Chapter7 Lesson Plans and Activity Directions

Title: The Science of Driving

Concepts:

- 7.1 Responding to Laws
- 7.2 Curves and Hills
- 7.3 Following Time and Space
- 7.4 Commentary Driving

Prerequisite: Participation in previous sessions, successful completion of previous assignments, and 80% or better on previous chapter exit exams.

Time: 3 hours

Required Equipment, Lesson Resources, and Support Materials:

- NDRPC 2014 DVD Interface, computer, projector, screen, and speakers
- Chapter 7 Lesson Plans and Activity Directions, and Overview Notes
- NDRPC 2014 Playbooks
- Simulated steering wheels
- Small model car, speed scale (inside back cover), small rubber band, and a small bolt
- When I Say Stop cards
- Ticket in the Door to 7.3 and Key
- Chapter 7 Exit Exam and Key

Optional Materials:

- Ten Habits Keep the Monster Caged! Using the Dynamics of Zone Control
- Partnership for EXPERT Driving 7th ed. IN-CAR Guides

Teacher Activities	Participant Activities
 7.1 Responding to Laws Time: 60 minutes Objective The learner will review basic traffic laws, apply them in more of how to interact effectively within those boundaries. 	complex driving environments, and demonstrate
Traffic Laws Protect You and Others Break the class into groups and assign 2 – 3 questions from the list of 'Frequently Asked Questions' from the ND Highway Patrol link. Give the groups 15 minutes to discuss the questions and then be prepared to present the information to the class. An alternative would be to assign a homework project on comparing other state's fines to North Dakota's.	Learn facts about traffic violations in North Dakota.
Distinct Vehicle Interactions Mental Rehearsal Activity: Distinct Vehicles Launch PPT to access several videos. Facilitate class discussion of specific laws and how to respond to school busses, city buses, and emergency vehicles.	Practice appropriate space management and yielding actions.
Traffic Laws: New and Review Interactive PPT Activity: Responding to Laws Launch PPT to access photos and videos. Facilitate discussions of various laws generally associated with complex urban environments.	Participate in activity and provide feedback when asked by teacher.

7.2 Curves and Hills **Time: 30 minutes**

Objectives

- The learner will understand that curves are high risk locations as well as the most frequent location of single car ٠ crashes involving young drivers.
- The learner will have a clear understanding that risk factors are generated by the vehicle, the road, and the ٠ driver when entering and negotiating curves and hills.
- The learner will be able to explain and demonstrate low risk vehicle control techniques used to approach and • otiate curves and hillcrest

negotiate curves and milerests.	
So, what's the problem?	
Interactive PPT, Videos: The Problem with Curves	
Launch PPT and help students examine risk factors associated	
with curves. Key concepts to emphasize:	
Inertia & momentum, radius, slope, surface conditions, tire	
conditions, vehicle type, weight, height, load, and expectations.	Get motivated.
Small Group Experiment: Discover how speed, vehicle, and load	
affect control in a curve.	Discover how inertia, momentum can affect
Demonstrate how this discovery activity will be conducted. Have	vehicle balance, traction, and control.
learners work together in teams of two or three.	
Questions you may want to ask:	Watch videos.
 How does the negative camber of the curve affect vehicle 	
control at different speeds?	Answer questions.
• Did changing the load of the vehicle change the amount of control in the curve?	
• What happens to your ability to manage a curve when you	
increase your speed by just a few mph?	
• When is the best time to slow down in a curve?	
Managing Curves	Discover what a drive line is and how one uses
Interactive PPT, Video: Drivelines	them to track through curves.
Launch PPT. Help learners understand different drivelines and	Practice using drive lines.
practice using drive lines through one series of curves.	Answer questions.
Approaching Hills	
Lead learners in class discussion on how to approach hillcrest.	Participate in class discussion. Answer questions.
Ask: What's the best LP to approach a hillcrest? Why?	
7.3 Following Time and Space	
Time: 30 Minutes	
Objectives	
• The learner will be able to explain the need for time and space	e management while operating a vehicle and will
be able to explain the benefits gained by using 4 seconds follow	wing space.
The learner will demonstrate the ability to accurately judge 4 of the second seco	or more seconds of following space for various
sneeds being practiced	
The learner will demonstrate the ability to create maintain ar	ad/or rebuild 4 seconds of space to the front
Ticket to Concent 7.3	
Load class through a solf or poor evaluation of responses to	Evaluate responses to E Ticket 7.2. Save for
Lead class through a sen of peer evaluation of responses to	Evaluate responses to E-ricket 7.5. Save for
questions using ficket to Concept 7.3 key. Allow students to keep	future use.
for future reference.	
Give Up Control	Experience the consequences of following too
Interactive PPT Activity: Following Time vs. Steering	close.
Distribute simulated steering wheels. Launch presentation and	Discover that more open space to the front gives
allow students to experience the consequenes and risks of	you the time and space you need to brake rather
following too close. As you near the end of the presentation,	than performing a risky evasive steering
expect some learners will conclude that braking is a better	maneuver.

alternative action to take than evasive steering. (See activity	
directions for more specific information related to evasive	
steering.)	
Or Create It	
Interactive Video Activity: Managing Following Time	Practice determining how much following time
Launch video. During part 1 have learners practice measuring	the camera car has in each scene.
following time in seconds. Relate to previous lesson 4.1 measuring	
time in space. Have them count aloud at first. Observe their	Gain experience determining if closure rate
performance (listen) and coach to correct if needed, and provide	(following space) is increasing (getting father
positive feedback. During part 2 help learners determine if closure	away), decreasing (getting closer), or staying the
rates are increasing, decreasing, or staying the same. If camera car	same and what actions to take to maintain or re-
is closing in, help learners determine the best actions to take to	build 4 or more seconds of front space.
keep or re-build 4 or more seconds of following space.	
Even When Being Followed	
Direct learners to the last photo on the page. Begin a disussion by	Participate in activity. Discuss the value of having
asking:	open front space.
Which driver has the best space management?	
What actions should you take if you have a tailgater?	
Walking Car Performance Activity: "When I Say Stop"	Experience the need for and value of having 4 or
See activity directions below for specific instructions on now to	more seconds of following time.
set up and conduct this activity and other variations.	
7.4 Commentary Driving & Chapter 7 Exit Exam	
Objectives	
 The learner will utilize the Zone Control System to FIND, SOLVE, and CONTROL line-of-sight and path-of-travel anablema in a variate of deiving situations. 	
The learner will complete Chapter 7 Evit Evam with a minimum	n score of 80%
EIND-State the Problem SOLVE-State the Solutions	
CONTROL-4-Second Danger Zones	
Ask learners to explain what commentary driving is and how it is	Explain what commentary driving is.
done. Direct them to the photo on the bottom of the page. Ask for	,
a volunteer or two to demonstrate and give feedback.	Answer questions when asked.
Ask learners:	
• What are the advantages of finding problems in the target	
area or 15-second range as compared to the 4-second	
danger zone?	
• What 4-second danger zones do you need to be especially	
aware of?	
Mental Rehearsal Activity: Practice Commentary Driving, Find,	
Solve, and Control with real-time video.	
Launch video and instruct learners to follow the directions	Practice commentary driving using the three
provided for each scenario. Be ready to pause to give learners	stops of Zopa Control
time to speak. Coach and give positive feedback.	steps of zone control.
Chapter 7 Exit Exam	Learners take chapter 7 exit exam.
Chapter 7 Exit Exam Administer exam, collect and correct.	Learners take chapter 7 exit exam.
Chapter 7 Exit Exam Administer exam, collect and correct. Assign and Wrap Up	Learners take chapter 7 exit exam.
Chapter 7 Exit Exam Administer exam, collect and correct. Assign and Wrap Up • Read Playbook Chapter 8	Learners take chapter 7 exit exam.
Chapter 7 Exit Exam Administer exam, collect and correct. Assign and Wrap Up • Read Playbook Chapter 8 • Ticket to Concept 8.3	Learners take chapter 7 exit exam.

Assessments

Learner will complete Ticket to Concept 7.3 and demonstrate accountability for completing chapter reading assignments. Learner will answer informal questions, and participate in class discussions, demonstrations, and activities.

Learner will complete Chapter 7 Exit Exam with a minimum score of 80%.

Assignments

- Read Playbook Chapter 8
- Ticket to Concept 8.3

7.1 Responding to Laws - Activity Directions

Interactive PPT Activity: Violations Family Feud Game

Props Needed:

Game Show Host Notes - print this document and have it handy. You'll need it in order to know which answer bar to reveal as your students take guesses during the game and to award points for each successful guess.

Objective:

Learn interesting statistics.

Conducting the Activity:

Break the class into two teams with 5 team spokespersons for each team. Explain that the team that accumulates "points" wins. You will need a volunteer to keep track of team points as they are earned or lost.

Each answer bar has "points" assigned. These "points" represent the number of drivers accounted for in each question, rather than an actual number of points. With that in mind, the game is a little bit "rigged". Round 1 will almost always end in 3 X's and be passed on to team 2. Round 2 is a little easier and has more "points" on the board. If you're running short of time you may conclude the game after Round 2.

7.2 Curves and Hills - Activity Directions

Speed in Curves Experiment - How Speed, Vehicle, and Load Affect Control

Props Needed:

- Whiz Ring
- Small Model Car
- Speed Scale—Back of Playbook
- Small Bolt
- Rubber Band

Conducting the Activity

Part One: Speed and Traction Scale

- 1. Using the table, stand the Playbook on end with the speed scale at the bottom of the page.
- **2.** Take the Whiz Ring and turn it upside down so the concave side is up it is a curve with a negative camber.
- 3. Hold one side of the Whiz Ring against the speed scale at the 15 mph line.
- **4.** Hold the other side of the Whiz Ring on the table. The ring will be at a slight angle.
- 5. Place the car in the groove of the Whiz Ring next to the Playbook or about 12 o'clock and let it go.

- 6. What happens? Car stays in the groove.
- 7. Increase the height of the top end of the Whiz Ring by 2 ½ mph on the speed scale. Do this by approximating ½ way between the lines. Mark your results gradually moving up the scale.
- 8. When can the vehicle no longer maintain contact with the road?
- **9.** Then try a higher profile vehicle van or pickup at the same speed levels and mark your results. Students will note the higher profile vehicle leaving the "roadway" at a much lower rate of speed than the car.

Make this Point

All vehicles will go out of control when the traction envelope is exceeded. The higher profile the vehicle, the sooner it will exceed its center of gravity.

Part Two:

- 1. Using the rubber band, attach the bolt to the top of the vehicle or in the pickup bed. Wrap it a few times on the bed of the truck close to the cab to prevent it from rubbing against the truck's tires. Show how the truck with an empty bed is able to safety travel through a left or right curve at 30mph (or whatever speed is proper for your set-up). Then place the bolt in the center of the bed of the truck with the head near the cab, secured by the elastic band. Now begin with the 30mph speed to see how the weight causes a change in control at the same speed. The bolt can represent passengers in a car or cargo in a pick-up truck. Adding weight changes the balance of the vehicle. You can repeat this activity by placing the bolt to the left side of the bed of the truck.
- 2. Find the top speed at which negotiating a right curve, with passengers on the left side of the vehicle, will result in success. Then, at the same speed, have the truck go into a left curve. Failure will occur.

Questions:

- What happened to the car, van, or truck as you increased the speed of the vehicle?
- At what point did it leave the Whiz Ring? ٠
- Was it different for different types of vehicles?
- What happened when you added the load to the vehicle? ٠
- What speed did it leave the Whiz Ring? •
- Why do you think that happened? •
- What does that tell you about controlling your speed in a curve with different vehicles and loads? •
- How does this relate to the vehicles the students drive? •
- Do they have vehicles they have altered, put lift kits on? ٠
- How will that change the vehicle's center of gravity? •
- What roads near their location have multiple crashes? •

Make These Points

There are many variables that could cause a vehicle to go out of control at a curve in the road. The most deadly single vehicle crashes, when no other vehicle is involved, occur at curves in the road. Most of the time when drivers are alone in the vehicle, they feel they are in control as they speed into curves. Then when there are occupants in the vehicle, the driver fails to realize that the car is out of balance from what he/she is accustomed to. Also, there are all the other psychological and emotional risk factors that may cause a teen driver to travel faster than normal while entering a curve when there are passengers in the vehicle. And, with a few additional risk factors present, it is sure to lead to failure.

Keep in mind, the majority of teen deaths occur with passengers in a vehicle that failed to negotiate a curve. The driver made a wrong decision on speed selection.

Walking Car Performance

Recruit student volunteer. Have the student walk around the room at a fast pace. While the student is walking, tell him/her to continue walking and close their eyes. Ask the class what they observed. Did the student slow down? If student did slow the pace, ask why and discuss. Make sure that the fact they were unable to see what was ahead of them was a reason for their slowing. Make the point that driving over a hillcrest or into a curve requires the same action. A lack of ability to see ahead requires a speed reduction. Losing one's ability to see in the classroom and slowing down should illicit the same response in one's vehicle. (For more information on why it often does *not* illicit the same response, see "ok expectancy" in this chapter.)

If the student did not slow down, discuss why. Could they visualize their intended path? Did they know where everyone in the class was and that they were seated and did not pose a threat? Ask them if they could be assured of the same thing on the roadway? Ask them what the potential consequences would be in classroom versus on the roadway.

7.3 Following Time & Space - Activity Directions

Following Time vs. Steering

Objective: The main purpose of this activity is to demonstrate the value of having open front space and the risks associated with an emergency lane change, commonly known as evasive steering.

This "emergency" occurs usually because the driver is not alert to problems, is following too closely, and/or is distracted by some other factor. The natural reaction is brake hard (threshold, locking, or engaging the ABS), steer hard, or do both simultaneously. Done improperly, each can have devastating consequences.

Preventative actions are much easier to accomplish than successfully dealing with an emergency. Keep yourself and your vehicle in the best shape for driving; know exactly where your vehicle is positioned on the roadway and in relationship to others; using a visual search pattern, maintain vehicle balance; find, solve, and control problems before they become emergencies; create and keep open space for yourself and others to use. It is important that you develop a habit of using a balanced hand position at the 9 & 3 or 8 & 4 positions for the best control under all driving conditions. It is critical that you habitually see problems develop, check related zones for an escape path, and aim through the open path to the target area <u>prior to</u> any evasive action steering maneuver.

The Dangers Involved in Evasive Action Steering:

- Failing to separate speed and steering forces prior to using evasive steering
- Steering into the path of other vehicles or into roadside hazard
- Too much steering input can result in an out of control skid or worse
- Too little input can result in an unsuccessful attempt to evade a potentially serious problem or collision
- At high speeds, evasive action steering increases the likelihood of a sideways skid or even turning over, if done improperly
- A Secondary Objective: To give learners some simulated experience using evasive steering techniques. Evasive steering requires 3 steering actions. The first moves only the front of your vehicle. This initial steering action inputs only the <u>minimum</u> amount of steering required to avoid an obstacle. The second action moves the rear of the vehicle away from the obstacle and requires twice the steering input as the first action. The third action straightens the vehicle as you move around the obstacle. It requires steering input in the amount equal to the first input.

Conducting the Activity:

Hand out simulated steering wheels.

The activity begins by asking learners: What actions would you take to avoid a crash? Listen to their answers and be prepared to observe their feet and hands during the video clip that follows. Some will brake and steer right, others will steer left into the path of oncoming traffic, some will just hit the brake, and some will freeze and take no actions. There may be a few learners who actually come off the pedals and steer for open space; they will not however, take three steering actions. Each action will result in failure to control the emergency.

Make this point: in an emergency your habits take over.

Explain what actions are needed to make a successful emergency lane change, then allow them to practice those actions several times with each following time interval.

As you near the end of the presentation, expect some learners will conclude that braking is a better alternative action to take than evasive steering. Give them positive feedback and continue through the last slides.

Walking Car Performance Activity: "When I Say Stop"

Objective: Experience the value of having 4 or more seconds of following time.

Props Needed: 30 note cards, 30 pre-printed labels that include:

- 2 "When I say stop, keep walking"
- 1 "When I say stop, turn right"
- 2 "When I say stop, run forward"
- 1 "When I say stop, turn left"
- 1 "When I say stop, backup"
- 25 "When I say stop, stop"
- 1 label on each note card and fold the cards in half
- Enough space and distance for two or more lanes of traffic (lines of moving students) going in the same direction outdoors, on the sidewalk, the perimeter of the classroom, etc.

Set up

Give all students a "When I say Stop" card and instruct them to keep what is written on it a secret from each other. Tell them that they are to form lines of traffic in the identified space, facing in the same direction. Explain the rules: When you say go, they are to walk at a fast pace. When you say stop, follow the directions on the card. Remind them that drivers don't set out to crash their cars or cause others injury. They are to do what is written on the card with that value in mind.

Conducting the Activity

Have your students stand facing in the same direction in two or more lines, representing lanes of traffic going in the same direction. Set the width of the lanes by instructing students in the right lane to stand one arm-length from students to the side. Set their initial following distance from the "car in front" by instructing students to stand **one step behind** the front student. (This is a close approximation of one second of following time.) Remind the group of the rule: When you say go, they are at a quick pace while maintaining "one-second" of space. When you say stop, they are to follow the directions on the card. Now move off to the side and say "Go". After 8 – 12 paces say "Stop". Observe what happens.

Now ask for a show of hands of those who were involved in a collision. Ask the students where they were looking or what they were looking at as they were walking at that close a distance. Ask how having more space would affect what they are able to see. Ask if more space would have made a difference in the number of collisions.

Collect the cards. Mix them up and give them to the students again. Students will be more apprehensive the second and third time doing this activity.

Regroup at the starting point and instruct the group to stand **two steps behind** the "car in front," representing 2 seconds of space and repeat the "go" and "stop" commands. Again, ask for a show of hands from those who were involved in collisions. Were there fewer collisions?

Repeat the activity with **four steps behind** the "car in front," representing 4 seconds of space. There will be far fewer collisions, if any. Ask if they had an open or closed line-of-sight this time. Ask if that make a difference in the control they had over the front space.

Make These Points

You can't always know what other drivers are going to do. The advantages of having 4 or more seconds of space:

- Gives you time to become conscious of moments when your closure rate begins to increase
- Opens your line-of-sight
- You are able to search beyond the vehicle in front
- Removes the control the front vehicle has over your actions
- Decreases the chance of becoming involved in a rear-end collision
- Will eliminate or minimize surprises from the actions of the front vehicle
- Makes drivers more conscious of the disadvantages of keeping a lesser amount of space and time