Driver Education Classroom and In-Car Curriculum

Unit 8

Vehicle Functions, Malfunctions and Collision Reporting

Driver Education Classroom and In-Car Instruction Unit 8-2

Unit Introduction

Unit 8 will present the driver with information about vehicle system functions and malfunctions, and what to do if involved in a collision. In addition, yielding the right-of way to emergency vehicles will be covered.

Content will include the meanings of various dashboard warning lights and the techniques used to respond to various vehicle malfunctions such as loss of brakes, loss of steering, tire blowouts, vehicle fires and others. It will also include content on interacting with other highway users and what to do if the driver is involved in a collision including, collision reporting requirements, what to do if the driver is involved in a collision.

Goals

Time Frame: 4 hours

Students will:

- Participate in teacher-led discussion dealing with vehicle systems and system malfunctions.
- Participate in teacher-led discussion on performance characteristics of various types of vehicles.
- Participate in teacher-led discussion on responding to various emergencies caused by vehicle malfunctions.
- Participate in teacher-led presentation on collision reporting requirements and behavior at the scene of a collision.
- Complete Unit 8 Test.

Driver Education Classroom and In-Car Instruction Unit 8-3

Title: Vehicle Functions and Malfunctions, and Collision Reporting	Time Frame: 4 hours
Resources Needed	**Instructor Preparation**
Textbooks: Drive Right Ch. 8, 13 How to Drive Ch. 11, 13, 14 Handbook Plus Ch. 3-F, 14 Responsible Driving Ch. 12, 14	Review recommended lesson activities Review textbook Review on-street lesson plan used in combination with this unit and textbook
Slides 8.1-8.11 Fact Sheets 8.1-8.2 Worksheet 8.1 Vehicle Owner's Manual	Review slides Review fact sheets Review worksheets Review included videos
Included Video: • *"Sharing the Road"* (9 minutes)	
Unit 8 Test	Included

Driver Education Classroom and In-Car Instruction Unit 8-4

Performance Objectives	Learning Activities	Resources
Students will understand the importance of warning lights/ gauges on the dash of the vehicle and what action to take if a warning light illuminates while driving or a gauge indicates a vehicle system malfunction	Use Slide 8.1 and discuss the various warning lights that may activate while driving. Also discuss what to do if a light activates. Distribute Fact Sheet 8.1.	Slide 8.1 "Dashboard Warning Symbols" Fact Sheet 8.1 "Vehicle Functions/Malfunctions"

Driver Education Classroom and In-Car Instruction Unit 8-5

Content Outline

Vehicle functions/malfunctions

It is essential to know what the warning lights and gauges on the instrument panel mean and where they are located.

Become familiar with a vehicle by reading the owner's manual

• This will help prevent the driver from being caught "off-guard" should a problem arise

Warning symbols - red color means stop as soon as possible and have the problem repaired. Yellow color means have the problem repaired within a reasonable time.

- Temperature light or gauge - stop as soon as possible and repair
- Oil pressure warning light or gauge - repair in a reasonable time
- Brake system warning light - stop as soon as possible and repair
- Anti-lock braking system (ABS) light - repair in a reasonable time
- Air bag warning light - repair in a reasonable time
- Check engine light - repair in a reasonable time
- Door ajar light - check all doors immediately
- Low fuel warning light - get fuel as soon as possible
- Alternator/Generator warning light or gauge - stop as soon as possible and repair

Driver Education Classroom and In-Car Instruction Unit 8-6

Performance Objectives	Learning Activities	Resources
Students will describe the correct actions to take in response to driving emergencies caused by vehicular malfunction.	Use Slide 8.2 and discuss each action or procedure to follow when responding to driving emergencies caused by system malfunction of the vehicle. • Tire blowout/failure • Accelerator failure • Brake failure • Engine failure • Engine flooded • Power steering failure • Car catches on fire	Slide 8.2 "Vehicle System Failures"
	Distribute Worksheet 8.1 and have the students complete the worksheet as the instructor describes the procedures for handling the vehicle failures listed above.	Worksheet 8.1 "Vehicle Malfunctions"
	Use Slides 8.3 through 8.5 and refer to Fact sheet 8.1 and further discuss each action or procedure to follow when responding to driving emergencies caused by each system failure of the vehicle.	Slide 8.3 "Tire Failure" Slide 8.4 "Accelerator Failure" Slide 8.5 "Engine Failure" Fact Sheet 8.1 "Vehicle Functions/ Malfunctions"

Driver Education Classroom and In-Car Instruction Unit 8-7

Content Outline

Tire failure can be caused by the gradual wear on the tires through hard braking and/or acceleration. They also need periodic balancing and alignment. Look for wear bars appearing across the tire as a sign that tires need to be replaced.

A tire blowout is a rapid deflation of air from the tire. If a front tire blows out, the vehicle will pull sharply in the direction of the blowout. If a rear tire blows out, the vehicle will wobble and shake and pull some in the direction of the blowout. In either case:

1. Grip the steering wheel firmly
2. Remove foot from accelerator
3. DO NOT BRAKE
4. Allow the vehicle to slow on its own or brake gently if necessary
5. Check traffic around you
6. Turn on emergency flashers
7. Drive to a protected location and pull off the roadway
8. Have the tire changed and replaced

Accelerator failure could be caused either by a broken spring or the pedal getting stuck in the down position. In either case:

1. Shift to "neutral" (the engine may race but no harm will be done)
2. Search for an escape path
3. Steer smoothly and brake gently
4. Pull off the roadway
5. Turn off the vehicle
6. Have the pedal repaired at a service center before driving again

Brake failure could be complete loss of brakes or only failure of the power brakes. If the brakes quit working:

1. Rapidly pump the brakes (may regain brakes)
2. Shift to a lower gear
3. Use the parking brake method to slow or stop (See Fact Sheet 8.1)
4. Find a "soft" crash area

If power brakes fail, the car can still be stopped with more pressure on the brake pedal.

Engine failure could happen when the engine quits running completely or becomes flooded or overheats. If the engine just shuts off while driving:

1. Shift to neutral
2. Look for an escape path
3. DO NOT BRAKE HARD
4. Pull off the roadway (brake gently but with more pressure on the pedal)
5. Stop, try to restart the engine
6. If unsuccessful, raise hood and turn on emergency flashers

Driver Education Classroom and In-Car Instruction Unit 8-8

Performance Objectives	Learning Activities	Resources
Students will describe the correct actions to take in response to driving emergencies caused by vehicular malfunction. (Continued)	Use Slides 8.6 and 8.7 along with Fact sheet 8.1 to accomplish this objective.	Slides 8.6 “Car Fire” Slides 8.7 “Engine Overheats” Fact Sheet 8.1 “Vehicle Functions/Malfunctions”

If the engine becomes flooded, there will usually be a strong odor of gasoline.

To start the engine:

1. Push the accelerator pedal to the floor and hold it there
2. Turn the key for up to five seconds
3. If it does not start, wait several minutes and try again
4. Once started, release the accelerator pedal

If the car catches on fire:

1. Steer the vehicle out of traffic and away from buildings and people
2. Have all occupants leave the vehicle immediately and move away
3. If the engine is on fire, do not open the hood
4. Call the fire department
5. If the passenger compartment is on fire, use a fire extinguisher, or call the fire department

If the engine overheats while driving:

1. Turn air conditioner off if it is on
2. Turn on the heater to draw heat off the engine
3. If these fail, move to a safe location off the roadway
4. When stopped, shift to “neutral” and press the accelerator pedal gently
5. Do not open the radiator cap
6. Seek help.

Power steering failure:

1. The vehicle can still be steered.
2. It will require much more effort on the driver’s part.

Driver Education Classroom and In-Car Instruction Unit 8-10

Performance Objectives	Learning Activities	Resources
Students will describe how to interact with other highway users.	Use Slide 8.8 and discuss the characteristics of and interaction with these motorized and non-motorized users of the transportation system. • Trucks • Trains • Sport Utility Vehicles • Recreational Vehicles/ • Trailers • Motorcycles • Bicycles, Mopeds and Motor Scooters • Construction Vehicles • Oversized Vehicles • Farm Machinery • Horse-Drawn Vehicles	Slide 8.8 "Vehicle Performance Characteristics"

Driver Education Classroom and In-Car Instruction Unit 8-11

Content Outline

Vehicle Performance

Vehicles of different sizes and power handle differently. Small vehicles, such as motorcycles, are light and can accelerate quickly. Large trucks and recreational vehicles take a lot of power just to accelerate to highway speeds. They also take a long distance to stop. A driver needs to be aware of these differences.

Trucks help transport nearly everything we eat, wear and use in our daily lives. They are an essential part of our national economy. Keep in mind that truck drivers often face the problem of tight scheduling and drive over long periods of time. This may lead to fatigue and/or loss of sleep. Another factor to be aware of is that large trucks making right turns move out to the left to begin making a right turn. Always check a truck's turn signal before starting to pass. Not being alert to this can lead to being caught in a right turn squeeze which can result in damage to the vehicle. Always keep out of the open space of a tractor trailer making a right turn. Following large trucks is a challenge. Drivers of large trucks sit high above the road and have an excellent view of the roadway ahead. However, their view to the sides and to the rear is often restricted. There are large blind spots in every large truck called no zones.

No zones are where truck drivers cannot see other vehicles and where most collisions occur. These no zones are in front of the truck, to the sides of the truck, and to the rear of every large truck. Be careful not to drive in these no zones. Drivers put themselves at risk because the truck driver cannot see them. When following a large truck, increase following distance to allow clear sight distance ahead. Stay far enough back so the side-view mirrors of the truck are visible. If the side-view mirrors cannot be seen, the truck driver cannot see the vehicle following.

Trains

Many railroad fatalities occur each year because drivers ignore crossing signals or drive around the end of crossing gates. Most railroad fatalities occur at the 188,000 crossings in America without signals or gates. The major cause of mishaps at railroad crossings is inattention. Drivers who cross the same tracks frequently may forget to look both ways. Speed, impatience, intoxication and poor judgment add to the problem. Remember that trains take at least ONE MILE to stop (in some cases, two miles). Follow these countermeasures for safe crossing:

- Never take familiar crossings for granted or assume no train is coming.
- Identify all warning signs, signals, and protecting devices.
- Never stop on railroad tracks.
- Before crossing the tracks, look and listen for approaching trains.
- Do not rely solely on lights and/or sounds; make sure the way is clear before
- crossing.
- Be alert after dark at crossings that are not protected by gates or flashing lights.

Driver Education Classroom and In-Car Instruction Unit 8-12

Performance Objectives	Learning Activities	Resources
Students will describe how to interact with other highway users. (Continued)	Use Slide 8.8 to describe the characteristics of these vehicles.	Slide 8.8 “Vehicle Performance Characteristics”

Driver Education Classroom and In-Car Instruction Unit 8-13

Content Outline

Sport Utility Vehicles

Sport utility vehicles are very popular in America. These four-wheel drive family vehicles have a big enough motor to go fast (equaling poor gas mileage). Sport Utility Vehicles are susceptible to rollovers when making sharp turns at high speeds. They are heavy, and this gives the driver added protection in a collision.

Recreational Vehicles and Trailers

Remember the stopping distance for a vehicle pulling a trailer is much greater than for a vehicle alone. This means a driver should increase following distance. Follow this helpful information when following an RV or car/trailer:

- Automobile + 20-foot trailer = 6 second following distance
- 35-foot RV = 6 second following distance

These vehicles also require a wider area to turn. Keep this in mind, and give them extra space to make the turn.

Motorcycles

Motorcycles are small vehicles that accelerate quickly. Because of their size, they are also more difficult to see. Danger exists because the motorcyclist is exposed and is offered no protection should a collision occur. To stop a motorcycle, the motorcyclist must operate separate brakes for front and rear wheels. A motorcyclist must coordinate the hand throttle, hand clutch and front gearshift lever to accelerate smoothly. Unlike four-wheel vehicles, a motorcycle might have difficulty remaining upright in motion. When near a motorcyclist, increase following distance. When a motorcycle is following, check the rearview mirror often. Be aware of following motorcyclists and avoid making sudden stops. A motorcyclist cannot cope with adverse weather conditions as well as a four-wheel vehicle can. Remember this and increase space around the motorcyclists in bad weather.

Bicycles

Bicycles are treated as vehicles. Drivers must yield the right-of-way to cyclists at intersections when passing and when turning. Avoid making right turns in front of a cyclist traveling on the shoulder and yield to a cyclist preparing to make a left turn. Bicycles are legally entitled to use the road. On roads where the speed limit exceeds 50 mph, bicycles must use the shoulder, except where prohibited.

Driver Education Classroom and In-Car Instruction Unit 8-14

Performance Objectives	Learning Activities	Resources
Students will describe how to interact with other highway users. (Continued)	Use Slide 8.8 to describe the characteristics of these vehicles.	Slide 8.8 “Vehicle Performance Characteristics”

Bicycles (continued)

When following a cyclist, slow down when merging. Avoid blasting the horn, as loud noises can surprise the bicycle operator, causing a crash. Do not follow closely. Bicycles can stop and maneuver quickly. Be prepared for a cyclist to swerve to avoid a road hazard. Young cyclists are likely to make surprising changes in direction. When passing a cyclist, wait until it is safe and allow adequate clearance.

Return to the lane when the cyclist can clearly be seen in the rearview mirror

- Do not blast the horn. Tap it gently to warn the cyclist.
- Do not attempt to share the lane with the cyclist.
- Reduce speed.
- Follow the bicycle and wait for a safe opportunity to pass.

Mopeds and Motor Scooters

A moped is a two-wheeled vehicle that can be driven with either a motor or pedal. Its name comes from motor-driven bicycle and pedal-driven bicycle. Like a bicycle, a moped can be pedaled and can be stopped with a hand brake. Like a motorcycle, a moped is powered by an engine and controlled by a hand throttle.

A motor scooter is a low-powered, two-wheeled vehicle. It is more powerful than a moped. A motor scooter is similar to a motorcycle, although most motor scooters require no manual gear shifting.

Construction Vehicles

These are found at or nearby construction sites. They are very large and loud. Proceed with caution around them. Many construction vehicles start out slowly and because of heavy loads they haul, acceleration takes longer. Remember the following in order to drive safely around construction vehicles:

- Do not tailgate.
- Driver may not see you in his side mirrors.
- Keep a safe distance between any construction vehicle(s).

If a construction vehicle is following:

- Keep checking in the rear view mirror.
- Do not stop quickly unless necessary.
- Construction vehicles need a lot of braking distance.

Driver Education Classroom and In-Car Instruction Unit 8-16

Performance Objectives	Learning Activities	Resources
Students will describe how to interact with other highway users. (Continued)	Use Slide 8.8 to describe the characteristics of these vehicles.	Slide 8.8 “Vehicle Performance Characteristics”

Various traffic control devices are used in road construction and maintenance work areas to direct drivers and pedestrians safely through the work site and to provide for the safety of highway workers.

The most commonly used controls are:

- Standard signs
- Electronic variable message signs
- Cones
- Drums
- Barricades
- Flashing arrow panels
- Workers controlling or flagging traffic

Speed limits may be reduced in work areas. The law doubles the fines for speed violators in work zones. The maximum penalty for violating speed limits in work zones is $1,000.

Oversized Vehicles

Be prepared to share the road with a number of special purpose vehicles. Snow plows can be expected in winter months. When mobile homes are being transported, they often are preceded and followed by vehicles that carry a "Wide Load" sign. Use extra caution when meeting or passing such vehicles. Allow extra space to increase sight distance. Use caution when passing.

Farm Machinery

In rural areas, large, slow-moving farm machinery should be expected. Machinery is typically allowed to cross or be driven on roads to get to the field or back to the farm. Farm machinery and vehicles which travel at 25 mph or less must display a slow moving vehicle emblem when using a public highway. This emblem is an orange triangle surrounded on each side by a strip of red. Be prepared to adjust speed or position upon seeing this sign. Pass with caution and remember the operator of the farm machinery cannot hear approaching vehicles. Farm equipment is not usually equipped with turn signals.

Horse-Drawn Vehicles

When encountering horse-drawn vehicles, adjust speed. A slow-moving vehicle emblem on the rear of the horse-drawn vehicle should be visible. Pass with caution. When passing, do not use the horn and do not "rev" the engine because this may scare the horse and cause a crash.

Driver Education Classroom and In-Car Instruction Unit 8-18

Performance Objectives	Learning Activities	Resources
Students will describe the requirements for yielding the right-of-way to emergency vehicles.	Use Slide 8.9 and discuss the duties of the driver yielding to emergency vehicles. Refer to Fact Sheet 8.2 for additional information.	Slide 8.9 “Yielding to Emergency Vehicles” Fact Sheet 8.2 “Your State’s Vehicle Law”

Driver Education Classroom and In-Car Instruction Unit 8-19

Content Outline

The instructor should provide content as it applies to yielding the right-of-way to emergency vehicles. Refer to the state's driver's handbook and the state's vehicle law.

The following topics should be addressed in addition to other state specific information:

Right-of-Way to Emergency Vehicles

Fire Departments

Driver Education Classroom and In-Car Instruction Unit 8-20

Performance Objectives	Learning Activities	Resources
Students will describe the actions to take when involved in a collision.	Distribute to the class and refer to Fact Sheet 8.2 while discussing the responsibilities at the scene of a collision.	Fact Sheet 8.2 "Your State's Vehicle Law"
	Use Slides 8.10 and 8.11 and discuss post-collision procedures.	Slide 8.10 "Collisions" Slide 8.11 "After a Collision"
	Included Video: As a summary, show "*Sharing the Road*" and discuss.	Included Video: "*Sharing the Road*" (9 minutes)
Students will complete the Unit 8 test.	Distribute, collect and grade the Unit 8 Test.	Test included

Driver Education Classroom and In-Car Instruction Unit 8-21

Content Outline

The instructor should provide supplemental content as it applies to collisions and this Unit. Refer to the state's drivers handbook and the state's vehicle law. (Generic content is provided.)

The following topics should be covered in addition to other state specific information:

Collision reporting

Typically, there are certain duties to be performed when a driver is involved in a crash.

Crash scene

If a collision with another vehicle, a pedestrian or someone's property occurs, IT IS LEGALLY REQUIRED TO FOLLOW SPECIFIC PROCEDURES. These five steps should be taken in addition to anything required by your state law:

1. Stop immediately
2. Aid the injured (if qualified, otherwise call for help)
3. Prevent further damage
4. Send for police
5. Exchange Information/Reporting

Take these additional steps after a collision:

1. Record witnesses' names and addresses
2. Make a sketch of the collision scene
3. Take a photograph
4. Record such facts as time, date, location, weather and driving conditions
5. Note the name of the hospital to which any injured persons were taken
6. Note the name and the identification number of the police officer at the collision scene

Give police the facts. Provide honest, accurate facts and never argue about who was to blame. Do not admit fault. Stay at the scene until all information has been recorded. Produce proof of financial responsibility by showing a card that lists current insurance or a bond card. Also, notify appropriate insurance agent promptly.

Driver Education Classroom and In-Car Instruction Unit 8-22

Fact Sheet **8.1**

Vehicle Functions/Malfunctions

It is essential to know what the warning lights and gauges on the instrument panel mean and where they are located. Become familiar with a vehicle by reading the owner's manual. This will help prevent the driver from being caught "off-guard" should a problem arise.

Warning symbols

- Temperature light or gauge - This light/gauge warns when the coolant in the engine is too hot or too low. If it comes on, pull off the road when safe and get professional help. Caution: never attempt to remove the radiator cap when the engine is hot as there is the risk of severe burns.
- Oil pressure warning light or gauge - This light/gauge warns when the oil is not circulating at the proper pressure or there is not enough oil. This light/gauge does not indicate the amount of oil in the engine.
- Alternator/Generator warning light or gauge - The vehicle's electrical system is in trouble if this light comes on or the gauge shows "discharge" while the engine is running. Discharge occurs when the alternator is not generating enough electricity to charge the battery. Be aware that if this happens, the engine must use electricity stored in the battery. Turn off as many electrical devices as possible (i.e., the radio, heater/AC, etc.). Caution: Have this checked without delay. If the battery is drained, the car can shut off.
- Brake system warning light - This warning light serves two purposes: to show the parking brake is set before moving the vehicle and to alert that part or all of the braking system is not working properly or in some vehicles, the brake fluid is too low. If the brake system is not working properly, brake gradually to a stop, have the vehicle towed and have the problem corrected.
- Air bag warning light - This light indicates whether the air bags are in proper working condition. When the ignition is turned on, the air bag light comes on for a few seconds, then goes off. If the air bags are not in proper operating condition, the warning light will stay on. Have this problem corrected at a service center.
- Service engine soon light - A computer monitors operation of fuel, ignition, and emission control systems. This light should come on when the ignition is on, but the engine is not running. If the light does not come on, have the system fixed right away. If the light stays on or it comes on while driving, the computer is indicating that you have a problem. Take your vehicle to a service center.
- Door ajar light - This comes on if a door(s) is not closed completely. The light will stay on until this is corrected. Do not try to open and close the door that is ajar while driving.
- Low fuel warning light - The fuel gauge tells how much fuel remains when the ignition is on (E is for empty - get some fuel - F is for Full). When the low fuel light activates, it means approximately two gallons remain. Stop and refuel as soon as possible.
- Anti-lock braking system (ABS) light - This light indicates whether the ABS is functioning properly. If the light comes on during driving, it indicates a problem with the system. Should this occur, have the problem corrected at a service center.

Fact Sheet **8.1**

Vehicle Functions/Malfunctions

Parking brake method

- If the car has a pedal-type parking brake under the lower left side of the dash, use the left hand to pull out the brake release and use the left foot to gently depress and release the parking brake pedal. Use the right hand to steer.
- If the car has a center-pull parking brake located between the two front seats, grasp the parking brake release with the right hand using the thumb to push in and hold the button. Gently pull up on the brake release with the button depressed. Use the left hand to steer.

Fact Sheet **8.2**

Your State's Vehicle Laws

Instructors should provide information about their state's vehicle laws as it applies to this Unit. In addition to state specific information, include information about right-of-way to emergency vehicles, collision reporting, and accident scene behavior.

Driver Education Classroom and In-Car Instruction Unit 8-25

Worksheet **8.1**

Name: Date:

Vehicle Malfunctions

Tire Blowout

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

Accelerator Failure

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Brake Failure

1. _____
2. _____
3. _____
4. _____

Engine Failure

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

Power Steering Failure

1. _____
2. _____

Car Fire

1. _____
2. _____
3. _____
4. _____
5. _____