considered a general term meaning all degrees of mental retardation from profound mental deficiency to borderline mental defect or to upper limits of dull normalcy. Frequently considered a synonym for mentally handicapped. Minimal brain dysfunction - this diagnostic category refers to children of average or above general intelligence with learning and/or behavior difficulties ranging from mild to severe, which are due to subtle deviations arising from genetic variations, perinatal brain insults, metabolic imbalances, biochemical irregularities, and/or illnesses and injuries sustained during the years critical for the development and maturation of those parts of the central nervous system having to do with perception, language, inhibition of impulses and motor control. Mongoloid child (Mongolis, a clinical type of feeble-minded person or child with Downs Syndrome) - physically and mentally defective at birth. Characterized by eyes obliquely placed; fold of skin at inner edge of eye; flat, round face; round cheeks and large flat lips; large long tongue usually protruding from mouth; small nose. Multiple-handicapped - a child who has two or more disabilities.

NOTES	CONTENT
	Nystagmus - an involuntary rapid movement of the eyeball, which may be horizontal, vertical, rotary, or mixed, i.e., of two varieties. Orthopedics - branch of medicine dealing with deformities and diseases of the bones and joints. Perception - the receiving, integration, and interpretation of impressions and sensations through the senses. Perceptual disturbances - a characteristic of brain-injured children who are attracted to the details of an object rather than the whole object. May occur in visual-perceptual field, tactual field, and auditory field. Requires special educational procedures. Perseveration - a perceptual distrubance occurring in brain-injured children may be present when child continually repeats what he has done, like repeating the same word, letter, action, or number over and over again. Requires specific educational procedures to aid child. Sense training - games, exercises, and materials to develop those senses relating to sight, hearing, muscular coordination, taste, touch, and smell. Special classes (homogeneous) - a segregated class in a regular grade school organized according to a small range of C. A. and mental age abilities. Strabismus - deviation of the eye which the individual cannot overcome. The visual axes assumes a position relative to each other different from that required by the physiological conditions. Squint or crossed eyes. Visually defective - one whose sight is imperfect.

NOTES	CONTENT
	OTHER TERMS USED IN YOUR DISTRICT

NOTES	CONTENT
	Behavior patterns of each child with these conditions are individual problems and should be understood. Each driver must treat each child separately. For example, don't give a general direction to the entire busload of children. You can't assume everyone would understand this direction. Behavior patterns of these children for any given day or hour of the day can be caused or changed by the actions of many people: · You, the school bus driver · Parents or members of the family · Teacher or aide · Other bus passengers These people affect <u>any</u> child but they can compound the trouble that a special child may already have. The person handling the youngster can understand what may have caused the problem and be able to correct it in the right manner. Additional problems could be created if the situations were handled badly. When you correct a child, take into consideration, regardless of the age and size of the youngster, his or her attention span. With some children, this can be rather short. Be consistent when you correct a child. A student may behave differently from day to day because of medication which he may be taking. Many students are extremely hyperactive and use their excess energy to get attention from you or from someone else. *Adapted from state of California (3)

NOTES	CONTENT
	It is difficult to give guidelines for handling all situations. However, these are some courses of action that should prove helpful: 1. Work with the child's parents by talking over any problems. 2. Work with the teacher. 3. Work with your supervisor. 4. Work with the child. It can also be of help to move the child to another seat away from a student who may be causing problems. NOTES:

BEHAVIOR PATTERNS*

NOTES	CONTENT
	Usually, your exceptional students will fall into one of three categories: • Physically handicapped • Mentally retarded • Educationally handicapped The children with these different types of handicaps may act quite differently. So, you should learn to recognize these differences and learn how to handle them. The following descriptions of behavior patterns are average and, of course, there will be many variations and degrees which are not covered here.

*Adapted from state of California (3)

NOTES	CONTENT
	The Physically Handicapped Child--Deaf and Hard-of Hearing. Hard-of-hearing children are those with slight or moderate hearing loss; the sense of hearing is still functional, with or without a hearing aid. Deaf children must be taught through their other senses. A hearing handicapped child's educational progress depends upon his intelligence, the degree of his hearing loss, and the age at which his hearing became impaired. The greatest handicap created by loss of hearing is the difficulty of learning speech and language. Because of this handicap, deaf children may be from two to five years retarded in educational subjects. A deaf child learns to respond to lip movement, facial expression and head movement, as well as to gestures, signs, and finger spelling. The Physically Handicapped Child--Blind and Partially Blind. The educational development of partially blind children probably does not deviate from that of seeing children; however, a severe deficit in any sensory area does create adjustment patterns which are different from those of non-handicapped children. Personality and social maladjustment can be caused by pain and discomfort, the likelihood of undue parental concern, negative attitudes of other children, teachers, or parents. Totally blind children are usually not deficient in language usage. They are taught to read braille, but in other school subjects such as arithmetic and spelling, they are educationally retarded. The blind child's knowledge is gained primarily through hearing and touch. The ease with which the blind child can move about, find objects and places, and orient himself to new situations is crucial; controlling himself

NOTES	CONTENT
	and his environment are essential to the development of poise and independence. The Physically Handicapped Child--Speech Handicapped. Defective speech may be defined as any speech which differs from the average so far as to draw unfavorable attention to the speaker. Speech defects are classified into: 1. Articulatory disorders, or those involving tongue, teeth, lips, palates, or jaws. 2. Vocal disorders, or those of pitch, vocal intensity, vocal quality. 3. Delayed speech, as when a child does not learn to speak at the normal age. This includes aphasia, in which the child cannot understand language or its symbols due to cerebral disorder, and dysphasia, which is a disturbance of language. 4. Speech disorders associated with hearing impairment, cleft palate, or cerebral palsy. The Physically Handicapped Child--Orthopedic and Other Health Problems. The crippled child is one who has an orthopedic impairment interfering with the functions of the bones, joints, or muscles. The child may have been born with the condition, or it may have been caused by an accident or by an infection such as polio or tuberculosis of the bones, or by muscular dystrophy, etc. The provisions which must be made for these children are for physical and medical reasons rather than for educational accomplishment; they have physical and emotional problems to conquer but their learning process is the same as that of

NOTES	CONTENT
	non-crippled children. The crippled child's restricted activity and the resulting frustration make it necessary for him to find other ways of attaining satisfaction within his abilities. He needs help in attaining a healthy concept of himself in spite of his disability. He may try to prolong his dependency upon other people in order to feel secure; he should be taught to become as independent as his condition permits. CEREBRAL PALSY Cerebral palsy is defined as any abnormal alteration of movement caused by defect, injury, or disease of the brain. Cerebral palsy may also include learning difficulties, psychological problems, sensory defects, convulsive and behavioral disorders. It takes different forms such as: 1. Spastic paralysis, in which muscles remain in a state of tension. The muscles can be moved voluntarily but the movement is slow, explosive, and poorly formed. Different groups of muscles can be affected by this paralysis. 2. Ataxia, in which the child is unsteady in his movements and falls easily. Sometimes his eyes are uncoordinated and move in a jerky manner. 3. Athetosis, in which the child walks in a lurching, writhing manner. Posture is uncontrolled. Athetotic movements such as facial grimaces and uncontrolled movements intensify as the child's conscious effort increases.

NOTES	CONTENT
	4. Tremor and rigidity, in which the body shows involuntary vibrating movements. This child is more predictable and consistent. Cerebral palsied children may or may not be mentally retarded, or they may have visual or hearing defects. All these children need to feel accepted and secure; they should be encouraged to be as self-sufficient and independent as their conditions allow.

NOTES	CONTENT
	The Educable Mentally Retarded Child. These children are considered minimally educable in academic subjects in school, in social adjustment in the community, and in the occupational field at an unskilled or semi-skilled level. Their height, weight, and motor coordination are close to average but their development in mental, social, and academic areas are one-half to three-fourths that of average children. Such children, at age 12, will have a mental age between 6 and 9 years. An educable mentally retarded child is usually not recognized as such until he enters school and begins to fail at learning required subjects. He is slower to learn and remains longer at each stage. Behavior problems develop and are usually the result of the discrepancy between the child's capacity to perform and the requirements of his environment. He is easily frustrated because he repeatedly fails to perform according to his chronological age. If materials and methods are geared to his ability to succeed, he becomes frustrated less easily. It is important for such a child to experience success and to know he has succeeded. The Trainable Mentally Retarded Child. These children have been defined as those who, because of subnormal intelligence, cannot learn in classes with the educable mentally retarded but who have the potential to learn self-care, adjustment to home and neighborhood, and economic usefulness at home or in an institution. These children develop at the rate of one-third to one-half that of normal children. NOTES:

NOTES	CONTENT
	The Educationally Handicapped Child. These children are defined as neurologically and/or emotionally handicapped. They often have behavior problems based on inner tensions which create anxiety, frustrations, fears, and impulsive behavior; social maladjustment, including incorrigibility, truancy, predelinquency, and delinquency. Normal mental health depends to a large degree on developing feelings of security, adequacy, and the ability to meet frustrations calmly. NOTES:

LOADING AND UNLOADING*

NOTES	CONTENT
	Most transportation systems load and unload special education youngsters in front of each child's home due to the fact that the child cannot be left unattended. These children sometimes need a driver's assistance to board the bus and must be held during this process. Eye-to-eye contact with some children is a must. Most buses used for this purpose are equipped with seat belts which should be used if possible. Care is needed at all times to keep these children on the bus when other children are being loaded or unloaded. The child that must have special equipment such as a wheelchair, braces, crutches, etc., has problems during the loading and unloading process and it is your responsibility to learn these problems and know how to handle them. Remember, care and protection are two things which the parents and children expect from you. Usually, you will follow the same routine loading and unloading procedures for controlling the bus as you would when transporting regular passengers. · Activate amber flashing lamps (if any) _____ feet from student's home. · Approach the stop slowly, and stop the bus. · Activate the red flashing warning lamps. *Adapted from state of California (3)

NOTES	CONTENT
	Then, follow these steps*: 1. <u>If an attendant is assigned to the bus</u>: a. Be sure each person knows his role; in the case of misunderstanding, don't argue. Carry on any discussion out of the students' presence. b. Direct him (her) to carry or guide the student onto the bus. c. When the use of seat belts is required or available, check to see that they are securely fastened before putting the bus into motion again. d. When specially equipped buses are used to accommodate wheelchairs, etc., with the use of a ramp, supervise the attendant in guiding the chair onto the bus and securing it in place inside the bus. 2. <u>If an attendant is not used</u>: a. Put the bus in "park" neutral; turn off the motor and take the keys out of the ignition. b. Leave the bus and carry or guide the handicapped student onto the bus. (The student should be brought to the bus by a parent or other responsible person from the house.) c. After securing the seat belt for the student, start the bus again, *From NHTSA Task Description (9)

NOTES	CONTENT
	following the proper procedures for entering the flow of traffic. 3. Check that the ramp and side door have been securely fastened into a locked position after the student has entered the bus. 4. Unloading on the school grounds: a. Carry or guide each student off the bus into the charge of a teacher or other school attendant. b. Check that all belongings of each student are taken off the bus. 5. Unloading at home of the passenger: a. Carry or guide each student off the bus into the charge of a parent or other responsible person. b. Check that all belongings of each student are taken off the bus. c. Report to the parent any observations which may be appropriate, whether medical or behavioral observations. d. If an authorized person is not at home to receive the student, keep him or her on the bus; after the run is completed, make arrangements with the school or transportation officials to care for the student until the parent (or other responsible person) has been contacted.

ON THE ROAD*

NOTES	CONTENT
	1. Assign the bus attendant (if any) to watch that all passengers remain safely seated (if no bus attendant, make periodic checks yourself). Occasionally a particular student's needs require more than you can provide as one who must be responsible for the safety of all passengers. DO NOT allow students to continually demand your attention when you are driving. 2. If any student shows symptoms of illness that requires immediate attention, pull bus as far to the right of the road as possible and stop; activate four-way hazard lamps. 3. If a radio is available, notify the proper authorities; otherwise assign the attendant or passing motorist to call them from a phone booth or nearby private home. 4. Watch for unusual behavior that should be expected to occur, i.e., petit mal epilepsy attacks, erratic behavior of emotionally disturbed or mentally retarded students, etc. NOTES:

*From NHTSA Task Description (9)

GET THE FACTS*

NOTES	CONTENT
	You must have pertinent information about each of your passengers and be a special observer of behavior on your vehicle. You are often the source of information which is vitally important to your supervisor, the student's teacher, and parents. All your passengers should have medical identification bracelets specifying special care or medication limitations. Secure pertinent information about and identification picture of each student you transport. Make a confidential card file form to be kept on your bus and in your supervisor's office. A 3" x 5" card is suggested.

Name Last First Telephone # (home)

Primary disability

Secondary Disability

Directions to driver (controlling or directing the child)

EMERGENCY HEALTH CARE INFORMATION

What medication is the student Under?

Student's Doctor Doctor's telephone #

Special information when time delays occur:

*Adapted from state of Michigan (6)

NOTES	CONTENT
	Due to the emotional reaction of your riders during time delays and emergency situations, expect passenger disruption. You should prepare a "line of action" in handling the particular student's needs and controlling the rest of your passengers when the following conditions occur: · Broken bones - keep broken bone and joints above and below break from moving. Get medical assistance. · Fainting - keep the person lying down until recovery. Loosen tight clothing. Secure medical assistance if condition persists. · Seizure** 1. Steer bus to side of roadway and stop vehicle. 2. Know and follow directions on child's 3" x 5" card. 3. Remain calm. Students will assume the same emotional reaction that you display. The seizure is painless to the child. Do not try to restrain the child. There is nothing you can do to stop a seizure once it has begun. It must run its course. Clear the area around him so that he does not injure himself on hard or sharp objects. Try not to interfere with his movements in any way. Special care should be taken to protect the head. *Adapted from state of Michigan (6) **Adapted from state of Ohio (10)

NOTES	CONTENT
	4. Don't force anything between his teeth. If his mouth is already open, you might place a soft object like a handkerchief between his side teeth in the back of the mouth. 5. It isn't generally necessary to call a doctor unless the attack is followed almost immediately by another major seizure, or if the seizure lasts more than about ten minutes. 6. When the seizure is over, let the child rest if he wants to. 7. The child's parents and physician should be informed of the seizure. · Shock - depression of body function. 1. Loosen tight clothing. 2. Keep the person lying down. 3. Guard against body heat loss. 4. Secure medical assistance. · Other

NOTES	CONTENT
	Report circumstances of illness or injury to your supervisor as quickly as possible. Planning for emergencies should include: 1. An "in-bus" list of telephone numbers for assistance in case of fire, respiratory or heart failure, and mechanical breakdown. 2. First aid equipment including a blanket. 3. Information on each child with parent's and physician's telephone numbers. A plan should be worked out between the parents and the school or driver to deal with emergencies that may arise. For example: 1. What is to be done if the parents are not at home to receive the child at the end of the day? 2. What is to be done if the bus, for some reason, cannot reach the home? One such reason could be due to weather conditions. 3. Have a back up plan. Example: A second home, such as a friend or relative, where the child can be taken in such emergencies. 4. What is to be done if the child needs medical attention while being transported?

PARENT RESPONSIBILITY*

NOTES	CONTENT
	Parents play a tremendous role in the preparation of their child for his busy day. Hopefully, everything goes well during this preparation so that you can receive the child happy and ready to go on time. The parents have the responsibility to: 1. Feed. 2. Properly clothe. 3. See that any special equipment such as wheelchair, etc. is ready and in good working order. 4. Make certain that all bodily needs are performed. 5. Have the child at the designated place on time so that you can assist the child in boarding the bus. 6. Give you any instructions or information that is necessary if there is to be any change of plans from normal routine. 7. Wave the bus on if the child is not attending school that day. 8. Notify, in advance, the transportation department or school if there are to be any changes. Parents must know the following if they are to cooperate with you. 1. The time you will pick up their child. *Adapted from state of California (3)

NOTES	CONTENT
	2. The time they can expect their child to return home so that someone will be there. 3. The exact location where he will be picked up and returned. 4. If arrangements must be made in the event of bad weather. 5. Where to call if they have problems and need additional information.

NOTES	CONTENT
	As a partner in the transportation system, you must take an active role in encouraging a system which is designed to aid you in meeting your students' needs by: 1. Asking for clarification of parent and driver responsibilities with respect to loading and unloading procedures. NOTES: 2. Seeking information as to what part you are to take in communicating needs to parents, teachers, supervisor, and students. NOTES:

ADVANCED LEVEL D
REVIEW QUESTIONS

MATCHING. Write the letter of the best answer in each blank.

1. A child whose actual age is 12 years but whose mental age is 8 years is classified as ___.
2. A child who must use a wheelchair is ___.
3. A child whose learning disability is due to minimal brain injury is said to be ___.
4. ___ patterns of each exceptional child are individual problems and should be handled accordingly.
5. ___ are responsible for having the exceptional child ready to be transported to school each morning.
6. Many buses used to transport exceptional children are equipped with ___ for the restraint and safety of the passengers.
7. You must be able to operate the ____ on the bus during the loading and unloading procedure.
8. Mentally retarded students and educationally handicapped students are likely to have a short ___.
9. Exceptional students are likely to be upset by disturbances in the normal ___.
10. Parents and doctors of exceptional children should provide you with information on any type of ___ the child may be taking.

A. bus attendants
B. medication
C. behavior
D. seatbelts
E. wheelchairs
F. mentally retarded
G. attention span
H. educationally handicapped
I. parents
J. ramp
K. accident
L. physically handicapped
M. routine
N. bus driver

TRUE OR FALSE

11. If you do not have a bus attendant, you must carry or guide each child onto the bus and fasten his seat belt, if one is provided. T ____ F ____

12. Physically handicapped students have a lower mental age than nonhandicapped students. T ____ F ____

13. If a child has a seizure, you should give him artificial respiration. T ____ F ____

14. When one child displays disruptive behavior, you must also be concerned about how the other passengers are affected. T ____ F ____

15. You should insist that no students soil themselves on your bus. T ____ F ____

16. What is your responsibility to parents when you know the bus will be late on the afternoon run due to a bad storm?

17. What should you do if no one is home to receive the child in the afternoon?

18. Who should you report to if you observe a child having an adverse reaction to medication?

19. How would you explain to your passengers and their parents that the bus route is being changed to pick up a new student?

20. Why must each exceptional child be treated individually?

21. Suppose a child behaves in ways that aren't typical for him and that violently upset other bus passengers. What would you do immediately? Who would you confer with if the behavior continues?

ADVANCED UNIT E

DETECTING HAZARDS

TABLE OF CONTENTS

OBJECTIVES

By the end of this unit, you should be able to:

1. Use clues to detect potential hazards.

2. Determine degree of actual hazards.

3. Select what action you should take to avoid hazards.

OVERVIEW*

NOTES	CONTENT
	You've heard it said that every time you get into the bus, you take your life in your hands. Yours and every one of your passengers. With the recent emphasis on defensive driving, more and more drivers are becoming aware that just about every driving situation has potential hazards. It's not enough just to know what you're doing. You have to know what everyone else is doing, too. If you've been driving a school bus for any length of time, you are aware of some of the hazards involved in your daily run. Some hazards are obvious; some aren't. Some are always there, like the sharp curve. And, some appear out of nowhere, depending on the changing traffic situation. Do you consciously search for hazards as you drive? In this unit, you'll practice a systematic technique for detecting hazards. You'll use most of your senses to pick up clues that indicate potential and actual dangers. And, you'll make decisions about how you should adjust your driving to minimize or avoid hazards. You should get into the habit of being an "automatic hazard detector." Expert school bus drivers drive well because they find the hazards before the hazards find them. You should develop a "mental image" of the clues associated with each hazard. The habit of detecting clues must be strong enough that you can: 1. Distinguish clues within a complex, changing traffic situation.

*Most of the unit adapted from NHTSA Driver Education Curriculum.(8)

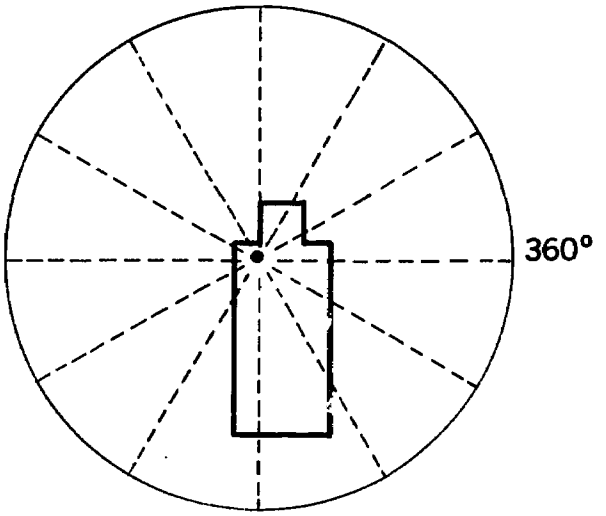
NOTES	CONTENT
	2. Identify them within the short period of time your eyes are focused upon the situation in normal scanning. 3. Detect them even when you are not consciously looking for them. Failure to recognize hazards in time is a major cause of accidents. • Passenger distraction, inattention, and misinterpretation of traffic sounds have caused drivers to react late to auditory clues of an impending crash. • Safe drivers tend to assure themselves of information 8 to 12 seconds ahead. The smallest lead time experienced drivers tend to allow is 1-3/4 seconds. • Even after several months, new drivers tend to spend more time monitoring only the road straight ahead than experienced drivers. Accident fatalities and rear-end collisions can be expected to be high in urban areas as a result of the increase of pedestrian and motor vehicle traffic. Approximately 12-15 percent of all urban school bus accidents are rear-end collisions.

NOTES	CONTENT
	Scan the environment for clues of potential hazards: 1. Continuously scan surroundings on and off the roadway, shifting your gaze frequently. Look well ahead in the lane to focus distance relative to the bus' speed and the roadway location. Specifically: a. Focus at farther distances as your speed increases. b. View the road ahead one full block in a city. c. Focus at farther distances down the road in rural areas than you would in urban areas. 2. Avoid fixing your eyes on the road surface immediately forward of the bus hood. 3. An unobstructed view is important. a. In a moderate number of accidents, collisions occurred at intersections where vision was reportedly obstructed or limited by buildings, vegetation, or parked cars. b. Roadside features that obscure your vision at intersections should be treated as if they were traffic lights and signs requiring you to stop. By stopping, you have an opportunity to study the traffic situation more carefully before proceeding rather than haphazardly continuing. 4. Observe other drivers. a. Accidents relating to overtaking vehicles have been caused frequently by the driver's

NOTES	CONTENT
	failure to note the actions of vehicles ahead. For example, a moderate number of accidents are caused by a driver's failure to note traffic stopped ahead for a left turn. b. Another cited cause is failure to check traffic in the adjacent lane prior to entering it to pass and/or to avoid impact with a stopped vehicle. 5. You must know how to gather critical clues. a. The driver who keeps abreast of the driving situation by continuous surveillance of traffic, traffic controls, and the surrounding environment will be more likely to recognize hazards while there is time to avoid them. b. You receive the vast majority of the clues you use through your eyes. The more intently you fix your central vision on a particular object, the less aware you will be of clues from your larger field of indirect vision. 6. <u>You must know the demands imposed on you when driving in urban or congested areas</u>. a. Visual demands on the driver appear to be about three times as much at 20 miles per hour in the city as at higher speeds on a modern divided highway. The mere presence of pedestrians and children increases your surveillance requirements. b. The greater need for surveillance in the city is partially due to the greater

NOTES	CONTENT
	concentration of other vehicles. Traffic controls and pedestrian traffic also contribute to making city driving a difficult task. 7. <u>You must know the primary sources of potential trouble, and their clues, to be prepared for sudden actions by others</u>. a. Driving alongside parked vehicles is potentially hazardous because your view is limited and hazards can appear when there is little time or space for evasive action. b. Three key sources of hazards are: • The spaces between parked vehicles through which pedestrians and animals may dart into the street. • The parked vehicle that may suddenly move into the car's path. • Occupants of parked vehicles who may open the vehicle doors to get out without first checking the traffic situation. Positioning the bus at least four feet out from the parked vehicle will place it beyond the arc of a door being opened. • People stepping out from between parked vehicles.

NOTES	CONTENT
	8. Usually, there are clues from parked vehicles of impending entry into a driving lane. Among the clues you will find useful are: a. Exhaust fumes. These indicate the engine is running. b. Back-up lights. For these lights to be activated, the ignition must be on and the gearshift lever in reverse. The appearance of back-up lights is often followed by a shift to a forward gear. c. Brake lights. Most drivers depress the brake pedal, thus activating the brake lights, just prior to shifting to a forward gear. d. Front wheels. The direction toward which the front wheels are pointed may indicate whether the vehicle is ready to leave the space or still maneuvering into a good position for leaving. e. Steering wheel. The steering wheel of vehicles parked to the right of the bus can be seen from some distance. If a steering wheel is not visible, it may mean the driver is behind the wheel. A separation of at least a car width from a vehicle that is being parallel parked is recommended to accommodate the wide leftward swing of the vehicle's front end as it backs to the right. 9. You should know that you have an active, not passive, role when being passed. Continuously assess the chances for the other driver to

NOTES	CONTENT
	safely complete the pass within the distance available. Make adjustments in the bus' speed and position to accommodate the passing vehicle. You can flick your high beams at night to signal other drivers that it's safe to pass. 10. <u>Develop the surveillance habit of scanning 360° around the bus.</u> 

DETECTING ROADWAY HAZARDS CLUES

NOTES	CONTENT
	ROADWAY HAZARDS 1. Sight Distance Limitations a. Curves (1) Watch the road ahead for indications of a curve. (2) When approaching a curve, estimate a safe speed (if not posted) from the degree of curvature and banking. b. Hills and Dips (1) Watch the road and roadside conditions (e.g., trees and poles) for signs of hills. (2) In approaching a downgrade, identify a grade which is steep enough to require downshifting. (3) Identify the presence of dips which may obscure another vehicle. 2. Maneuvering Limitations. Detect the following potential maneuvering limitations: a. Narrow or narrowing lanes. b. Roadway construction that is difficult to detect. c. When road surface ruts are present in gravel or dirt roads, you will: (1) Assess the road surface characteristics adjacent to the rut. (2) Assess the depth of the rut.

NOTES	CONTENT
	3. Traction Limitations a. Rough Surfaces (1) Detect surface irregularities on asphalt and concrete, such as potholes, cracked pavement, etc. (2) On a wooden surface, look for cracks, holes, and nails. (3) On a brick road, look for holes, bumps, cracks, loose bricks, and slippery spots. (4) "Washboard" conditions, e.g., continuous ruts. b. Slippery Surfaces. Anticipate potentially slippery surfaces: (1) Anticipate the smoothness of concrete or asphalt road surfaces at intersections. (2) Recognize areas of the roadway which are soaked with oil or grease. (3) Estimate depth and extent of deep water which partially or totally covers the roadway. (4) When driving on snow- or ice-covered roadways: (a) Judge the effect of traffic and temperature on road surface friction. (b) Observe closely the movement of vehicles approaching on side streets. (c) Note whether vehicle wheels are skidding.

NOTES	CONTENT
	(5) If ice is melting on the roadway: (a) Be alert for ice patches near shaded areas (e.g., underpasses and buildings). (b) Note spots where direct sunlight may have accelerated melting. (c) Look for additional ice patches ahead on the roadway. c. Loose Surfaces. Detect the signs of the following loose surfaces: (1) Gravel (2) Soft sand (3) Wet leaves 4. Traffic Conflict Points a. Recognize potentially hazardous roadway conditions when approaching and emerging from toll plazas: (1) Look for erratic driving from other drivers whose attention may be diverted while fumbling for money. (2) When emerging from the toll plaza, look for other drivers accelerating rapidly and cutting in to get ahead of the "pack." b. If driving on an entrance ramp, be alert for vehicles which are stopped or slowing down on the on-ramp. c. If driving on a long entrance ramp with an acceleration lane that continues on as an off-ramp or deceleration lane, be aware that

NOTES	CONTENT
	vehicles may leave the main roadway and cross over to merge onto the acceleration lane. Out-of-state drivers may be unfamiliar with exits and merge at the last minute. d. When approaching and entering an off-ramp: (1) Be alert for vehicles entering the deceleration lane, if that lane is also part of the acceleration lane for vehicles entering the roadway. (2) When nearing the end of the off-ramp, look for other vehicles which may be stopped or waiting in line at the end of the off-ramp. e. When approaching and passing interchanges on the freeway, note vehicles in the deceleration lane swinging back into the lane at the last minute. f. Look for lead vehicle deceleration at the following locations: (1) Uncontrolled intersection. (2) Entrances to highway (e.g., on-ramps), including short acceleration lanes and left-hand entrances. (3) Highway exits (e.g., off-ramps), including short deceleration lanes and left-hand exits. (4) Divergence points (forks in the road).

NOTES	CONTENT
	LOCAL ROADWAY HAZARDS:

NOTES	CONTENT
	OFF ROAD HAZARDS 1. Sight Limitations a. When driving on general highways, be alert for hidden traffic, pedestrians or animals obscured from view by nearby roadside structures, trees, or dense vegetation. b. When driving in urban areas: (1) Minimize distractions from the environment by seeking out traffic lights possibly "embedded" in lights from neon signs. (2) In commercial areas, be alert for vehicles emerging from driveways and alleys obscured by buildings, parked vehicles or pedestrian traffic on the sidewalk. 2. Maneuver Limitations. When driving on roads with shoulders, periodically observe the conditions of the shoulders, including: a. Width b. Surface condition c. Alignment with pavement d. Presence of obstructions (e.g., signs, guardrails) e. Pitch of the roadbed 3. Traffic Entry Points a. Vehicle Entry Points (1) When approaching entrances to driveways, alleys, and parking lots, look ahead to determine their location.

NOTES	CONTENT
	(2) When driving in off-street areas, be alert for vehicles in or crossing the car's path. (3) Be alert for vehicles backing up to the exit or entering a parking space. b. Pedestrian Entry Point (1) When approaching a commercial bus stop: (a) Look for pedestrians crossing the street to board the bus or streetcar. (b) Check to see that pedestrians have reached safety before starting. (2) Near playgrounds, residential areas, schools: (a) Be alert for children playing or darting into the path of your bus from behind vehicles, structures, or vegetation. (b) Look for children sledding or otherwise playing in the snow or on the ice. (c) When driving in an off-street area, be alert for vehicle and pedestrian traffic that may be entering or crossing the traffic aisle from any direction. LOCAL OFF ROAD HAZARDS:

NOTES	CONTENT
	SINGLE VEHICLE HAZARDS You should be able to recognize clues predictive of traffic hazards involving the motion of an individual vehicle. 1. General - In general, when surveying traffic, observe other drivers' driving behavior so that you can watch for clues to how they react: a. Note drivers who frequently change lanes as opposed to those who remain in the lane. b. Note drivers who operate their vehicles with frequent changes in speed as opposed to those who maintain a steady speed. c. Note those drivers who do not signal prior to a maneuver as opposed to those drivers who do signal consistently. d. Note those drivers who stop suddenly in non-emergency situations as opposed to those drivers who decelerate gradually to stop. e. Note out-of-state license plates; drivers may be unfamiliar with locations and road conditions. 2. Losing Control - Recognize clues indicating that another driver may lose proper control of vehicle: a. Surface conditions that might adversely influence oncoming

NOTES	CONTENT
	vehicle control (e.g., slippery surface, ruts, deep snow, etc.). b. Movements of the other vehicle in including the following: (1) Turning too fast, e.g., if oncoming driver is turning too sharply after an off-road recovery. (2) Approaching from the side too fast to stop or turn. (3) Closing too fast from the rear. c. Movements of your bus, e.g., stopped too quickly to allow a following vehicle to stop. 3. Lack of Communication by Other Drivers - Look for clues or situations in which the driver of another vehicle may execute a maneuver without signalling. a. Whenever a turn may be made, e.g., an oncoming car may suddenly turn left particularly when: (1) The vehicle is slowing, or (2) The other driver is not attending to your oncoming bus. b. When a stopped vehicle gives an indication of imminent movement, e.g., parked car with driver in seat, exhaust, or turned wheels. c. When a driver may be giving a false indication, e.g., moving to the left

NOTES	CONTENT
	near an intersection when he intends to turn right. Any turn signal may be uncancelled from previous maneuver. 4. Failure of the Other Driver to Observe - When there are clues indicating that another driver may not have observed the bus and, therefore, may not be prepared to yield the right-of-way. These clues include the following: a. Driver not responding, e.g., approaching intersection from the side without slowing. b. Driver's vision obscured, e.g., posts, windows. c. Driver's view restricted, e.g., the vehicle is partially hidden by trees, detectable to you only by reflection or dust. d. Your bus may not readily be seen, e.g., when sun is in other driver's eyes, etc. 5. Inadequate Adjustment by the Other Driver - Look for indications that another driver is not adjusting properly to a situation. Impatience causes many improper actions. He or she may execute a maneuver that will cause hazard to you, including the following: a. Other driver isn't adjusting to an obstruction, such as a pothole or barrier.

NOTES	CONTENT
	b. Other driver isn't adjusting to a surface condition such as ice or snow. c. Other driver isn't adjusting to a pedestrian, e.g., turning a corner into a street blocked by pedestrians. d. Other driver isn't adjusting to another vehicle, e.g., passing vehicles forced to cut back abruptly. 6. Slow Moving or Stopping Vehicles - Watch for indications that another vehicle is slowing or may stop suddenly. a. Slow-moving vehicles: · Farm vehicles · Underpowered vehicles · Trucks on hills b. Frequently stopping vehicles: · Buses, including other school buses · Buses and trucks carrying inflammables at railroad crossings · Postal delivery vehicles c. Vehicles that are engaged in the following maneuvers: · Turning or exiting · Entering the roadway · Merging with other vehicles · Approaching controlled intersections or railroad crossings

NOTES	CONTENT
	LOCAL SINGLE VEHICLE HAZARDS:

NOTES	CONTENT
	MULTIPLE VEHICLE HAZARDS You should be able to recognize the clues in a traffic pattern that are predictive of a potential conflict. 1. Traffic Convergence. One or more vehicles converging on a traffic stream may force another vehicle into a conflict. a. May force another vehicle to change lanes, including entering from side of road, driveway, freeway ramps, etc. b. May cause other vehicles to stop suddenly. 2. Vehicle Obstructions. A vehicle slowing or stopping may cause another vehicle to drive around it, causing a conflict. a. Drivers tailgating, indicating a chance of a sudden pass. b. Slow-moving or stopped vehicles encourage other vehicles attempting to pass. c. A vehicle entering into the roadway, forcing other vehicles around it. 3. Limited Traffic Visibility. One vehicle may limit another's visibility, allowing the other driver to enter a potential conflict, e.g., an oncoming driver turns left.

NOTES	CONTENT
	LOCAL MULTIPLE VEHICLE HAZARDS:

NOTES	CONTENT
	OTHER ROAD USERS HAZARDS You should be able to recognize clues of potential conflict with other road users, including pedestrians, cyclists, and animals. Clues will include the following: 1. Position of Road User Relative to Roadway a. Pedestrians near roadway. b. Cyclist in roadway. 2. Motion of Road User a. Pedestrian running toward roadway. b. Children at play. c. Cyclist moving toward roadway. 3. Road User's Ability to See a. Road user's vision, e.g., pedestrian carrying packages, umbrella. b. Line of sight, e.g., driver alighting from a parked vehicle. 4. Attentiveness of Road User a. Activity, e.g., child chasing ball. b. Attention, e.g., pedestrian looking the other way, talking, etc. 5. Lack of Control, e.g., motorcyclist turning on a slippery surface, gravel, etc. LOCAL OTHER ROAD USERS HAZARDS:

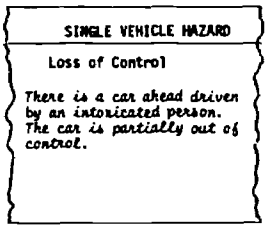
NOTES	CONTENT
	COMBINATION VEHICLE/ROADWAY HAZARDS You should be able to identify potential hazards arising out of the interaction between vehicles and roadway. 1. Decision Point. Any point in the roadway at which drivers are confronted with decisions represents a potential point of conflict, e.g., a vehicle starting to exit from a freeway may suddenly return to the freeway; drivers unfamiliar with route signs may be in the wrong lane for their destination and change lanes suddenly as two major routes split. 2. Compression Point. Any point at which the roadway is compressed represents a potential source of conflicts, e.g., a vehicle approaching a point where 4 lanes become 2, may suddenly change lanes. LOCAL COMBINATION VEHICLE/ROADWAY HAZARDS:

NOTES	CONTENT

Now you'll practice detecting hazards "on paper" before actually going out on the road for "real life" practice. Use the HAZARD DETECTION WORKSHEETS which follow. You'll find a numbered worksheet for each of the six types of hazards. Follow these steps:

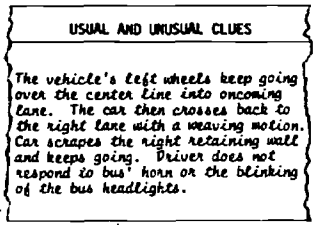
1. Read the hazard situation in the left block.

EXAMPLE:



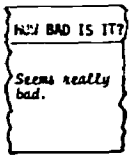
2. In the second block, read the usual and unusual clues that indicate the hazard.

EXAMPLE:



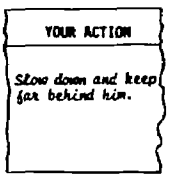
3. Decide how bad the hazard is and write your judgment in the third block.

EXAMPLE:



4. Write in YOUR ACTION--what you'd do to avoid or minimize the danger of the hazard.

EXAMPLE:



NOTES	CONTENT
	The first few have been done for you as examples. Use these as a take off point for discussion before you fill in the rest of the worksheets. Discuss your completed worksheets with the entire class.

HAZARD DETECTION WORKSHEET #1

ROADWAY HAZARDS	USUAL AND UNUSUAL CLUES	HOW BAD IS IT?	YOUR ACTION
Sight Distance Limitations *You are coming up to a blind intersection.*	*There is no traffic light or stop sign. A building on the left corner is under construction, blocking your view of traffic coming from the left. Traffic is heavy in both directions.*	*Moderately bad, but not impossible to negotiate safely.*	*Stop at intersection. When there's a gap in traffic from left, edge forward until you can see around building. When gap in traffic from both sides, sound horn and proceed.*
Maneuvering Limitations *You are directed by a detour sign on to an unfamiliar road which has a hairpin curve.*	*You can see a road sign illustrating the direction and angle of curve and a caution sign.*	*Not too serious*	*Slow down to 5 mph and be sure to start the turn with enough room to clear it safely.*
Traction Limitations *You are crossing a bridge in snowy weather.*	*The car ahead of you is fishtailing slightly; the bridge surface looks glazed.*	*Could be very bad.*	*Ease off on accelerator and allow engine to slow bus; keep accelerating enough to keep wheels turning.*
Traffic Conflict Point *You are approaching a traffic circle that is fed by 4 roads in each direction.*	*Cars are entering the circle from every road and there is a truck in the circle approaching from the left.*	*Potentially bad.*	*Wait for an acceptable gap in traffic from the left. Also, wait until vehicles coming from the left, and signalling to turn right into your road, have actually started to turn. Then proceed.*

HAZARD DETECTION WORKSHEET #2

OFF-ROAD HAZARDS	USUAL AND UNUSUAL CLUES	HOW BAD IS IT?	YOUR ACTION
Sight Limitations *You are approaching a hidden driveway 65 feet ahead on your right.*	*You are going 20 mph. You see a vehicle backing out onto the road; the car is half-hidden by hedges. You've noticed other driveways along this road. The car doesn't have his brake lights on.*	*Pretty bad, his view of the road is blocked, and he's still backing.*	*Sound horn. Take evasive action to avoid hitting the backing car: brake. You should stop within about 60 feet.*
Maneuvering Limitations *You must pull into the museum driveway.*	*The driveway is a narrow semi-circle There are 2 cars stopped in the driveway, blocking passage of a vehicle the size of your bus.*		
Traffic Entry Points *You are approaching a shopping center on your left.*	*There is no traffic light to control the flow of traffic in and out of the shopping center. Several cars are waiting to enter the road. The car nearest the road has his left turn signal on and the driver is looking to the left.*		

SINGLE VEHICLE HAZARD	USUAL AND UNUSUAL CLUES	HOW BAD IS IT?	YOUR ACTION
Loss of Control *There is a car ahead driven by an intoxicated person. The car is partially out of control.*	*The vehicle's left wheels keep going over the center line into oncoming lane. The car then crosses back to the right lane with a weaving motion. Car scrapes the right retaining wall and keeps going. Driver does not respond to bus' horn or the blinking of the bus headlights.*		
Lack of Communication *There is a motorcycle slowing down in front of you. The motorcyclist gives no hand signal.*	*You are approaching an intersection. The cyclist pulls left close to the center line and his brake lights come on.*		
Lack of Observation *A car that has passed you starts to cut back in front of you.*	*There is a car about 1/2 car length in front of you, going 40 mph. You are going 40 mph. The passing car is going 45 mph.*		

SINGLE VEHICLE HAZARD	USUAL AND UNUSUAL CLUES	HOW BAD IS IT?	YOUR ACTION
Inadequate Adjustment *The car behind you is closing.*	*You are going 30 mph. It looks like he is traveling much faster. You are on a two-lane road and a truck is in the oncoming lane.*		
Slow Moving or Stopped Vehicles *You are following a tractor.*	*The tractor looks like he is traveling 15 mph. He has his flashers on.*		

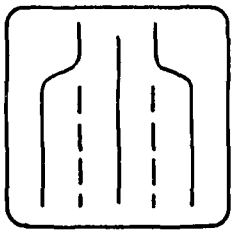
MULTIPLE VEHICLE HAZARDS	USUAL AND UNUSUAL CLUES	HOW BAD IS IT?	YOUR ACTION
Traffic Convergence *You are on an expressway approaching an entrance ramp.*	*You see a MERGE sign. Several cars are stopped on the entrance ramp looking for a gap in traffic. You are 100 feet from the entrance.*		
Vehicle Obstructions *A car that has overheated is stopped ahead in your lane on a 4-lane road.*	*Several cars ahead are stopped with left turn signals on, waiting to merge into the passing lane.*		
Visibility Limited by Traffic *An ambulance is approaching but you can't see it.*	*There is a truck behind you and a steady stream of oncoming traffic. You can hear the siren. Cars in the oncoming lane are pulling to the side of the road.*		

HAZARD DETECTION WORKSHEET #5

OTHER ROAD USERS HAZARDS	USUAL AND UNUSUAL CLUES	HOW BAD IS IT?	YOUR ACTION
Road User's Position *You are approaching a school zone and see a policeman in the middle of the road.*	*You have passed a flashing yellow sign saying 15 mph. The policeman directing traffic waves everyone to go straight. You have your turn signal on.*		
Road User's Motion *A woman on a bicycle is traveling with traffic in the same direction you are going.*	*You are closing on the bicycle which is to your right. She gives a left hand signal and starts to swerve left.*		
Road User's Ability to See *A child is waiting to cross the street.*	*The child turns his head right and left but the hood on his snowsuit partially blocks his view. He is not at a crosswalk. He steps off the curb.*		

OTHER ROAD USERS HAZARDS	USUAL AND UNUSUAL CLUES	HOW BAD IS IT?	YOUR ACTION
Attentiveness of Road User *An elderly man is crossing the street.*	*You have the green light. He is crossing at an intersection against the DON'T WALK sign. You are going 15 mph. and are 40 feet from intersection.*		
Road User's Lack of Control *A car is pulling a boat and trying to pass you.*	*The boat begins to fishtail as the car picks up speed. The car's brake lights go on.*		

HAZARD DETECTION WORKSHEET #6

VEHICLE/ROADWAY HAZARDS	USUAL AND UNUSUAL CLUES	HOW BAD IS IT?	YOUR ACTION
Decision Points *You are coming to an unmarked fork in the road.*	*Your route takes off to the left road in the fork. You are following a car with an out of state license plate. His brake lights go on.*		
Compression Points *The road ahead goes from a 4-lane road into a 2-lane road.*	*You see a sign like this:*  *You are in the right lane.*		

NOTES	CONTENT
	Now you're ready to detect hazards on the road. Your instructor will describe the route you will follow. Search for clues and announce them to your instructor as you go, using the following COMMENTARY DRIVING TECHNIQUE: 1. Talk out loud to yourself, identifying every usual and unusual clue that indicates a potential hazard. 2. Use the clues to decide how bad the hazard is. Decide whether it's really bad, moderately dangerous, o.k. to proceed, or whether there's not enough information to tell. 3. Say what you should do--proceed, slow down, go around, take an alternate path, or stop. 4. Act on your decision if instructor agrees. NOTE: Sometimes the hazard will appear so fast that Steps 1 through 3 will have to be done "in your head." So act, then talk over with your instructor the thought process you went through.

ADVANCED UNIT E
REVIEW QUESTIONS

Check the letter of the answer that best completes the statement or answers the question:

1. Accident fatalities and rear-end collisions can be expected to be high in _____areas as a result of the increase of pedestrian and motor vehicle traffic.

   ____ a. expressway
   ____ b. rural
   ____ c. urban
   ____ d. all of the above

2. To detect hazards, you must be able to distinguish _____ within a complex, changing traffic situation.

   ____ a. clues
   ____ b. taillights
   ____ c. accidents
   ____ d. rules

3. You should develop a(n) _____ _____ of the clues associated with each hazard.

   ____ a. avoidance pattern
   ____ b. "mental image"
   ____ c. peripheral vision
   ____ d. distraction habit

4. You should focus your eyes at farther distances ahead on the roadway as your speed _____.

   ____ a. decreases
   ____ b. stabilizes
   ____ c. increases
   ____ d. none of the above

5. Many collisions occur at intersections where _____ is obstructed or limited by buildings, vegetation, or parked cars.

____ a. hearing
____ b. stopping
____ c. path
____ d. vision

6. The more intently you fix your central vision on a particular object, the _____ aware you will be of clues from your larger field of indirect vision.

____ a. less
____ b. more
____ c. better
____ d. more directly

7. Driving alongside parked vehicles is potentially hazardous because your view is limited and hazards can appear when there is little time or space for _____ _____.

____ a. accelerating quickly
____ b. evasive action
____ c. parking maneuvers
____ d. both a. and c. above

8. An example of a single vehicle hazard is:

____ a. an army convoy
____ b. traffic at turnpike toll booths
____ c. a slow moving tractor
____ d. a car passing you when there is a vehicle in the oncoming lane

9. Multiple vehicle hazards include:

____ a. vehicles tailgating the bus
____ b. a driver on an on-ramp entering the flow of traffic on a freeway
____ c. vehicles that limit another vehicle's visibility
____ d. all of the above

10. Any point in the roadway at which drivers are confronted with decisions are potential

____ a. single vehicle hazards
___ b. combination vehicle/roadway hazards
____ c. off-road hazards
____ d. none of the above

Check whether these statements are mostly True or False

11. Any point at which the roadway is compressed (for example, a four-lane road narrows into two lanes) represents a conflict point. T ____ F ____

12. Lack of communication by other drivers on the road is not a hazard to your safe driving. T ____ F ____

13. A driver who frequently changes lanes should be watched as a potential hazard. T ____ F ____

14. Drivers who do not signal prior to a maneuver are potentially hazardous. T ____ F ____

15. There are certain locations on any route where you can anticipate that other vehicles will decelerate. T ____ F ____

16. The condition of the shoulder of the road shouldn't concern you if you don't intend to pull off the roadway. T ____ F ____

17. In urban areas, you have to be more alert for traffic lights because of neon lights and other lights on the street. T ____ F ____

18. The primary hazard around playgrounds, residential areas, and schools is that other drivers tend to tailgate. T ____ F ____

19. You should depend on other drivers to signal their intentions just as you signal yours. T ____ F ____

20. You can use usual and unusual clues to assess how bad a hazard is before you take action. T ____ F ____

ADVANCED UNIT F

CONTROLLING THE POSITION OF THE BUS

TABLE OF CONTENTS

OBJECTIVES

By the end of this unit, you should be able to control the position of your bus by:

1. Estimating required space for the bus.

2. Observing the position of other vehicles.

3. Making sure other drivers observe you.

4. Maintaining adequate separation between the bus and all other objects and pedestrians.

NOTES	CONTENT
	Observing You must be prepared to observe and respond to other vehicles in the following situations: 1. When unusual noises occur. 2. Vehicles approaching from ahead. a. Approaching intersections and interchanges. b. Before attempting to pass. c. When overtaking cars ahead. d. Approaching parked cars. e. When entering traffic. 3. Vehicles following from behind. a. General. b. When changing lanes. c. When preparing to pass. d. When leaving traffic. e. When entering traffic. f. At intersections and interchanges. g. When slowing or stopping. 4. Cross traffic. 5. Other road users. NOTES:

*Entire unit adapted from NHTSA Driver Education Curriculum (8)

NOTES	CONTENT
	Being Observed Make sure that you are observed by other drivers and road users through the following: 1. Use of brake lights when slowing or stopping. 2. Use of hand or turn signals when changing lanes. 3. Use of lights, horn, and appropriate acceleration when passing. NOTES: Separation You must maintain adequate separation--a safe margin of space between your bus and other vehicles, as follows: 1. Longitudinal separation a. Following distance b. Overtaking 2. Lateral separation a. Passing b. Being passed c. Approaching oncoming vehicles d. Approaching parked vehicles

NOTES	CONTENT
	e. Approaching turning vehicles f. Approaching other road users NOTES:

SKILLS YOU WILL NEED

NOTES	CONTENT
	You must develop the following <u>perceptual skills</u>: 1. The ability to determine roadway limitations through peripheral vision, in order to be able to position the bus properly while attending to traffic. 2. The ability to maintain an appropriate separation from the car ahead when following. 3. The ability to judge closing rate with the cars approaching from ahead, behind, and the side. You must develop (or improve) your <u>manipulative skills</u> in controlling the longitudinal and lateral motion of the bus while attending to general traffic and roadway conditions. NOTES:

ESTIMATING REQUIRED SPACE

NOTES	CONTENT
	1. You must be able to attain and maintain an appropriate, stable margin of space between the bus and any moving or stationary object. To do so, you will have to perceive changes in the separation distance or apparent object size, depending upon the distance involved, and adjust the bus speed and/or position. 2. Skill must be developed in using peripheral and central vision to accomplish the finer steering control required to keep the bus within its lane while maintaining a safe distance from parked vehicles, etc. 3. You must be able to judge the rate at which your bus is closing with the vehicle ahead in order to adjust your speed or initiate a pass at the proper time. a. The primary perceptual clue in the daytime is the change in apparent size of the lead vehicle. b. At night the primary clue is the distance between the taillights. c. Size or brightness of the taillights are <u>not</u> useful clues. 4. You must be able to judge: a. If the closing rate and distance of following vehicles in other lanes and the traffic flow will give you a safe opportunity to change lanes. b. The speed and distance of leading vehicles must be similarly gauged. Speed changes must be estimated quickly if changing into the lane is to be done safely.

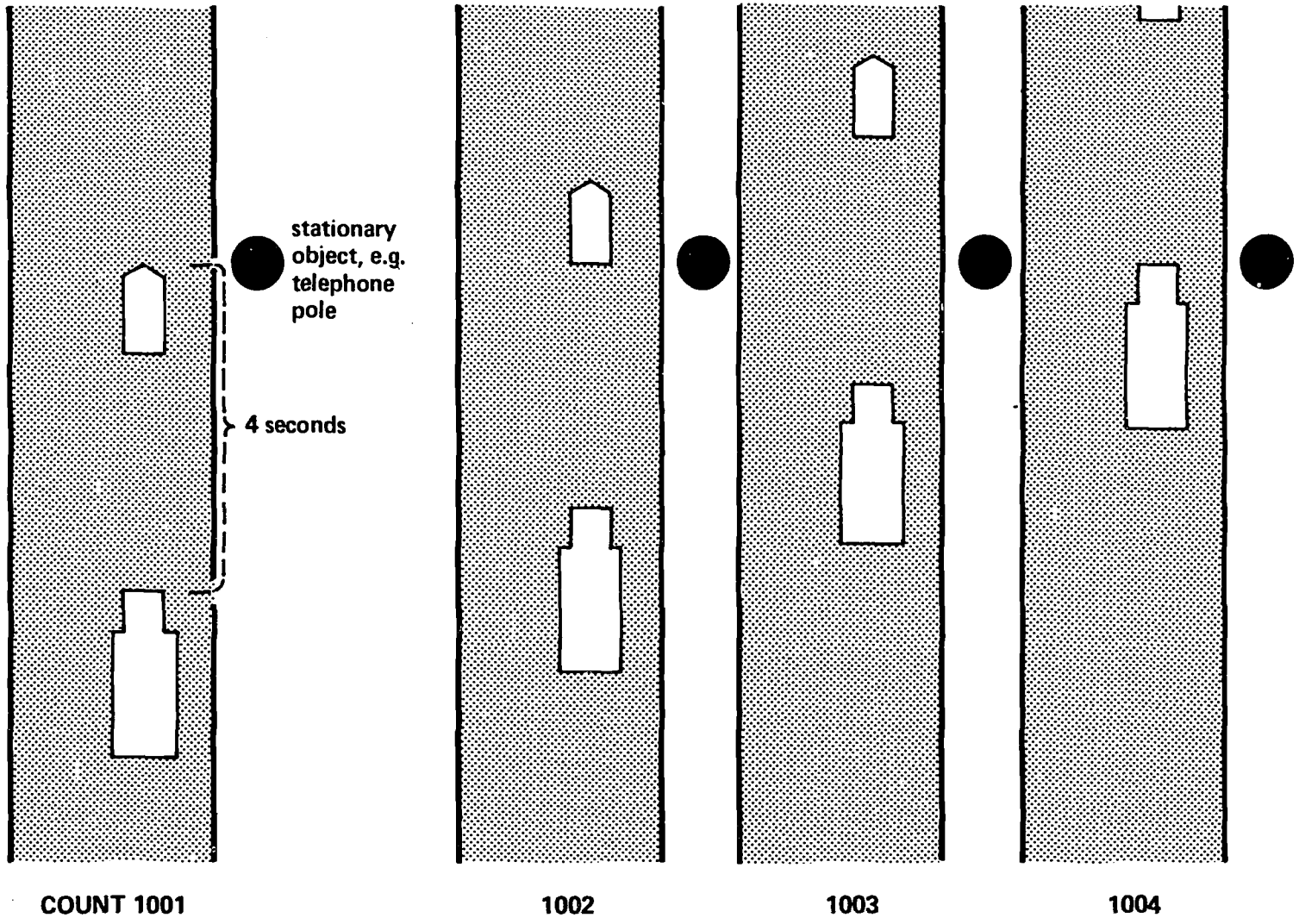


Figure 1. Four Second Timed Interval

NOTES	CONTENT
	c. Before changing lanes, you must be able to: (1) Keep traffic to your front, side, and rear under constant surveillance and simultaneously steer the bus within its lane. (2) Accomplish the change in a smooth continuous movement with very slight steering corrections and accelerator reversals. 5. You must: a. Develop the visual surveillance habit of scanning 360° around the bus. b. Develop coordination between control movements and eye movements. c. Be able to use peripheral vision for lateral control. d. Develop the ability to adjust your position to avoid hazards you detect. 6. You must know that appropriate and stable following distances maintain safe traffic flow, and certain conditions call for a greater than normal following distance. a. Following another vehicle requires a margin of space of sufficient size for you to adjust to unexpected moves by the vehicle ahead or to fluctuations in the traffic ahead without being forced into sudden swerves or stops. b. One rule that can be used to maintain safe following distances is to keep a distance between vehicles that is traveled in at least

NOTES	CONTENT
	three seconds. The three-second separation time interval can be estimated by using the procedure described in Figure 1, p. 10. c. A traditional rule of thumb has been one bus length for every 10 miles per hour of speed. d. Some circumstances call for <u>greater</u> following distance: (1) <u>When increasing speed</u>. As speed increases, so does the distance required to come to a stop. To allow for the greater stopping distance, a greater headway between the bus and vehicle ahead is needed. (2) <u>When driving on wet or icy roads</u>, which also increases the stopping distance. (3) <u>When driving at night or during weather conditions that adversely affect your ability to see</u> roadway and traffic conditions ahead. Vehicles may decelerate sharply during poor visibility. A greater following distance is required to allow a safety cushion for responding to sudden actions by the vehicle(s) ahead. (4) <u>When fatigued</u>. This causes a person to respond to situations more slowly than when he is fresh. The longer you take to react, the greater is the distance required to stop the car. To accommodate this poorer performance, allow a greater headway from the vehicle in front.

NOTES	CONTENT
	(5) When following emergency vehicles. Most states require a separation of at least 500 feet from emergency vehicles. (6) When following dual-wheeled vehicles, which may cause debris to be thrown from between the wheels. Also, the vehicle's larger size tends to block the view ahead if followed closely. (7) Following two-wheeled vehicles. Because of their lighter weight, two-wheeled vehicles can stop within a much shorter distance than the bus. Usually, they can also stop within a shorter distance than a car. e. Unstable spacing between vehicles adversely affects the flow of following traffic. 7. Drivers seem to underestimate distance in feet by 30 to 40 percent on the average, at highway speeds. In one study, drivers, on the average, were 20 percent off in attempting to maintain an 80-foot following distance at 45 miles per hour. Following too closely is a significant factor for accidents. For example: a. Driver failure to maintain an appropriate interval while following a lead vehicle in traffic was a significant factor in rear-end collisions in a moderately high percentage of accident reports reviewed. b. Maintaining "proper" following distance prior to changing lanes permits deceleration and reentry to the right lane if necessary. Independent studies of accidents and near

NOTES	CONTENT
	accidents among professional drivers attributed these situations largely to following too closely before changing lanes to pass. 8. The length of a sufficient gap in traffic will be defined differently by different drivers. Generally, a seven- to eight-second gap or lag in the flow of traffic is required before you enter an intersection. During peak traffic hours, this gap may be reduced by a second or two. 9. Drivers tend to underestimate gaps in traffic from the left and overestimate gaps in traffic from the right, owing to differences in angle of view. During peak hours, drivers in a hurry tend not to allow sufficient gaps in traffic from the right. NOTES:

NOTES	CONTENT
	When approaching a bridge, tunnel, or underpass, you should: 1. Decelerate for better control. 2. Look for signs indicating load, width, and height limits; or estimate whether required clearance is available. BUS DIMENSIONS: 3. Decide whether to proceed. 4. Yield to oncoming vehicles if structure is narrower than normal roadway. 5. Avoid stopping in or on the structure except in response to traffic flow or an emergency. 6. Maintain appropriate speed, taking into account the surface grade, weather conditions and traffic. 7. Stay as far right as possible until you clear the structure.

NOTES	CONTENT
	OBSERVING 1. You must be able to respond to specific AUDITORY CLUES from the environment (which includes other traffic, pedestrians, and animals) in order to drive safely. a. Attempt to identify the sources of unusual sounds, including sounds of emergency vehicles, screeching tires, horns, and whistles. b. Look in the direction of the noise, using the mirrors to help locate the sound. c. Note whether the noise is continuous or intermittent, or whether its intensity is increasing or decreasing as an indication of whether the source of the sound is approaching or leaving, or completely irrelevant to the intended path of your bus. d. Open the window to improve the audibility of noise. In addition, to improve the detection of warning signals, minimize passenger noise level within the bus. 2. Observe VEHICLES AHEAD in order to drive safely. a. When negotiating intersections: (1) Observe the oncoming traffic for an indication of a left turn. (2) If turning left, check to make sure that the oncoming traffic has not anticipated a green light.

NOTES	CONTENT
	b. Look ahead and note indications of vehicles leaving parking spaces by: (1) Observing the vehicle driver's hand signals or activated directional turn signals. (2) Noting the vehicle's lighted back-up lights or brake lights. c. Observe other traffic when negotiating a safe exit from parking spaces. (1) If parked at an angle and backing out, check the traffic behind and the vehicles to each side of the bus. (2) If parked at an angle and exiting facing a traffic lane from a perpendicular space, check the traffic to both sides of the front of the bus. (3) If parallel parked and a parked vehicle is ahead, check for traffic before entering the roadway. d. Observe the vehicle ahead and do not pass if the lead vehicle is: (1) Signalling or otherwise indicating a left turn. (2) Changing lanes preparatory to passing. (3) Weaving or wandering. In this case, sound the horn or flash the headlights to alert the driver of the lead vehicle. If the weaving does not cease, wait until you can pass with at least one-half lane separation.

NOTES	CONTENT
	(4) Decelerating suddenly. (5) Passing children, cyclists, or animals. (6) Being passed by another vehicle. In this case, wait until the lead vehicle has been passed, your view of the road ahead is clear, and an acceptable gap is present. e. Adjust your speed to changes in the speed of the lead vehicle. Note indications of reduced speed, such as: (1) Hand signals from the lead vehicle driver. (2) Activation of the lead vehicle's brake lights or directional turn signals. (3) Vehicles in front of the lead vehicle which are changing speed, causing the lead vehicle's velocity to change. f. Watch for slow-moving vehicles on a long or steep upgrade and downshift. Some states require vehicles going less than 40 mph to use their emergency flashers. g. Check the traffic to the front and rear when entering traffic. Specifically: (1) Yield to the rear-approaching traffic. (2) Look for a suitable gap in the traffic.

NOTES	CONTENT
	(3) Note the vehicle that you plan to enter behind and activate the turn signal as that vehicle passes. 3. Observe VEHICLES BEHIND in order to drive safely. a. In general, you should be able to react appropriately to being followed. Specifically: (1) Make smooth gradual stops and observe the roadway and traffic ahead to anticipate stop requirements. (2) Check the rearview mirror frequently to assess the traffic situation behind. Watch for tailgating vehicles and for the following vehicle's directional signals indicating an intent to pass. (3) Avoid looking at the mirrors if being followed at night by a vehicle with high beams on at a near distance. b. Look for rear-approaching traffic in the new lane when deciding to change lanes. You should: (1) Look out the window to check your blind spot, moving your head enough to see around the blind spot. (2) On multi-lane roads, look for vehicles about to enter the new lane from the far adjacent lane. (3) Check all mirrors to observe vehicles passing in the new lane, following

NOTES	CONTENT
	vehicles closing fast from the rear in the new lane, and following vehicles about to enter the new lane. c. When approaching an upgrade, check the traffic for trucks or other heavy vehicles that may be "highballing," i.e., approaching a long or steep hill with excessive speed. d. When negotiating a downgrade, periodically observe the traffic behind for vehicles which may be accelerating excessively. 4. Observe CROSS TRAFFIC in order to drive safely. a. Observe the traffic ahead and from the left and right when approaching and traversing intersections. Specifically: (1) Watch for vehicles which are close and fast approaching the intersection and decelerate or stop to permit those vehicles to clear the intersection. (2) Watch for vehicles approaching from the left and signalling a right turn, and decelerate and prepare to enter the intersection only after the vehicle has begun the turn. (3) If your vision is obscured (e.g., by buildings, trees, parked vehicles, etc.), stop at the intersection and edge forward slowly.

NOTES	CONTENT
	b. Observe other traffic when moving with traffic. Specifically: (1) Scan the traffic situation and the roadway contour well ahead, in addition to watching vehicles surrounding the bus. (2) Periodically observe vehicles in adjacent lane(s) in case that lane is needed for maneuvering or passing. 5. Observe PEDESTRIANS AND ANIMALS in order to drive safely. a. You should respond to pedestrians and animals appropriately. Specifically: (1) Watch for pedestrians or animals entering the roadway from the front of or between parked vehicles. (2) Watch for pedestrians near intersections, crosswalks, and school crossings. Decelerate and proceed cautiously if pedestrians are near the corner of an intersection. (3) When stopped at intersections and noting pedestrians waiting to cross with large or heavy objects, remain stopped to allow the pedestrians to proceed. b. Watch out for animals (domestic and wildlife) in the roadway. c. When in danger of striking a pedestrian or cyclist, check the traffic for space to take evasive action.

NOTES	CONTENT
	Add here any particular observation techniques you find useful. Include other things to observe that are pertinent in your area if they aren't covered in this section. NOTES:

NOTES	CONTENT
	You must be able to utilize signaling devices and techniques to ensure that other drivers are aware of your intentions and to warn other drivers of potential hazards. 1. <u>Signal appropriately to traffic behind you under the circumstances indicated</u>: a. Signal your intention to decelerate or stop, by using brake lights-- (1) When determining the suitability of a parking space. (2) When preparing to park parallel or to exit from a parking space. (3) When parking at an angle. (4) In response to the actions of the vehicles ahead. b. Signal your intention to change lanes or direction, by using directional turn signals well in advance. 2. <u>Signal your intention to pass</u>: a. To the lead vehicle--by flicking your headlights at night, or by sounding the horn: (1) When the lead vehicle's vision to the rear is obscured by a trailer, open trunk lid, ice or snow on the rear window, or objects in the rear window. (2) When the lead vehicle is about to pull out and pass.

NOTES	CONTENT
	(3) When the lead vehicle moves laterally toward the car. (4) When the driver of the lead vehicle appears inattentive. b. To traffic following--by activating the left turn signal well in advance of initiating the passing procedure. 3. Signal appropriately your intention to turn, using directional signals: a. When leaving a parallel parking space to enter traffic. b. When leaving traffic. c. At intersections at the appropriate time. d. When approaching and entering an off-ramp without a deceleration lane. e. When leaving an off-street area facing traffic. f. When preparing to change lanes or direction. 4. As a warning to other drivers: a. Tap the brake pedal lightly-- (1) To signal following traffic (and to reduce speed) if the lead vehicle changes speed. (2) To signal following traffic if an oncoming vehicle starts across the center line.

NOTES	CONTENT
	b. Flash headlight beams or sound the horn-- (1) To signal an oncoming vehicle that he has crossed the center line. (2) When the occupants of a parked car are about to exit on the roadway side. c. Sound the horn-- (1) When passing a stopped vehicle in the roadway. (2) When approaching the crest of a hill on a narrow road in order to alert oncoming vehicles. 5. Sound the horn: a. To alert animals (domestic and wildlife) in the roadway of the car's approach. b. When in danger of striking a pedestrian or cyclist. NOTES:

LONGITUDINAL SEPARATION PROCEDURES

NOTES	CONTENT
	Maintain adequate LONGITUDINAL separation from other traffic. 1. In maintaining an appropriate following distance behind the lead vehicle: a. Allow enough distance for stopping the bus before the lead vehicle stops, if necessary. b. Decelerate early and gradually for required stop maneuvers to avoid jamming on the brakes. 2. Increase longitudinal separation: a. When following-- . Oversized vehicles that obscure your visibility. . Gasoline or inflammable/explosive carriers. . Vehicles that stop frequently--e.g., other school buses, delivery vans, mail carriers. . Two-wheeled vehicles--e.g., motorcycles and bicycles. . Vehicles carrying protruding loads. . Vehicles being driven erratically. . Emergency vehicles. b. On wet or icy roads. c. Under conditions of reduced visibility--fog, snow, smoke or haze. d. Under conditions of darkness.

NOTES	CONTENT
	e. Where traffic intersects, merges, or diverges. f. When the road ahead is not visible. 3. Accelerate to increase separation distance with the vehicle following, if the driver of the vehicle exhibits erratic behavior. 4. Decelerate and be prepared to stop in order to maintain appropriate longitudinal separation: a. When the lead vehicle reduces speed. b. When a vehicle is stopped on the roadway ahead. Stop well behind the overtaken vehicle so that you can pass the vehicle without having to back up. c. When approaching a parked vehicle with the hood up. d. When the driver(s) of the vehicle(s) behind, including one that may be tailgating, indicates he wishes to pass. e. When following slow-moving vehicles. Deceleration should be initiated in sufficient time-- · To avoid emergency stops ("panic stops") · To assure at least a three-second separation from the vehicle ahead. f. When following or approaching special vehicles, such as another school bus, trolley or transit bus, engaged in picking up and/or discharging passengers.

NOTES	CONTENT
	g. When an emergency vehicle, such as an ambulance, fire truck, or police vehicle is approaching from any direction. h. When flashing red lights or flashing yellow lights are noted on the vehicle ahead. i. When following a convoy, such as a funeral procession. j. When following a driver exhibiting erratic behavior. k. When approaching hidden driveways that are heavily used, e.g., plant exits. 5. Be prepared to stop or to change lanes when the vehicle ahead is about to enter or exit a parking space. a. If you decide to stop, allow the driver of the other vehicle sufficient clearance to complete his maneuver without crowding. b. If you decide to change lanes, allow a full car width between the bus and the vehicle that is parallel parking.

LATERAL SEPARATION PROCEDURES

NOTES	CONTENT
	Maintain adequate LATERAL separation distance from other traffic in relation to such procedures as passing, being passed, meeting oncoming vehicles, driving on freeways, entering traffic, changing lanes, and negotiating intersections. 1. In maintaining the appropriate lateral separation distance when PASSING, you should: a. Select the appropriate lane for the passing maneuver. (1) In general, pass on the left. (2) On a two- or three-lane roadway-- · You may pass on the right of the vehicle that is stopped for a left turn. · Use only the middle lane for passing on the left on a three-lane roadway. (3) On a four-lane roadway, you may pass moving traffic if necessary and legally permissible. (4) On six or more lanes, you may pass on the right-- · When no lane change is necessary. · When it is safe and expeditious to traffic. 2. In maintaining the appropriate lateral separation distance when BEING PASSED, you should: a. If the pass appears to be safe-- (1) Maintain position in the center of the lane, or slightly to the right,

NOTES	CONTENT
	if possible, to provide additional passing clearance. (2) Maintain or reduce speed, avoid acceleration. b. Prepare to decelerate to provide more space if the passing vehicle cuts in front of you after passing. c. If the passing vehicle attempts to abort the pass, accelerate quickly, if there is adequate clearance ahead, to allow the passing driver to pull safely back into the driving lane. 3. In maintaining the appropriate lateral separation distance in relation to ONCOMING VEHICLES, you should: a. Keep to the right of the center line. b. Maintain maximum lane separation by-- (1) Using the right lanes whenever possible. (2) Positioning the bus in the right section of the lane whenever a move to the right lane is impossible or impractical. c. Maintain precise steering control over the bus when oncoming vehicles pass to be able to react quickly to wind gusts, road irregularities or to an oncoming vehicle crossing the center line. d. On a narrow downgrade, yield the right-of-way to the oncoming vehicles, pulling off

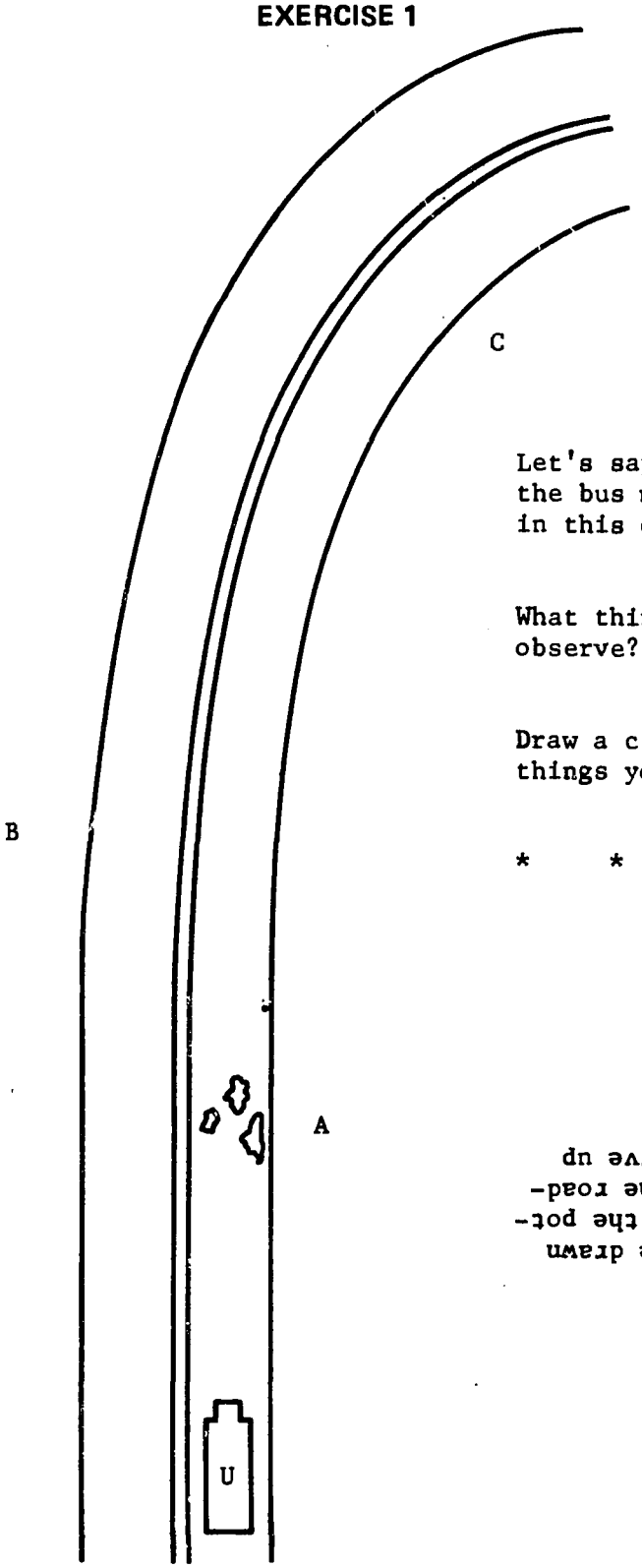
NOTES	CONTENT
	the road if necessary to allow the vehicle to continue. However, be cautious not to pull onto soft shoulders. 4. To maintain the appropriate lateral separation distance when CHANGING LANES, you should: a. Adjust the speed of the bus, accelerating or maintaining speed, whichever is necessary. b. Steer into the new lane, after waiting a few seconds following the signal to turn. c. Position the bus in the center of the new lane. 5. To maintain adequate lateral separation from PARKED VEHICLES, position the bus to avoid striking the vehicle door if it opens unexpectedly. 6. In maintaining adequate lateral separation distance with other traffic at INTERSECTIONS, proceed as follows: a. When turning left, in general: (1) Wait until there is a sufficient gap in traffic from both left and right to permit the turn to be made without danger. (2) Avoid pulling halfway into the intersection when it will interfere with traffic. b. If a driver in the oncoming lane suddenly makes a left turn across the path of the bus, stop or slow down to let him pass, depending on both of your speeds.

NOTES	CONTENT
	c. When turning left with no oncoming traffic, enter the appropriate lane for normal driving. d. When turning left with oncoming traffic approaching: (1) Proceed to the center of the intersection. (2) Remain to the right of the center line. (3) Keep wheels pointed straight, not turned left. (4) Proceed with the turn when it is safe to do so. e. When turning left and the oncoming vehicle also signals for a LEFT turn: (1) Proceed partially into the intersection and stop, leaving adequate heading to complete the turn. (2) Remain to the right of the center line. (3) Complete the left turn when assured that the oncoming vehicle will turn and conditions are otherwise safe. f. When turning left and the oncoming vehicle signals for a RIGHT turn: (1) Proceed partially into the intersection and stop until the oncoming vehicle begins his turn. (2) Turn left into the nearest left lane of the cross street.

NOTES	CONTENT
	g. Do not enter the intersection unless complete passage is assured. 7. In maintaining an adequate separation distance with PEDESTRIANS AND ANIMALS, proceed as follows: a. Yield the right of way to pedestrians at all times. b. When passing pedestrians, provide the maximum possible clearance (using the passing lane if possible) and do not pass the vehicle ahead when pedestrians reduce the lane clearance. c. Decelerate when entering animal crossing zones or when noting animals on or alongside the roadway. Overtake animals at reduced speed and resume a normal rate after the pass has been accomplished. d. Prepare to stop or swerve if the animal enters the roadway. In this case, if swerving the bus to avoid hitting the animal would jeopardize the safety of the driver, passengers or other motorists or pedestrians, do not swerve the bus. e. When in danger of striking a pedestrian or cyclist, decelerate by pumping the brake and swerve the bus gradually when an insufficient stopping distance exists. NOTES:

NOTES	CONTENT
	On the following pages, exercises are provided so you can apply the principles that you have just learned to simulated traffic situations. Your instructor will provide you with some guidelines. NOTES:

EXERCISE 1



Let's say you are driving the bus marked with a "U" in this drawing.

What things should you observe?

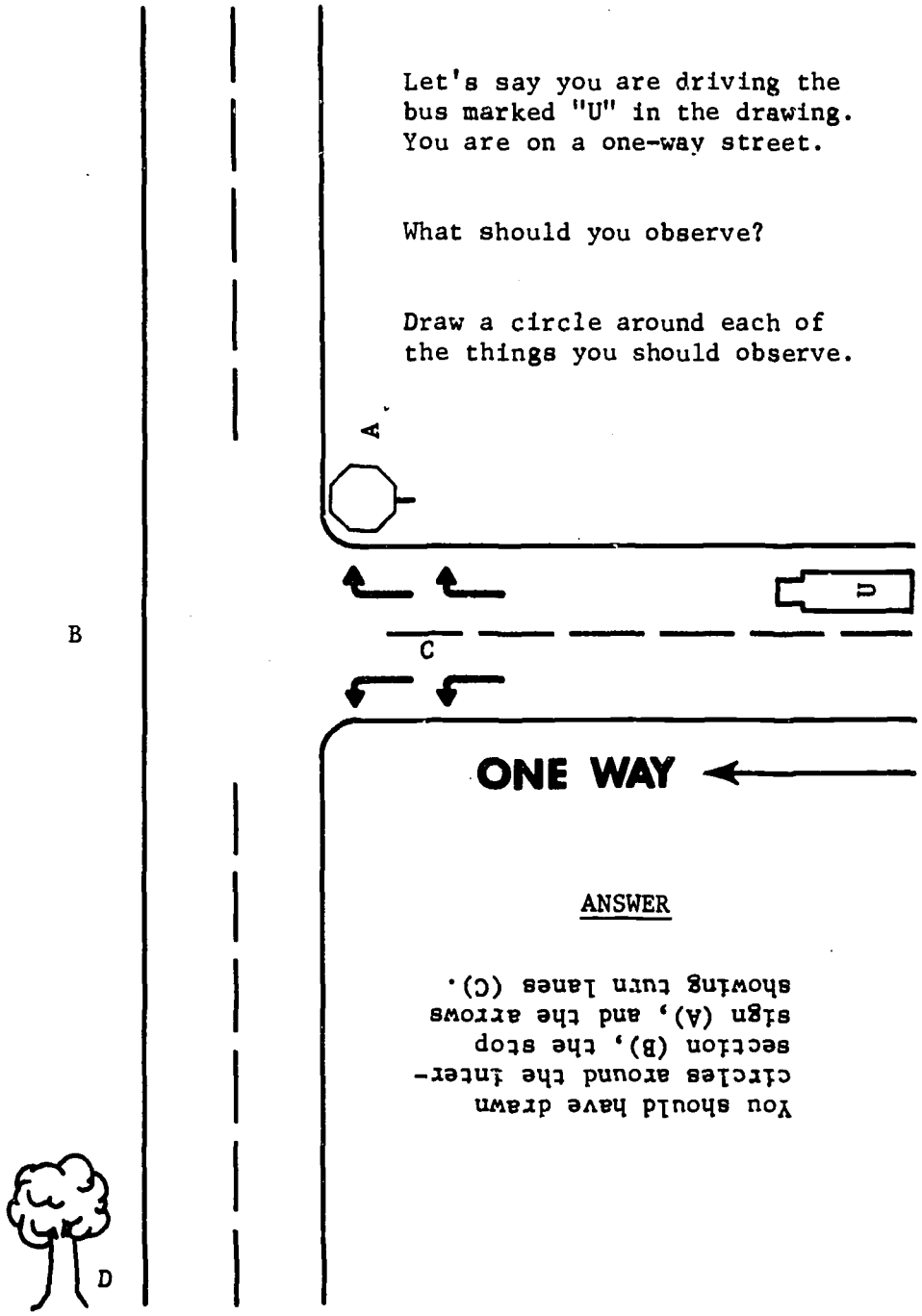
Draw a circle around the things you should observe.

* * * * *

ANSWER

You should have drawn circles around the pot-holes (A) in the road-way and the curve up ahead (C).

EXERCISE 2



Let's say you are driving the bus marked "U" in the drawing. You are on a one-way street.

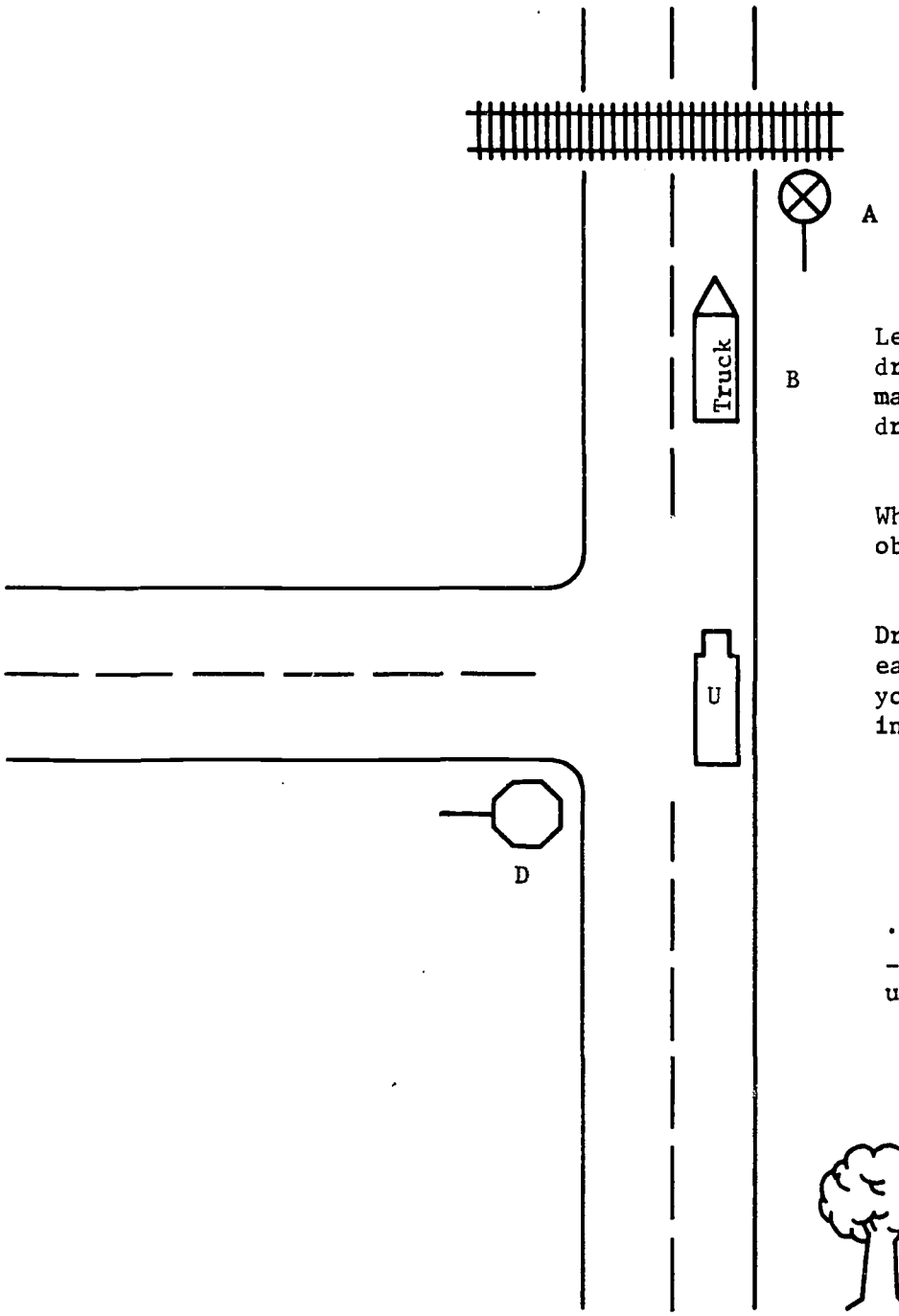
What should you observe?

Draw a circle around each of the things you should observe.

ANSWER

You should have drawn circles around the intersection (B), the stop sign (A), and the arrows showing turn lanes (C).

EXERCISE 3



Let's say you are driving the bus marked "U" in the drawing.

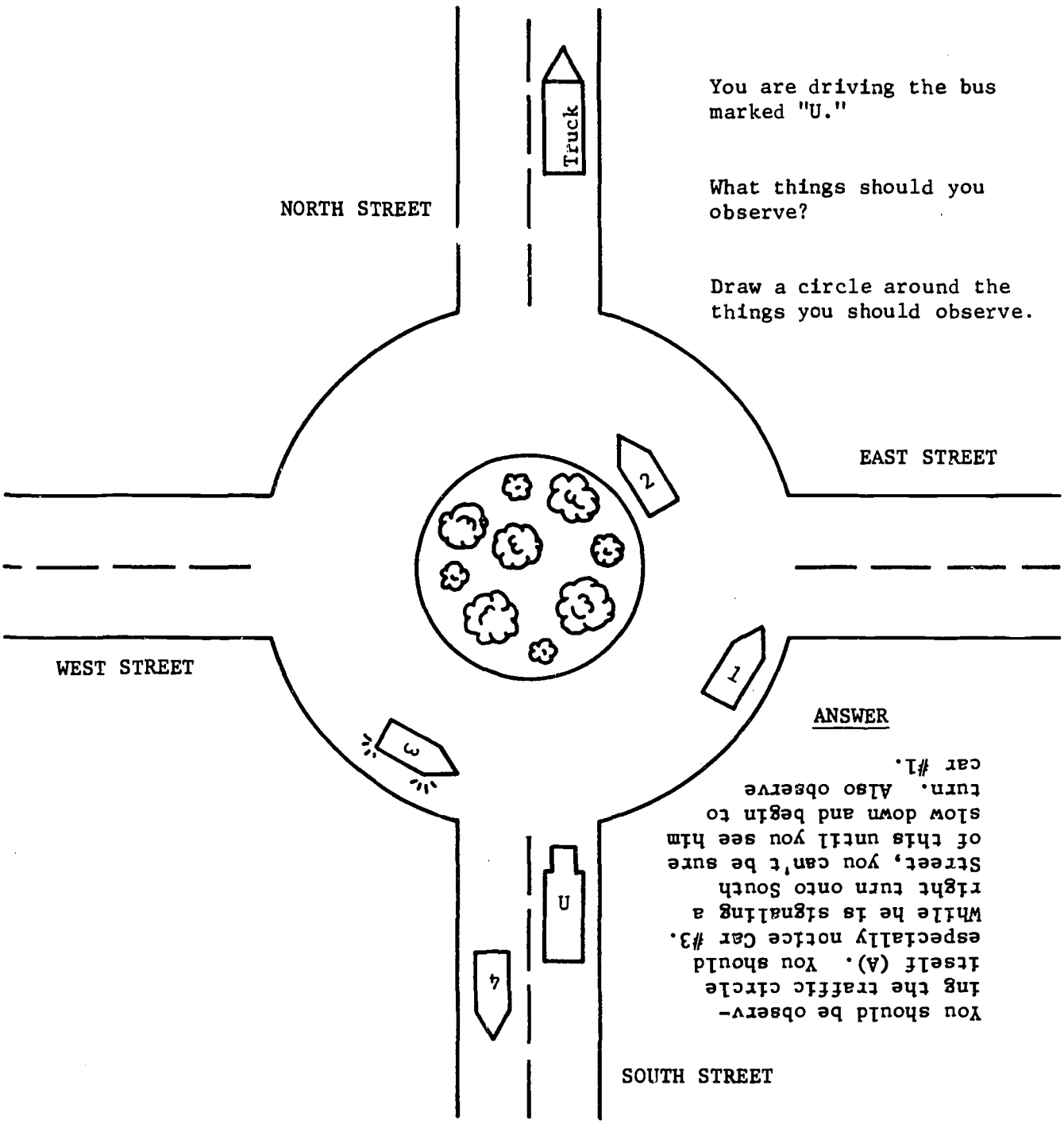
What should you be observing?

Draw a circle around each of the things you should be observing.

ANSWER

You should have drawn a circle around the truck ahead (B). You should also be observing the sign that shows a rail-road crossing (A).

EXERCISE 4



You are driving the bus marked "U."

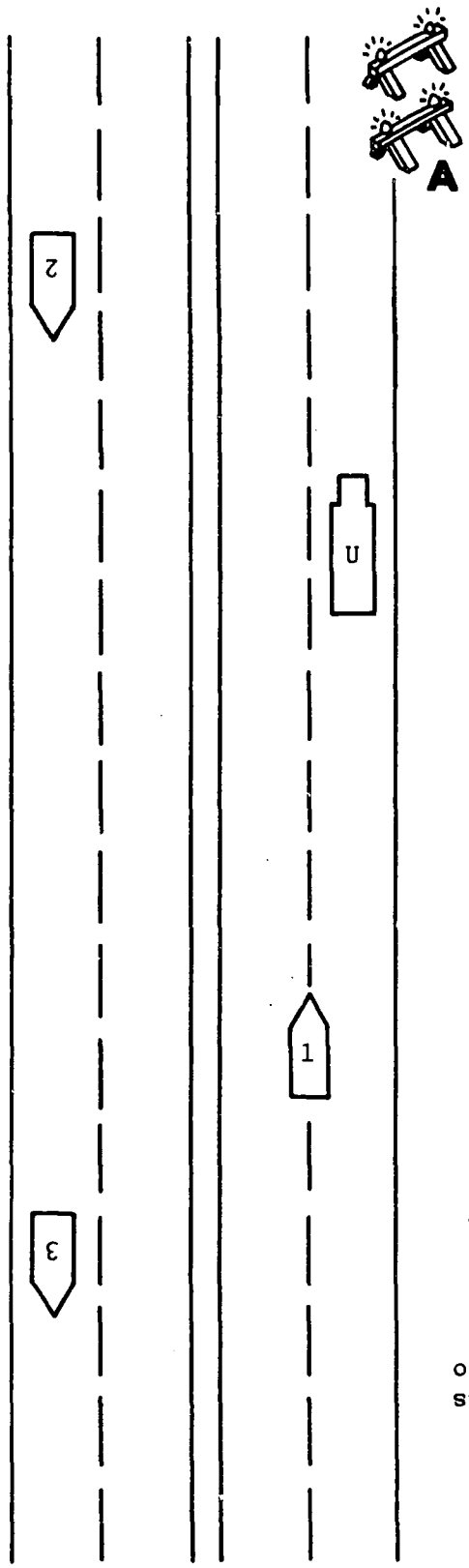
What things should you observe?

Draw a circle around the things you should observe.

ANSWER

You should be observing the traffic circle itself (A). You should especially notice Car #3. While he is signaling a right turn onto South Street, you can't be sure of this until you see him slow down and begin to turn. Also observe car #1.

EXERCISE 5



You are driving the bus marked "U."

What should you observe?

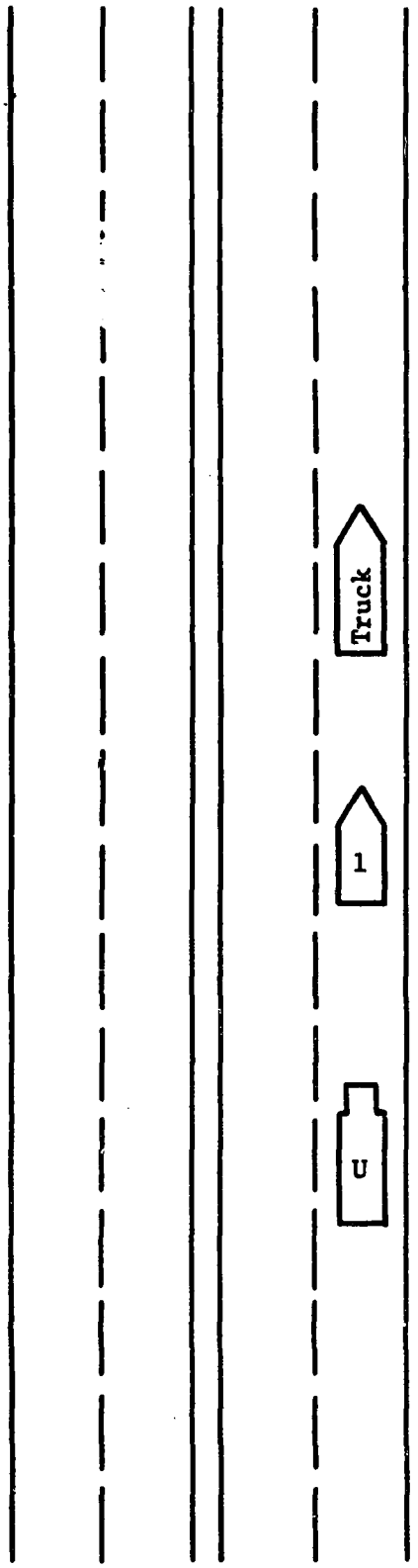
Draw a circle around the things you should observe.

* * * *

ANSWER

You should observe the construction barricades (A). However, you also need to be looking behind. Car #1 is driving in the middle of the road. The driver could be starting to pass or simply not paying attention. In any case, car #1 could cause you problems, and you should be observing it.

EXERCISE 6



You are driving the bus marked "U." You want to pass car #1 and the truck.

In the spaces below, write three ways you should communicate what you want to do.

1. _____

_____

_____

2. _____

_____

_____

3. _____

_____

_____

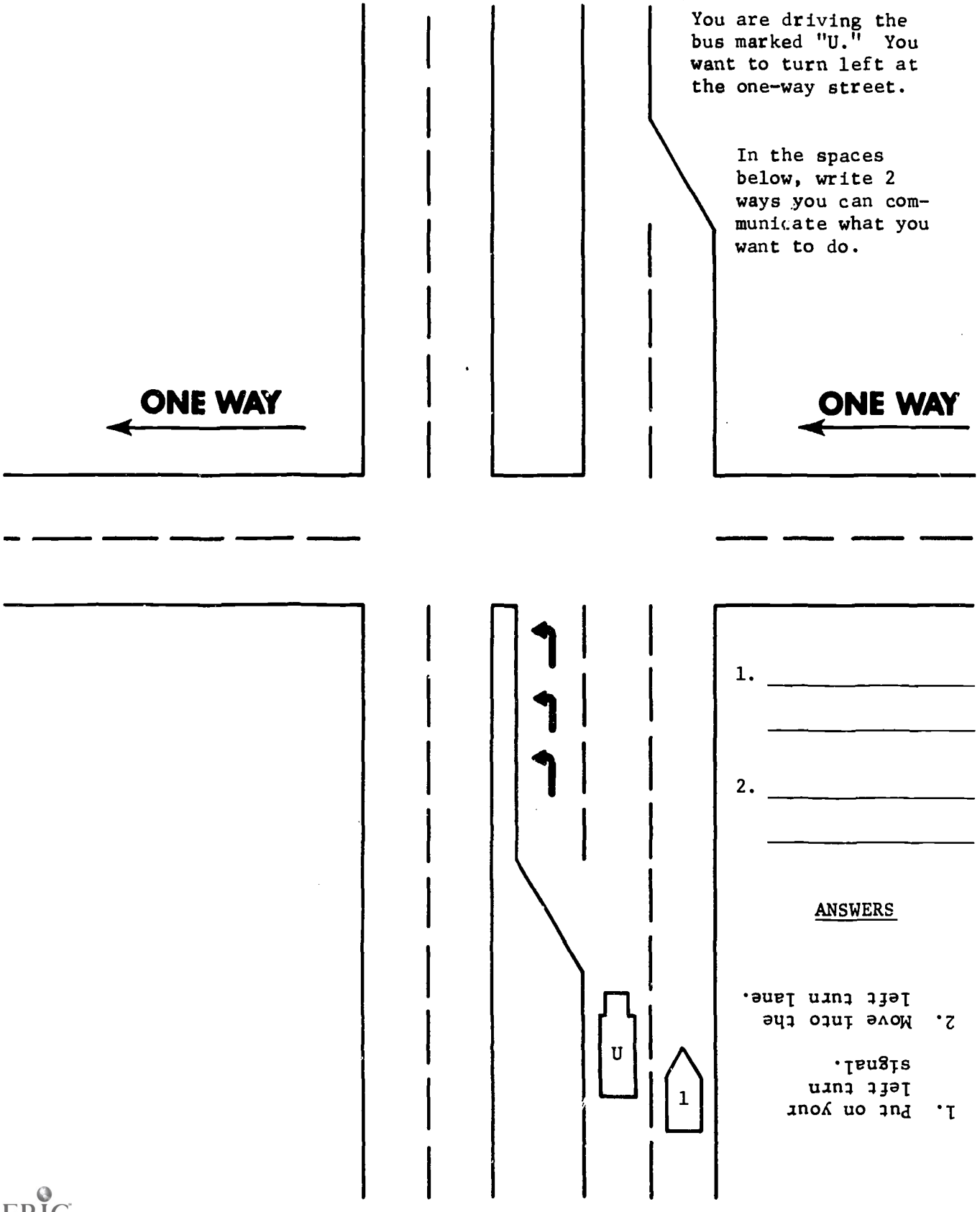
ANSWERS

1. Put on your left turn signal.

2. Tap your horn.

3. Begin to move into the left lane.

EXERCISE 7



You are driving the bus marked "U." You want to turn left at the one-way street.

In the spaces below, write 2 ways you can communicate what you want to do.

1. _____

_____

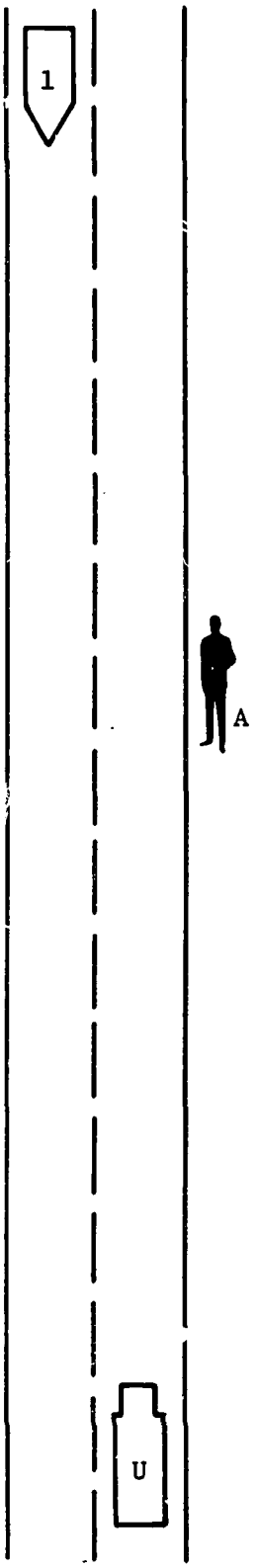
2. _____

_____

ANSWERS

1. Put on your left turn signal.
2. Move into the left turn lane.

EXERCISE 8



You are driving the bus marked "U."

You notice a person, walking next to the road at A.

What, if anytning, should you do to communicate? Write it here:

_____

_____

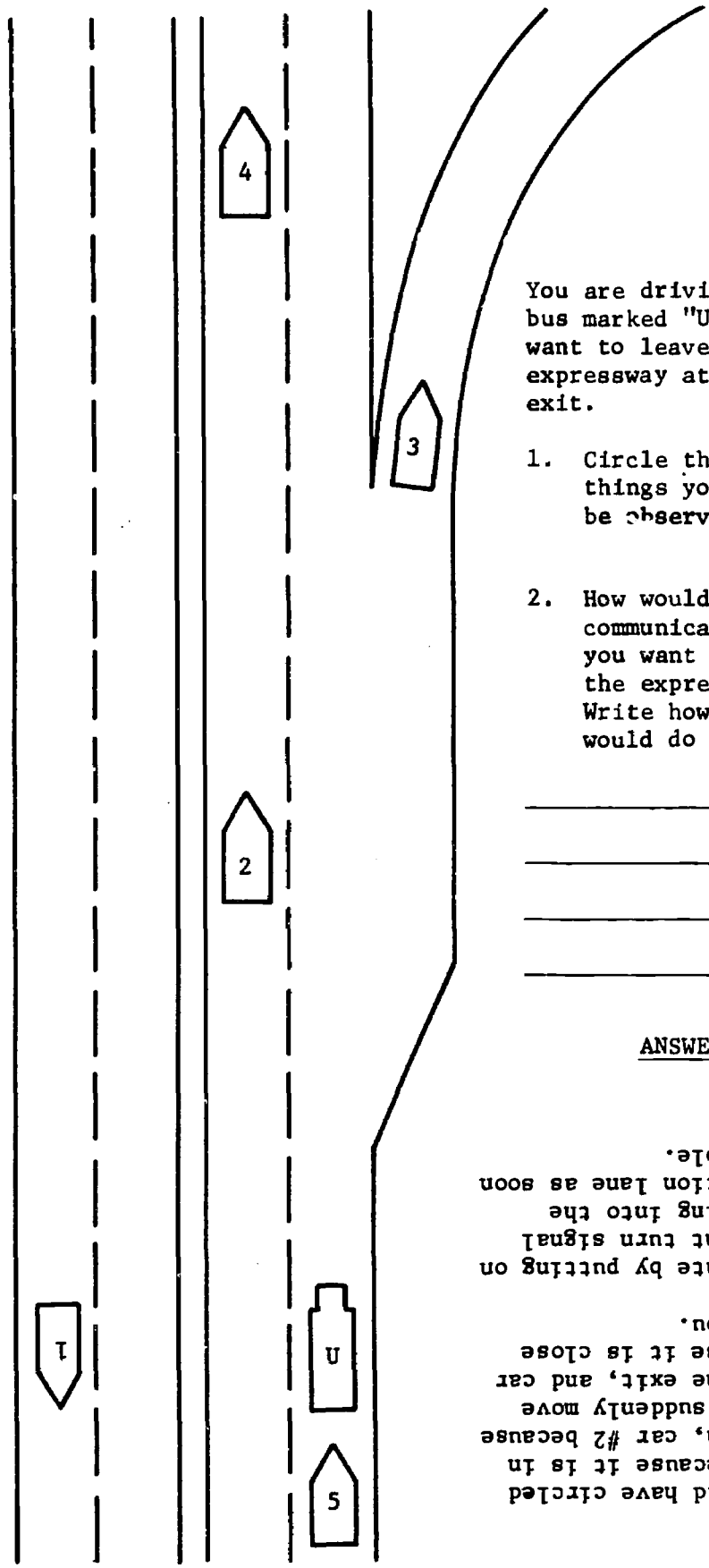
_____

* * * * * *

ANSWER

Tap your horn to warn the person walking that you are approaching.

EXERCISE 9



You are driving the bus marked "U." You want to leave the expressway at this exit.

1. Circle the main things you should be observing.

2. How would you communicate that you want to leave the expressway? Write how you would do this:

_____

_____

_____

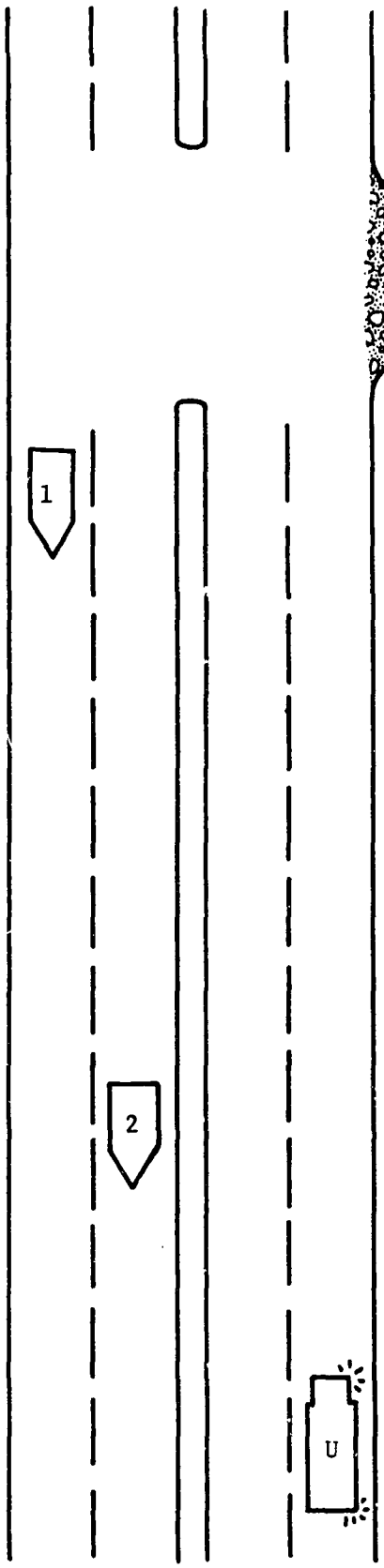
_____

ANSWER

You should have circled car #3 because it is in your path, car #2 because it could suddenly move toward the exit, and car #5 because it is close behind you.

Communicate by putting on your right turn signal and pulling into the deceleration lane as soon as possible.

EXERCISE 10



(GRAVEL ROAD)

You are driving the bus marked "U." You have been driving on a paved highway. Now you are going to turn right on a gravel road.

What speed adjustment will you need to make on the gravel road? Write your answer here:

Why is this necessary? Write the answer here:

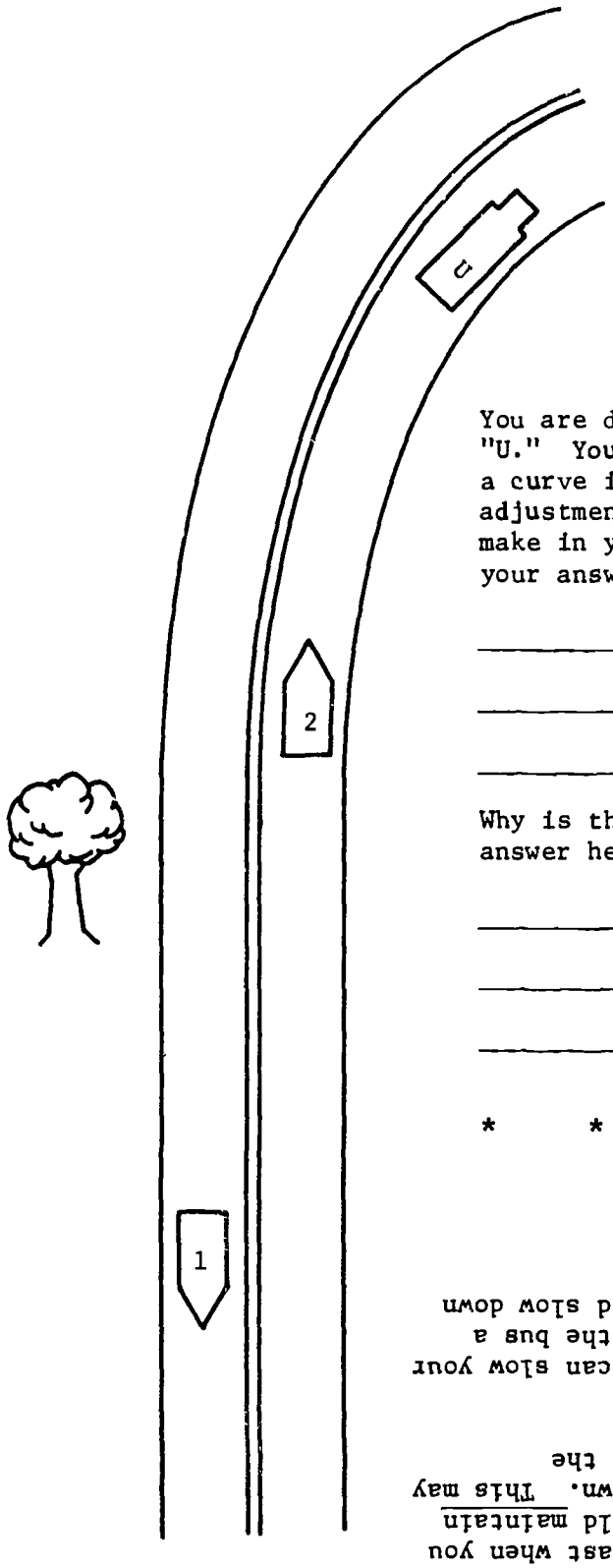
* * * * *

ANSWERS

You will need to reduce your speed on the gravel road.

The reason you reduce your speed is that your bus can be more difficult to control on gravel than it is on a paved highway. Your wheels have less traction. By slowing down, you increase your ability to stop or maneuver.

EXERCISE 11



You are driving the bus marked "U." You are in the middle of a curve in the road. What adjustment, if any, should you make in your speed? Write your answer here:

_____

_____

_____

Why is this necessary? Write your answer here:

_____

_____

_____

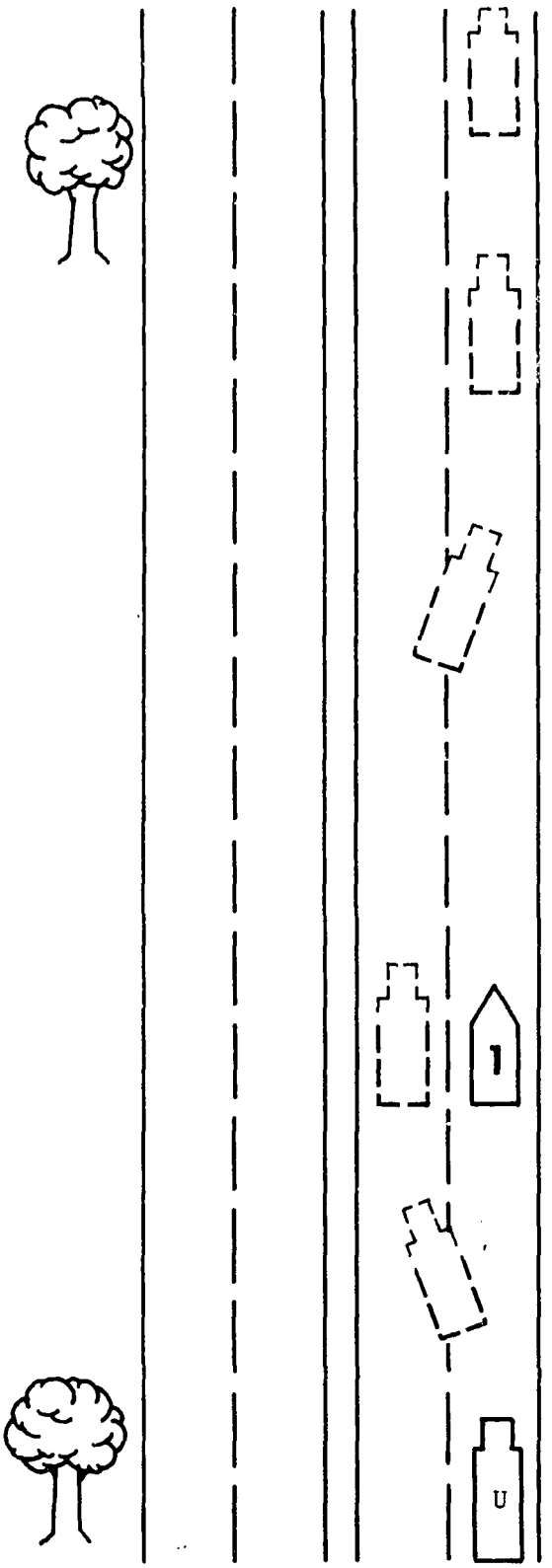
* * * * * *

ANSWERS

Unless you were going too fast when you entered the curve, you should maintain your speed. Do not slow down. This may mean pressing down a bit on the accelerator.

The reason is that a curve can slow your bus down. Unless you give the bus a little more "gas," you could slow down and interfere with car #2.

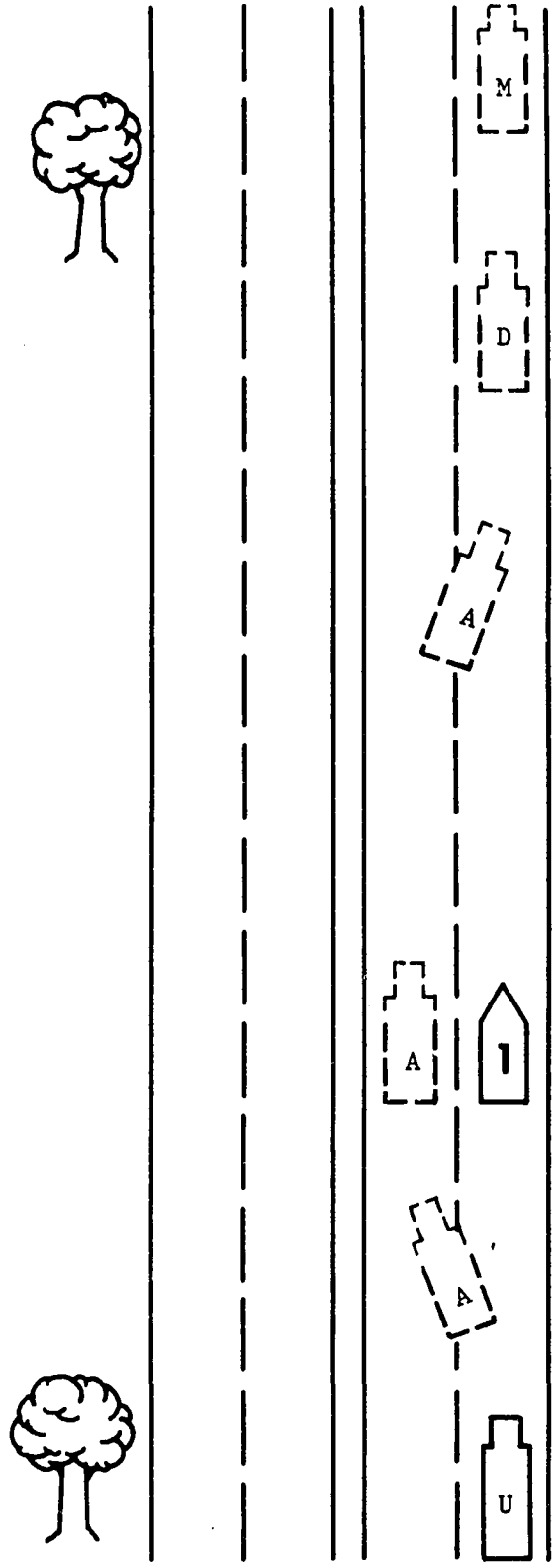
EXERCISE 12



You are driving the bus marked "U." You want to pass car #1. Put either A for accelerate, or M for maintain speed, or D for decelerate in each of the unmarked buses according to what you should do in passing.

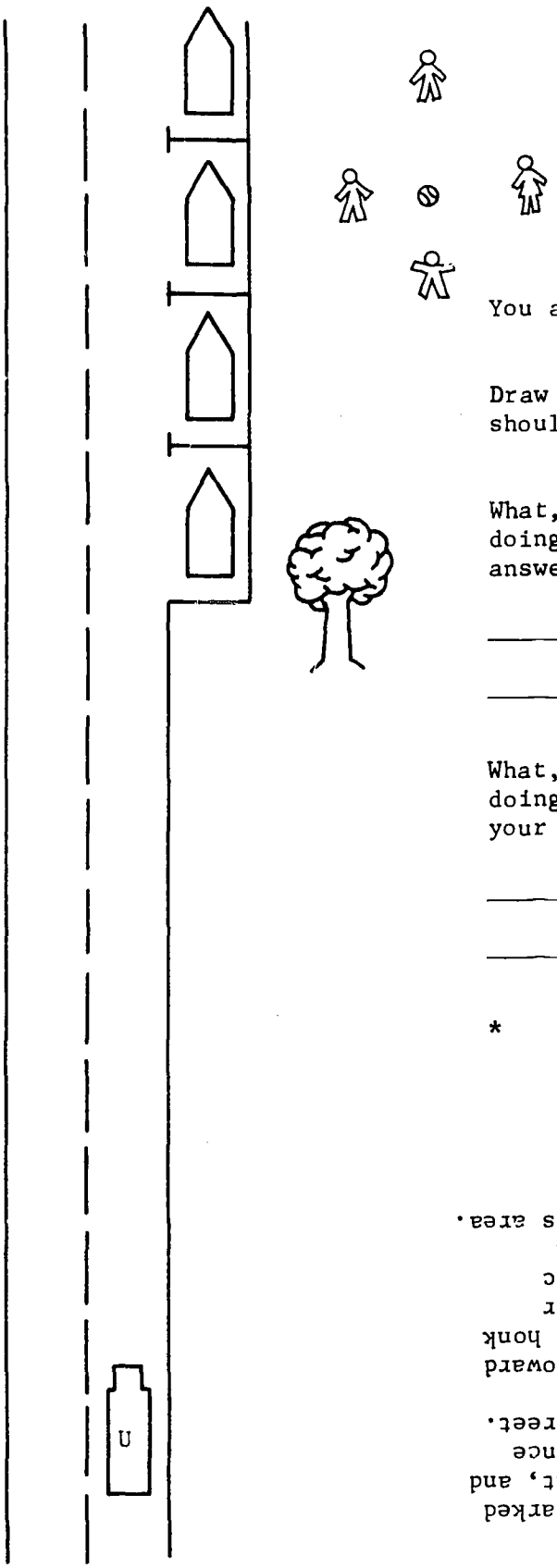
Turn the page to check your answer.

ANSWER TO EXERCISE 12



Be sure that you do not decelerate too early or too much. If you do, you could interfere with car #1

EXERCISE 13



You are driving the bus marked "U."

Draw a circle around the things you should be observing.

What, if anything, should you be doing to communicate? Write your answer here:

_____

_____

What, if anything, should you be doing to adjust your speed? Write your answer here:

_____

_____

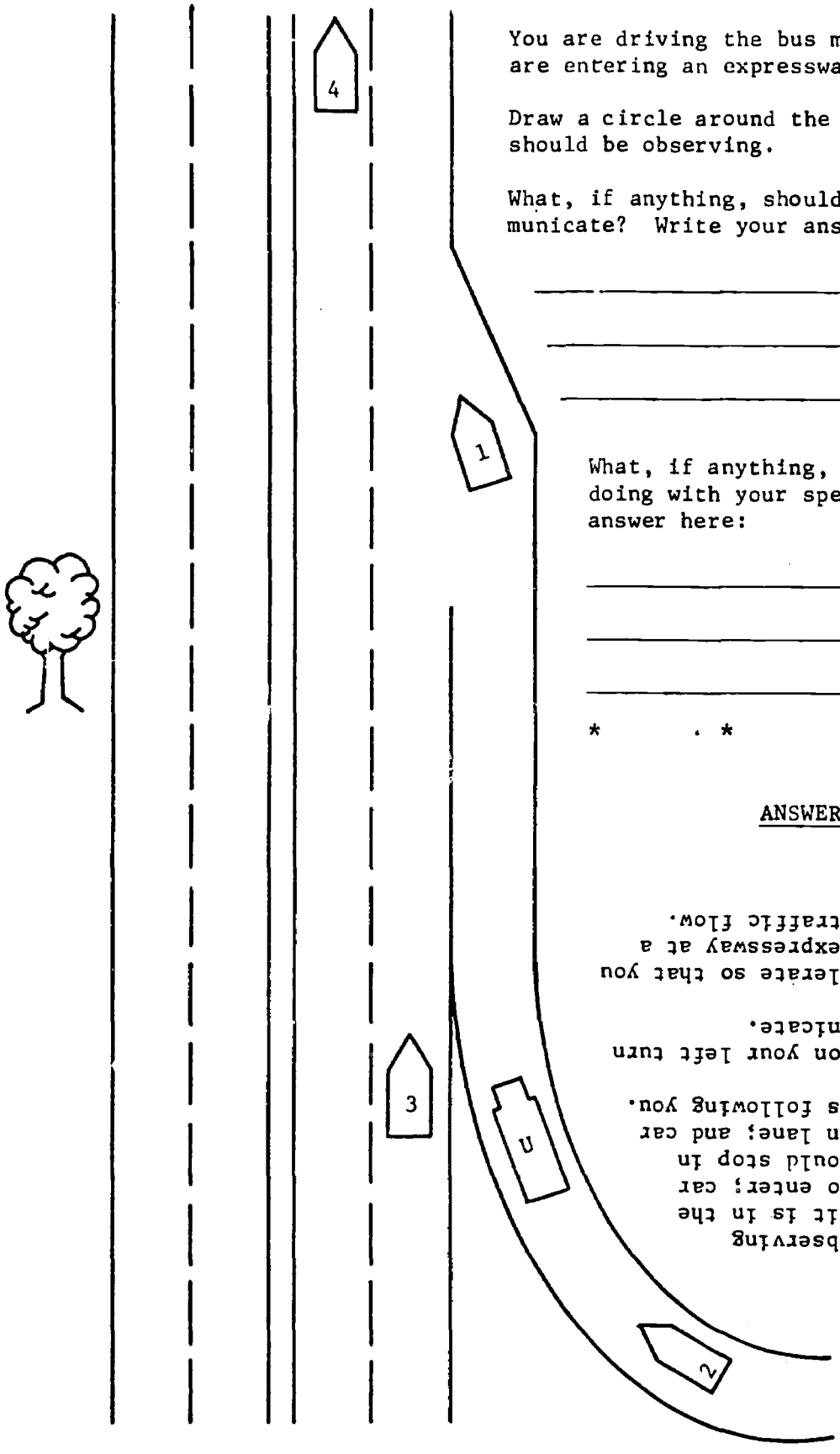
* * * * *

ANSWERS

You should be observing the parked cars, since one might pull out, and the children playing ball, since someone could run into the street.

Unless you saw a person run toward the street, you don't need to honk to communicate. Applying your brakes will signal any traffic behind. You should slow down because of the hazards in this area.

EXERCISE 14



You are driving the bus marked "U." You are entering an expressway.

Draw a circle around the things you should be observing.

What, if anything, should you do to communicate? Write your answer here:

What, if anything, should you be doing with your speed? Write your answer here:

* * * *

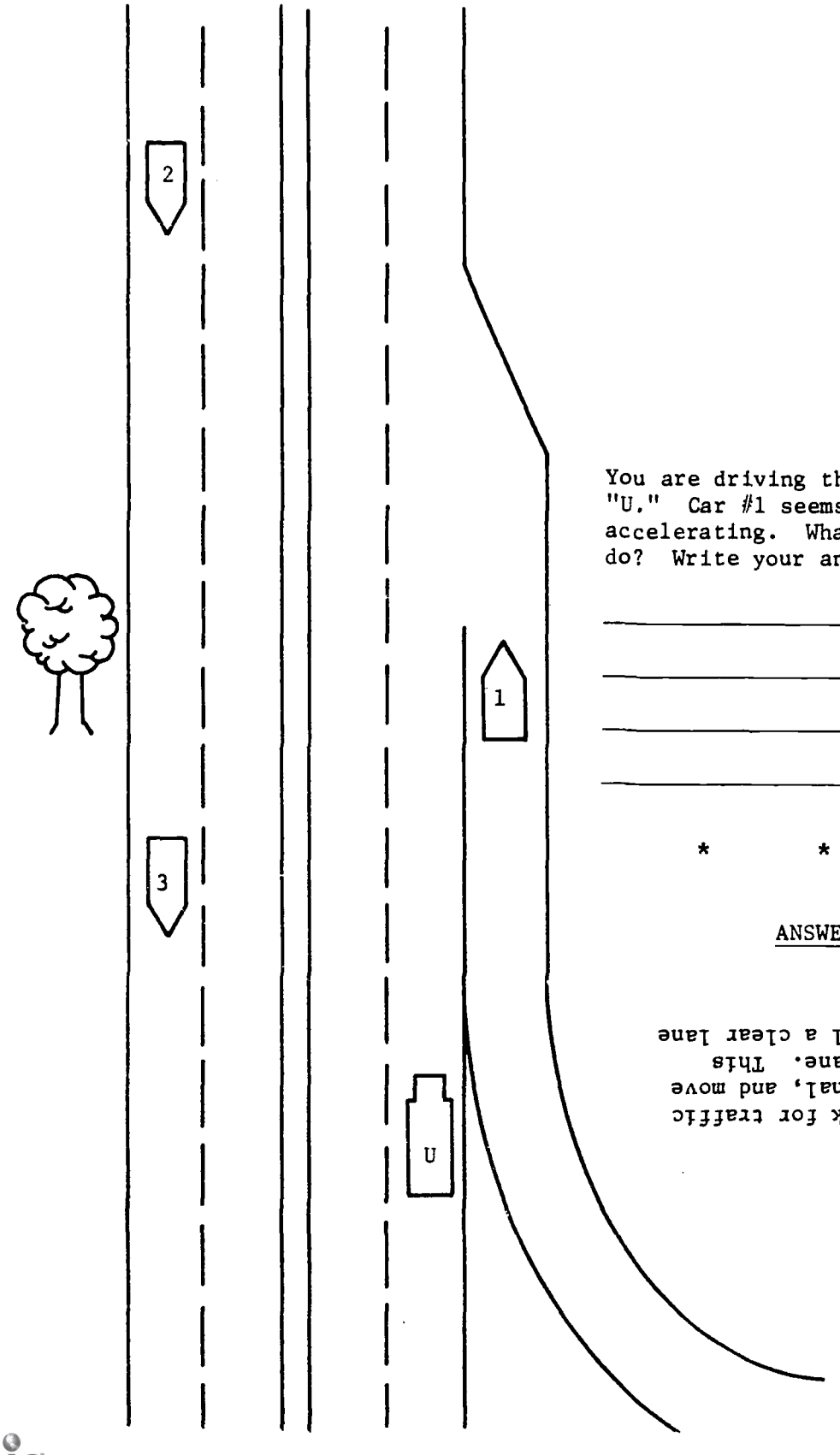
ANSWERS

You should be observing car #3 because it is in the lane you want to enter; car #1 because it could stop in the acceleration lane; and car #2 because it is following you.

You should put on your left turn signal to communicate.

You should accelerate so that you will enter the expressway at a speed with the traffic flow.

EXERCISE 15



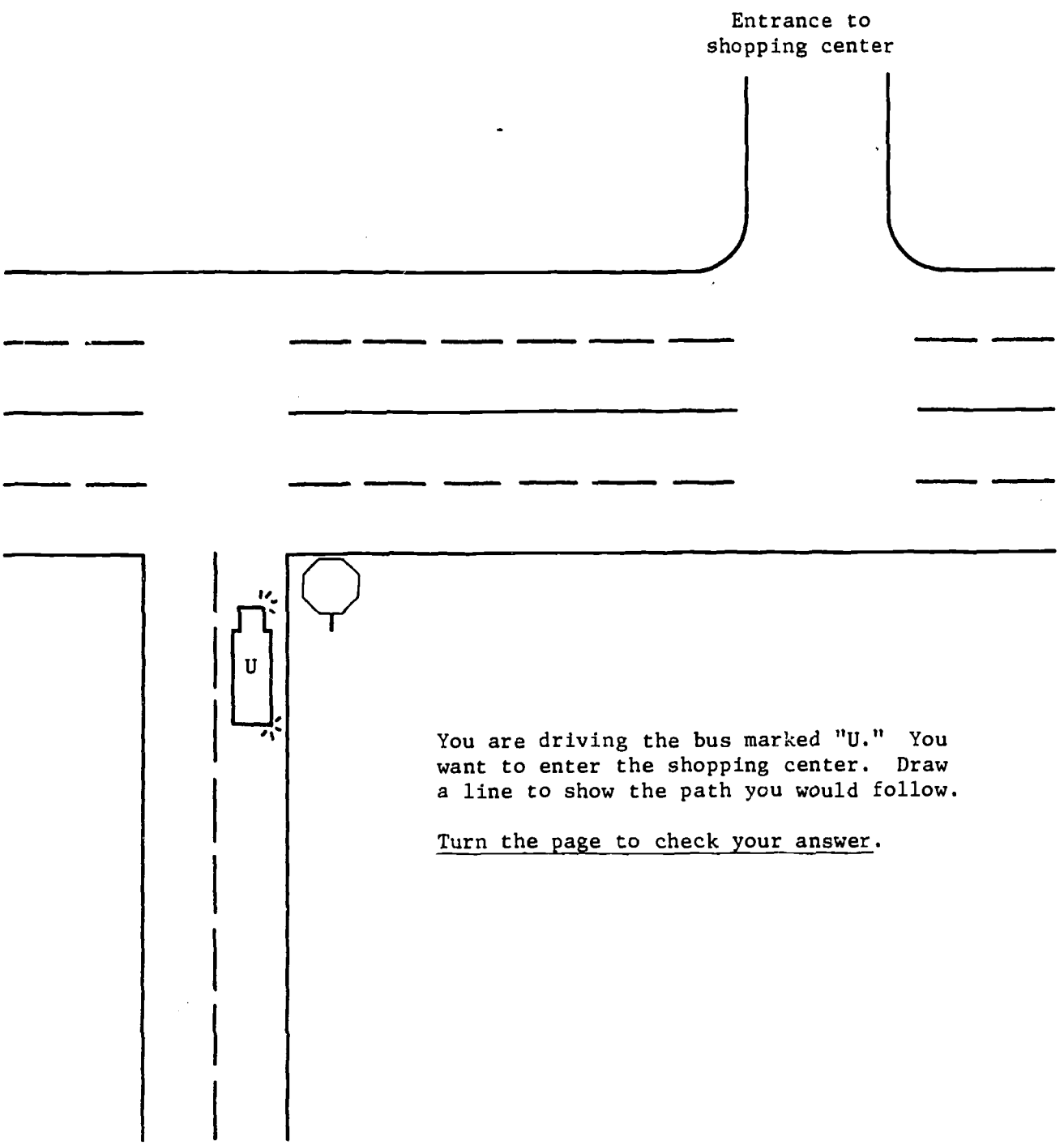
You are driving the bus marked "U." Car #1 seems to be accelerating. What should you do? Write your answer here:

* * *

ANSWER

You should check for traffic behind you, signal, and move into the left lane. This will give car #1 a clear lane to pull into.

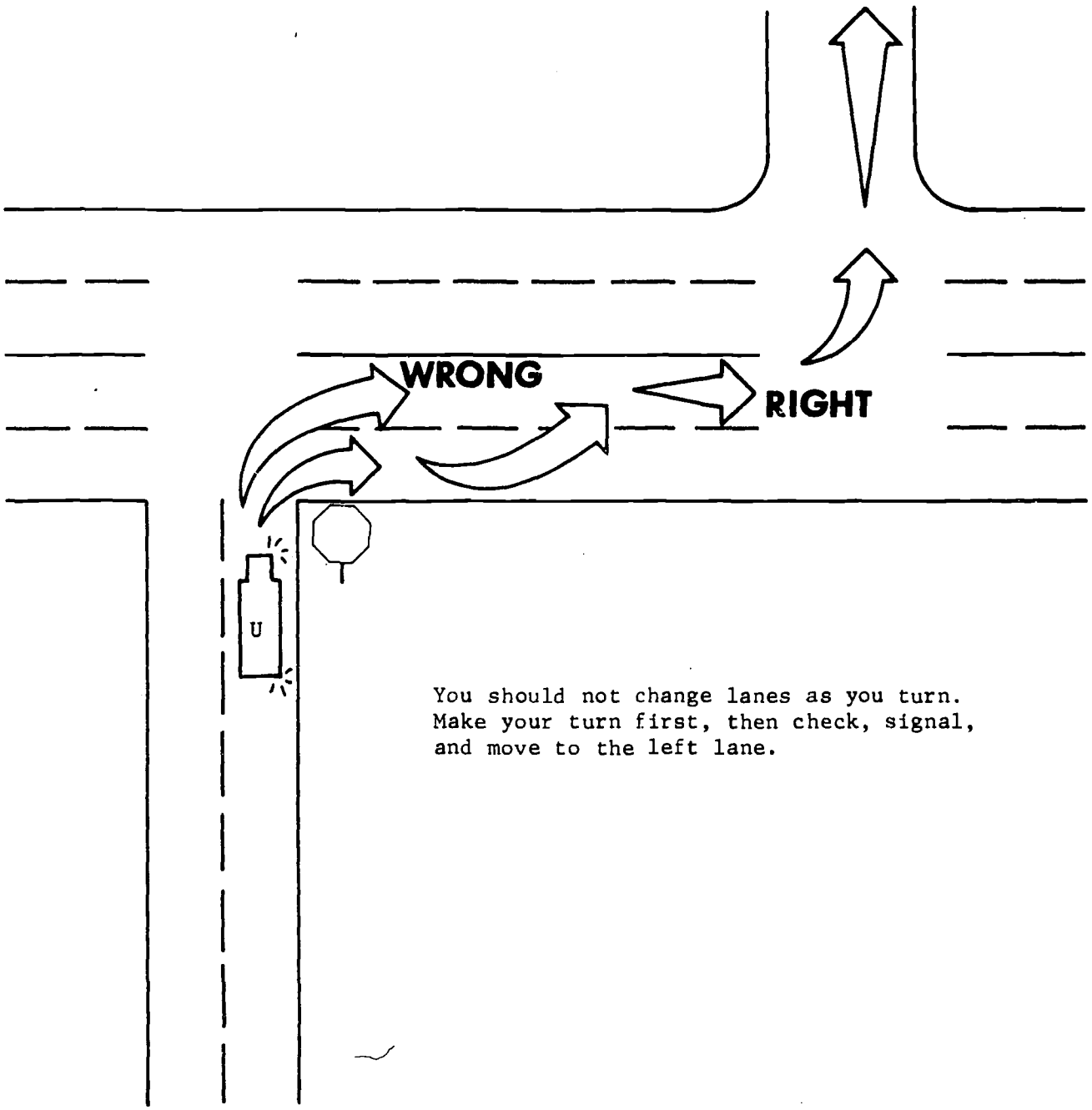
EXERCISE 16



You are driving the bus marked "U." You want to enter the shopping center. Draw a line to show the path you would follow.

Turn the page to check your answer.

ANSWER TO EXERCISE 16



You should not change lanes as you turn. Make your turn first, then check, signal, and move to the left lane.

ON-THE-ROAD PRACTICE

NOTES	CONTENT
	Now you'll practice observing, being observed, and maintaining separation while actually driving on the road. Your instructor will describe the planned route and review the Commentary Driving Technique. NOTES:

ADVANCED UNIT F
REVIEW QUESTIONS

Check the letter of the best answer.

1. You should _____ the movement of other vehicles on and approaching the roadway so you can react safely.

   ____ a. separate
   ____ b. observe
   ____ c. compete with
   ____ d. avoid

2. You use the horn and directional signals to make sure that you are _____ _____ by other drivers.

   ____ a. not crowded
   ____ b. over-taken
   ____ c. being observed
   ____ d. yielded to

3. Maintaining adequate separation means keeping a _____ _____ _____ between your bus and other vehicles.

   ____ a. margin of safety
   ____ b. margin of space
   ____ c. extra space cushion
   ____ d. all of the above

4. In addition to manipulative skills, you use your _____ skills in estimating the required space around the bus.

   ____ a. psycho-motor
   ____ b. driving
   ____ c. perceptual
   ____ d. unconscious

5. At night, the primary perceptual cue for judging your closing rate on the vehicle ahead is:

____ a. the distance between the lead vehicle's taillights
____ b. the size of the lead vehicle's taillights
____ c. the brightness of the lead vehicle's taillights
____ d. none of the above

6. You use your _____ vision to observe vehicles not in your direct path of vision.

____ a. depth
____ b. night
____ c. central
____ d. peripheral

7. You should develop the habit of _____ 360 degrees around the bus.

____ a. scanning
____ b. screening
____ c. driving
____ d. separating

8. Which of the following circumstances call for a greater than normal following distance?

____ a. when you're behind an ambulance
____ b. when you're behind a motorcycle
____ c. when you are fatigued
____ d. all of the above

9. You should maintain appropriate lateral separation when:

____ a. being passed
____ b. being tailgated
____ c. approaching a car stopped at a stop sign
____ d. all of the above

10. Which of the following cues aid in maintaining longitudinal separation?

____ a. animals in the roadway
____ b. noise from traffic in cross streets
____ c. the level of your gas gauge
____ d. your speedometer reading
____ e. none of the above

Check whether these statements are mostly true or false.

11. You should always swerve to avoid an animal or pedestrian in the roadway. T ____ F ____

12. To maintain the appropriate lateral separation distance when changing lanes, you should position the bus in the center of the new lane. T ____ F ____

13. In general, pass on the right on a 4 lane roadway. T ____ F ____

14. A "panic stop" is always better than no stop at all. T ____ F ____

15. When approaching a vehicle that is taking up two lanes, you should maintain longitudinal separation. T ____ F ____

16. When approaching an intersection with a car coming from the left cross street signalling his intention to turn right, it is all right to proceed into the intersection after the car has begun to turn. T ____ F ____

17. Since you drive a school bus, you have the right of way on a narrow bridge. T ____ F ____

18. Two seconds is the minimum time interval to maintain behind a vehicle you are following. T ____ F ____

19. Drivers tend to underestimate bus lengths and distance measured in feet. T ____ F ____

20. You must know the approximate size of your bus so you can estimate whether your bus can safely clear structures with restricted lateral and overhead space. T ____ F ____

ADVANCED UNIT G

DRIVING UNDER SPECIAL CONDITIONS

TABLE OF CONTENTS

OBJECTIVES

By the end of this unit, you should be able to select special driving techniques for:

1. Rural and mountainous areas.

2. Urban areas.

3. Night and darkness.

4. Adverse weather conditions.

5. Expressways.

OVERVIEW*

NOTES	CONTENT
	Beginning drivers too often learn to drive only under favorable driving conditions and probably with a lighter vehicle than a school bus. Then, when they have to drive a heavy bus under unfavorable road, light, traffic or weather conditions, they go right ahead with the only driving practices they have learned and they run into trouble. Special or unusual driving conditions put special responsibilities on you. They lengthen the stopping distance or danger zone. Under unfavorable conditions, you must reduce vehicle speed merely to maintain the same margin of safety that you keep under favorable conditions. You probably operate your bus over a variety of roads and under varied conditions. So, it is necessary to adapt your driving habits to the conditions under which you are driving. On poor roads, a considerable part of your attention should be devoted to getting through with the greatest degree of comfort to the passengers and without damaging the bus. On main highways, a large part of your attention should be concentrated on other traffic on the road. Know how the bus is going to respond on different types of roads and what the braking distance will be on different road surfaces--under normal conditions and when rain, snow, or ice is present. *Adapted from state of Iowa (5)

DRIVING ON RURAL HIGHWAYS*

NOTES	CONTENT
	Much of the school bus travel takes place on suburban or rural roads. Such highways may consist of standard-width, hard-surfaced roads, narrow hard-surfaced roads, gravel and crushed rock surfaces, and just plain dirt. Rural roads which are not hard-surfaced are generally quite narrow. Probably the greatest hazard on such roads is the questionable condition of the outer edges of the roadbed. During wet weather they frequently become soft and give way when the school bus gets too close to the edge. Under such conditions, the bus driver when meeting oncoming vehicles, should avoid pulling too far to the right. In many cases, it is wise to stop the bus entirely until the other car has maneuvered around it. Hills are another source of danger. Many motorists using these roads tend to drive toward the center of the road. Bus drivers approaching a hill, especially one with a curve, should pull over to the right as far as possible so as to minimize the possibility of a head-on collision with a motorist coming over the hill from the opposite direction. NOTES:

*Adapted from state of Iowa (5)

NOTES	CONTENT
	Many of the secondary roads, though hard-surfaced, are narrow and crooked. On such roads, the driver may permit his right wheels to run off the paved surface. When this happens, the driver should be cautious so as not to follow his instinct and attempt to pull the bus back onto the pavement immediately. He should keep going straight and allow the bus to slow down. The brakes should be applied very gently in slowing the vehicle--quick and hard application of brakes should be avoided. If conditions permit it, engine compression alone should be used to slow the bus to the desired speed. If there is sufficient space on the shoulder of the road, he should first pull further right two or three feet from the pavement after the bus has slowed down. And then, with the bus moving very slowly, turn the wheels to the left and cut back onto the pavement. Blind and uncontrolled intersections constitute an additional hazard on rural roads. All such intersections must be approached at a reduced speed and with utmost care. Where the intersection is blind to the extent that it is impossible to see down the side roads until almost at the intersection, the only safe procedure is to enter the intersection at a crawl.

NOTES	CONTENT
	DRIVING IN CITY TRAFFIC Regardless of the fact that the school bus will be operated most of the time on the open highway, it is important that you acquaint yourself with the sound practices that are necessary for town and city driving. Become familiar with local traffic regulations and follow the direction of officers directing traffic. One of the most common faults of school bus drivers, while driving in town, is that they do not stay in the proper lane of traffic. Many drivers feel that since they are driving a vehicle that is wider than the ordinary car, it is safer if they straddle the lane. This is an erroneous assumption and a dangerous idea; the bus is in a much safer position if it is in one lane than if it is in two. Keep the bus in the right lane, unless you are preparing to make a left turn. In this position, the bus will not interfere with other traffic to the extent that it does when occupying a portion of both lanes. If lanes are not marked off, it is up to you to imagine that the lanes exist and to operate the bus in the proper one. If you make it a habit to drive your bus in the wrong lane, or continually change from one lane to another, you demonstrate an absence of respect for other drivers and the safety of your passengers. Another factor that is important to the safe operation of a school bus in city traffic is regulating the speed of the bus in accordance with other traffic on the street. If the bus is operated at a speed that is in excess of, or greatly under, that of

*Adapted from state of Iowa (5)

NOTES	CONTENT
	other vehicles, it becomes a hazard to both the occupants of the bus and other users of the street. Be careful to maintain enough distance between the bus and other vehicles to allow room to stop without colliding with other vehicles under emergency conditions. In city traffic, the speed of the bus should be in accordance with the speed of other vehicles, so that the bus will not create a hazard and "tieup" traffic. Streets in cities, and roads leading into cities, frequently consist of four or more lanes and divided highways. If such roads are a part of the school bus route where children are picked up, consideration of the safety of the children should be paramount. The bus should be required to double back rather than to have a child cross a highway unassisted. This will permit children living on such roads to load and unload on the right side of the highway, consequently lessening the danger of accidents that have occurred at various times when students have had to cross the road to board a bus.

INTERSECTIONS IN URBAN AREAS

NOTES	CONTENT
	Consider these factors when you have to drive through or turn at <u>intersections</u> in an urban area. How will your driving be different? HEAVY TRAFFIC TRAFFIC OFFICERS TRAFFIC LIGHTS PEDESTRIANS ONE WAY STREETS SAFETY ISLANDS

NIGHT DRIVING (TWILIGHT TO DAWN)

NOTES	CONTENT
	SOME THINGS YOU SHOULD KNOW • Driving at twilight is more dangerous than driving during daylight. Drivers overestimate their ability to see at twilight. Shadows increase the difficulty in judging speed and distance of other vehicles. Many drivers are also fatigued at dusk enroute home from work. One-fifth of motorists in fatal accidents were fatally injured between the hours of 5 p.m. and 8 p.m. • Distance and speed estimation for oncoming vehicles at night is almost equal to that of daytime driving in the case of standard size vehicles. However, since distance perception at night is based upon angular separation of headlights, the distance of a small foreign or compact car may be overestimated. • At 100 feet away, it is very difficult to see objects beside or beyond an approaching vehicle. Vision does not return to normal for some time after passing the vehicle. The driver actually travels effectively blind for some distance after having passed a pair of brilliant headlights. • Your visibility is affected considerably by oncoming headlights at distances even in excess of 3,000 feet. • Your high beams may blind the oncoming vehicle driver, compounding the problem of driving, especially on a wet and possibly slippery surface.

NOTES	CONTENT
	IMPROVING YOUR ABILITY TO SEE AND DRIVE DURING DARKNESS Maintain the Proper Vigilance Needed to Improve Your Ability to see During Darkness 1. Use the taillights of the vehicle ahead as an indication of the closing rate when driving in rural areas. 2. Watch for dark or dim objects on the roadway when driving at night. If dark objects appear, see-saw your eyes up and down, or cock your head to one side and peer out the corner of your eyes. 3. Watch beyond the headlights on and near the roadway for slow moving or unlit vehicles, curves, road obstructions or defects, pedestrians and animals. 4. Watch for pedestrians and unlit vehicles and objects on the roadway and at the curbside when driving in urban areas at night. 5. When approaching a pedestrian or animal at night: a. Dim the lights to low beams. b. Decelerate. c. Watch the pedestrian or animal for an indication of change in direction of movement. d. Prepare to take evasive action should the pedestrian or animal enter the roadway. 6. When approaching an animal refuge or crossing area, decelerate and watch for animals on or alongside the roadway.

NOTES	CONTENT
	Always drive more slowly than under similar circumstances during daylight. Maintain a speed that permits stopping within the distance illuminated by the headlights. ALLOW A GREATER MARGIN OF SAFETY IN PERFORMANCE OF MANEUVERS THAN DURING DAYLIGHT HOURS. If the driver of an oncoming vehicle refuses to dim his headlights: a. Decelerate b. Maintain your headlights on low beam. c. Avoid looking directly at the vehicle's bright lights. d. Focus the eyes to the right side of the roadway, beyond the oncoming vehicle. e. Close one eye as the vehicle draws near, to save vision in that eye until the vehicle passes. f. Maintain a slower speed for a period of time after the vehicle has passed.

NIGHT DRIVING PROCEDURES*

NOTES	CONTENT
	1. Before starting, check that all lights in the interior as well as on the exterior of the bus are in working order and that they are clean. 2. Keep headlights on low beam in cities and towns, in fog or haze, and approaching other motorists on a highway. Also put them on low beam as another vehicle passes the bus and until the vehicle is at least ____ feet in front of the bus, or until your headlights stop illuminating the back end of the vehicle that has passed. 3. Keep interior overhead lights off while driving. 4. Keep level of lights on instruments bright enough to read the instruments, but not so bright as to interfere with vision outside the bus. Schedule start and return times of the trip with consideration of slower night driving time. 6. If the night driving time will require more than a one-hour stretch of driving, schedule rest stops for at least 10 minutes for each hour of driving. 7. If it is necessary to stop the bus on the shoulder of an open roadway, activate the parking lights and choose a spot which can be seen for at least 500 feet by oncoming and following traffic. NOTES:

*Adapted from NHTSA Task Description (9)

NOTES	CONTENT
	During the course of a school year, as a bus driver you will face a variety of hazardous conditions that will demand alert and skillful action. Conditions you'll constantly face are: ice, snow, mud, and fog. A basic rule to follow is always to shift to a lower gear when it is apparent that you will encounter any of these conditions. A vehicle cannot be operated safely and efficiently at a high rate of speed when any of the above conditions prevail. 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 gas to allow the wheels to take hold. If the bus stops, do not continue to spin the wheels in hope of pulling out. In mud and soft sand, this will only serve to dig the wheels deeper. If the bus becomes stuck, first try to get it out by pointing the front wheels straight ahead, and then try "rocking" the bus by alternately putting it into reverse and into low. This can be done in a manner that the wheels do not spin, and in many cases, it will pull the bus out of a tough spot. If this fails, some material to provide friction, such as crushed rock, tree branches, pieces of timber, or burlap should be pushed down around the rear wheels to allow the bus to again get in motion. CONDITION OF STREETS AND HIGHWAYS You'll be driving over the same route twice a day all during the school year. You'll become thoroughly acquainted with the route and, after a short time,

*Adapted from state of Oregon (12)

NOTES	CONTENT
	may begin to take the road for granted. But conditions change rapidly; potholes develop overnight, the grade washes away, shoulders become soft, railroad crossing approaches change during the night or day, loose gravel appears, slick spots develop through accumulations of snow and ice or oil deposits. Each day conditions are different and you must be on the alert to detect these changes before it is too late. It is no use to say that an intersection accident happened because the road was slick. Such accidents usually happen because the driver fails to adjust his or her driving to the road condition. ADJUSTING YOUR DRIVING TO POOR ROAD CONDITIONS Rain, snow, sleet, fog, or icy pavement have never caused an accident. These conditions merely add more hazards to driving and make the normal hazards worse. Accidents are caused by drivers who do not adjust their driving to meet these conditions. Accidents blamed on skidding or bad weather conditions are classed as preventable. Expert drivers can drive safely on extremely slippery surfaces by reducing speed, installing chains, and using sanders when necessary. 1. Reduce speed of bus. 2. Drive well to the right hand edge of the road. 3. Watch side roads closely for entering traffic. 4. Beware of patches of wet leaves and smooth blacktop surfaces. 5. Never look directly at lights of oncoming vehicles.

NOTES	CONTENT
	6. In fog, use windshield wipers and defrosters continuously. 7. In fog, haze (or rain or snow when it's overcast), drive with headlights on low beam. 8. Avoid sudden stops. Signal stops by tapping brake pedal to make the stop lights blink. NOTES: RAILROAD CROSSINGS--EXTRA CAUTION: WARNING DEVICES MIGHT BE AFFECTED BY WEATHER During wet, stormy, or foggy weather, before placing part of the bus on railroad tracks, you must take all extra precautions to know conclusively that the crossing can be made in safety. Any movement of warning signal or device maintained at such railroad crossings, such as ordinarily indicates the movements of trains, must be taken as an additional warning of danger. You must not accept a movement as indicating that the device is either in or out of order or not properly handled, but must always take the movement as a conclusive warning of danger. You must not cross the tracks while the warning signal is in motion until you have conclusively ascertained that, regardless of the warning signal, no train is approaching.

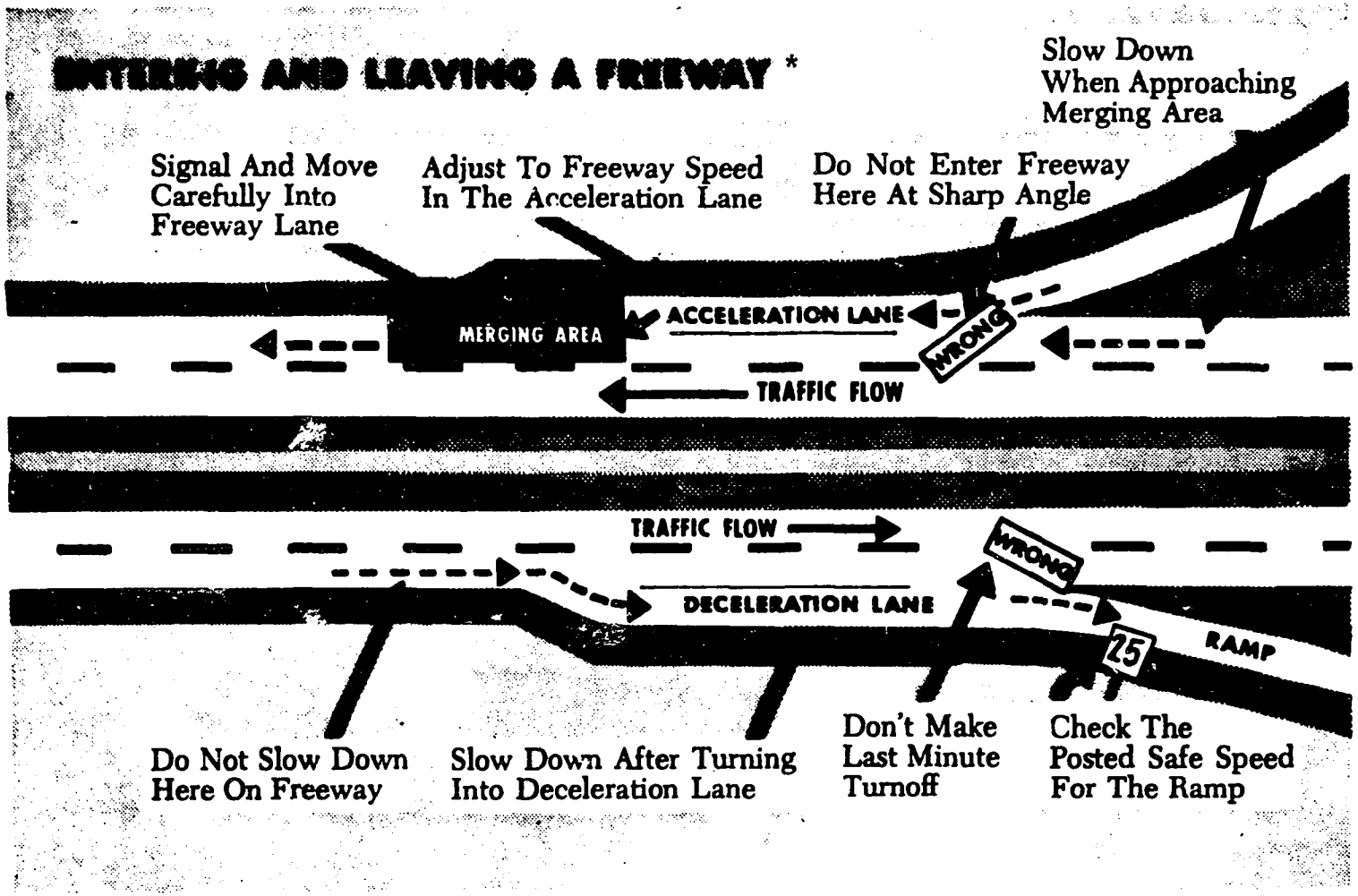
NOTES	CONTENT
	SNOW AND ICE* 1. Pretrip Tasks a. Check that chains are securely locked with spreaders on. b. Clear lights, mirrors, and front and rear windows of precipitation. c. Check that door works smoothly. d. Place a box of sand or grit in the bus (check that sanders are full, if available). e. "Warm up" vehicle for several minutes unless the vehicle is kept pre-warmed. f. Check that heater and window defroster are working. g. Start trip earlier than usual to compensate for slower driving time. 2. On the Road a. If ice or a "wet" snow is on the ground, start up the bus in second gear for better traction. b. When pulling out into the roadway, allow for greater stopping time and maintain greater distance from other vehicles. c. Drive more slowly than is posted for dry road conditions, especially on bridges and in tunnels. d. When approaching intersections and stopping, pump the brakes (once or twice) so wheels do not lock on the ice. *Adapted from NHTSA Task Description (9)

NOTES	CONTENT
	e. To avoid a skid, disengage the clutch when the bus is almost at a standstill. f. Make turns smoothly, avoiding application of the brake. g. If a build-up of snow or ice occurs on front or rear windows, stop the bus and brush it off. 3. Posttrip Tasks a. Sweep water and snow out of bus and off steps. b. Clear excess snow from windows. RAIN 1. Pretrip Tasks a. Clear windows, lights, and mirrors of mud and other dirt. b. Check that windshield wipers are in working order. c. Start trip earlier than usual to compensate for slower driving time. 2. On the Road a. Drive more slowly than the speed posted for dry road conditions. b. Make turns slowly, avoiding use of the brake as much as possible. c. Use windshield wipers at all times. d. If rain is heavy, drive with headlights on. e. When fog occurs, drive with headlights on low beam.

NOTES	CONTENT
	3. Posttrip Tasks a. Sweep water off floor and steps of the bus. b. If mud has splashed on lights and sides of bus, clear it off.

NOTES	CONTENT
	When a driver thinks of adverse weather conditions, he usually thinks of how bad the roads will be. Don't forget, rain, snow (and, of course, fog and smog) also reduce visibility. No matter how good your eyes are, you just can't see as well when the sun isn't shining. How should you adjust your driving under these conditions? RAIN SNOW FOG (AND SMOG) Discuss your answers with the class.

NOTES	CONTENT
	Expressway driving is different from the stop-start routine you experience on city and residential roads. Expressway driving forces you to adjust your habits to high-speed travel. Experts recommend the following driving techniques which will help you take advantage of fast, convenient expressways--with safety. How to Get on an Expressway Slow down and look before turning into an expressway approach. 1. Survey the traffic on the main roadway when entering an on-ramp. a. Look briefly back over your left shoulder if entering the main roadway from the right. b. Look back over your right shoulder if you're entering the main roadway from the left 2. If driving on a short entrance ramp, check briefly for the main roadway approaching from the rear in selecting a gap. Specifically: a. Look briefly back over your right shoulder and look at the rearview mirror if entering the main roadway from the left. b. Look briefly back over your left shoulder and look at the side and rearview mirrors if entering the main roadway from the right.



*From state of Ohio (11)

Diagram from Ontario (Canada) Department of Transport

Figure 1. Entering and Leaving a Freeway

NOTES	CONTENT
	c. Move your head from side to side in order to view the roadway through the mirrors, if necessary. d. If no gap is visible, observe the ramp ahead, periodically view the main roadway using the mirrors if possible, and stop before reaching the end of the on-ramp if it is necessary to await an acceptable gap. e. Periodically check the main roadway by quick shoulder glances or the use of mirrors, when approaching the main roadway. 3. Check the traffic on the main roadway when driving on a long entrance ramp. Specifically: a. Check the mirrors and glance briefly over your left shoulder if approaching the main roadway from the right. b. Check the rearview mirror and look briefly over your right shoulder if approaching the main roadway from the left. Wait for an opening in traffic.* Expressway drivers are traveling a lot faster than you will be at first. A car going sixty can run you down. Keep far right, preferably in an acceleration lane, while you are getting up to the average speed of traffic. *Adapted from Allstate Insurance Company pamphlet (1)

NOTES	CONTENT
	Expressways, as you know, have divided traffic streams. When you enter from a "southbound" approach you can't go north. If you make a mistake you must proceed with traffic until the next interchange. Only then can you leave the expressway and re-enter by the proper approach. NEVER attempt to cross the center strip. It's illegal--and suicidal. How to Drive the "Straightway" Pick your lane--and stay with it. Weaving and lane wandering are especially dangerous on a high-speed expressway. In general, keep to the right. Where slow trucks and merging traffic make this lane hazardous, move over to the next lane. Leave plenty of room between you and the car ahead. Follow no closer than one bus length for every 10 miles of speed. Signal to alert others before you pass or change lanes. Use your turn signal lights to show you are about to leave your lane. How to Drive at Expressway Speeds Drive smoothly at a steady speed. Give the driver behind a chance to follow or pass you safely. You're a highway hazard if you indulge in spurts of speeding and dawdling. Drive within a 25 percent range of the speed of traffic. If most cars are doing 60, you shouldn't drop below 45. If traffic is moving at 40, maintain a minimum of 30 mph. Keep right when you want to go slower than average.

NOTES	CONTENT
	On long drives, change your speed level every 15 to 20 minutes. Keeping the same speed dulls your reactions. A five or ten mile variation will perk you up. Watch for signs noting changes in speed limits. A 40-mile zone on a 60-mile highway signals a danger area. Drop your speed promptly and stay alert for the upcoming hazard. How to Meet a Crisis on an Expressway If you must stop, signal for a right-hand turn as you decelerate. Drive completely off the right side of the road--all four wheels and fenders. If your right wheels go off the pavement, do not brake. Stay in gear as you reduce speed to about 10 miles an hour. Look behind for a clear field. Turn left and you're back on the road again. If a car is coming at you in the wrong lane, honk your horn and blink your lights. Then take evasive action to the right. How to Get Off an Expressway Look for advance signs for your proper turn-off. Move to the correct turn-off lane. Decrease your speed. Begin signalling your intention of turning off the expressway as soon as you slow down. Read the interchange signs carefully to choose the proper turn-off lane. (If you're on a special activity trip, your pretrip plans should indicate which exits you'll take. Make sure you know these

NOTES	CONTENT
	in advance so you'll recognize the signs when you see them.) Drive slowly, or stop if necessary, before you enter traffic on the cross highway. And remember--you're back in slow-driving territory, with side streets, traffic lights and pedestrians. Defensive Driving Tactics for Expressways Look ahead for signs of trouble. A knot of cars in the distance means reduce your speed now. Prepare for slow moving traffic or a complete stop. Look behind for signs of trouble. Your rearview mirror will forewarn you of a speeder, a passer, a car out of control. Watch the pavement for signs of trouble. A rough patch that would cause mild bumping at moderate speed can throw your bus off the road at high speed. Expressways at Night Drive at least 10 miles an hour slower than you do in daylight. Don't trust oncoming headlights as road guides. The traffic streams may be widely separated. Dim your lights for oncoming cars.

ADVANCED UNIT G
REVIEW QUESTIONS

Check whether these statements are mostly True or False.

1. When driving on poor roads, a considerable part of your attention should be devoted to getting through with the greatest degree of comfort to the passengers and without damaging the bus. T ____ F ____

2. Probably the greatest danger on rural roads which are not hard-surfaced is the questionable condition of the outer edges of the grade. T ____ F ____

3. If your wheels run off the paved surface on a narrow road, you should slow down and turn your wheels gradually to cut back onto the pavement. T ____ F ____

4. Blind and uncontrolled intersections are often found on rural roads. T ____ F ____

5. One of the most common faults of school bus drivers in urban areas is that they do not stay in the proper lane of traffic. T ____ F ____

6. It's better to drive much slower than other urban traffic rather than much faster. T ____ F ____

7. You have more help in controlling the position of your bus at an intersection in an urban area than you do in any residential or rural intersection because at an urban intersection there are traffic lights, traffic officers, safety islands, etc. T ____ F ____

8. Driving at twilight is more dangerous than driving during daylight. T ____ F ____

9. Distance and speed estimation for oncoming standard-size vehicles at night is almost equal to that of daytime driving. T ____ F ____

10. If it's unexpectedly necessary to pull the bus off onto the shoulder of the road at night, you should activate the red flashing warning lights. T ____ F ____

11. A basic rule for driving in adverse weather is to shift to a lower gear. T ____ F ____

12. To avoid getting stuck or spinning the wheels when driving on ice, you should try to keep the bus moving slowly and steadily forward in gear. T ____ F ____

13. Accidents blamed on skidding or bad weather conditions are classed as preventable. T ____ F ____

14. When driving in snow and ice, you brake while negotiating turns. T ____ F ____

15. The problems of reduced visibility due to poor weather are similar to the reduced visibility due to darkness. T ____ F ____

16. When driving on an expressway, you should drive within a 25 percent range of the speed of traffic. T ____ F ____

17. When entering an expressway, you should stay in the acceleration lane until you are up to the speed of the traffic flow. T ____ F ____

18. If your wheels go off the pavement on an expressway, brake quickly to avoid collision. T ____ F ____

19. When you want to exit from an expressway, you should not activate your turn signal until you pull into the deceleration lane. T ____ F ____

20. You should enter the expressway by merging sharply into the flow of traffic, provided an acceptable gap of at least 8 seconds is present. T ____ F ____

ADVANCED UNIT H

PREVENTIVE MAINTENANCE OF THE BUS

TABLE OF CONTENTS

OBJECTIVES

By the end of this unit, you should be able to:

1. Use your senses to detect symptoms of possible trouble.

2. Describe basic bus components.

3. Identify driving actions which avoid undue wear on the bus.

OVERVIEW*

NOTES	CONTENT
	Preventive maintenance is the scientific care of a vehicle that will guarantee the dependability and maximum life from the various parts. It is a carefully organized system of inspections made at regular mileage and/or time intervals, combined with immediate attention to all reported defects. These inspections are made up of a series of well-balanced checking procedures combined with the process of cleaning, tightening, lubricating, and adjusting of parts and units. It is the best known, simplest, and most economical means of protecting the original investment in a fleet of motor vehicles. A regular periodic inspection program is the key to a good preventive maintenance program. (For sample inspection forms refer to Figures 1 and 2.) You have a responsibility in this field, in addition to the inspection program carried out by a trained mechanic. You are on the road with the bus for a number of hours each day. You and you alone are in a position to observe its performance under all conditions. You should learn to recognize defects and immediately report the symptoms to the maintenance department. Don't attempt to diagnose the trouble but report anything unusual that you HEAR, SEE, SMELL, and FEEL. Remember, defects cannot be repaired if they are not reported. 1. Listening for trouble. a. Sharp knock when picking up speed. b. Light knock when engine is running at idle speed. c. Dull regular knock.

*Adapted from state of Iowa (5)

SCHOOL BUS MONTHLY OR 1000 MILE INSPECTION REPORT*

Bus. No. _____ Driver _____ Inspection Date _____

Speedometer Reading _____

BODY		ENGINE	
1 Check all instrument panel gauges		27 Inspect motor supports: front, rear	
2 Check all lights, signals, and wiring		28 Check oil and air filters	
3 Check horn; first aid kit		29 Check muffler, manifold and exhaust line	
4 Check flares; fusees; flags; axe			
5 Inspect heater and defroster equipment		30 Inspect fan belt	
6 Inspect fire extinguisher		31 Inspect generator and distributor	
7 Inspect windshield wipers		32 Check battery and starter	
8 Check and adjust rear view mirrors		33 Check cooling system	
9 Check cleanliness: Interior; Exterior		34 Check carburetor and fuel line	
10 Inspect windows; windshield; door glass		35 Others	
11 Check seats and upholstery (seats must be tight to floor)			
12 Inspect emergency door, latches, warning signal			
13 Inspect service door, controls, steps			
14 Check stop arm			
TIRES			
15 Check for cuts, bruises, uneven wear, air pressure			
FRONT END			
16 Check spindles; wheel alignment; tie rods; drag links			
17 Check springs; clamps; shackles			
18 Check steering mechanism			
REAR AXLE			
19 Check springs; clamps; shackles			
CLUTCH			
20 Check pedal clearance & adjustment			
21 Check clutch for slipping or dragging			
TRANSMISSION			
22 Check shifting for noise			
23 Check for leaks and cracks			
BRAKES			
24 Check pedal clearance and pressure			
25 Check fluid			
26 Check emergency brake			

I certify that I have completed the inspection of this bus as indicated above.

Date _____ Mechanic _____

NOTE: Place a check mark (✓) in the column when each item is completed. If an item is unsatisfactory, leave column blank until repairs are made. If there is more than one item on a line, circle the ones that are unsatisfactory. A check mark in the column will indicate that the circled items have been completed.

Figure 1. Sample School Bus Monthly or 1000 Mile Inspection Report

*Adapted from state of Iowa (5)

SCHOOL BUS ANNUAL INSPECTION SHEET*

Bus Number _____ Make _____ Year Model _____ Driver _____

Date of Inspection _____ Speedometer Reading _____

MOTOR		BRAKES	
1 Inspect for oil or grease leaks and any unusual noises		41 Remove wheels, inspect lining, linkage, drums, wheel bearings, hydraulic cylinders and lines	
2 Tighten cyclinder head bolts		42 Inspect booster and hoses	
3 Tighten manifolds--stop leaks		43 Check air compressor, governor, gauge	
4 Inspect muffler and exhaust line		44 Check emergency relay valve	
5 Inspect and adjust fan belt		45 Check chambers, travel & adjustment	
6 Tighten engine block to base		46 Inspect emergency brake lining, ratchet and pawl	
7 Tighten engine support bolts		CHASSIS	
8 Tighten lower crankcase bolts		47 Check all wheels for trueness	
9 Adjust valves and tappets		48 Tighten rim lugs, check studs	
10 Inspect ignition cables		49 Tighten body bolts and clips	
11 Check battery:clean, tighten, refill		50 Tighten fenders, bumpers	
12 Clean and adjust distributor points		51 Inspect universal joints and flanges; tighten all bolts	
13 Inspect and adjust carburetor		52 Check propeller shaft center bearing	
14 Check and clean generator and starter		53 Check & adjust radius rods	
15 Oil generator and starting motor		BODY	
16 Check voltage regulator, connections and charging rate		54 Inspect windshield wipers; test horn	
17 Clean fuel pump; air cleaner		55 Check seats and upholstery (seats must be tight to floor)	
18 Clean or replace oil filter		56 Inspect and adjust rearview mirrors	
19 Clean and adjust spark plug gaps		57 Inspect heater & defroster equipment	
COOLING SYSTEM		58 Inspect fire extinguishers	
20 Drain and flush radiator		59 Inspect windshield, windows, glass	
21 Inspect & tighten hose connections		60 Inspect emergency door, latches, hinges, warning signal	
22 Inspect water pump & cooling system		61 Inspect service door, controls, rubber	
23 Tighten radiator stay rods and hold-down bolts		62 Check stop arm	
STEERING AND FRONT END		63 Check all instrument panel gauges	
24 Check wheel bearings, knuckle pins bushings, spindles, steering arms, tie rod ends, drag link; align front wheels		64 Flares, fusees, flags, first aid kit, axe (replace when necessary)	
25 Tighten steering housing to frame		65 Check floor covering, safety shield	
26 Tighten pitman arm		66 Inspect body mounting sills & bolsters	
27 Adjust play in steering post		67 Tighten tank support bands	
28 Inspect springs for faulty leaves		68 Check visibility of all signs and lettering	
29 Tighten spring clips & U-bolts		69 Check all lights, signals, wiring	
30 Tighten spring shackles & hangers		TIRES	
CLUTCH		70 Check for cuts, bruises, uneven wear	
31 Check pedal clearance & adjustment		71 Check tread (replace if smooth)	
32 Check clutch for slipping or dragging			
TRANSMISSION		CHANGE OIL AND GREASE	
33 Check shifting and for noise		LUBRICATE ACCORDING TO CHART	
34 Check for leaks and cracks			
REAR END			
35 Inspect differential for leaks			
36 Inspect differential pinion for play			
37 Tighten differential housing bolts			
38 Tighten rear axle flange bolts			
39 Tighten spring clips & U-bolts			
40 Tighten spring shackles & hangers			

I certify that I have completed the annual inspection of this bus as indicated above.

NOTE: Place a check mark (✔) in column when each item is completed.

_____ _____
Date Mechanic

Figure 2. Sample School Bus Annual Inspection Sheet

*Adapted from state of Iowa (5)

NOTES	CONTENT
	d. Clicking or tapping noises. e. Continuous or intermittent squeal or squeak. f. Loud exhaust noise. g. Engine backfiring, missing, popping, spitting, or overheating. h. Steaming or hissing. 2. Feeling for trouble. a. Excessive vibration. (1) Engine compartment (2) Steering wheel (3) Drive line b. Low speed or high speed shimmy. c. Hard steering and steering wander. 3. Looking for trouble. a. Sudden drop in oil pressure. b. Low oil pressure. c. No oil pressure. *NOTE: If any of the above exist, the vehicle shall not be driven until corrected.* d. Excessive oil consumption. e. Smoke coming from under dash. f. Smoke coming from under hood. g. Scuffed tires or spotty wear. 4. Smelling trouble. a. Odor of gasoline. b. Odor of burning rubber.

NOTES	CONTENT
	c. Odor of burning oil. d. Odor of burning rags. e. Exhaust fumes. Any other unusual conditions should be reported immediately to the proper authority.

BUS COMPONENTS

NOTES	CONTENT
	You should have a basic knowledge of the school bus components to know generally how these will affect the bus' operation. There will be times when this knowledge will be useful to you in adjusting your driving performance and in detecting trouble while on the route. Proper driving habits will increase the efficiency and economy of the bus operation. Brief explanations of the basic bus components are provided on the next few pages. Bus components included are: • Braking System • Engine • Transmission and Driveshaft • Clutch • Steering • Electrical System • Suspension Your instructor will discuss how each bus component works.

NOTES	CONTENT	
	BRAKING SYSTEM	HOW IT WORKS
	• Hydraulic • Vacuum-Hydraulic • Air	Pressing on brake pedal causes fluid or air to flow into brake cylinder. Cylinder moves brake shoes outward against brake drum (inner surface of metal wheel). This pressure of shoes against drum causes wheel to slow and stop.
	ENGINE	
	• Carburetor • Combustion Chambers • Pistons • Crankshaft	Takes fuel in gas tank, mixes it with air in carburetor. Mixture is fed into combustion chamber where it's ignited by spark plugs. The exploding mixture causes pistons to move. The motion of the pistons causes the crankshaft to turn. The rotating crankshaft connects the final power from the engine to the transmission. The power is then carried to the driveshaft, the differential, the rear axles, and the rear wheels.
	TRANSMISSION AND DRIVESHAFT	A system of gears which allows you to change the ratio of number of engine revolutions to number of wheel revolutions. For example, in low gear, engine might turn 100 times for one wheel turn. In a

NOTES	CONTENT	
		higher gear, the engine might turn 10 times for one wheel turn. Driveshaft connects transmission to rear wheels, making them turn.
	CLUTCH	When depressed, disconnects engine from transmission so you can change transmission gears.
	STEERING	Steering wheel and column connects to gears and linkage mechanism which changes direction of front wheels.
	ELECTRICAL SYSTEM	Supplies power for primary engine functions and auxiliary functions: Primary Engine Functions • Power generation and storage (battery, generator/alternator, and voltage regulator) • Power distribution (engine wiring) • Timing (distributor) • Spark generation (spark plugs and coil) Auxiliary Functions • Inside/outside lighting (headlights, amber/red flashing warning lights, turn

NOTES	CONTENT
	signals, instrument panel lights, etc.) · Air/heat circulation (heater, defroster, blowers) · Horn SUSPENSION — Springs and shock absorbers which enable driver to handle bus properly on rough terrain and sharp curves, etc. Answer these questions: 1. Which bus component is made up of a system of gears? 2. Which component is responsible for the way the bus handles and rides on rough terrain and sharp curves? 3. Which bus component works on fluid or air pressure? 4. Which component disconnects the engine from the transmission so you can change gears? Your instructor will answer any questions you may have on how the bus works.

PREVENTING MAJOR PROBLEMS BY DETECTING EARLY SIGNS OF TROUBLE*

NOTES	CONTENT
	1. BRAKING SYSTEM--EARLY SIGNS OF TROUBLE a. Air pressure drop (air brakes only) b. Brake pedal low (hydraulic or vacuum-hydraulic brakes) c. Pedal spongy (hydraulic or vacuum-hydraulic brakes) d. Smell or see brake fluid (hydraulic or vacuum-hydraulic brakes) e. Brake drum very hot (all types) f. Bus swerves when brakes are applied (all types) 2. ENGINE--EARLY SIGNS OF TROUBLE a. Engine miss at low speed b. Engine miss at high speed c. Ping when accelerating d. Dull "clunk" at idle e. Sharp loud knocking. SHUT OFF ENGINE IMMEDIATELY f. Heat gauge indicates temperature rising higher than normal g. Oil pressure dropping below normal. SHUT OFF ENGINE IMMEDIATELY h. Engine stalls or runs sluggish on cold damp morning

*From state of Ohio (11)

NOTES	CONTENT
	3. TRANSMISSION AND DRIVESHAFT--EARLY SIGNS OF TROUBLE a. Hard shifting b. Slipping out of gear c. Clunk or jerk when power is applied or released d. Unusual sounds when power is applied 4. CLUTCH--EARLY SIGNS OF TROUBLE a. Motor revving with clutch engaged and vehicle moving and in gear b. Odor of burning clutch lining c. Gear clash d. Squealing sound when clutch pedal is depressed, with engine running e. Clutch "chattering" 5. STEERING--EARLY SIGNS OF TROUBLE a. Steering very difficult b. Wheels shimmy c. Bus veers one way or the other d. Bus wanders on roadway 6. ELECTRICAL SYSTEM--EARLY SIGNS OF TROUBLE a. Ammeter indicates a discharge. WATCH OUT FOR FIRE b. Smoke appearing around wires, switches, etc. DISCONNECT BATTERY IMMEDIATELY c. Ammeter indicates heavy charging d. Lights dim

NOTES	CONTENT
	7. SUSPENSION--EARLY SIGNS OF TROUBLE a. Bus bounces or rolls from side to side easily b. Bus out of alignment as it travels along road c. Bus "bottoms" on bumps NOTES:

WHAT YOU SHOULD DO TO PROLONG THE LIFE OF THE BUS*

NOTES	CONTENT
	You can develop good driving habits that will avoid undue wear on each specific bus component. BRAKES • Do not jam brakes on hard. Apply them smoothly and steadily. • Do not depress clutch until engine stall speed is reached so engine can assist in stopping the bus. • Do not drive with your foot resting on the brake pedal. • Drain water out of air reservoir on buses equipped with air brakes. (If board policy permits.) • Pump the brakes (once or twice) on long hard stops and on hills to aid heat dissipation and reduce brake fade. ENGINE • Don't race engine during warm-up. • Don't over-speed engine at any time. • Don't lug engine; this causes engine and drive-line damage. • Don't allow engine to operate beyond established oil change and maintenance intervals. • Don't accelerate harshly; this causes extreme stress during periods when oil pressure is low; therefore, excessive wear. *Adapted from state of Ohio (11)

NOTES	CONTENT
	• Don't attempt to operate engine when oil pressure is low, temperature is high, or ammeter indicates a continuous discharge. • Do not add water to over-heated engine. • Use caution when removing radiator cap on a hot engine. TRANSMISSION AND DRIVE SHAFT . Usually you shouldn't skip gears when upshifting or downshifting. • Do not lug the engine. • Do not speed in any gear. • Do not release the clutch quickly. • Transmit power smoothly (coordination). • Shift smoothly. • Avoid fast acceleration on rough surfaces. • Avoid jerky movements of any kind. CLUTCH • Don't "ride" the clutch, it partially disengages the clutch causing excess heat or wear. • Don't upshift at low engine speed. Permit engine to speed up enough in one gear so that when the shift is made to the next gear, the engine won't lug. • Usually, you shouldn't skip gears when upshifting or downshifting; this causes undue engine lugging and shock-loading of clutch and driveline. • Don't speed.

NOTES	CONTENT
	· Usually, you shouldn't skip gears when down-shifting, this causes the clutch components to turn at very high speeds. · Don't coast with the clutch disengaged; the asbestos clutch disc will spin at a very high · Don't hold the bus on a hill by slipping the clutch. Nothing wears out a clutch faster. Adjust shifting speeds to accomodate load and terrain. STEERING · Avoid potholes--slow up! (Drive around if possible.) · Have mechanic inspect steering if you hit a bad bump or pothole. ELECTRICAL SYSTEM · Don't drive when ammeter indicates discharge. · Don't start engine when lights and/or heaters are on. · Don't forget to check belt tension and battery water level. · Don't allow heaters and lights to remain in operation when bus is not moving or engine is stopped for an extended period. · Make sure polarity is correct when using jumper cables (+ to +, - to -). SUSPENSION · Don't travel fast on rough roads.

NOTES	CONTENT
	• Don't cross rough areas at an excessive rate of speed. • Avoid "pot holes" when possible (but, don't turn out of your lane. It's better to slow down.) • Don't accelerate harshly on rough surfaces. • Check wheel alignment of bus that is on a rough road frequently.

ADVANCED UNIT H
REVIEW QUESTIONS

Check whether these statements are mostly true or false.

1. You shouldn't drive with your foot resting on the brake pedal. T___ F___

2. You should race the engine to warm it up because its hard on the engine to drive it while it's cold. T___ F___

3. If you "lug" the engine when you go up hills (try to go up in too high a gear) you'll wear out the brake shoes. T___ F___

4. You shouldn't drive the bus if oil pressure is low. T___ F___

5. You should usually avoid skipping gears when you upshift and downshift. T___ F___

6. Springs and shock absorbers are part of the suspension component. T___ F___

7. "Slipping the clutch" is the driving habit that wears out a clutch most quickly. T___ F___

8. The condition of the road (pot holes, bumps) has the worst effect on electrical system. T___ F___

9. If the ammeter indicates discharge, you should have your brakes checked immediately. T___ F___

10. Preventive maintenance consists of correctly diagnosing symptoms of component malfunctions. T___ F___

11. If your temperature gauge rises higher than normal, you should report it. T___ F___

12. If your bus swerves when you apply the brakes, it could mean that one or more wheels are not braking evenly. T___ F___

13. If your bus slips out of gear, you should shut off the engine immediately. T___ F___

14. If you hear a squealing sound when you depress the clutch pedal, it usually means your brake linings are worn. T___ F___

15. If the steering on your bus becomes very difficult, your wheels could be improperly aligned. T___ F___

16. If smoke appears around wires or switches, you should disconnect the battery immediately. T___ F___

17. If your lights are dim, you should go ahead and drive. T___ F___

18. If your bus bounces or rolls from side to side easily, you are just driving too fast for conditions. T___ F___

19. If you notice exhaust fumes, it is nothing to worry about unless your muffler is also excessively loud. T___ F___

20. If your engine "misses" at high speeds, you should shut off the engine immediately. T___ F___

ANSWERS TO REVIEW QUESTIONS

ADVANCED UNITS A-H

ANSWERS TO REVIEW QUESTIONS
ADVANCED UNITS A-H

TABLE OF CONTENTS

ADVANCED UNIT A
ANSWERS TO REVIEW QUESTIONS

1. b. The best reason for not driving at high speeds when there is a thin layer of water on the roadway is that your tires will tend to ride on top of the water. This is often called hydroplaning. It can cause you to lose control of the bus' steering and braking. Slowing down reduces the chance that your bus might hydroplane.

2. a. You are driving down a street with some icy patches. Suddenly there is trouble a block ahead and you have to stop. You should take your foot off the accelerator and allow the engine to slow the bus down. By the time you reach the trouble spot, you should be going slow enough to brake to a safe stop.

3. d. On a cold wet day, the road is generally the most slippery on a bridge. Bridges will freeze more quickly than other parts of the road in cold weather. This happens because the road on a bridge is not in contact with the earth, and does not have the warmth of the soil to keep it from freezing.

4. b. A little loose sand or gravel on the roadway may lead to a skid. Loose sand or gravel can make it hard for your tires to grip the road. When this happens, you can lose control of steering and you could get into a skid.

5. d. Remember, it is not advisable to try to shift to 2nd when you're going that fast.

6. c. In recovering from a skid to the right, you should "countersteer left to help you get back on course." It is needed to stop your bus from rotating to the right. If you don't countersteer, your bus may skid in the opposite direction.

7. b. In returning to the roadway after an evasive maneuver, you should "turn gradually back onto the road." Turning your wheels sharply (at that speed) could overturn the bus. Using the brakes while maneuvering on the shoulder could throw you into a skid.

8. a. When you are making an evasive maneuver, you need complete control of your bus. When you apply your brakes, and then try to steer right, it's very easy to lock up the wheels and cause the bus to skid. It makes sense to slow down as much as you can before leaving the roadway; but then release the brake so you have complete steering control when you go onto the shoulder. Once you are clear on the shoulder, you can brake to a stop.

9. c. If you hear a loud "pow" and the bus shakes, you should "keep your foot off the brake." You have just had a blowout. Any attempt to brake the bus or maneuver quickly could throw your bus into a skid.

10. b. If a car comes across the center line, you should "brake and steer right." This is the only thing that will prevent a head-on collision. While it may cause you to sideswipe a car on your right, there is less chance of serious injury. The goal is to do what will maintain the greatest safety for all.

PERFORMANCE CRITERION: 9 out of 10 correct.

ADVANCED UNIT B
ANSWERS TO REVIEW QUESTIONS

1. a. dangerous conditions
   b. injuries
   c. treatment
2. severe
   airway; breath
3. bleeding heavily
4. when dangerous conditions exist at the scene, e.g., fire
5. shock
6. B
7. A
8. B
9. B
10. True
11. True
12. True
13. False

PERFORMANCE CRITERION: 12 out of 13 correct

ADVANCED UNIT C
ANSWERS TO REVIEW QUESTIONS

1. d
2. d
3. d
4. a
5. b
6. b
7. c
8. d
9. c
10. b

PERFORMANCE CRITERION: 8 out of 10 correct

ADVANCED UNIT D
ANSWERS TO REVIEW QUESTIONS

1. F
2. K
3. H
4. C
5. I
6. D
7. J
8. G
9. M
10. B
11. T
12. F
13. F
14. T
15. F
16. Notify them of delay and give estimate of rescheduled arrival time.
17. Take him to alternate person responsible (friend, neighbor, etc.) if someone else is designated on the child's 3" x 5" card. Otherwise, keep student with you until your run is completed. Return to school and have someone there try to contact the parent(s). Contact the school officials if unable to contact parents. Never leave the child unattended.
18. Parent, teacher, child's doctor if urgent.
19. Will vary, but new pick up time must be specified, and passengers assured that new route will be different but nothing to worry about.

If new student has a handicap unfamiliar to rest of students, you should explain it to rest of group beforehand.

20. Their problems vary widely and so does their comprehension level, tolerance level, adaptability, etc. What is appropriate for one child may not be appropriate for another.

21. (Will vary.) Pull off the road, if possible, and stop the bus. If cause of such behavior is obvious, try to eliminate the cause. If cause is not obvious, try to restrain the behavior, especially if it is physically destructive to the child himself or others. Try to maintain eye contact with the child. If bus is so disrupted that you cannot calm the student or rest of passengers, radio for help or stop a passing motorist and have him send for help. Do not continue run until you can drive safely without distraction. Arrange to get child to hospital or doctor if injury results. Confer with parents, teacher, and your supervisor.

PERFORMANCE CRITERION: 19 out of 21 correct.

ADVANCED UNIT E
ANSWERS TO REVIEW QUESTIONS

1. c
2. a
3. b
4. c
5. d
6. a
7. b
8. c
9. d
10. b
11. T
12. F
13. T
14. T
15. T
16. F
17. T
18. F
19. F
20. T

PERFORMANCE CRITERION: 16 out of 20 correct

ADVANCED UNIT F
ANSWERS TO REVIEW QUESTIONS

1. b
2. c
3. d
4. c
5. a
6. d
7. a
8. d
9. a
10. d
11. F
12. T
13. F
14. F
15. T
16. T
17. F
18. F
19. T
20. T

PERFORMANCE CRITERION: 16 out of 20 correct

ADVANCED UNIT G
ANSWERS TO REVIEW QUESTIONS

1. T
2. T
3. T
4. T
5. T
6. F
7. F
8. T
9. T
10. F
11. T
12. T
13. T
14. F
15. T
16. T
17. T
18. F
19. F
20. F

PERFORMANCE CRITERION: 16 out of 20 correct

ADVANCED UNIT H
ANSWERS TO REVIEW QUESTIONS

1. T
2. F
3. F
4. T
5. T
6. T
7. T
8. F
9. F
10. F
11. T
12. T
13. F
14. F
15. T
16. T
17. F
18. F
19. F
20. F

PERFORMANCE CRITERION: 18 out of 20 correct

ADVANCED UNIT REFERENCES

1. Allstate Insurance Company. Expressway Driving is Different.

2. Arkansas Department of Education. Handbook for school bus drivers. Author. Little Rock, Arkansas. June 1972.

3. California State Department of Education. Manual for California's school bus driver instructor course. Author. Sacramento, California. 1972.

4. California State Department of Education. Manual of first aid practice for school bus drivers. Author. Sacramento, California. 1972.

5. Iowa Department of Public Instruction. Training and supervision of the school bus drivers. Author. Des Moines, Iowa.

6. Michigan Program for School Bus Driver Safety Education. The Michigan school bus driver's manual. A guide for professional school bus drivers. Author. 1972.

7. Missouri State Department of Education. Emergency services. Author. Jefferson City, Missouri. 1972.

8. National Highway Traffic Safety Administration. Driver education curriculum. Author. Washington, D. C.

9. National Highway Traffic Safety Administration. The selection and training of school bus drivers. Author. Washington, D. C. February 1971.

10. Ohio Trade and Industrial Education Service, Division of Vocational Education, State Department of Education. School bus driver education. Basic course learner's manual. Author. Columbus, Ohio. 1972.

11. Ohio Trade and Industrial Education Service, Division of Vocational Education, State Department of Education. School bus driver education. Advanced driver's course. Author. Columbus, Ohio. 1972.

12. Oregon State Department of Education. School bus driver training, basic course learner's manual. Author. Salem, Oregon. May 1968.

13. Salago, Dolores M. Unpublished critique of advanced unit D, transporting exceptional students. Cumberland Hills School for Exceptional Children. Pittsburgh, Pennsylvania. December 1973.

☆ U. S. GOVERNMENT PRINTING OFFICE : 1974 O - 536-526