

**Driver Education
Classroom and In-Car
Curriculum
Unit 3
Space Management System**

Driver Education Classroom and In-Car Instruction Unit 3-2

Unit Introduction

Unit 3 will introduce operator procedural and information processing tasks in a low risk driving environment. Basic vehicle maneuvering tasks will include using procedural steps, driver information processing and an introduction to the space management system. The space management system will be used to determine appropriate roadway position, appropriate vehicle speed and appropriate communication with other users. Roadway characteristics discussed will be interaction with intersections, surface conditions and traffic controls.

Goals

Time Frame: 6 hours

Students will:

- Participate in a teacher-led discussion using the space management system
- Participate in a teacher-led discussion of the time space needs of drivers and the function of central and fringe vision
- Participate in a teacher-led discussion of developing a dynamic visual search process and the inadequacy of a 2-second following distance
- View the video Managing Space and Time for Safe Driving and participate in a teacher-led discussion on risk reducing strategies
- View the video Using Your Eyes Effectively and participate in a teacher-led discussion on proper scanning techniques
- View lessons 6 through 9 of the video Teaching Your Teens to Drive and participate in a teacher-led discussion of the procedures used when searching for information by category
- Use a space management system to manage path of travel, visual lines of sight, space between vehicles and evaluate alternate paths of travel or speed adjustments to reduce risk
- Participate in teacher-led discussion using the space management system for managing intersection problems in this unit
- Complete Unit 3 Test

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

Title: Space Management System	Time Frame: 6 hours
Resources Needed	Instructor Preparation
<p>Textbooks: <u>Drive Right</u>, Ch. 4 <u>How to Drive</u>, Ch. 8, 9, 10 <u>Handbook Plus</u>, Ch. 4 <u>Responsible Driving</u>, Ch.2, 10</p> <p>Slides 3.1-3.21 Fact Sheets 3.1-3.4 Videos 3.1-3.2</p> <p>Included Video:</p> <ul style="list-style-type: none"> • <i>Managing Space and Time for Safe Driving</i> (8 minutes) • <i>Using Your Eyes Effectively</i> (8 minutes) • <i>Teaching Your Teens To Drive Lessons</i> 6-9 <p>Unit 3 Test</p>	<p>Review recommended learning activities Review textbook Review on-street lesson plan used in combination with this unit and textbook</p> <p>Review slides Review fact sheets Review included videos</p> <p>Included</p>

Driver Education Classroom and In-Car Instruction Unit 3-4

Performance Objectives	Learning Activities	Resources
<p>Students will identify and describe the visual/perceptual tasks required of a driver to operate a motor vehicle safely.</p>	<p>Use Slides 3.1-3.2 and Fact sheet 3.1, to lead a discussion of the vision and perception requirements necessary for the safe operation of a vehicle.</p>	<p>Slide 3.1 "Vision and Perception Requirements" Slide 3.2 "Vision/Sightlines/Travel Paths" Fact Sheet 3.1 "Visual Perceptual Tasks"</p>

Driver Education Classroom and In-Car Instruction Unit 3-5

Content Outline

Vision and Perception Requirements

The instructor will emphasize the importance of directing attention, maintaining an open line of sight, searching skills and targeting a line to maintain a safe path of travel.

Visual functions - 60% of the human brain is devoted to vision.

The central vision area describes the fringe area around the focal area that is used to judge depth and position. It is measured by testing object identification and depth perception fields. It also gives support information to the focus vision and is used for determining standard visual references in driving, relative position in space and time, and movement into space/time.

The peripheral vision is conical in shape around the other vision fields. It picks up lateral changes in color and object movement. Peripheral vision is strongly affected by fatigue, drugs, and speed. It often gives the driver an initial warning of a changing or closed space area. This concept can be demonstrated by using two flashlights and showing them on a screen or blackboard. If they are focused together, obvious rings will appear demonstrating the three visual field concepts. The three visual information fields are utilized by a driver when a problem comes toward their vehicle from the side. A driver will first recognize that something is moving toward the vehicle and possibly see the type of vehicle (large/small truck or large/small car). The driver will then focus on the vehicle to identify color, make, year, etc.

Maintaining an open line of sight

This is the ability to see the center of the driver's path of travel. This can be blocked by a curve, hill, bush, building, vehicle, etc. The driver's ability to have an unrestricted line of sight is a visual basis for speed and steering adjustments. An interrupted line of sight means changes in speed and position are necessary for reestablishing a clear line of sight to the driver's path of travel.

Searching skills

- Using visual skills to make turns
- Forward visual turning point
- Rear visual turning point
- Line of sight
- Paths of travel

Driver Education Classroom and In-Car Instruction Unit 3-6

Performance Objectives	Learning Activities	Resources
<p>Students will demonstrate knowledge of the space management system SEE.</p>	<p>Use Slides 3.3 and 3.4 to discuss the basic space management concepts. Also see Fact sheet 3.2.</p> <p>Included Video: Show Video 3.1 “<i>Managing Space and Time for Safe Driving</i>” to introduce the space management system. Continue discussing this subject using Slides 3.5 and 3.6.</p> <p>Pass out Fact Sheets 3.3 and 3.4 as study guides.</p>	<p>Slide 3.3 “System Management”</p> <p>Slide 3.4 “System Management Strategies”(continued)</p> <p>Fact Sheet 3.2 “Space Management Concepts”</p> <p>Included Video: “<i>Managing Space and Time for Safe Driving</i>” (8 minutes)</p> <p>Slide 3.5 “Space Management Strategies”</p> <p>Slide 3.6 “Space Management Strategies”</p> <p>Fact Sheet 3.3 “Vehicle Operating Space”</p> <p>Fact Sheet 3.4 “Using the Basics”</p>

Driver Education Classroom and In-Car Instruction Unit 3-7

Content Outline

The SEE space management system is a three-step process that can serve to change a driver's awareness from the procedural habit level to the process judgment level of driving.

The three steps of SEE are:

- Search - for line of sight or path of travel adjustments
- Evaluate - alternative paths and speed for adjustments
- Execute - the best speed, lane position and communication to reduce risk

These three steps must be actively practiced to develop them into a decision-making process. During the practice sessions, all three steps will be used for any one situation. When there is more than one change, the three steps should be used for the most critical line of sight or path of travel problem.

The most important goal is to achieve the very best use of speed control, lane positioning and communication. Since "best" is a comparative term, space management sets the guidelines for the most appropriate decision in any given situation.

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

Performance Objectives	Learning Activities	Resources
Students will demonstrate knowledge of the search process.	Use Slides 3.7 and 3.8 to discuss the need to look for risk situations. Students will enter intersections during this BTW session and will need to begin the process of identifying risk and problem areas.	Slide 3.7 "Searching" Slide 3.8 "Searching"
Students will demonstrate knowledge of the evaluating risk process.	Use Slides 3.9 and 3.10 concerning the need to have a process to learn to determine a perceived risk in relation to a real risk. Learning probability and consequences are key to making effective decisions.	Slide 3.9 "Evaluating" Slide 3.10 "Evaluating"

Driver Education Classroom and In-Car Instruction Unit 3-9

Content Outline

Searching for high risk situations

- Search techniques
- Time for perceiving hazards
- Getting a larger view of the roadway
- Keeping eyes moving
- Sightline and travel path

Searching information

- Gaining information
- Space management
- Looking for changing areas
- Look for open areas
- Look for closed areas

Recognizing High Risk Situations

- Potential and critical risks
- Nearness of critical hazards
- Collision potential
- Intersections
- Curvatures

Decision-making

- High risk situations
- Sightline and travel path
- Lane position
- Time control
- Space control

Controlling high risk situations

- Open Line of Sight and Path of Travel
- Motion control
- Controlled/threshold braking
- Controlled/progressive acceleration

Steering control

- Hand-to-hand
- Evasive action
- Hand-over-hand

Driver Education Classroom and In-Car Instruction Unit 3-10

Performance Objectives	Learning Activities	Resources
<p>Students will demonstrate knowledge of the execute process for making an appropriate response.</p>	<p>Use Slides 3.11 and 3.12 concerning the need to make an appropriate speed or position change along with an appropriate communication of intentions.</p>	<p>Slide 3.11 “Executing” Slide 3.12 “Executing”</p>
<p>Students will describe how drivers can communicate their intended moves to other highway users.</p>	<p>Students will describe how drivers can communicate their intended moves to other highway users.</p>	<p>Slide 3.13 “Communicating Intent”</p>

Driver Education Classroom and In-Car Instruction Unit 3-11

Content Outline

Responding to risk probability and consequence “executing:”

Speed changes

- In response to risk or danger
- In response to traffic conditions
- In response to roadway conditions
- In response to vehicle balance

Lane position changes

- In response to risk or danger
- In response to traffic conditions
- In response to roadway conditions
- In response to vehicle control

Determining appropriate communication

- Prior to position changes
- Prior to braking
- Warning others
- Engaging other drivers

Communicating intent

- Signals - turning, backing, four-way hazards
- Headlights - visibility, self and others, use at all times
- Brake lights - slowing, stopping, turning
- Horn - warning, increased eye contact
- Hand signals - use only the legal ones
- Position of vehicle - space management, turning intent
- Speed - danger, hazardous behavior
- Driver actions - inattentive, confused, lost, talking

Driver Education Classroom and In-Car Instruction Unit 3-12

Performance Objectives	Learning Activities	Resources
<p>Students will describe where, when, how and what a driver needs as part of the search process for a space management system and why the 2-second following distance rule is not adequate.</p>	<p>Use Slides 3.14 through 3.17 to lead a discussion of managing visibility, time and space.</p> <p>Use Slide 3.18 and have the class try to determine the distance to the bridge. Then, play Video 3.1 and have students time the distance to the bridge.</p> <p>Explain why a 3-4 second following interval is preferred, using Slides 3.19 and Video 3.2.</p> <p>Included Video: Show video “<i>Using Your Eyes Effectively</i>” and discuss.</p> <p>Included Video: As a summary, show Lessons 6,7, 8 and 9 of “<i>Teaching Your Teens to Drive</i>”. Stop and discuss each lesson.</p> <p>Make reading assignments for the next unit.</p>	<p>Slides 3.14-3.17 “Managing Visibility, Time and Space”</p> <p>Slide 3.18 “Determining Sight Distance”</p> <p>Video 3.1 “<i>Determining Sight Distance</i>”</p> <p>Slide 3.19 “Determining Following Distance”</p> <p>Video 3.2 “<i>Determining Following Distance</i>” (45 seconds)</p> <p>Included Video: “<i>Using Your Eyes Effectively</i>”</p> <p>Included Video: “<i>Teaching Your Teens to Drive</i>” (11 minutes)</p> <p><u>Drive Right</u>, Ch. 6,7,9,10 <u>Handbook Plus</u>, Ch. 12 <u>How to Drive</u>, Ch. 5, 9 <u>Responsible Driving</u>, Ch. 9,10</p>
<p>Students will complete the Unit 3 Test.</p>	<p>Distribute, collect and grade the Unit 3 Test.</p>	<p>Test Included</p>

Driver Education Classroom and In-Car Instruction Unit 3-13

Content Outline

Managing visibility, time and space

- 20-30 seconds ahead - identify potential problems - awareness
- 12-15 seconds ahead - identify objects that require a change in speed or position
- 8-12 seconds ahead - identify alternate paths of travel and stopping zone
- 4-8 seconds ahead - stopping zone and following interval
- The 2-second following distance was designed for use if there were an alternate path to steer into. Stopping in this time frame is usually not possible unless the driver is searching well ahead for clues. Therefore, a 3-4 second following distance is required.

Visual search categories drivers should be looking for:

Highway

- Structure
- Surface
- Features
- Atmosphere
- Intersections

Traffic controls

- Signs
- Signals
- Markings
- Intersections/interchanges

Motorized vehicles

- Type
- Characteristics

Non-motorized users

- Bicyclists
- Pedestrians
- Skaters, skateboarders
- Animals (pets and/or wild)

Visual Perceptual Tasks

Explaining driver vision requirements

Gaining information from three visual areas

There are three basic ways in which a driver gains information through the eyes. The focal vision area is used to read and identify distinct objects. It is often measured by determining visual acuity through an eye chart. It is the basis for the visual lead, targeting and searching tasks in driving. The central vision area describes the fringe area around the focal area that is used to judge depth and position. It is measured in testing through object identification and depth perception fields. It also gives support information to the focus vision and is used for determining standard visual references in driving, relative position in space, time and movement into space/time. The peripheral vision is conical in shape around the other vision fields. Its function is to notice changes in color and object movement. Peripheral vision is strongly affected by fatigue, drugs and speed. It often gives the driver an initial warning of a changing or closed space area. This concept can be demonstrated by using two flash lights and showing them on a screen or blackboard. If they are focused together, obvious rings will appear demonstrating the three visual field concepts. An example of the three visual information fields can be given by identifying a problem coming toward a vehicle from the side. A driver will first recognize that something is moving toward the vehicle and then possibly see the type of vehicle (large/small truck or large/small car). The driver will then focus toward the vehicle to identify color, make, year, etc.

Establishing visual lead

A novice driver will need to develop a visual lead in order to keep steering reversals to a minimum. With very little free play in new vehicle steering mechanisms, it becomes critical to limit wheel movements to the left and right of the path of travel. Keeping eye focus farther away from the vehicle will allow the driver to take more time to make decisions. A visual lead is an area 20 to 30 seconds from the front of the vehicle. Various driver systems have methods designed to keep eye focus centered in the path of travel at a distance that is 20-30 seconds away from vehicle. This task is critical to gaining as much information as possible from the driving scene. Good searching sets up good sightlines and good peripheral fields for seeing changes and identifying alternate paths of travel.

Driver Education Classroom and In-Car Instruction Unit 3-15

Fact Sheet

3.1

Visual Perceptual Tasks

Search process

An organized searching process will need to start from the visual lead area. Eye focus movements from the path of travel in an organized pattern describes a visual search process. The search for traffic flow information and potential risk situations is the function of a visual search process.

Line of sight

This is the ability to see the center of the driver's path of travel. This can be blocked by a curve, hill, bush, building, vehicle, etc. The driver's ability to have an unrestricted line of sight is a visual basis for speed and steering adjustments. An interrupted line of sight means changes in speed and position are necessary for reestablishing a clear line of sight to the driver's path of travel.

Path of travel

Selecting the path of travel is a combination of line of sight, standard visual references, and guided experiences. Learning about your path of travel and alternate paths of travel is critical for driver performance.

As speed increases:

The ability of peripheral vision to detect the motion of other objects is affected by the speed and movement of your vehicle. Minor changes to car position occur in shorter time frames, causing significant or exaggerated vehicle movements.

The vision adjustment needed is to:

Lengthen or increase visual lead which:

- allows more time to gather information
- increases peripheral vision area, which allows for motion detection farther away from your vehicle in order to give time for adequate response
- puts more space between other vehicles and your vehicle, so abrupt responses are held to a minimum

Driver Education Classroom and In-Car Instruction Unit 3-16

Fact Sheet

3.1

Visual Perceptual Tasks

Adequate following distances

As speed or road conditions change, the need for a change in following distance (time/space) is apparent. Note the distance for steering is much shorter than the distance for stopping. Response time with the hands is close to 1/2 second, while response time with the foot is normally 3/4 second. This does not take into account any lag in perception time due to fatigue, drugs or inattention. All time and distance relationships are designed for the best driving conditions. Another concern to note is following vehicles of different weights changes the ability to stop.

- 2 seconds permits a driver time to steer out of problem areas at all listed speeds on a dry surface and braking out of problems at speeds under 35 mph.
- 3 seconds permits a driver time to steer out of problem areas at all listed speeds on dry surface and braking out of problems at speeds to 45 mph.
- 4 seconds permits a driver to steer out of problems at all listed speeds on dry surface and braking out of problems at speeds to legal limit of 65 mph.

Driver Education Classroom and In-Car Instruction Unit 3-17

Fact Sheet

3.2

Space Management Concepts

Space management system

To this point, searching skills have been used to assess the position of the vehicle in relation to fixed or moving objects. Further attention has been directed to the limitations of most drivers' visual search patterns as a result of learned behaviors. In this unit, the instructor will emphasize where to search, how to search, when to search and what to search for.

Emphasis should be placed on the importance of using central and fringe vision while adjusting to objects in or near the path of travel. Communication between drivers, how to group elements by category, and how to gather information more efficiently when driving are also a focus in this section.

To be effective, a space management system must be easy to use and apply to all highway situations.

The purpose of this lesson is to help students understand how they can control risk to the front by adjusting lane position by timing their arrival at a given point, by placement of the vehicle when stopping and by controlling speed. Further, by identifying an alternate route of travel 8 to 12 seconds in advance, closure on their projected path of travel need not cause an emergency.

Driver requirements - Drivers need visibility, space and time to perform all maneuvers in traffic whether crossing, turning, passing or adjusting speed and/or position.

Vehicle requirements - When a driver performs any maneuvers with the vehicle, he must have the time to do it, the space to perform and adequate traction to make the maneuver.

Search for objects or conditions - Look for other roadway users or conditions in or adjacent to the projected path of travel that could increase the level of risk.

Evaluate the projected path ahead for alternate paths of travel - Check to sides and rear for speed and lane position options.

Execute appropriate adjustment(s) - Change speed, change position and/or communicate.

Visual search process - This is the first space management skill a driver must develop in an effective visual search.

Where to search - This involves moving the eyes from the instrument panel and mirrors, to 20 to 30 seconds ahead.

Driver Education Classroom and In-Car Instruction Unit 3-18

Fact Sheet

3.2

Space Management Concepts

When to search involves timing and direction of the search pattern. When to search requires consciously looking to determine conditions all around the vehicle before initiating any maneuver.

How to search involves looking in a systematic pattern of far ahead to near, as well as to the left, right and rear of the vehicle and making efficient use of both central and fringe vision. Always concentrate on your path of travel with quick glances to other areas.

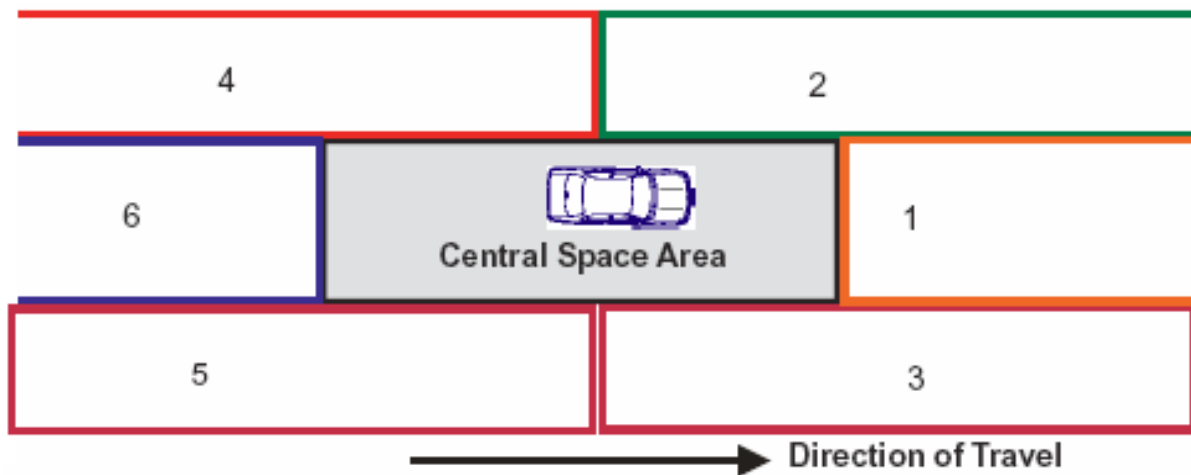
- **Searching 20 - 30 seconds ahead** - By searching ahead 20 to 30 seconds and identifying objects that could require a change in speed or direction 12 to 15 seconds ahead and possible alternative paths 8 to 12 seconds in advance, the driver has more time and space to exercise options.
- **Searching 4 - 8 seconds ahead** - The 4 seconds ahead represents your following distance and the 8 seconds provides a safe stopping zone under most conditions.

What to search for requires forethought and planning - To be effective when searching the highway and traffic scene, the driver must look for specific categories of information.

- **Roadway characteristics** - Road and lane width, lane markings, roadway surface, shoulder condition and slope, curb type and height, hills and curves, intersections and interchanges, areas of limited visibility, location and type of structures adjacent to the roadway
- **Signs, signals and markings** - Warning, regulatory, directional and informational.
- **Motorized vehicles** - Cars, trucks, tractor-trailer rigs, buses, motor homes, motorcycles, construction vehicles/farm tractors and other slow moving equipment and horse drawn equipment.
- **Non-motorized highway users** - Pedestrians, bicyclists, pets and/or wild animals

Vehicle Operating Space

There are seven basic areas of operating space around a vehicle. The diagram below shows the six areas or spaces surrounding the car that are visible to the driver. The vehicle occupies the central area, which includes the driver and the space occupied by the vehicle that is not visible to the driver.



The areas or spaces around the central space area may have the following conditions:

Open: There is a space or area to operate within that is without restrictions to the line of sight or path of travel.

Closed: The space or area is not available for the car's path of travel or there is a restriction to the driver's line of sight. An alternative path of travel must be identified.

Changing: A space or area condition in which the level of risk is increasing. It is often an open space or area that is changing to a closed line of sight or path of travel or a closed space or area with additional problems or changes.

The more driving experience people have, the more likely it is that they will become a victim of seeing what they expect to see. A typical driving expectancy is a mental set that makes a driver think things are not as threatening as they actually are.

As a result, the driver continues to maintain speed/path of travel when conditions dictate that an adjustment in time/space management is needed. This means that the driver should do something to the speed or path of travel of the vehicle to locate it in the most controllable space.

Driver Education Classroom and In-Car Instruction Unit 3-20

Fact Sheet

3.4

Using the Basics

To search effectively, drivers need to know what to look for, when to look, where to look, and how to evaluate if a potential problem could be a good or poor situation. The structure of the space management system can give a rapid response to a number of variables.

There are many ways a driver can be involved in a crash. Most crashes result from a change in the driver's ability to control sightline, or travel path and driving into a threatening situation.

Examples of changes:

- A red traffic light is a closed area front travel path.
- A hill crest is a closed front sightline.
- A parked car on the right is a closed right front sightline and travel path.
- A bicyclist on the right is a closed right front path.
- An oncoming car or truck is a closed left front travel path.
- A car traveling in the left mirror blind space area is a closed left rear travel path.
- A motorcycle in the right mirror blind space area is a closed right rear travel path.
- A truck following closely is a closed rear sightline and travel path.

After searching and seeing a changing or closed space area, drivers need to evaluate the conditions of the opposite space areas before making a decision. After evaluating the related space areas, act on selecting the best speed, lane position and/or communication tool.

New conditions are always presenting themselves when driving. A driver must constantly question the present conditions. What speed selection is most comfortable for each situation? What is the legal speed limit? What should the lane or lane position be? What is a good speed for this situation? What would be a high risk or poor speed selection, with little to gain? Each situation has different and changing conditions.

These are some of the processing evaluations that a driver would make for any driving situation. The speed and lane position selected are usually based upon what the legal limitations are, what the destination is, and what is comfortable for the driver.

Whatever the choices for speed and position, the space management system recommends looking for how the group of ongoing conditions could cause less control over **line of sight** and/or **path of travel**. In other words, watch for changes in the space areas around the vehicle.

If drivers are able to watch for slight changes, make minor adjustments for best speed control and lane position, and use effective communication—they very seldom will be surprised by the actions of others that would require a critical high stress or evasive response.