

Curriculum Scope and Sequence Modules for Driver Education in Virginia

Module Six

Information Processing: Complex Risk Environment

- Characteristics of Expressways
- Entering, Changing Lanes, and Exiting
- High Speed Considerations

Virginia Department of Education
in cooperation with the
Virginia Department of Motor Vehicles

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Standards of Learning Addressed In This Module

- DE.3 The student will recognize the effects of momentum, gravity, and inertia on vehicle control and balance, and the relationship between kinetic energy and force of impact. Key concepts/skills include
- a) seating and hand position;
 - b) steering, braking, and acceleration;
 - c) compensating for shifts in vehicle load (from side to side, front to rear, and rear to front) that affect vehicle performance;
 - d) types of collisions — head-on, near-frontal, broadside, rear-end, rollover, sideswipe.
- DE.4 The student will demonstrate the ability to manage visibility, time, and space to avoid conflicts and reduce driving risks. Key concepts/skills include
- a) synthesizing information visually from the driving environment, using a space-management process;
 - b) applying following-interval concepts;
 - c) selecting gap and judging distance;
 - d) estimating passing-time and space needs.
- DE.5 The student will demonstrate appropriate adjustments when approaching controlled and uncontrolled intersections, curves, railroad crossings, and hills with line-of-sight or path-of-travel limitations. Key concepts/skills include
- a) roadway signs, signals, and markings;
 - b) right-of-way rules;
 - c) slope/grade of terrain;
 - d) vehicle position.
- DE.6 The student will identify the characteristics of an expressway and apply risk-reducing expressway driving strategies. Key concepts/skills include
- a) entering, merging, integrating into, and exiting from traffic flow;
 - b) managing interchanges;
 - c) selecting vehicle position and changing lanes.
- DE.7 The student will demonstrate the ability to communicate presence and intentions with other highway transportation users. Key concepts/skills include
- a) vehicle position and driver action;
 - b) vehicle communication devices.
- DE.20 The student will demonstrate competency in map-reading and trip-planning skills. Key concepts/skills include
- a) destination driving;
 - b) trip-planning technologies.

Module Six Introduction

Module Six—Information Processing: Complex Risk Environments

The student will use risk-reducing strategies to manage multiple-lane roadways at speeds up to 65 miles per hour in complex risk environments.

Topic 1—Characteristics of Expressways

The student will understand the characteristics of expressways.

Topic 2—Entering, Changing Lanes, and Exiting

The student will apply risk-reducing strategies to enter and exit traffic, steer, establish speed and lane position, pass other vehicles, and travel on multiple-lane roadways.

Topic 3—High Speed Considerations

The student will understand the added risks and precautions necessary when driving on an expressway at speeds up to 65 miles per hour.

Minimum Time Frames	
Module Six—2 Hours	
Classroom Instruction	Recommended Minutes
Topic 1 — Characteristics of Expressways	25
Topic 2 — Entering, Changing Lanes, and Exiting	25
Topic 3 — High Speed Considerations	60
Supplement—Parent Orientation	55
In-Car Instruction (Option 1)	
Behind-the-Wheel Instruction/Break	60
Observation	60
Laboratory Multiphase (Option 2)	
Behind-the-Wheel Instruction/Break	60
Observation	60
Simulation	120
Parental Involvement	60

Module Six
Topic 1—Characteristics of Expressways

25 Minutes Instructional Time
Prerequisites: Successful Completion of Modules 1 to 5

Instructor Activities	Time Frame
<p>Review Module Six, Topic 1 Lesson Plans Prior to Lesson</p> <p>Show Transparencies T-6.1 "Characteristics of an Expressway" T-6.2 "Cloverleaf Interchange" T-6.3 "Diamond Interchange" T-6.4 "Trumpet Interchange" T-6.5 "Frontage Road Interchange" T-6.6 "Common Expressway Signs" T-6.7 "Common Expressway Signals" T-6.8 "Expressway Lane Markings"</p> <p>Distribute and Review Student Worksheets W-6.1 "Expressway Interchanges"</p> <p>Review Module Assessments Prior to Lesson W-6.1 "Expressway Interchanges" MA-6.1 "Complex Risk Environments"</p> <p>Additional Resources (Media and/or Text) Video: "Teaching Your Teens to Drive," (AAA) Video: "Freeway Driving" (AAA Foundation) "Drive Right" Ch. 11 "How to Drive" Ch. 8-10 "Handbook Plus" Ch. 12.12 "License To Drive" Ch. 12 "Responsible Driving" Ch. 11</p>	<p>20-25 minutes (2-4 minutes) (2-3 minutes) (2-3 minutes) (2-3 minutes) (3-5 minutes) (2-3 minutes) (2-3 minutes) (2-3 minutes)</p> <p>5-10 minutes</p>

Characteristics of Expressways

Knowledge and Skills

The student is expected to describe the characteristics of expressways.

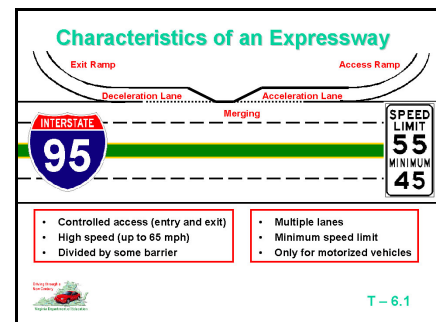
Activities & Resources

Ask the class to give some examples of expressways that they know about in their immediate area or in the Commonwealth of Virginia.

Ask the class for some advantages of expressway driving. List their answers on chalkboard, markerboard, flipchart, etc.

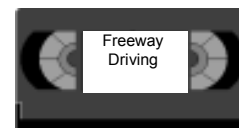
Show Transparency T-6.1 "Characteristics of an Expressway" to discuss the characteristics of this complex environment that are different from moderate risk environments.

- Controlled access intersections
- Speeds up to 65 mph
- Divided and multiple lanes
- Minimum speed requirements
- Vehicle restrictions



T-6.1
Characteristics of an Expressway

Show the video "Freeway Driving" (AAA) to summarize the strategies covered in this lesson.



Support Information**Complex Risk Environment**

A complex risk environment is limited to speeds up to 65 mph, having controlled or limited access interchanges or intersections in urban, suburban, and rural settings. Traffic flow can be heavy and many times unpredictable, which does not allow excessive time for the novice driver to identify risks through changes to line of sight or path of travel. Instructor should be prepared to control the level of risk regarding the traffic flow around the vehicle by asking the driver to change speed or position. Two way, one way, access lanes, and multi-lane roadways are recommended for use in teaching complex risk environment.

Expressways

Expressways are high-speed (up to 65 mph) roadways that typically carry a high volume of traffic. They are usually divided by a barrier of some type (guardrail, cement barrier, grassy median). There are multiple lanes going in the same direction (two, three, four, or more lanes). They are controlled-access because there are only certain locations where a driver can enter and exit the expressway. These are called interchanges. Expressways have a low frequency of collisions, but often have a high injury severity rate when a collision occurs because of the higher speeds.

Advantages of Expressway Driving and Limited Access Roadways

- Collision and fatality rates are lower than on other types of roadways.
- Cross traffic is not present because of controlled interchanges.
- Opposing traffic is divided by some barrier.
- Pedestrians, bicyclists, and slow-moving vehicles are not permitted on expressways.
- They are designed to help drivers anticipate conditions ahead.

Passing and Being Passed

Passing other vehicles and being passed often occurs on high-speed roadways. The intermix of traffic flow, interchanges, and traffic volume creates passing situations that raise the risk and provide sudden changes that add to the complex nature of multi-lane driving. Depending on the roadway, lane position, and speed, the driver may encounter passing activities on both sides of the vehicle. The BGE setting of the mirrors allows the driver to recognize movement from the rear and to the sides more effectively.

Other Users

Trucks, tractor-trailers, buses, recreational vehicles, and other large or slow moving vehicles add additional challenges to driving on multiple-lane roadways. They are especially a concern when driving on hills where large vehicle speeds are not consistent with other vehicles. Larger vehicles may provide a wind blast that can move smaller vehicles when passing. Keep in mind that drivers of smaller vehicles may not recognize the time needed to pass larger vehicles on the roadway.

Managing Space

- Adjust the vehicle's position and speed to road and weather conditions in order to provide time for braking, accelerating, and steering.
- Develop a minimal four-second following interval when merging onto the roadway, changing lanes, and exiting the expressway area.
- Minimal steering inputs are needed at higher speeds to change lanes when passing, entering, or exiting. Excessive steering can lead to a loss of control at higher speeds.
- Always move over one lane at a time rather than moving across multiple lanes. Visibility and time are key elements to performing a safe lane change.
- Make room for vehicles entering the roadway from an entrance ramp by exiting entrance lanes.
- When another driver tailgates, it is safer to change lanes while keeping an adequate distance to the front of the vehicle.
- Maintain plenty of space when returning to the lane after a pass.
- Reduce speed when roadway narrows at tunnels, construction zones, and for larger vehicles.
- Be alert for crosswinds when driving over bridges or through open mountain passes.

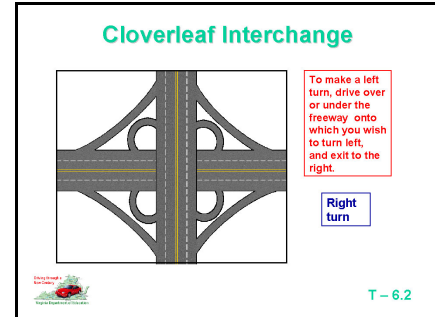
Characteristics of Expressways

Knowledge and Skills

The student is expected to recognize and understand the different kinds of expressway interchanges.

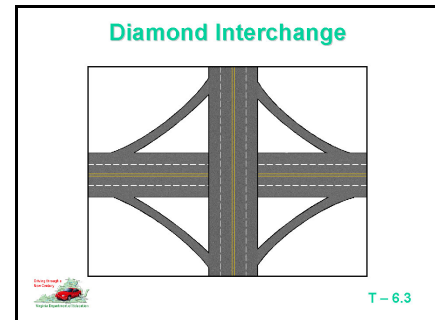
Activities & Resources

Show Transparency T-6.2 “Cloverleaf Interchange” and point out the travel lanes in a cloverleaf-designed, restricted access interchange. Explain how to successfully complete turnarounds by going to the next interchange rather than suddenly slowing down. Never use a reverse maneuver on an expressway.



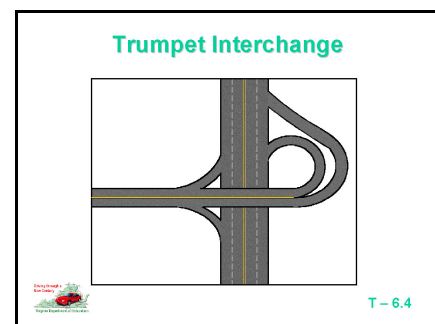
T-6.2 Cloverleaf Interchange

Show Transparency T-6.3 “Diamond Interchange” to describe the traffic flow at a diamond interchange.



T-6.3 Diamond Interchange

Show Transparency T-6.4 “Trumpet Interchange” to describe the traffic flow at a trumpet interchange.

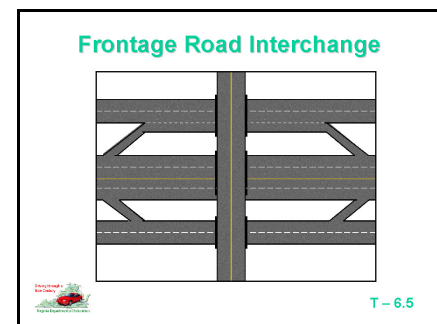


T-6.4 Trumpet Interchange

Use Worksheet W-6.1 “Expressway Interchanges” as a classroom assessment tool or as a discussion tool.



Show Transparency T-6.5 “Frontage Road Interchange” to describe the traffic flow on access roadways, and the yield rules for vehicles leaving an expressway. Note that access roads may be two-way or one-way traffic flow roadways.



T-6.5
Frontage Road Interchange

Support Information

Types of Interchanges

- **Cloverleaf Interchange**—Allows for interchange of two expressways or major roadways with minimal disruption of speed or movement. The cloverleaf usually has entrance and exit weave lanes, since traffic leaves one roadway and enters from another roadway. Curved roadways have banked and flat exits, which lead to braking and steering problems as drivers adjust from high speed to the speed of the exit curve. The curves are often noted by reflector poles, which are frequently knocked down by vehicles that lose traction due to excessive speed on the entry and exit of the curved roadways.
- **Diamond Interchange**—Allows for interchange of a major roadway with a secondary dual or multiple lane roadway. The diamond interchange may have traffic control devices on the intersecting secondary roadway, which allow for left and right turns onto the secondary roadway. The signals may be used to allow left turns from the secondary roadway to the entry ramps of the major multiple roadway. Lane markings may indicate lane position on the approach to the intersection. A diamond interchange will allow the driver to re-enter the entrance ramp by moving across the intersection of the secondary roadway.
- **Trumpet Interchange**—Allows for interchange of secondary two-way streets to a multiple lane roadway with minimal traffic mix. The major function of a trumpet intersection is to replace the T-intersection at the junction of two roadways. These intersections are often found when interstate feeder roads stop at the interstate roadway or loop. For example, Interstate 64 may stop at Interstate 295, since Interstate 64 would direct drivers from a major city to the Interstate Loop (295) or the Interstate (95).
- **Frontage Road Interchanges**—Allows for interchange of vehicles using parallel secondary two-way or one-way roadways and a major multiple lane roadway. Frontage road turnarounds allow drivers to exit a multiple lane roadway and use the opposing frontage road to enter the multi-lane roadway in the opposite direction. They allow dense city traffic flows to mix efficiently with higher speed traffic flows of the multiple lane roadway. Yield rules and roadway markers on the frontage road may vary, depending on the direction of traffic flow.
- **Entrance/Exit Ramps**—Cross traffic is not present because of interchanges. The exit ramps and entry ramps may be miles apart but traffic mix increases at the locations for entry and exit. Interchanges are made up of the through lanes, entry, and exit ramps, acceleration lanes, and deceleration lanes. Entry ramps may be controlled by metering devices.

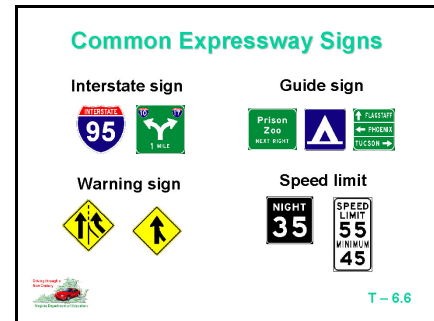
Characteristics of Expressways

Knowledge and Skills

The student is expected to recognize and understand common expressway signs, signals, lane markings, and speed limits.

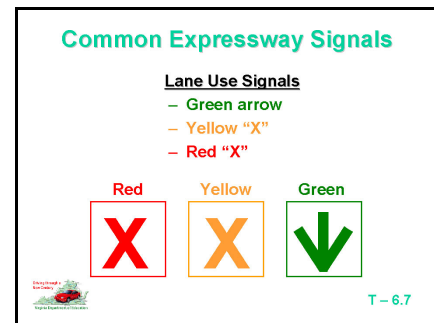
Activities & Resources

Show Transparency T-6.6 “Common Expressway Signs” to explain the differences between interstate roadway signs and urban and suburban roadway signs.



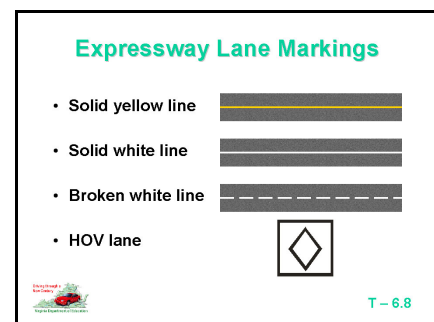
T-6.6
Common Expressway Signs

Show Transparency T-6.7 “Common Expressway Signals” to explain the differences between interstate roadway signals and urban and suburban roadway signals.



T-6.7 Common Expressway Signals

Show Transparency T-6.8 “Expressway Lane Markings” and discuss the appropriate actions taken by a driver in response to traffic controls on an expressway.



T-6.8 Expressway Lane Markings

Discuss with the students the maximum speed limits in Virginia. Then, discuss the need for minimum speed limits on Virginia expressways.

Signs, Signals, Lane Markings and Speed Limits

The “**Interstate**” sign is shaped like a shield and is red, white, and blue in color. Guide signs are rectangular and may be green/white, blue/white, or brown/white depending on where they are guiding the driver. Warning signs are yellow/black or orange/black depending on the area of warning. Regulatory signs (speed limit, etc.) are rectangular shaped and colored black/red/white. Signs may be located beside the roadway or hanging overhead on cross-posts.

Traffic signals on expressways are rare. They may be used as *lane usage* signals. A green arrow over a lane means that the lane is open for travel. A yellow “X” over a lane means travel in that lane is about to change or close. The driver should move at least one lane to the right when safe to do so. A red “X” over lane means travel in that lane is closed or prohibited.

Lane markings on expressways mean the same as on any other roadway. The solid yellow line should always be to the driver’s left side. Broken white lines separate lanes of travel going in the same direction. Solid white lines mark the right edge of the roadway or entrance and exit lanes. HOV (High Occupancy Vehicle) lanes are marked with a white diamond and have restrictions on the number of passengers in vehicles that are traveling in this lane.

Speed limits on expressways in Virginia can be no higher than 65 mph. In urban, congested areas, they are usually 55 mph. These fixed speed limits are based on optimal road/weather conditions.

Minimum speed limits are necessary because going too slowly on expressways can be just as dangerous as going too fast. In Virginia, it is against the law to operate a vehicle at such a slow speed as to impede the normal and reasonable movement of traffic. The Department of Transportation or local authorities determine when posting minimum limits are necessary.

Expressway numbering follows a pattern. North/south routes have odd numbers. Even numbers are assigned to east/west routes. Most routes are one- and two-digit numbers. Alternate routes are usually three-digit. If the first digit is even, the alternate route goes around the city. If it is odd, it leads into the city.

Multiple Lane Roadway Characteristics

Traveling on multiple-lane roadways is often faster than traveling on local roadways due to the lack of intersections that require stopping. Driving at higher speeds is demanding and requires full concentration to allow time for searching and evaluating risks in order to respond in time to problems. Limited access and controlled access roadways allow vehicles to enter and exit with limited interruptions in traffic flow while using merge and exit ramp areas. There are normally two or more lanes of traffic traveling in the same direction. Speed and the effects of speed limit the driver’s ability to use the peripheral vision field effectively.

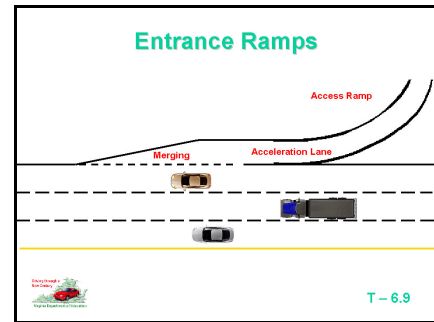
Notes

Knowledge and Skills

The student is expected to describe the procedures and strategies for entering and merging onto expressways.

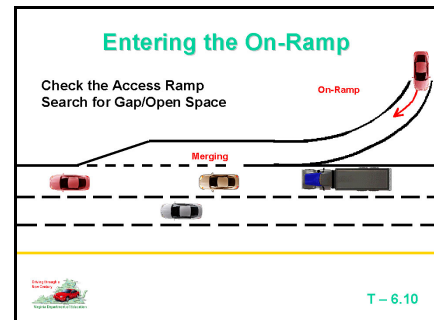
Activities & Resources

Show Transparency T-6.9 "Entrance Ramps" and discuss the parts of an expressway entrance. Use Worksheet W-6.2 "Expressway Characteristics" to supplement this discussion.



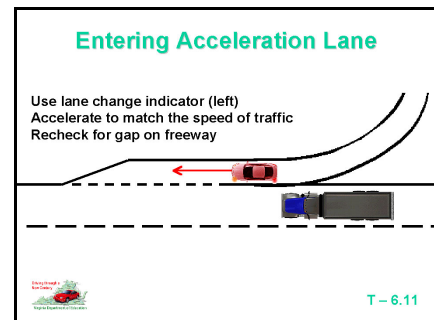
T-6.9 Entrance Ramps

Show Transparency T-6.10 "Entering the On-Ramp" and discuss the first steps for entering an expressway. Ask the class to identify clues a driver should search for when selecting the proper expressway entrance.



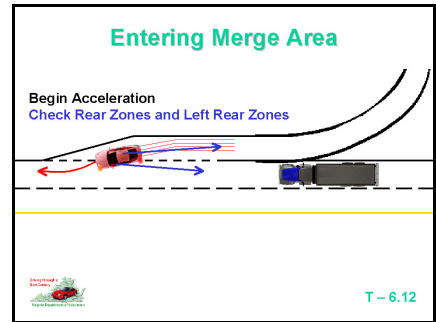
T-6.10 Entering the On-Ramp

Show Transparency T-6.11 "Entering Acceleration Lane" and discuss the steps for using the acceleration lane when entering an expressway.



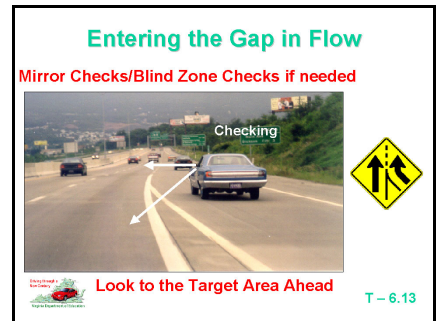
T-6.11 Entering Acceleration Lane

Show Transparency T-6.12 “Entering Merge Area” and discuss the steps for using the merge area while entering an expressway.



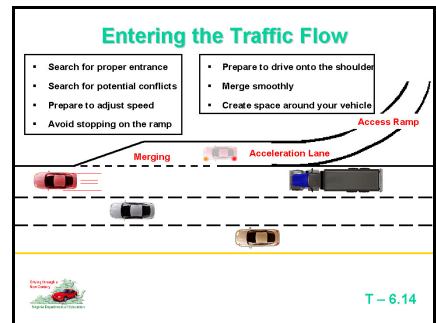
T-6.12 Entering Merge Area

Show Transparency T-6.13 “Entering the Gap in Flow” and continue discussing the steps for using the merge area while entering an expressway.



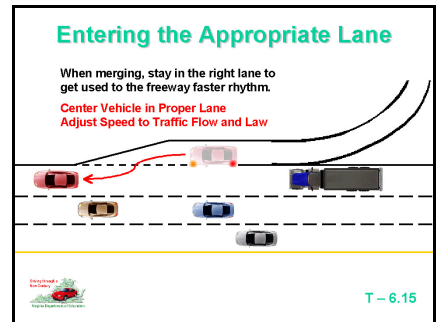
T-6.13 Entering the Gap in Flow

Show Transparency T-6.14 “Entering the Traffic Flow” and continue discussing the steps for using the merge area while entering an expressway.



T-6.14 Entering the Traffic Flow

Show Transparency T-6.15 “Entering the Appropriate Lane” and discuss the steps for using the merge area while entering an expressway.



T-6.15 Entering the Appropriate Lane

Entering an Expressway

Before entering the expressway, search guide signs for the correct route number and direction or destination. If entering what is believed to be an entrance ramp and it is marked with “DO NOT ENTER” or “WRONG WAY” signs that are red and white in color, immediately pull over to the edge, turn around, and get off the ramp.

Expressway entrances include three areas: the entrance ramp, the acceleration lane, and the merge area. The entrance ramp allows the driver time to search traffic for flow and traffic gaps, and evaluate speed and space requirements before entering. These ramps may be uphill, downhill, or level with the expressway. Each presents a different challenge when trying to search the traffic flow on the expressway.

Steps for Entering the Expressway

- Use the correct entrance and check for ramp speed signs.
- On the entrance ramp, search for vehicles ahead and behind using quick glances while searching for gaps or open space in traffic flow.
- In the acceleration lane, use signal to indicate entrance to expressway, then adjust speed to flow of traffic.
- Continue to search ahead and behind while looking for a gap.

In the Merge Lane

- Maintain speed/acceleration.
- Check rear zone and left rear zone.
- Accept or reject gap/space.

Entering Gap in Traffic Flow

- Check mirrors.
- Visualize target area on new roadway.
- Check signal and create a space cushion.

Entering the Traffic Flow

- Merge into lane position.
- Release lane changer device.
- Maintain new target area.

Entrance Ramp

This area gives the driver time to evaluate traffic conditions. It can be level with the expressway or on an uphill or downhill grade. Each has special search characteristics and requires special attention. Remind the driver to also search ahead for traffic on the ramp as well as for a gap in traffic on the expressway.

Acceleration Lane

This is the area to get the speed up to or near the speed of traffic on the expressway. The amount of acceleration depends on traffic flow on the expressway. Again, searching ahead for traffic in the lane, and for traffic signs such as “stop” or “yield” is just as critical as searching for a gap on the expressway.

Merging Area

This is the area to move onto the expressway. Attempt to merge at the speed of traffic.

Problems with Expressway Entrances

General problems associated with expressway entrances include heavy traffic, short ramps and acceleration lanes, and high walls that may block visibility. Also, traffic ahead on the ramp may slow or stop abruptly.

Entrance Ramp Problems

- Picking the wrong lane
- Traffic ahead and behind on the ramp
- Sharp curves on the ramp
- Visibility problems ahead and to the expressway

Reducing Risk on the Entrance Ramp

- Searching for the proper entrance
- Searching ahead, behind, and to the expressway
- Preparing to adjust speed for blocked ramp
- Avoiding stopping or backing on ramp

Acceleration Lane Problems

- Amount of traffic in lane and on expressway
- Short acceleration lane
- Limited space ahead
- Actions of drivers ahead and behind

Reducing Risk in the Acceleration Lane

- Searching ahead and for gap on expressway
- Preparing to adjust speed
- Pulling onto the shoulder if no merge is available

Merging Area Problems

- Heavy traffic
- Lack of a gap to merge
- Traffic slowing or stopping ahead
- Visibility problems ahead and to the side

Reducing Risk in Merging Areas

- Searching ahead and to the side
- Preparing to blend speed with traffic
- Watching for traffic changing lanes at merge

Driving at the common speed of traffic is the best way to establish and maintain a safe space around your vehicle. Avoid the possibility of exceeding the legal posted speed.

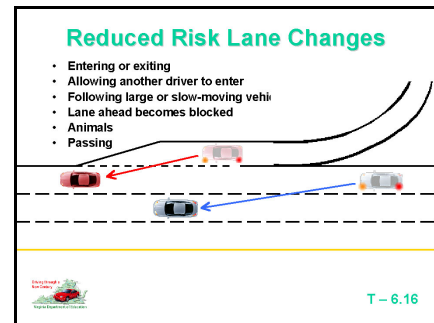
Following distance is critical on the expressway. It is important to try to maintain a 3-4 second following distance. Keeping a space cushion to at least one side of your vehicle gives an escape route if the lane ahead becomes blocked. Also, try to maintain at least a 2-second space to the rear of your vehicle by controlling space to the front. Increase following distance when following large trucks, buses, or motorcycles, or when driving in bad weather, being tailgated, or entering/exiting the expressway.

Knowledge and Skills

The student is expected to describe the procedures and strategies for changing lanes on expressways.

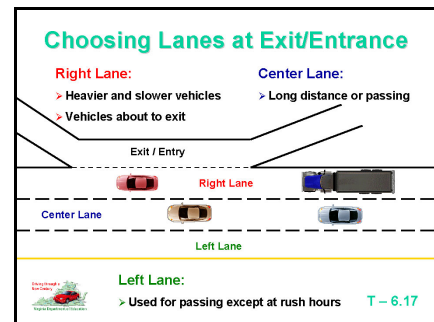
Activities & Resources

Show Transparency T-6.16 "Reduced Risk Lane Changes" and discuss changing lanes while driving on an expressway.



T-6.16
Reduced Risk Lane Changes

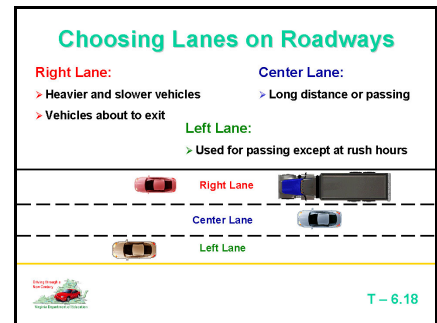
Show Transparency T-6.17 "Choosing Lanes at Exit/Entrance" and discuss the proper lane choice when approaching a merge area on an expressway.



T-6.17 Choosing Lanes at Exit/
Entrance

Ask students to list situations that might require a driver to change lanes on the expressway. Use chalkboard, markerboard, or flip chart to record answers.

Show Transparency T-6.18 “Choosing Lanes on Roadways” and discuss the proper lane choices when driving on an expressway.



T-6.18
Choosing Lanes on Roadways

Support Information

The need to change lanes on the expressway occurs often. It can be dangerous when there are more than two lanes going in the same direction; several vehicles may want to move into the same lane. Openings in traffic may appear and disappear in seconds. Search techniques become even more important.

Reasons for Changing Lanes

- Entering or exiting
- Changing lanes to allow another vehicle to enter
- Following large or slow-moving vehicles
- Lane ahead becomes blocked
- Animals on expressway
- Passing

Lane Change Procedure

When changing lanes, change one lane at a time. Do not cross several lanes at once. Adjust speed to the flow of traffic once in the new lane.

- Signal.
- Check traffic (mirrors and head check).
- If clear, steer smoothly to the new lane (if not, wait).
- Cancel signal.

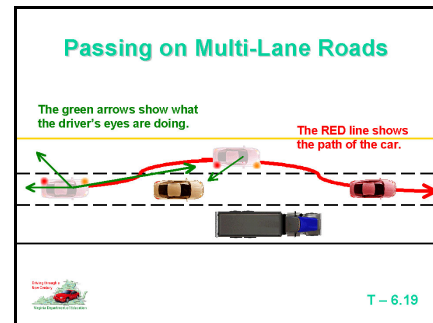
The far-left lane should be used for vehicles passing slower traffic. The center lane is for through-traffic. The far-right lane is used by slower-moving traffic or by vehicles entering or exiting the roadway.

Knowledge and Skills

The student is expected to know and understand the procedures for passing and being passed.

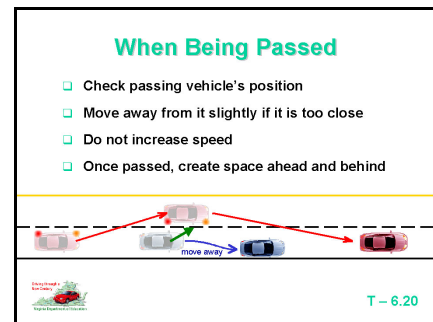
Activities & Resources

Show Transparency T-6.19 “Passing on Multi-Lane Roads” and discuss proper lane change procedures when passing other vehicles on an expressway.



T-6.19
Passing on Multi-Lane Roads

Show Transparency T-6.20 “When Being Passed” and discuss the proper choices when being passed on an expressway.



T-6.20 When Being Passed

Passing is one of the most dangerous maneuvers a driver can attempt. High speed passing on expressways adds to the danger. High volume of traffic on expressways increases the chance of collisions. Passing may occur on the left or right. Again, more than two lanes heading in the same direction present special search technique challenges. Drivers often compete for the same space.

Passing Maneuvers

- Check traffic ahead, to the side, and behind.
- Signal.
- Make a head check.
- Change lanes smoothly.
- Cancel signal.
- Accelerate smoothly.
- Check space to the side.
- Check mirrors.
- When both sets of headlights of the vehicle being passed are visible, complete the lane change procedure to return to the lane originally left.
- Cancel signal.
- Adjust speed to maintain space all around your vehicle.

Risk Reducing Strategies When Being Passed

- Check the position of the passing vehicle.
- Move away from vehicle if it is too close.
- Do not increase speed.
- Once passed, adjust speed to create a 3-4 second or more following distance.

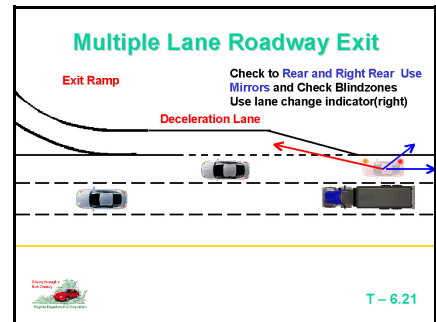
Entering, Changing Lanes, and Exiting

Knowledge and Skills

The student is expected to describe the procedures and strategies for exiting an expressway.

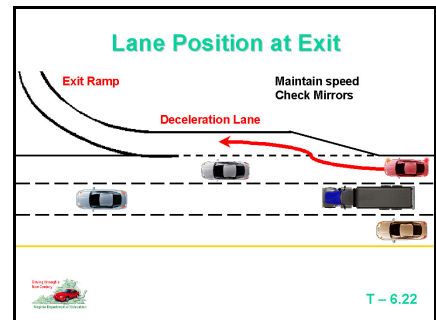
Activities & Resources

Show Transparency T-6.21 "Multiple Lane Roadway Exit" and discuss the proper visual checks when exiting an expressway.



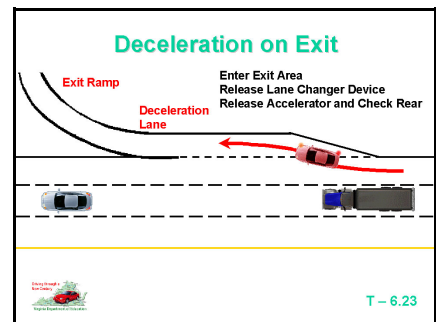
T-6.21 Multiple Lane Roadway Exit

Show Transparency T-6.22 "Lane Position at Exit" and discuss proper lane position and possible lane change procedures when exiting an expressway.



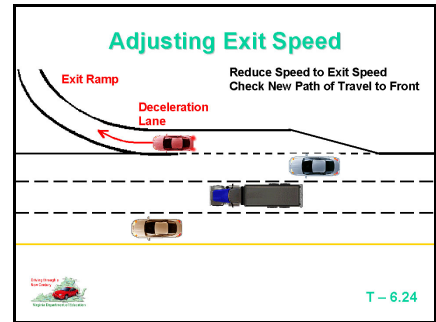
T-6.22 Lane Position at Exit

Show Transparency T-6.23 "Deceleration on Exit" and discuss deceleration when exiting an expressway.



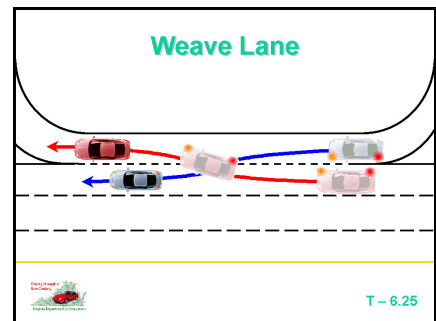
T-6.23 Deceleration on Exit

Show Transparency T-6.24 “Adjusting Exit Speed” and discuss speed adjustment when exiting an expressway.



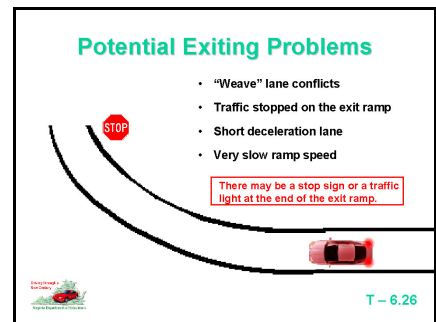
T-6.24 Adjusting Exit Speed

Show Transparency T-6.25 “Weave Lane” and discuss special considerations when entering or exiting an expressway using a weave lane.



T-6.25 Weave Lane

Show Transparency T-6.26 “Potential Exiting Problems” and discuss the problems a driver might encounter when exiting an expressway.



T-6.26 Potential Exiting Problems

Collect Worksheet W-6.2 “Expressway Characteristics” as an assessment tool or as a class discussion device.



Exiting an Expressway

Leaving the expressway is a smooth procedure accomplished at an expressway exit. As far in advance as possible, identify the exit needed. If the exit is missed, do not stop and/or back up on the expressway. The exit has two components:

- Deceleration lane – area where speed can be reduced to exit safely.
- Exit ramp – these may be level or sharply curved, uphill or downhill. Be sure to adjust speed to that of the ramp speed sign.

Identify the exit needed early. Exits are marked with guide signs, usually one to two miles before the exit. About one-half mile (20-30 seconds) before the exit, signal and move to the lane that leads to the deceleration lane. At the deceleration lane entrance, perform a smooth lane change procedure and move into the deceleration lane. Check the posted ramp speed sign and begin to adjust speed to or below the posted speed. Also, check for traffic stopped ahead. Check mirrors and begin to slow down. Keep a space cushion ahead and behind your vehicle. Be prepared to stop.

Possible Exiting Problems

- “Weave” lane conflicts
- Traffic on the exit ramp
- Short deceleration lane prior to sharp curve
- Very slow ramp speed

Expressway Considerations

Some entrance ramps enter from the left instead of from the right. This means that traffic is entering the far-left lane, usually reserved for higher speed traffic. Therefore, the potential for vehicle merging problems is much greater. When entering the expressway from the left, the search pattern is also different, and is directed to the right and over the right shoulder instead of the left of the shoulder. Also, additional lane changes to the right may be necessary once on the expressway if your desired speed is less than traffic traveling in the left lane of the expressway.

A **“weave” lane** is both an entrance and an exit for an expressway. Traffic may come onto and leave the expressway at the same location. This causes conflicts for both drivers using a “weave” lane. It also causes conflicts for drivers on the expressway and on the entrance ramp in terms of speed and space adjustments. The driver entering from the entrance ramp shall yield the right-of-way to the driver leaving the expressway.

Expressway driving is challenging. High speeds, traffic flow, types of traffic, and driver interaction all make expressways unique. Large trucks use expressways regularly and require smaller vehicle drivers’ special attention. Multiple lanes make lane selection critical. Stopping distances are increased with higher speeds. Lane markings and traffic signs play an important role. Search patterns need to be lengthened (20 to 30 seconds ahead) since potential clues approach more quickly with higher speeds. Any actions taken with the vehicle need to be smooth and timed. Sudden changes in speed or direction could spell trouble.

Lane choice is dependent upon several factors: the volume of traffic, type of traffic, speed, and the planned exit. The far right lane has potential for conflicts with drivers entering and leaving the expressway. The center and/or far-left lane is reserved for drivers passing and high-speed traffic. Trucks and buses may use the far right lane when climbing hills, as their speed is usually slower going uphill.

Module Six
Topic 3—High Speed Considerations

60 Minutes Instructional Time
Prerequisites: Minimum Age For Entry Into Program

Instructor Activities	Time Frame
<p>Review Module Six, Topic 3 Lesson Plans Prior to Lesson</p> <p>Show Transparencies T-6.27 "On the Roadway...Do Not" T-6.28 "On the Roadway...Do Not" T-6.29 "Multiple Lane Roadway Dangers" T-6.30 "Multiple Lane Roadway Dangers" T-6.31 "Highway Hypnosis" T-6.32 "Ramp Metering" T-6.33 "Short Trips on Expressways" T-6.34 "Long Trips on Expressways" T-6.35 "Reducing Risk Entering the Roadway" T-6.36 "Increase Following Distance" T-6.37 "Special Roadway Conditions"</p> <p>Distribute and Review Student Worksheets W-6.3 "Problem Areas on Multiple Lane Roadways"</p> <p>Review Module Assessments Prior to Lesson W-6.3 "Problem Areas on Multiple Lane Roadways" MA-6.1 "Module Six Assessment"</p> <p>Additional Resources (Media and/or Text) Video : "Teaching Your Teens to Drive" (AAA) Video: "Freeway Driving" (AAA) "Drive Right" Ch. 11 "How to Drive" Ch. 8-10 "Handbook Plus" Ch. 12.12 "License To Drive" Ch. 12 "Responsible Driving" Ch. 11</p>	<p>50-60 minutes (4-6 minutes) (4-6 minutes) (4-6 minutes) (4-6 minutes) (4-6 minutes) (4-6 minutes) (4-6 minutes) (4-6 minutes) (4-6 minutes) (4-6 minutes) (4-6 minutes) (4-6 minutes)</p> <p>5-10 minutes</p>

High Speed Considerations

Knowledge and Skills

The student is expected to:

- understand the added risks and precautions necessary when driving on an expressway.
- develop plans for taking both short and long trips on an expressway.

Activities & Resources

Ask the class to list possible problems that may be encountered when driving on an expressway. List the responses on a chalkboard, markerboard, or flip chart. Compare student list to transparencies and discuss how to reduce the risk of these problems.


Hand out Worksheet W-6.3 “Problem Areas on Multiple Lane Roadways” as an assessment tool, for homework, or as a classroom discussion tool.



Show Transparency T-6.27 “On the Roadway... Do Not” and discuss what not to do when driving on an expressway.

On the Roadway... Do Not

- Drive over or across median, yellow painted line, or raised dividing section
- Make a left turn or a U-turn
- Use left lane except for passing
- Change lanes without signaling and checking for an open gap




T – 6.27

T-6.27
On the Roadway... Do Not

Show Transparency T-6.28 “On the Roadway... Do Not” and continue discussing what not to do when driving on an expressway.

On the Roadway... Do Not

- Drive onto freeway except through an on-ramp
- Park or Stop on the freeway, except at areas provided
- Park on shoulder unless you have an emergency
- Backup



T – 6.28

T-6.28
On the Roadway... Do Not

Show Transparency T-6.29 “Multiple Lane Roadway Dangers” and discuss the typical dangers encountered when driving on an expressway.

Multiple Lane Roadway Dangers

- Higher speeds-greater breaking distances needed. (takes longer to stop!)
- Field of vision is narrowed
- Highway hypnosis
- Velocitation effect
- Entering and exiting sometimes on the left

Transportation Safety Council T-6.29

T-6.29
Multiple Lane Roadway Dangers

Show Transparency T-6.30 “Multiple Lane Roadway Dangers” and continue discussing the typical dangers encountered when driving on an expressway.

Multiple Lane Roadway Dangers

- Vehicles on shoulder re-entering
- Windy sections of the roadway
- Two vehicles changing lanes into same lane
- Slow moving vehicles ahead
- “Pack Driving”
- Tire Hydroplaning during wet weather conditions

Transportation Safety Council T-6.30

T-6.30
Multiple Lane Roadway Dangers

Show Transparency T-6.31 “Highway Hypnosis” and discuss the dangers inherent in driving long distances without taking a break.

Highway Hypnosis

This is a dull or drowsy condition that can occur because of the concentration needed while driving long distances. It becomes worse when the driver’s eyes focus on the yellow line.

REST AREA

Plan breaks and rest stops to combat highway hypnosis or pull to a safe area for rest and sleep when tired.

Transportation Safety Council T-6.31

T-6.31 Highway Hypnosis

Show Transparency T-6.32 “Ramp Metering” to discuss driver responsibilities and necessary precautions when approaching a controlled metering ramp. Also discuss the purpose of the metering device.

Ramp Metering

- System of Lights and sensors
- Allows only one car at a time
- For entering a limited access highway.

Transportation Safety Council T-6.32

T-6.32 Ramp Metering

Show Transparency T-6.33 “Short Trips on Expressways” and discuss the problems associated with routes, congestion, map reading, and vehicle maintenance.

T-6.33
Short Trips on Expressways

Show Transparency T-6.34 “Long Trips on Expressways” and discuss vehicle maintenance, loading, planning stops, map reading, construction delays, and avoiding city congestion.

T-6.34
Long Trips on Expressways

Support Information

Added Risks and Precautions When Driving on an Expressway

Potential Exiting Problems

- “Weave” lane conflicts
- Traffic stopped on the exit ramp
- Short deceleration lane
- Very slow ramp speed

On the Roadway... Do Not

- Drive over or across median, yellow painted line, or raised dividing section
- Make a left turn or a U-turn
- Use left lane except for passing
- Change lanes without signaling and checking for an open gap

On the Roadway... Do Not

- Drive onto freeway except through an on-ramp
- Park or Stop on the freeway, except at areas provided
- Park on shoulder unless you have an emergency
- Back up

Support Information

Multiple Lane Roadway Dangers

- Higher speeds—greater braking distances needed because it takes longer to stop
- Field of vision is narrowed
- Highway hypnosis
- Velocitation effect
- Entering and exiting sometimes from the left
- Vehicles on shoulder re-entering roadway
- Windy sections of the roadway
- Two vehicles changing lanes into same lane
- Slow moving vehicles ahead
- “Pack Driving”
- Tire hydroplaning during wet weather conditions and higher speed

Highway Hypnosis

- When driving over a long period of time, particularly on a rural expressway with little traffic, be aware of a condition known to drivers as “highway hypnosis.” The driver may become hypnotized by constantly staring ahead on the roadway, which may result in driving in a dulled, drowsy, trance-like condition.
- Switch drivers often.
- Plan breaks and rest stops to combat highway hypnosis.
- Pull to a safe area for rest and sleep when tired (not on the shoulder of the road).

Ramp Metering

- Controls traffic volume with a system of lights and sensors.
- Allows only one car at a time to enter roadway.
- Spaces and controls number of cars entering a limited access highway.

Short Trips on Expressways

- Know the name, route, and number of the entrance and exit to be used.
- Check vehicle for basic maintenance problems.
- Plan a time to travel to avoid congestion.
- Take a local map (if needed).

Long Trips on Expressways

- Conduct thorough maintenance check of vehicle.
- Ensure balanced vehicle loading and that items will not pose a hazard during sudden braking maneuvers.
- Plan stops for food, rest, and fuel.
- Know the route and the exit numbers.
- Check with police or VDOT for construction delays (information is posted on VDOT’s website).
- Carry money or credit cards for emergencies.
- Take a map of planned route.
- Plan to avoid congestion in cities.
- Carry a cell phone for emergencies.
- Monitor local radio stations for traffic crashes.
- Get travel advice from AAA or the internet.

High Speed Considerations

Knowledge and Skills

The student is expected to know and understand the procedures to reduce risks on expressways when encountering special circumstances.

Activities & Resources

Show Transparency T-6.35 “Reducing Risk Entering the Roadway” and review the entry to an expressway.

Reducing Risk Entering the Roadway

- Search for proper entrance
- Search for potential conflicts
- Prepare to adjust speed
- Avoid stopping on the ramp
- Prepare to drive onto the shoulder
- Merge smoothly
- Create space around your vehicle




T – 6.35


T-6.35 Reducing Risk Entering the Roadway

Show Transparency T-6.36 “Increase Following Distance” and discuss the need to increase following distance when driving on an expressway.

Increase Following Distance



- Following large trucks or buses
- Following motorcycles
- Driving in bad weather
- When being tailgated
- When driving a heavy load or pulling a trailer
- Entering/exiting the expressway



T – 6.36

T-6.36 Increase Following Distance

Show Transparency T-6.37 “Special Roadway Conditions” and discuss special conditions one might encounter when traveling on expressways.

Special Roadway Conditions

- Expressways through cities
- Disabled vehicles
 - Others along the roadway
 - Your vehicle becomes disabled
- Construction areas
- Toll booths





T – 6.37

T-6.37 Special Roadway Conditions

Reducing Risk Entering the Roadway

- Search for proper entrance
- Search for potential conflicts
- Prepare to adjust speed
- Avoid stopping on the ramp
- Prepare to drive onto the shoulder
- Merge smoothly
- Create space around your vehicle

When to Increase Following Distance

- Following large trucks or buses
- Following motorcycles
- Driving in bad weather
- When being tailgated
- When driving a heavy load or pulling a trailer
- Entering/exiting the expressway

Special Expressway Conditions**Expressways Through Cities**

The volume of traffic may increase dramatically; speeds may slow to a crawl. Drive in the left or center lane to avoid merge conflicts in rush hour. Search for exits early and adjust position for exit.

Disabled Vehicles

When seeing a disabled vehicle ahead, reduce speed and increase the space between your vehicle and the disabled vehicle. This may involve changing lanes. Be alert for pedestrians, tow trucks, and/or police vehicles.

Things to Do If Your Vehicle Becomes Disabled

- Pull off as far as possible onto the shoulder or median.
- Turn on emergency flashers.
- Raise the hood to signal for assistance.
- Stay in the vehicle and lock doors.
- Ask anyone who stops to go to a phone and call for assistance.
- Do not get into a stranger's vehicle.

Construction Areas

- Search ahead for warning signs.
- Reduce speed.
- Adjust position to maintain a space around the vehicle.

Toll Booths

Search well ahead for toll booth signs. Begin reducing speed early, as traffic may be backed up at the booth. Search for green lights or signs for an open booth. When exiting, search traffic to both sides for merging potential. Accelerate smoothly and adjust speed.

Notes

Curriculum Scope and Sequence Modules for Driver Education in Virginia

Module Six

Worksheets

- W-6.1 Expressway Interchanges
- W-6.2 Expressway Characteristics
- W-6.3 Problem Areas On Multiple Lane Roadways

Simulations

- SLS-6.1 Simulation Laboratory Session
- SLS-6.2 Simulation Laboratory Session

Assessment

- MA-6.1 Module Six Assessment

Virginia Department of Education
in cooperation with the
Virginia Department of Motor Vehicles

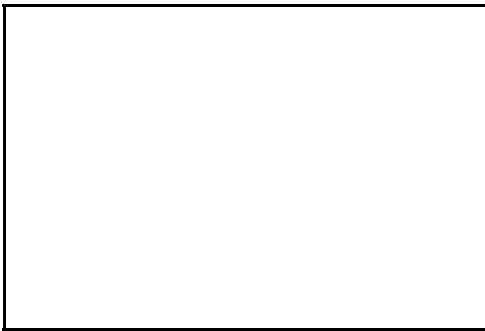
Name _____

List the basic characteristics of a multiple-lane roadway or expressway.

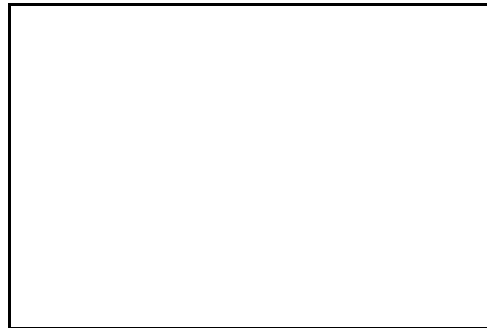
- A. _____
- B. _____
- C. _____
- D. _____
- E. _____
- F. _____

List and draw four typical expressway interchanges found in Virginia:

1. _____



2. _____



3. _____



4. _____

List four common expressway signs.

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

List two special traffic signals used on expressways.

- 1. _____
- 2. _____

List four common pavement marking systems used on expressways.

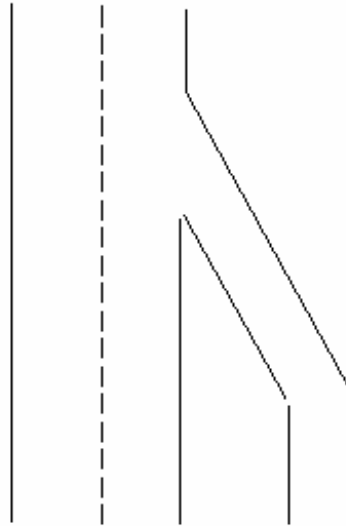
- 1. _____
- 2. _____
- 3. _____
- 4. _____



Name _____

List and draw the steps to merge onto the expressway.

- A.
- B.
- C.
- D.
- E.
- F.



List when reduced-risk lane changes are used.

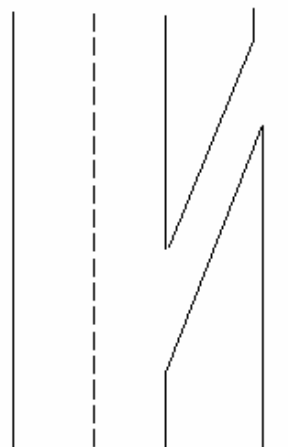
- 1. _____ 2. _____ 3. _____
- 4. _____ 5. _____ 6. _____

List four concerns when being passed.

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

List and draw the steps to merge onto the expressway.

- A.
- B.
- C.
- D.



Describe special problems in a weave lane when exiting.

Name _____

List eight choices that drivers **should not** make on an expressway.

- A. _____ B. _____
- C. _____ D. _____
- E. _____ F. _____
- G. _____ H. _____

List eleven dangers faced by new drivers on an expressway.

- 1. _____ 2. _____ 3. _____
- 4. _____ 5. _____ 6. _____
- 7. _____ 8. _____ 9. _____
- 10. _____ 11. _____

Explain the purpose of a ramp metering device.

When is it crucial to increase the following interval on an expressway?

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

List four special roadway areas found in expressway travel.

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

Notes

Simulation Laboratory Session

Suggested Titles: “Interstate Driving” (DORON Video or Laserdisc)
“Space Cushions” (DORON Video or Laserdisc)
“Identifying and Avoiding Conflicts” (SSI Safe Driver Training Series)
“Avoiding Collisions” (SSI Safe Driver Training Series)

Learning Goals: The student demonstrates comprehension of speed control and vehicle positioning in lane, which will increase the ability to position vehicle for moderate risk vehicle maneuvers.

Performance: Performances are based on the simulation video used for this section. In each situation, the student will demonstrate correct positioning for vehicle control.

Assessment: Instructor records assessment of speed, positioning, and techniques on the district on-street records form. Student assessment of simulation activities may also be added to the student portfolio.

Instructor Activities	Student Driver Activities	Materials Needed and Notes

Simulation Laboratory Session

- Suggested Titles:** “Threat Recognition” (DORON Video or Laserdisc)
 “Destination Driving” (DORON Video or Laserdisc)
 “Dealing with Emergencies” (SSI Safe Driver Training Series)
 “Handling Roadway Hazards” (SSI Safe Driver Training Series)
- Learning Goals:** The student demonstrates comprehension of speed control and vehicle positioning in lane, which will increase the ability to position vehicle for moderate risk vehicle maneuvers.
- Performance:** Performances are based on the simulation video used for this section. In each situation, the student will demonstrate correct positioning for vehicle control.
- Assessment:** Instructor records assessment of speed, positioning, and techniques on the district on-street records form. Student assessment of simulation activities may also be added to the student portfolio.

Instructor Activities	Student Driver Activities	Materials Needed and Notes

Notes

Please do not write on the test. Select the best answer and place the appropriate letter (A, B, C, D) on the answer sheet provided.

1. Which is NOT a characteristic of an expressway?
 - A. High speed traffic
 - B. Divided by some barrier between opposing lanes of travel
 - C. Has a high rate of collisions
 - D. Drivers can enter and exit only at certain places

2. Types of interchanges at expressways are called _____.
 - A. flute, harp, and violin
 - B. diamond, trumpet, and cloverleaf
 - C. ruby, star, and heart
 - D. bear, owl, and eagle

3. Before traveling long or short distances on expressways, be sure to _____.
 - A. check fluid levels in your car
 - B. know your entrance and exit before you leave
 - C. neither A nor B are correct
 - D. both A and B are correct

4. "Highway hypnosis" is a driver condition that is affected by _____.
 - A. short trips on expressways
 - B. the driver staring at the roadway for long periods of time
 - C. frequent rest stops
 - D. a magician

5. When choosing the ramp to enter the expressway, what should you do?
 - A. Use any ramp available to get on.
 - B. Check for "DO NOT ENTER" and "WRONG WAY" signs at the ramp.
 - C. Make sure the ramp is marked "UP".
 - D. Only make right turns to get onto the entrance ramp.

6. The entrance to an expressway has three parts. What are they?
 - A. The entrance ramp, the acceleration lane, and the merge area
 - B. The entrance ramp, the deceleration lane, and the merge area
 - C. The exit ramp, the deceleration lane, and the change area
 - D. The weave, the speed sign, and the curve

7. When entering the expressway, search for _____.
- A. traffic ahead
 - B. a gap in traffic on the expressway
 - C. the ramp speed sign
 - D. all the above are important
8. When in the acceleration lane, getting ready to get on the expressway, which of these is important to do?
- A. Stop suddenly if there is no gap to move into on the expressway.
 - B. Stare straight ahead for traffic in the lane.
 - C. Do not yield to traffic on the expressway.
 - D. Adjust your speed to flow of traffic on the expressway.
9. Which of these should you NOT do when merging onto an expressway?
- A. Select a gap large enough to fit your vehicle.
 - B. Change lanes smoothly.
 - C. Change two lanes at once and speed up.
 - D. Adjust your speed to create a safe following interval.
10. Which of the following can be a potential problem when entering an expressway?
- A. Bicyclists, pedestrians, and mopeds.
 - B. No traffic at the merge area.
 - C. No gap to move into on the expressway.
 - D. A long straight stretch of roadway ahead.
11. Some expressway entrances come in from the left instead of the usual right. Why do these present special problems?
- A. The left lane is usually reserved for higher speed traffic.
 - B. No one can see to the left.
 - C. Lane changes to the right are impossible.
 - D. Parked vehicles on the left shoulder.
12. Driving on the expressway requires the driver to _____.
- A. search farther down the roadway for clues (20-30 seconds ahead)
 - B. take pills to stay awake
 - C. drive slowly and carefully
 - D. stop often for traffic signals
13. You are driving and looking to get onto Interstate 95. What color will the sign be identifying I-95?
- A. Yellow and black.
 - B. White and black.
 - C. Red, white and blue.
 - D. Green and white.

14. Some expressways have minimum speed signs. This means that you _____.
- A. should not drive slower than the minimum speed posted
 - B. can drive as slowly as you want
 - C. can drive as fast as you want
 - D. speed limits have no effect on your driving
15. You are driving on an expressway that has 3 lanes going in your direction. You will be driving a long distance ahead. Which lane should you drive in to avoid the most conflicts?
- A. Right lane
 - B. Center lane
 - C. Left lane
 - D. Any lane
16. Keeping a safe space cushion around your vehicle on the expressway is important. When is it difficult to do this on expressways?
- A. When tractor-trailers are on the expressway.
 - B. When it is rush hour, bumper-bumper traffic.
 - C. When pulling a trailer.
 - D. When driving at night.
17. Passing another vehicle is dangerous anytime. What makes it more dangerous on an expressway?
- A. Speeds are higher and danger can come up quickly.
 - B. There is usually more sight distance ahead.
 - C. Traffic travels at the same speed all the time.
 - D. Traffic signs regulate where you can pass on the expressway.
18. If you want to get off the expressway but miss your exit, _____.
- A. pull over to the shoulder and back to the exit
 - B. pull across the median and head back to the exit
 - C. go to the next exit, cross over and return to your exit
 - D. flag down a police officer for an escort back to your exit
19. When leaving an expressway _____.
- A. search early for your correct exit
 - B. signal early for your exit to warn following drivers of your intent to leave
 - C. do most of your slowing in the deceleration lane
 - D. A, B, and C are correct

20. A “weave” lane on a freeway is very dangerous because_____.
- A. it is a lane for drunk or drowsy drivers
 - B. the lane curves sharply
 - C. it is both an entrance and exit lane
 - D. high occupancy vehicles use this lane
21. Which is NOT a possible problem at an expressway exit?
- A. Pedestrians and bicyclists.
 - B. Traffic backed up on the ramp.
 - C. A short deceleration lane.
 - D. A very slow ramp speed.
22. If there is a disabled vehicle along side the expressway, you should _____.
- A. reduce speed and put more space between you and it
 - B. increase speed to get by it quickly
 - C. stop and offer the driver a ride
 - D. keep the same lane position
23. If your vehicle becomes disabled on the expressway, which should you NOT do?
- A. Pull off as far as possible onto the shoulder or median.
 - B. Turn on the emergency flashers.
 - C. Call for help if you have a cell phone.
 - D. Ask for a ride to a service station from anyone who stops to help you.
24. Construction areas on expressways require a driver to _____.
- A. pay more tolls
 - B. slow your speed and adjust your lane position
 - C. play loud music to drown out the construction noise
 - D. maintain a high rate of speed to get through quickly
25. Some expressways make the driver pay a toll to drive on them. Which of the following is NOT a threat around toll booths?
- A. Traffic slows rapidly on approaching the toll booth.
 - B. Traffic congestion can be a problem.
 - C. Traffic merging together from several lanes.
 - D. A, B, and C are all threats at toll booth areas.

Name: _____

Date: _____

Score: _____

1. _____

14. _____

2. _____

15. _____

3. _____

16. _____

4. _____

17. _____

5. _____

18. _____

6. _____

19. _____

7. _____

20. _____

8. _____

21. _____

9. _____

22. _____

10. _____

23. _____

11. _____

24. _____

12. _____

25. _____

13. _____

Notes

Name: _____**Date:** _____**Score:** _____

- | | | | |
|-----|---|-----|---|
| 1. | C | 14. | A |
| 2. | B | 15. | B |
| 3. | D | 16. | B |
| 4. | B | 17. | A |
| 5. | B | 18. | C |
| 6. | A | 19. | D |
| 7. | D | 20. | C |
| 8. | D | 21. | A |
| 9. | C | 22. | A |
| 10. | C | 23. | D |
| 11. | A | 24. | B |
| 12. | A | 25. | D |
| 13. | C | | |