

Chapter 1

Introduction to Risks and Tools

Content Notes

Program Mission Statement: It is our mission to help learners achieve low-risk driving behaviors and habits that will serve them throughout their lifetime and lead to a driving future that is free of crashes

Approximate time required to complete this chapter: 3 hours. In-car lessons cannot begin until this chapter is completed. The first in-car lesson must be completed after the 4th hour and before the 10th hour of classroom instruction.

Classroom Concepts:

- 1.1 Risk involved in Driving
- 1.2 Preparing to Drive
- 1.3 Instruments Gauges and Symbols
- 1.4 Vision Control
- 1.5 Motion Control
- 1.6 Steering Control

1.1 - Risk involved in Driving

Regulations for an Instruction Permit

Limitations (see Oregon Driver Manual):

- Must have a licensed driver at least 21 years old seated beside you (this person must have had a license for at least three years for the experience to count toward the 50- or 100-hour requirement)
- Must hold the permit for at least six months before applying for a provisional license
- Must have 50 hours of practice driving plus an ODOT-approved driver education program or 100 hours of practice driving
- ORS 807.066 Must show proof of school enrollment or other educational progress before DMV can issue driving privileges

Risk

Risk is always present. It is important you make correct and informed choices to keep you safe. The more risks present, the greater the probability that a crash will occur. Most crashes happen because of over-accumulation of risks that the driver is not aware of.

Drivers need to eliminate risks contributed by their performance and acquire good driving habits to help manage risks successfully. Low-risk behavioral patterns and habits will provide protection against an over-accumulation of risks. That is what this course is all about.

The Highway Transportation System (HTS)

ORS 801.305 — “Highway” means every public way, road, street, thoroughfare, and place, including bridges, viaducts, and other structures within the boundaries of this state, open, used or intended for use of the general public for vehicles or vehicular traffic as a matter of right.

Three Parts of the HTS

- People—the people who use the HTS by walking, driving, or riding are called roadway users. Roadway users vary greatly in their ability to use the system.

- Vehicles—think about the wide range of vehicles that use the HTS. Mopeds and motorcycles are small and have little protection. The other extreme is the tractor semi-trailer, which weighs tons. Between these are cars, vans, small trucks, buses, campers, farm vehicles, and construction equipment.
- Roadways—these vary from dirt lanes to complex multilane expressways. Common conditions such as rain, darkness, or rough pavement can become major problems. It is up to the driver to maintain control of their vehicle at all times and in all conditions.

Purpose of HTS

The HTS exists for the safe, efficient, and convenient/timely movement of people and goods from place to place.

HTS Regulations

Many federal, state, and local government agencies help regulate the HTS. The federal government has established the National Highway Safety Act with a set of traffic safety guidelines. Federal, state, and local governments enforce these national guidelines.

Breakdown in the HTS

A breakdown in the HTS occurs when any part of the system does not work well. Breakdowns cause serious problems and consequences in congestion, crashes, loss of money, injury, and death. A driver's ability to drive responsibly will be the major factor in avoiding being part of these breakdowns.

Vulnerable Roadway Users

A Vulnerable Roadway User (VRU) is anyone who is on or alongside the roadway without the protective covering of an automobile

We Drive by Habits

Good driving habits help lower and manage risks. In order to use the tools effectively, the driving task must be performed by habit. The major purpose of this traffic safety education program is to help in the habit formation stage. It is not adequate to merely know what is right. We must do it often enough until it is developed into habit. Developing risk management driving habits requires knowing how and when to perform a maneuver, possessing the correct attitude, and repeating the action correctly every time.

1.2 - Preparing to Drive

There are a lot of things drivers need to think about and be prepared for before they get in the car and start the vehicle.

While Approaching the Vehicle Have Keys in Hand, Driver Fitness: Mental/Physical

The first rule of personal safety in all circumstances is "be aware of your surroundings." You do not want to spend unnecessary time digging a key out of your purse or pocket. Take inventory of how fit you are to drive.

Look Under the Vehicle

It is easy to see under your vehicle when you are a distance away from it. You may then be able to detect a problem. You are looking for objects under your vehicle, tires inflation, broken glass, etc.

Look At and Around the Vehicle

Being able to see all around your car is especially important so that you know where your tires may travel and what they may run over. You may detect a child or some object near your tires, which you would not see from inside the vehicle.

Before Opening the Door Look Inside the Vehicle

Looking into the car before opening the door will allow you to detect any problems.

Control the Door Swing

Controlling the door swing will help avoid hitting the car parked next to you.

After Entering the Vehicle Doors Locked, Windows Up

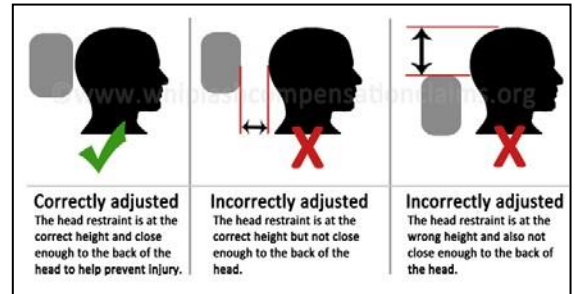
Locking the doors gives you security from carjackers. Windows up protects the head in a side impact crash.

Head Restraint Up to Ears

The head restraint should be capable of catching your head during a rear impact. Adjust to ear level.

Adjust Seat – Sit Up, Don't Slouch

Adjust the seat to give a slight bend in the knees and elbows. Sit as high as possible for the best view available. The lower the driver is seated, the greater the optical illusion as to where the vehicle is in relation to the roadway. Push your buttocks all the way back into the seat, sit up straight. You will gain firm support, maximize your body's balance in the driving compartment, and relieve lower back stress. Sitting too close or too far from the pedals decreases your ability to control your speed. If you're too close, your ankle will feel tight. Too far away and your heel will come off the floor when you apply the brake.



Check and Adjust All Mirrors

The inside mirror should be adjusted so it frames the rear window. See directions for the Modified Mirror Setting to adjust the outside mirrors.

Safety Belts on All

Before starting the vehicle, make sure you and all passengers put on safety belts correctly.

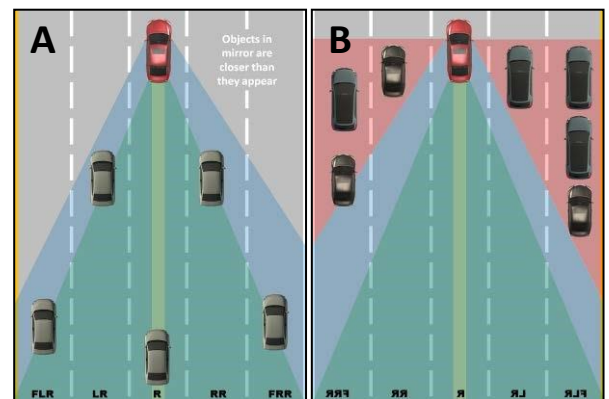
Mirror Settings - Old and New

The suggested technique for setting rear-view mirror position has changed several times in the past two decades.

The Traditional Method is to sit up straight in the seat and adjust the outside mirrors to see just a bit of each side of the vehicle.

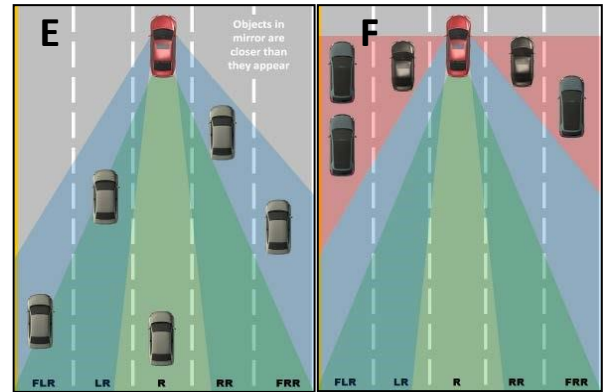
The biggest advantage to that method is that it gives the driver the ability to see large areas to the rear as illustrated in **graphic A**.

The biggest disadvantage to using that setting is the large size of the blind spots on either side of the vehicle as illustrated in **graphic B**.



Modified Mirror Settings are designed to address the problems associated with Traditional mirror settings.

This setting widens the driver's view of the rear zones as graphic **E** illustrates. And it reduces the size of the blind spots as seen in **graphic F**. However, it is critical that the driver turns the head to check the vehicle's blind spot before performing any lateral maneuver. To set the left outside mirror, lean your head slightly to the left and adjust the mirror out until you can see down the left side of the vehicle. The outside right rear-view mirrors are slightly convex in all newer vehicles. This gives a wider view on the right, but remember, "Objects in mirror are closer than they appear." To adjust the right-side mirror, lean your head slightly to the right and adjust the mirror out until you can see down the right side of the vehicle. Then sit up straight in the seat. If the driver's view to the rear becomes blocked, a slight tilt of the head will allow a clear view.



Restraint Systems

There are many types of occupant protection systems: seat belts, air bags, head restraints, and child seats. They must be used correctly to protect occupants from injuries in a crash. Oregon has a safety belt law. **See Oregon Vehicle Code 811.210 for the penalty for not using a safety belt or not using it correctly.**

www.oregon.gov/ODOT/DMV/pages/form/vehiclecodebk.aspx

Occupant Protection

For most, the term "occupant protection" refers to safety belts, child restraints, or driver and passenger side air bags.

Adults Safety Belt

- Lap belt should fit snugly after fastening across hips
- Adjust center post mounting for height if vehicle is so equipped
- Belt over top of shoulder and across chest to distribute force in event of crash
- Keep seat back in upright position to avoid sliding out of the seat in frontal crash

Head Restraints

- Proper adjustment
- Seat position

Air Bags/Dash and Steering Wheel

- No passenger under 12 years of age in front seat
- Protect against head and chest injuries
- Speed of inflation (Up to 200 mph - one-twenty-fifth of a second. The powdery substance released from the airbag, by the way, is regular cornstarch or talcum powder, which is used by the airbag manufacturers to keep the bags pliable and lubricated while they're in storage.)
- Driver should adjust seat for minimum 10-inch clearance between chest and steering wheel
- Raise seat (if you don't have a power seat, use a wedge-shaped cushion), adjust steering wheel to direct air bag at chest instead of face

Air Bags/Side Impact Protection

- Upper door frame

- Seat edge/door panel

Occupant restraint has traditionally been provided by manual (or active) seat (lap) belts that have been standard equipment in new cars since 1964.

- Lap belts have been available for retrofit in automobiles since the late 1940's and have been standard equipment since 1964.
- Since 1968, lap and shoulder belts have been required in the front outboard seat positions of all cars sold in the United States.

The purpose of safety belts is to:

1. Maximize whatever benefits can be achieved during the first collision by "riding down." By absorbing the impact of the first collision sooner, belts give the benefit of increased stopping distance and dissipation of the forces of impact by the vehicle itself.
2. Minimize the harm of the second collision. By taking the forces of the impact quickly, belts dissipate those forces through a relatively safe medium (the belt itself) instead of through a dangerous medium (glass or steel).

The law requires that all occupants are properly restrained at all times!

Preparing to Start the Engine

Parking Brake On

The habit of parking and applying the parking brake will prevent unwanted movement of the vehicle. Often, on a steep hill, when the parking brake is not used and the vehicle is held in place by the "Park" position of the transmission, the total weight of the car is rested upon one pin the size of your little finger. This pin can break easily. Perhaps the most important reason for always using the parking brake is that it should be the primary holding force to keep your vehicle from moving, and the "Park" position is a backup system. Therefore, it would be unlikely that the vehicle would become a runaway car. It is also a safeguard against a small child putting an unattended vehicle into motion.

Insert Key (if a key is needed)

Learn the positions of the switch to start the car.

Shift Should Be in "Park"

The engine of the vehicle will only start when the shift is in the P (park) position or the N (neutral) position.

Starting the Engine

Twist Key and Release or Push the Button

To avoid the grinding of the starter, twist the key and then release. Not all vehicles use a key to start; some use push buttons, some use a key fob, some have remote start.

After Starting the Engine

Turn Headlights and Other Necessary Accessories On

Get in the habit of driving with your headlights on at all times. Driving with headlights on will allow other drivers and pedestrians to see your vehicle during various situations. Your vehicle is visible up to 9/10 of a mile with headlights on during daylight hours. With your headlights on, other drivers' eyes will be drawn to an awareness of your vehicle through the detection of light by their peripheral vision (side vision) even when they do not effectively look for you.

Safety, Communication, Comfort and Convenience Devices - Important to know where they are located and how to use them!

Securing and Exiting the Vehicle

- **Keep Foot on Brake** - Keep your foot on the brake until the parking brake is set, and then shift into Park.
- **Accessories Off** - To prevent unnecessary drain on the battery, turn off all accessories before turning off the engine.
- **Windows Closed** - Some power windows must be closed before turning off the ignition.
- **Ignition Off, Key Removed** - Turn off the ignition and remove the key. Keep the key in your hand until after you exit the car.
- **Safety Belts Off** - It should take no more than two seconds to remove the belt.
- **Left Rear Check** - Make an over-the-shoulder check to determine if or when the door can be opened safely.
- **Open Door** - Open the door as little as necessary and close it as soon as possible.
- **Doors Locked** - Keys in hand, lock the door, and walk toward the rear of the car so traffic is visible.
- **Alarm Set** - If your car is equipped with an alarm set it.

1.3 - Instruments Gauges and Symbols

Background

The most important skill regarding the reading of instruments is for the learner to know the difference between a normal and abnormal reading and to be able to know what the consequences are for ignoring the gauge's warning. Many drivers see the gauge or warning light but fail to understand the message.

Reading Instruments and Gauges

The various gauges and instruments, located in front of the driver, provide information about the condition and status of various parts of the car. They should be scanned and checked when the key is turned to the "on" position and while the vehicle is actually running.

Other Instructional Components

When the ignition is switched on, the instrument lights come on momentarily and then turn off as each system becomes ready. If any light doesn't go off, blinks, or comes on while driving, your attention is needed. What follows is not a complete list of symbols and warnings that may appear in and on a car's instrument cluster.

Color Has Meaning

RED indicates a potentially serious problem, safety issue, or important reminder.

AMBER indicates something needs to be serviced or repaired soon. If the symbol is flashing, it is truly important that you contact your mechanic.

GREEN or **BLUE** is information only and indicates a system is on or operating

Warning and Indicator Symbols



Seat Belt Reminder/Warning: It usually has an audible warning alarm that goes with it. The symbol appears and remains active as long as the engine is started, and the seat belt remains unfastened. It simply wants you to put on your safety belt and make sure everyone else is belted.



Brake Warning Indicators: Could indicate a serious brake problem, but the light will also be on when the parking brake is engaged. If you are sure the parking brake is released, stop as soon as possible. To continue driving could be dangerous! Needs service.



Engine Coolant Temperature Warning: Indicates the engine temperature is too high. Stop your vehicle and turn off the engine as quickly as possible. It may require immediate attention to avoid vehicle serious engine damage. Turning on the heater to the highest setting will remove some of the heat as well. Needs service. Do not add cold water.



Engine Oil Level or Oil Pressure Warning: This indicates a problem with the oil circulation.



Charging System Warning: Indicates a charging system problem



Supplemental Restraint System (SRS) Air Bag Indicator Symbols: When this light goes out, it indicates that the airbag is

ready to deploy in the event of a crash. If it stays on, it means that the system should be serviced as soon as possible.



Anti-lock Brake System Trouble Lights: The ABS system helps to prevent front-wheel skids in slippery or extreme braking

conditions. If there's a problem with the Anti-lock Braking System, the system will turn itself off and the warning light will come on. The brakes will function as normal, without the benefit of the anti-lock system.



Electronically Controlled Brake System: Orange indicates a less serious problem than red. The electronic control represents a functional enhancement and may be inoperable, but the brakes themselves will still operate.



Tire Pressure Monitoring System Lights: Indicates low tire pressure, which could affect the grip and raise fuel consumption.

The light comes on when the inflation on one of the tires is down 25% or more.



Check Engine Light Symbols: Reveals a problem with the engine or gas emissions and requires the car to be serviced.

Thousands of reasons for it and only your mechanic can properly address them. A loose or missing gas cap will cause the light to come on.



Check Gas Cap Indicator Symbol: If you see this light, stop the vehicle in a safe place and make sure the gas cap is tightened properly. If you ignore this light, the Check Engine light will likely come on next.

If any of these indicators are turned on, it means the system needs to be checked and/or serviced as soon as possible. There are many other symbols and indicators. Check your owner's manual to be aware of warning lights for your vehicle, such as traction control, park assist and others.

Special and Advanced Feature Symbols and Indicators



Attention Assist Indicator Symbol: If the vehicle is equipped with this cool option, the symbol will be shown after a pre-set period of time, suggesting a break from driving. It will be accompanied by a warning tone and a text message on the instrument panel's display. The color of the symbol is not relevant





Lane Departure Warning Symbol, Lane Departure Warning (LDW) System: Assuming detectable lane markers, this light blinks orange if the vehicle is traveling close to either the left or the right of the traveling lane. A warning chime may also be heard.





Lane Keep Assist (LKA) CAUTION: does not steer the vehicle and is only an aid to help stay in the driving lane. It may not provide enough time to avoid a lane change collision. LDW may not be loud enough to hear the warning beeps. It may not work properly under bad weather conditions or if the windshield is not kept clean. It may not detect lane markings and will not detect road edges.


Lighting Indicators and Routine Symbols

 **Headlamp Controls and Indicator Symbols:** Indicates location of a Master Lighting switch. Some car companies use this symbol when the headlamps are turned on. In vehicles equipped with automatic headlamp operation, the symbol will appear when the light switch is set to Auto.

 **High Beam on Indicator Symbol:** It is active only when the high beams are active and has been a standard in vehicles for decades.

 **Daytime Running Lamps (DRL):** Illuminates when the daytime running lamps (DRL) are on. Also, an indication that taillights, license plate, and parking lights are switched OFF. Full headlights allow others to see your vehicle at all times and in all weather conditions. At minimum, turn on the headlights at dusk and during inclement weather; failure to do so may result in a collision.

 **Turn Indicator Lights:** Illuminates when the turn signal or hazard lights are activated. Also indicates that the signal lights on the front and rear of the vehicle are operating normally.

 **Fog Lamp Indicator Symbol:** The indicator is lit only when the fog lamps are activated. There is a Rear Fog Lamp Indicator symbol in amber. This indicator is only active when the lamps are actually on.

Speedometer: Analog or digital gauge indicates the speed at which vehicle is traveling. Check it while you are driving and, especially, when you see a speed limit sign. Only 1/3 or 1/2 of a second glance away from the target area is needed.



Tachometer: Shows the number of revolutions per second (RPM x 1000) at which the engine is operating. Shows when engine is and is not running. However, not all cars have tachometers. Not to be mistaken for the speedometer!

Odometer: This shows the total number of miles the car has been driven since it was new. It is a crime to tamper with this gauge.

Trip meter: This is like the odometer in that it shows the total number of miles driven. However, unlike the odometer, it can be set to a zero reading and is helpful in recording the number of miles of a trip or the number of miles traveled on each full tank of fuel



1.4 - Vision Control

Vision Control

There is an amazing connection between your eyes and hands! Physically your eyes are in the car, but visually they are ahead of the car leading you down the road. Using your eyes correctly is the key to low-risk driving.

Central, Fringe and Peripheral Vision

A driver gains information through the eyes in three basic ways.

- Central vision is that part of one's visual field that sees detail. With central vision, we are able to read, focus on the computer screen, and identify distinct objects in the driving environment. It is the basis for the visual lead, aiming to the target and target area, and searching tasks in driving.
- The fringe vision area describes an area around the focal area that is used to judge depth and position. One's fringe vision gives support information to one's central vision. It is used to see standard reference points and vehicle position on the roadway.
- The peripheral vision is conical in shape around the other vision fields. It functions 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.

Vision Usage

- Brief eye fixations must be made with the central vision to identify elements – 1/3 to 1/2 second search
- The driver must learn how to use central, fringe, and peripheral vision
- See the target to the environment with central vision
- See the target in relation to the car with lower part of fringe vision
- Search out to the target area for conditions in the intended driving path
- Re-evaluate the immediate driving path

Establishing a Visual Lead

Keeping your eyes focused farther away from the vehicle will allow the driver to take more time to make decisions. This task is critical to gaining as much information as possible from the driving scene.

As speed increases, the amount of information needed to keep car position and detect movement increases. The speed and movement of the vehicle reduces the driver's ability to detect the motion of other objects with peripheral vision. Minor changes to car position occur in shorter periods, causing significant or exaggerated vehicle movements.

The faster you go, the more critical it is to aim to the target area.

- Allows more time to gather information
- Increases peripheral vision area, which allows for motion detection farther away from the vehicle in order to give time for adequate response
- Puts more space between other vehicles and your vehicle, and abrupt responses are avoided

Target Usage Advantages:

- Learning to use an effective searching process
- Gets the driver to look far ahead
- Increases steering accuracy
- Helps driver visualize the space he/she intends to occupy
- Gains proactive perception time, reducing dependence upon reaction time
- Develops skid prevention, detection, and correction skills

On-Target, Off-Target

Learning how to locate a target.

A *target* is a stationary object that appears in the center of where you intend to drive the car. For example, if you look as far down the road as possible to the space that you expect the car to occupy, you will see some fixed object, such as part of a house, a tree, a pole, a sign, a bush, etc.

The *target area* is the driving environment to the left and right of where the target is located. Searching the target area for driving-related information is more important than merely identifying a target.

The *path-of-travel* is the actual space you expect your vehicle will travel on the roadway, from the point where you are located when you first see the target, to when you arrive into the target area.

Aiming for Targets

Aiming for targets will help keep the car in its travel path, help make accurate turns, and help get the driver's eyes ahead of the vehicle. The use of targets is an important skill necessary to avoid and recover from a skid situation.

Looking into Turns

Develop the habit of turning your head in the direction of intended movement before turning the steering wheel.

1.5 - Motion Control

Motion Control

Smooth and precise braking, and acceleration actions are car control skills drivers use every day to manage vehicle balance and prevent a crash.

Vehicle Balance

Pitch: the force applied forward or backward from the center of gravity of the vehicle

Roll: vehicle weight is transferred to the side of the tires when turning or cornering

Yaw: the spinning effect of a vehicle around its center of gravity

A driver is far less likely to successfully manage the vehicle without the knowledge of targets, target area, path-of-travel, the use of central and fringe vision, seat adjustments, safety restraints, and various braking and acceleration techniques. These are basic car control behavioral skills.

Explain that vehicles balance on four tires. Stopped vehicles have the best balance. Drivers must learn how to manage those forces with a combination of vision, motion, steering control, and timing techniques.

Driver Position for Best Pedal Control, Balance, and Stability in the Seat

- Position heel on floor in front of the brake to maximize braking controllability
- Ball of foot makes and maintains contact with pedals for smooth braking and accelerating
- Pivot ball of foot to accelerator from brake
- Left foot on dead pedal for balance and stability

Normal Smooth Stop = Controlled Brake + Trail Brake

To make a "Normal Smooth Stop," use controlled braking at the beginning of a braking action (feel the grab point and then steady even pressure), then decrease some braking pressure 1-2 seconds before the car stops.

Smooth Start = Releasing Brake + Light Acceleration + Progressive Acceleration

1.6 - Steering Control

Steering Control

Smooth and precise steering, actions are used to manage vehicle balance and perform precision turns and maneuvers.

Steering Techniques

You need good steering habits to maintain control of the car, especially if a critical situation develops. One critical situation may be caused by a tire blow out. Another may occur during rainy conditions when the car begins to hydroplane, or when a large truck or bus passes and creates a buffet of wind that can push your car into another lane. These and other critical situations seldom occur, but when they do, good steering habits are important to avoid losing control. 10 & 2 steering is discouraged.

Discuss that while driving a vehicle with power steering, steering becomes much more difficult when the engine fails. However, one is still able to steer the car by putting an extra amount of force into the steering effort.

Best Hand Position when Traveling Straight

Hold the steering wheel with two hands in a balanced position, if you look at the steering wheel as the face of a clock, a 9 & 3 position or an 8 & 4 position. Either of these balanced positions will give you good control while traveling straight.

Hand-over-Hand Technique for Slow Sharp Turns

Such a technique begins with both hands on the steering wheel. Making a left turn begins with the left hand at the 9 position and the right hand at the 3 position, both hands staying on the wheel until the left hand travels to the 7 position. Then the right hand continues to move the wheel until it reaches the 8 position, during which time the left hand crosses over the right hand, grips the wheel at the 12 position, and continues turning until it reaches the 7 position. The right hand at the 12 position then continues the turning.

Pull – Push Technique for Most Turns and Curves.

This method can give you good steering control when turning and navigating curves. It begins with your hands in the 8&4 position. While entering a left curve or making a left turn, slide left hand to 11 position, grip and pull to 7 position. The right hand at the 4 position is pushed up, while the left hand slides up to the 11 position, if more steering is needed, and pulls down. Continue to pull and push as needed. For right turns, right hand begins at 1 position and pulls to 5. Left hand pushes up from 7.