

Virginia Department of Education

Module Two Transparencies

Virginia Driver Responsibilities: Preparing to Operate a Vehicle

Topic 1 -- Driver Preparation Procedures

Topic 2 -- Identifying Vehicle Control Devices

Topic 3 -- Operating Vehicle Control Devices

Topic 4 -- Vehicle Balance Considerations

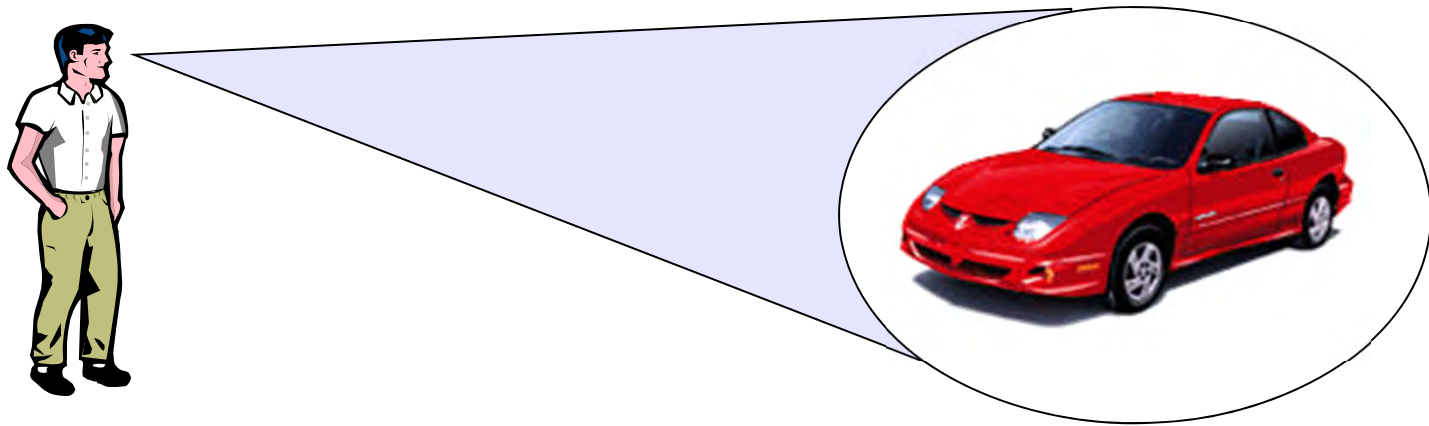
Topic 5 -- Standard Vehicle Reference Points

Provided in cooperation with the Virginia Department of Motor Vehicles

Pre-Drive Tasks



Check around the outside of the vehicle for broken glass (windows, lights, etc.), body damage, condition of tires, fluid leaks, direction of front tires, or debris on the ground that could interfere with movement.



Check for small children or pets near vehicle.



Pre-Drive Tasks



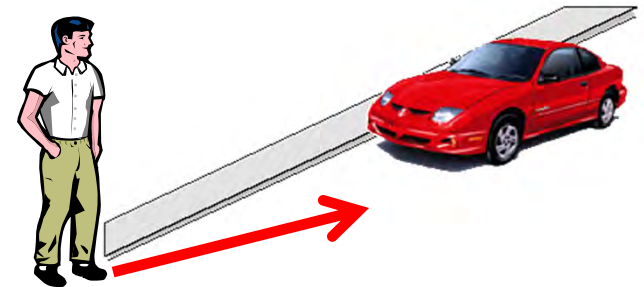
Store personal items in trunk of vehicle

- Sliding books or book bags on seats when slowing or stopping will distract the driver.
- Food or beverages also distract the driver from the driving task.
- Valuables visible in the car may attract a thief.



When parked at the curb

- Approach vehicle from the front to monitor oncoming traffic.
- Approach driver's door with key in hand.



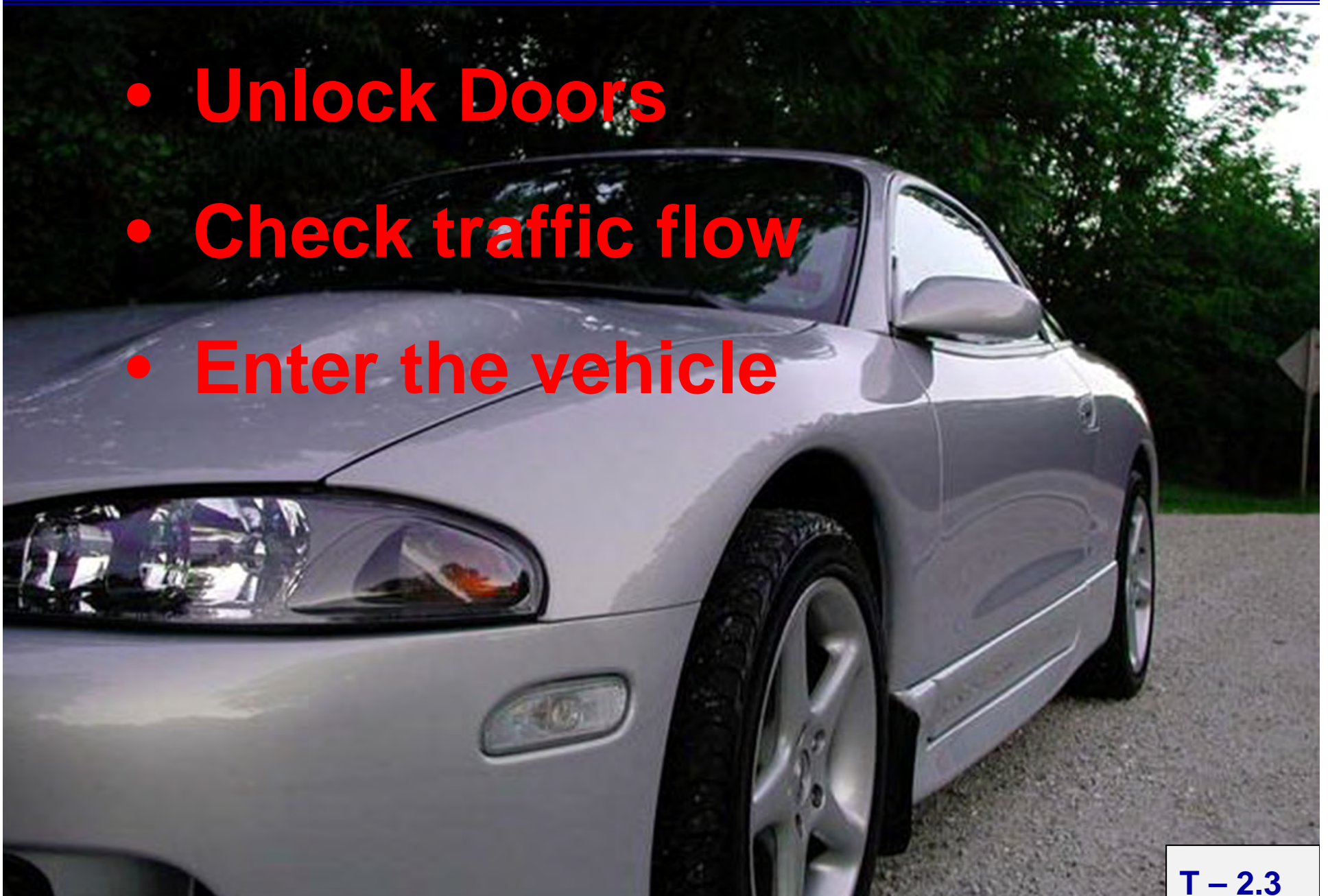
When parked in parking lot

- Approach vehicle from the rear to observe people or objects near the car.
- Approach driver's door with key in hand.

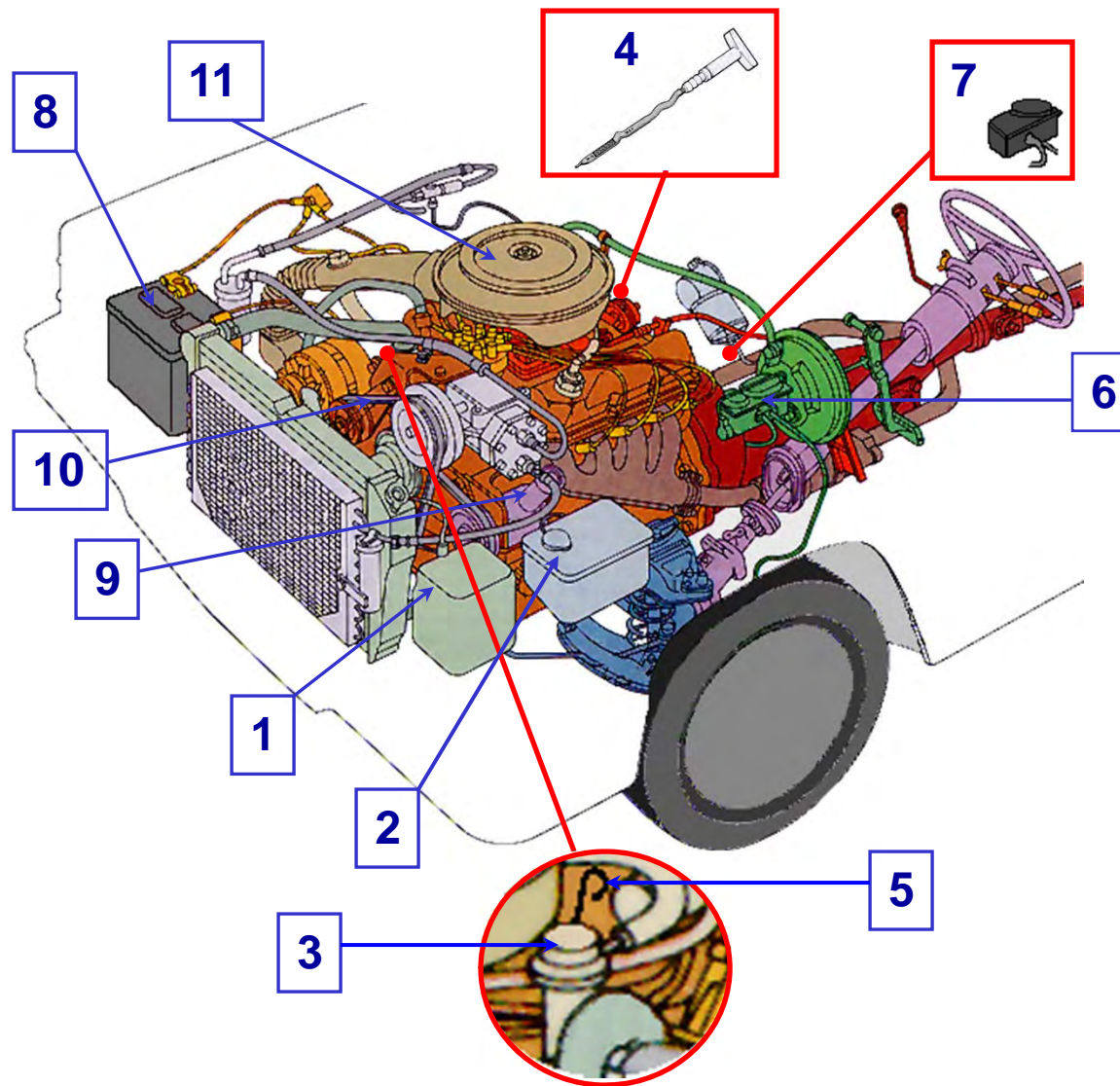


Pre-Drive Tasks

- **Unlock Doors**
- **Check traffic flow**
- **Enter the vehicle**



Under the Hood Checks



1. Engine Coolant Reservoir
2. Windshield Washer Fluid Reservoir
3. Engine Oil Filler Cap
4. Transmission Fluid Dipstick (Automatic Transmission)
5. Engine Oil Dipstick
6. Brake Fluid Reservoir
7. **Clutch Fluid Reservoir (Manual Transmission)**
8. Battery
9. Power Steering Fluid Reservoir
10. Drive Belts
11. Air Filter Assembly

Weekly Self-Checks

Tires



- Tire pressure
 - Check recommendation in owner's manual
- Tread wear, damage, or bars showing
- Cuffing (uneven wear on inside or outside tread areas)
- Bald spots
- Cuts, stones, metal fragments, or other damage

Vehicle Safety, Communication & Accessories



- Headlights, tail lights, and turn signals
- Emergency lights and markers
- Emergency kit
- Windshield wiper blades, operation, and washer fluid
- HVAC
- Safety warning lamps (brake, ABS, air bag, safety belts)

Under the Hood Checks

Self-Check



Check every 1-2 Months

- All interior and exterior lights
- Engine oil level, brake fluid level, and engine coolant level
- Lap/shoulder belts and seat latches for wear and smooth function

Check Twice Per Year

- Air pressure in spare tire
- Power steering fluid level
- Parking brake for proper operation
- Hinges, latches, door weather strips, and outside locks (check and lubricate)
- Body and door drain holes (check and clean)
- Cooling system coolant strength
- Battery connections (clean if necessary)
- Transmission fluid level

Professional Service



Every 3,000 - 5,000 Miles

- Oil change/filter replacement
- Tire rotation/balance

Every 15,000 Miles

- Automatic transmission fluid level
- Brake pads/shoes/rotors/drums, brake lines, hoses, and parking brake system
- Engine cooling system
- Steering linkage, suspension and, if equipped, drive shaft and ball joints
- Cabin air filter replacement, if equipped

Every 30,000 Miles

- Exhaust system and heat shield
- Engine air filter and fuel filter replacement
- Accessory drive belts
- Automatic transmission/transaxle service, if equipped

Driver Readiness Tasks

Security

- Check passengers for safe entry
- Lock doors
- Place key in appropriate location

Driver's Seating Position

- Adjust so driver's heel can pivot smoothly between foot pedals
- Adjust to allow at least 10" between driver's chest and the steering wheel
- Adjust seat back for driver's visual needs



Driver Readiness Tasks

Restraints

- Safety belt positioned across chest and over pelvis (strongest skeletal bones)
- Sit at least 10" from the steering wheel and side air bags
- Head restraint – middle of the back of the skull



Adjusting Safety Belt for Proper Fit

- Adjust the seat, place your lower back firmly against the seat and sit up straight (if equipped with adjustable center post mountings for shoulder belt height, adjust height setting so the belt does not rub against your neck)
- grab the bracket above the latch plate and pull the belt across your pelvis (make sure it is not twisted)
- push the latch into the buckle until you hear it click (check to make sure the latch is locked)
- snug the lap belt by pulling down on the buckle end as you pull up on the shoulder belt

Driver Readiness Tasks

Mirrors

- Set rear view mirror to see 200 feet to the rear.
- Set side view mirror 15 degrees out to view adjacent lane.



NOTE: *If rear view is blocked*, adjust side view mirrors to see the side of vehicle and area behind the vehicle. **This mirror setting will increase your blind spot.**

Starting Tasks



- ✓ **Check/set parking brake**
- ✓ **Place foot on service brake**
- ✓ **Put key in ignition and unlock**
- ✓ **Move shifter to park/neutral**


Starting Tasks




- ✓ **Activate choke/fuel injection**
- ✓ **Turn ignition to the on position**
- ✓ **Check gauges**
- ✓ **Adjust ventilation (HVAC)**
- ✓ **Set needed accessories (defroster, wipers, etc.)**

Securing Tasks

✓ Stop in a legal, safe parking space

 Park an appropriate distance from a fire hydrant, intersection, RR crossing, loading zone, etc.

 Keep foot on service brake.



✓ Set Parking Brake

Recommended in most new vehicle owner's manuals to protect transaxle and constant velocity joints.

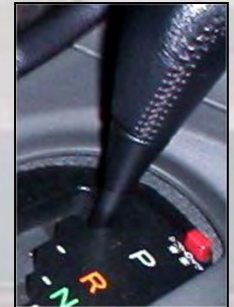
✓ Place gear selector in (P)ark.

Or place in recommended gear (Reverse or First gear) for manual shift transmission.



✓ Turn off any vehicle accessories

Check that all systems are functioning and ready to use next time.



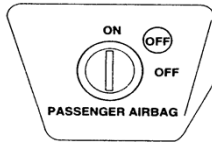
Securing Tasks



- ✓ **Turn ignition switch to “off”**
 - The engine and all accessories should shut off.
- ✓ **Lock ignition switch and remove key**
 - This is a safety feature for removing the key in most vehicles.
- ✓ **Remove occupant restraints**
 - In some older cars, the shoulder restraints operate when the door is opened.
- ✓ **Check traffic and exit the vehicle**
 - Check traffic flow to rear prior to opening the door.
 - Rear child safety door locks may need to be opened from the driver's door.
- ✓ **Secure doors and windows**
 - Protects valuables and unauthorized entry by others.

Alert/Warning Symbols and Controls

A.



Air Bag On/Off Switch

B.



Air Bag Functioning

C.



Antilock Brake System Functioning

D. THEFT

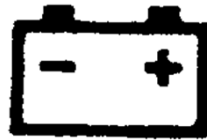
Theft-Deterrent System Activation

E.



12 Volt Extension Outlet

F.



Battery/Alternator Warning Light

G.



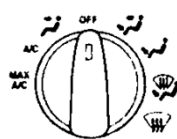
Brake Warning Light

H.



Safety Alert Symbol

I.



Vent and Air Flow Control

J.



Door Locks

K.



Low Oil Pressure Warning Light

L.



Temperature Indicator

M.



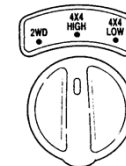
Seat Belt Reminder

N.



Fog Lamps

O.



Drive Wheel Selector

P.



Fuel Indicator

Q.



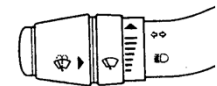
Fuse / Fuse Box

R.



Emergency Flashers

S.



Turn Signal Wipers Stalk

Alert/Warning Symbols and Controls



Headlights/High Beam Indicator



Lighter Indicator



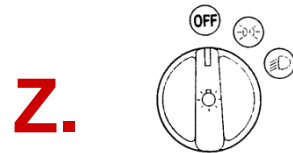
Power Window Controls



Left/Right Signal Indicator



Hood Release



Exterior Lights



Rear Defroster Indicator



Front Windshield Defroster



Horn



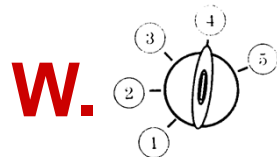
Overdrive On/Off Indicator



Cruise Control Device



Windshield Washer



Fan Speed Indicator



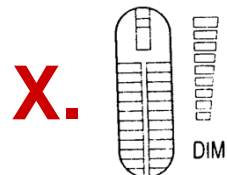
Parking Lamp Indicator



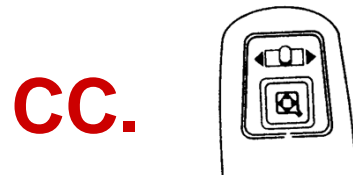
Steering Wheel Height Adjustment



Windshield Wipers



Interior Light Adjustment



Adjust Left/Right Side Mirror



Trunk Release



Electronic Traction Control System

Control, Information, Comfort, and Safety Devices

- Headlamp Control
- Fuse Panel
- Instrument Panel
- Vents



Location and description for all instruments and features can be found in Vehicle's Owner's Manual

Multi-Function Lever

- Headlight High/Low Beam Switch
- Windshield Wiper/Washer Control
- Turn Signal Switch
- Speed/Cruise Control

Control, Information, Comfort, and Safety Devices

Center Instrument Cluster



- **Speedometer (mph-km/h)**
- **Odometer**
- **Trip Odometer**
- **Gear Indicator**

Location and description for all instruments and features can be found in Vehicle's Owner's Manual

Control, Information, Comfort, and Safety Devices

Instrument Panel

- Safety Belt Reminder
- Antilock Brakes (ABS)
- Brake Warning Light
- Air Bag Warning Light
- Battery/Alternator Warning light
- Fuel indicator
- Left/Right Turn Indicator Light
- Engine Temperature
- High Beam Indicator
- Speed Control Settings



Location and description for all instruments and features can be found in Vehicle's Owner's Manual

Control, Information, Comfort, and Safety Devices

Instrument Panel Con't

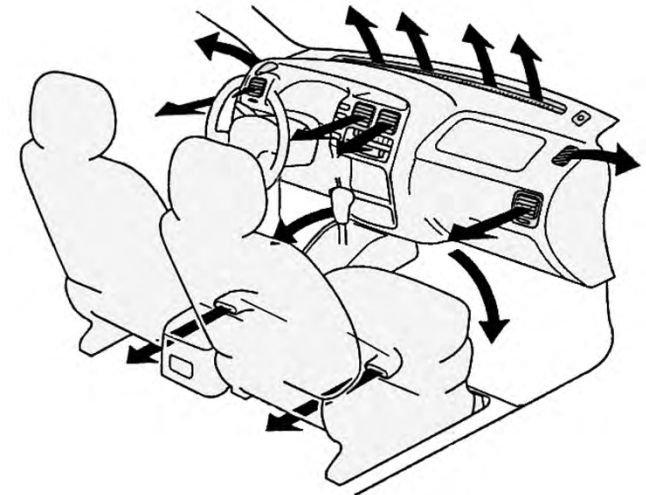
- Oil Pressure Gauge
- Door Ajar Warning Light
- Anti-Theft Light
- Speed Control Light
- O/D On/Off
- Driver Air Bag (SRS)
- Lighter
- Horn



Location and description for all instruments and features can be found in Vehicle's Owner's Manual

Control, Information, Comfort, and Safety Devices

- **Electronic Sound System**
- **Selector Lever**
- **Auxiliary Power Outlets**
- **Climate Control Systems**
- **Passenger Air Bag Cut Off Switch**



NOTE: Location and description for all instruments and features can be found in Vehicle's Owner's Manual

Operating Vehicle Control Devices

- **Safety Considerations to Minimize Risks**
 - **Maintain steering control while adjusting information, comfort, or control devices**
 - **Always turn steering wheel in direction of desired movement when**
 - **Moving forward or**
 - **Moving backward**
 - **When adjusting steering wheel height and/or angle consider**
 - **Airbag deployment**
 - **Hand position**
 - **Wheel movement**



**Crossing arms
over airbag
creates an
injury risk!**

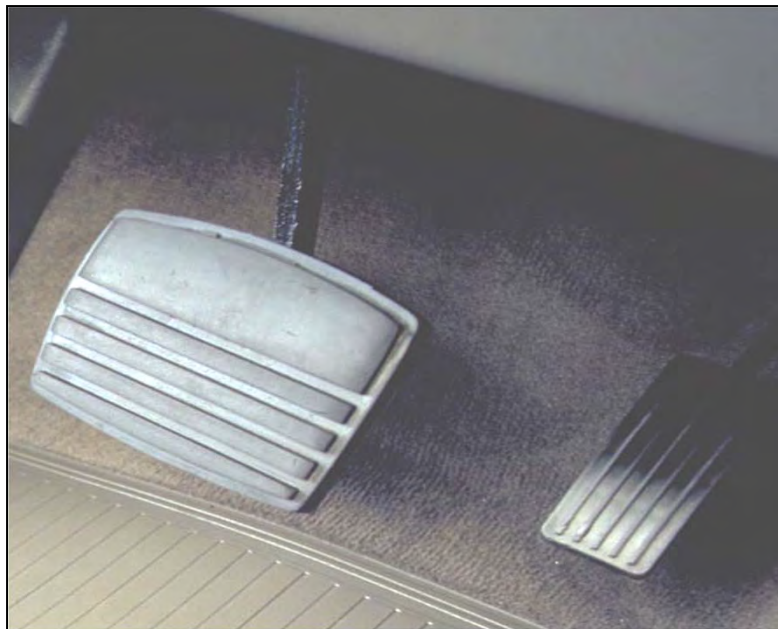
Operating Vehicle Control Devices

Brake Pedal

Used to stabilize, decrease, and increase speed.

The driver can:

- cover the brake;
- trail brake;
- control squeeze brake;
- threshold brake;
- lock the brakes;
- apply ABS;
- jab (stab) brake; or
- lift off the brake.



Accelerator Pedal

Used to stabilize, increase, and decrease speed.

The driver can:

- cover the accelerator;
- use progressive acceleration;
- use thrust acceleration; or
- lift off the accelerator.

Operating Vehicle Control Devices



Gear Selector Lever

- Transmission Type and Location
- Overdrive and Drive gear use

Parking Brake

- Owner's Manual suggests engaging parking brake before placing in Park.

Cruise / Speed Control – Why and How

- To maintain a constant speed.
- Never use in stop-and-go traffic or on slick surfaces.

Ignition Switch - Location and Functions

Safety, Communication, Comfort, & Convenience Devices

- Mirrors
- Safety Belts
- Head Restraints
- Horn
- Turn Signals
- Door Locks
- Hazard Flashers
- Windshield Wipers and Washers
- Headlights / Daytime Running Lights
- Hood Release
- Trunk Release
- Heat / Defroster / Air Conditioner Controls
- Seat Adjustment



Safety, Communication, Comfort, & Convenience Devices

Mirrors

- Adjust Inside and Out



Safety Belts

- Adjust for Maximum Effectiveness



Head Restraints

- Protect Against Whiplash



Horn

- Know Location and Use



Turn Signals

- Know Location and Use

Door Locks

- Manual / Power
- Child Proof Rear Door Locks



Hazard Flashers

- Know Location and Use



Safety, Communication, Comfort, & Convenience Devices

Windshield Wipers and Washers

- Location and Use



Headlights / Running Lights

- Location and Use

Hood Release

- Location



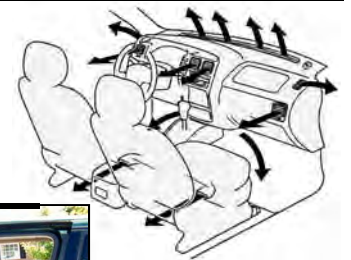
Trunk Release

- Location



Heat / Defroster / Air Conditioner Controls

- Location and Use



Seat Adjustment

- Power / Manual Controls



Controlling Vehicle Balance

Vehicle Balance (Roll, Pitch, and Yaw)

- **Roll:** vehicle's weight shifts from side to side
- **Pitch:** vehicle's weight shifts forward or backward
- **Yaw:** vehicle's rear tire weight shifts to one side
- **Note:** These weight transfers occur when the amount of weight or force pulling on each tire changes
- Optimum balance is achieved at rest with no movement
- Suspension and tire pressure also affect vehicle balance

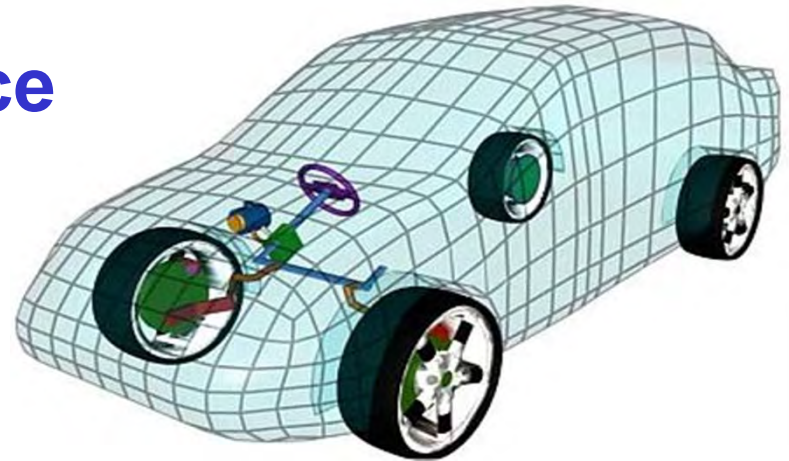
Vehicle Movement on Crowned or Banked Roadway

- Can create dramatic changes to vehicle balance due to suspension and weight shifts

Controlling Vehicle Balance

Maintaining Vehicle Balance

- **Steering Wheel Balance**
 - Smaller steering wheel design
 - Rack and pinion steering control
- **Precise Steering, Braking, and Accelerator Input**
 - Less steering movement needed in modern vehicles
 - Need smooth acceleration/deceleration
 - Squeeze brakes for balanced stops
- **Changes in Steering Ratios, 1980's to Date**
 - Steering input has been significantly reduced



Controlling Vehicle Balance

Seating

- Driver position/balance and safety belt/pedal use

Changing Vehicle Load from Side to Side (Roll)

- Steering Wheel Movements
- Brake Application and Steering Combinations
- Slope of pavement



Vehicle Control

Vehicle Direction / Speed Requirements

Changing Vehicle Load from Front to Rear (Pitch)

- Light accelerator pressure
- Releasing the brake
- Progressive accelerator pressure
- Thrust accelerator pressure

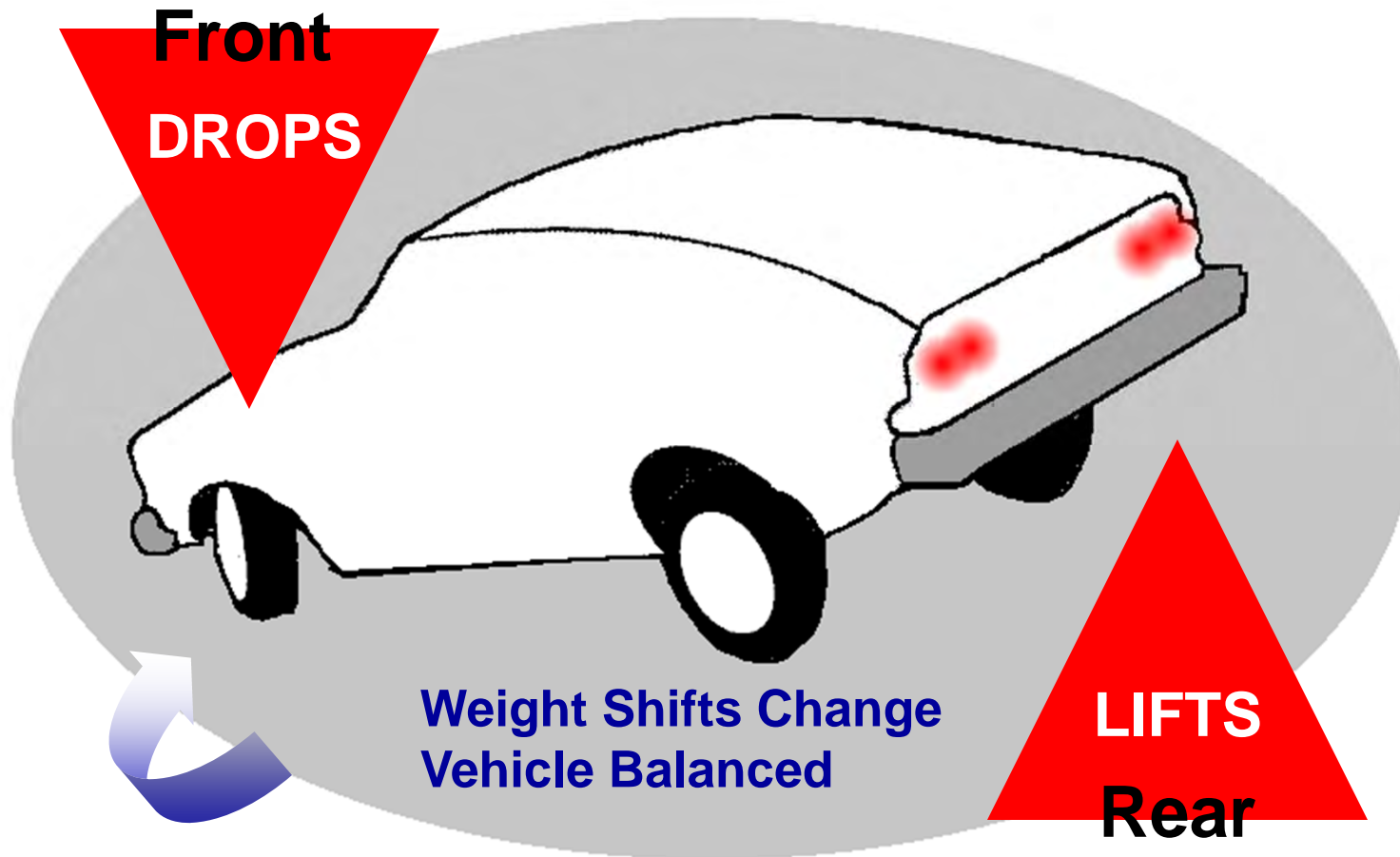


Changing Vehicle Load from Rear to Front (Pitch)

- Releasing the accelerator
- Controlled braking (Squeeze on)
- Threshold braking
- Trail braking (Squeeze off)



Vehicle Control



Accelerating, braking, or steering shifts the vehicle's weight from tire to tire and affects vehicle balance and control.

Vehicle Control

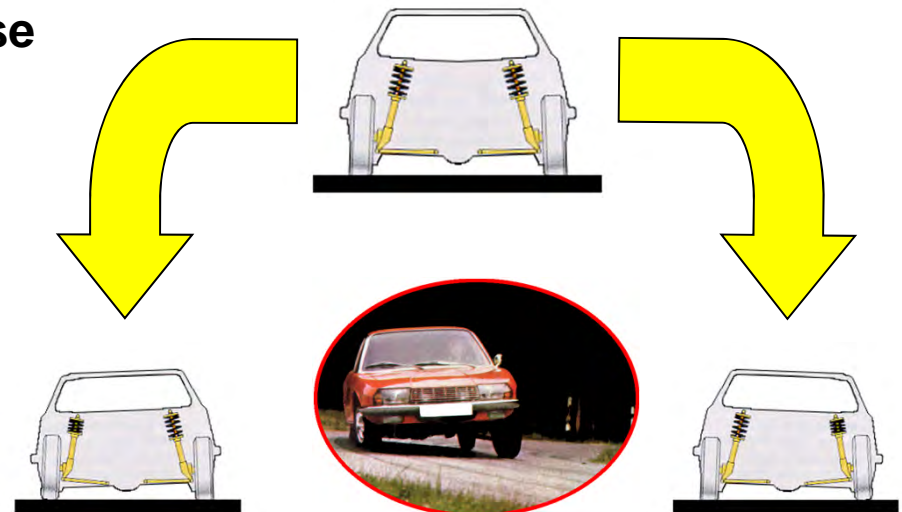
Vehicle Direction / Speed Requirements

Changing Vehicle Balance from Left to Right (Roll)

- Sudden braking and steering
- Sudden or excessive acceleration and steering
- Sudden or excessive steering
- Road tilted to right
- Traction loss to right rear may cause yaw motion

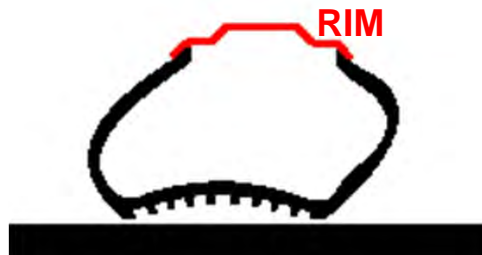
Changing Vehicle Load from Right to Left (Roll)

- Sudden braking and steering
- Sudden or excessive acceleration and steering
- Sudden or excessive steering
- Road tilted to left
- Traction loss to left rear may cause yaw motion



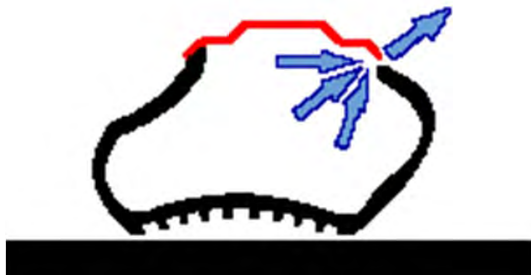
Vehicle Control

When cornering, tires tend to flex.

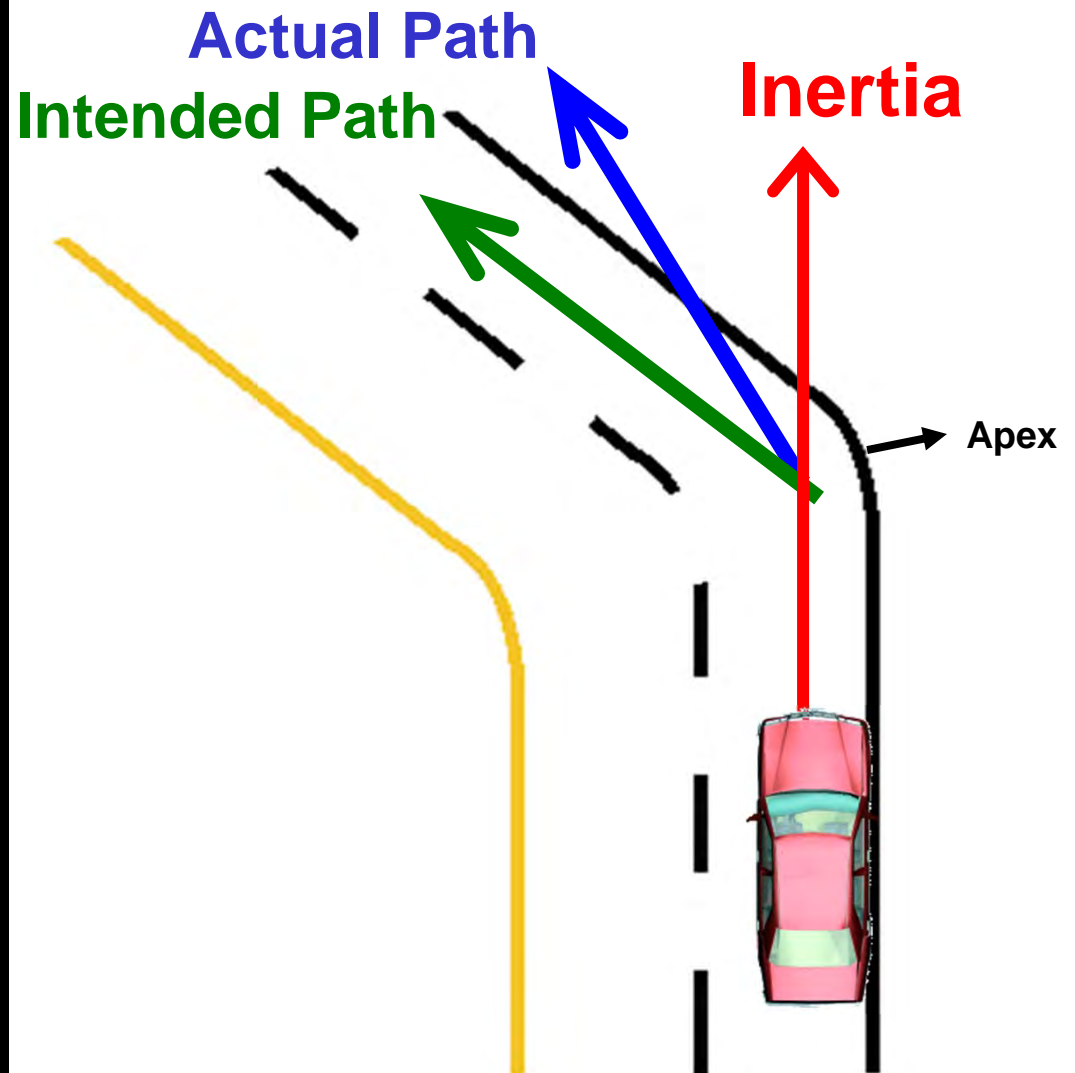


Tires turning left

If the tires are underinflated, the contact with the rim may be lost. **AIR LOSS WILL OCCUR.**



Excessive tire flexion increases tire heat and may result in a blowout.



Cornering

Vehicle Control

Vehicle Direction / Speed Requirements

Steering Wheel Control

❑ Hand position on steering wheel

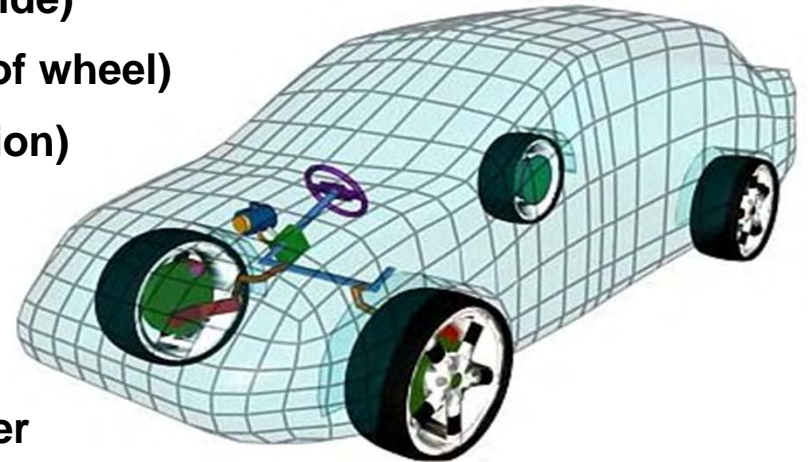


- Holding top or upper half of wheel (excessive steering and air bag injury risk)
- Hands located on lower half of wheel (relaxed, balanced control)



❑ Steering techniques

- Hand-to-hand steering (Push/Pull/Slide)
- Hand-over-hand steering (top third of wheel)
- Evasive steering (ABS wheel limitation)
- One-hand steering
 - ☞ To reach controls
 - ☞ At top when backing straight
 - ☞ At bottom when backing a trailer



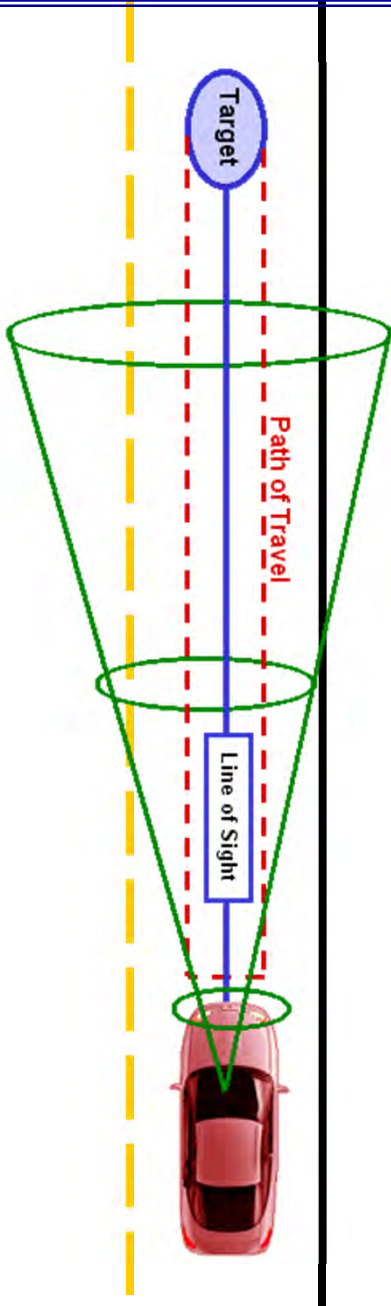
Targeting and Visual Requirements

Visual Functions

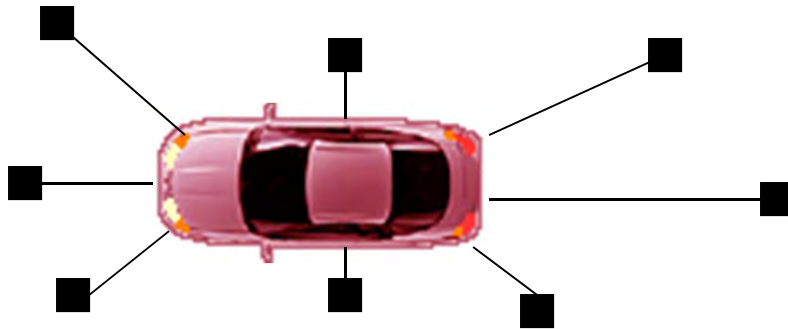
- Focus Vision (Focal/Foveal)
- Central Vision (Limited Fringe Area)
- Peripheral Vision (Side)

Vision Goals

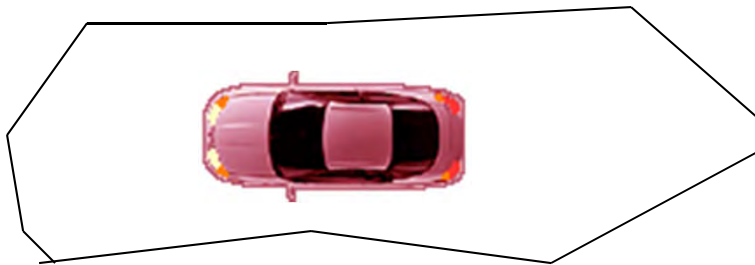
- Maintaining an open line of sight
- Searching skills
- Targeting line of sight, path of travel
- Referencing vehicle to path of travel
- Using visual references and turning targets
- Forward visual turning points
- Rear visual turning points



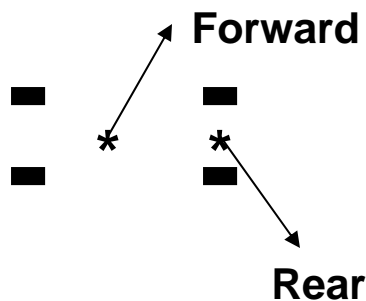
Determining Vehicle Operating Space



Markers represent edge of sightlines

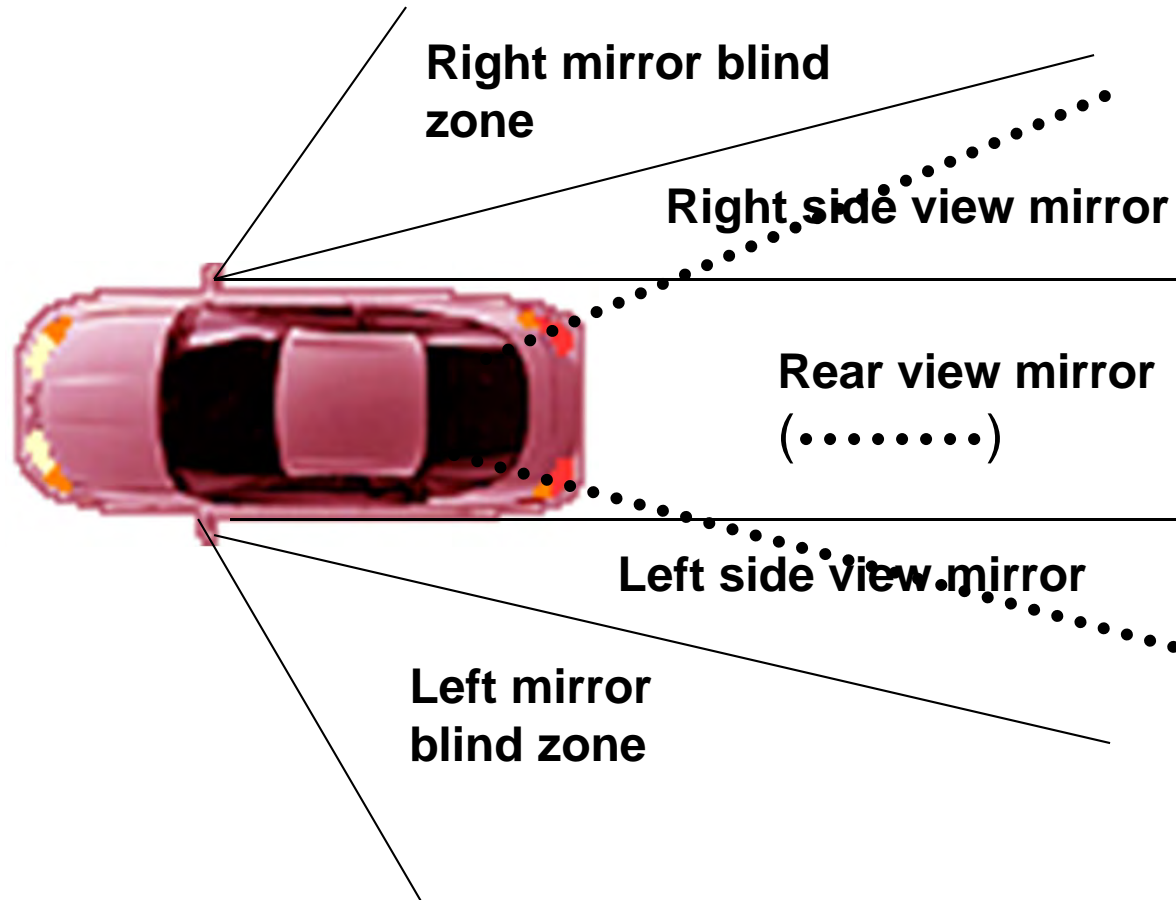


Outline of pavement area around the car the driver cannot see from the driver's seat



Rectangles are the tire patches and asterisks represent the vehicle's forward and rear turning axis

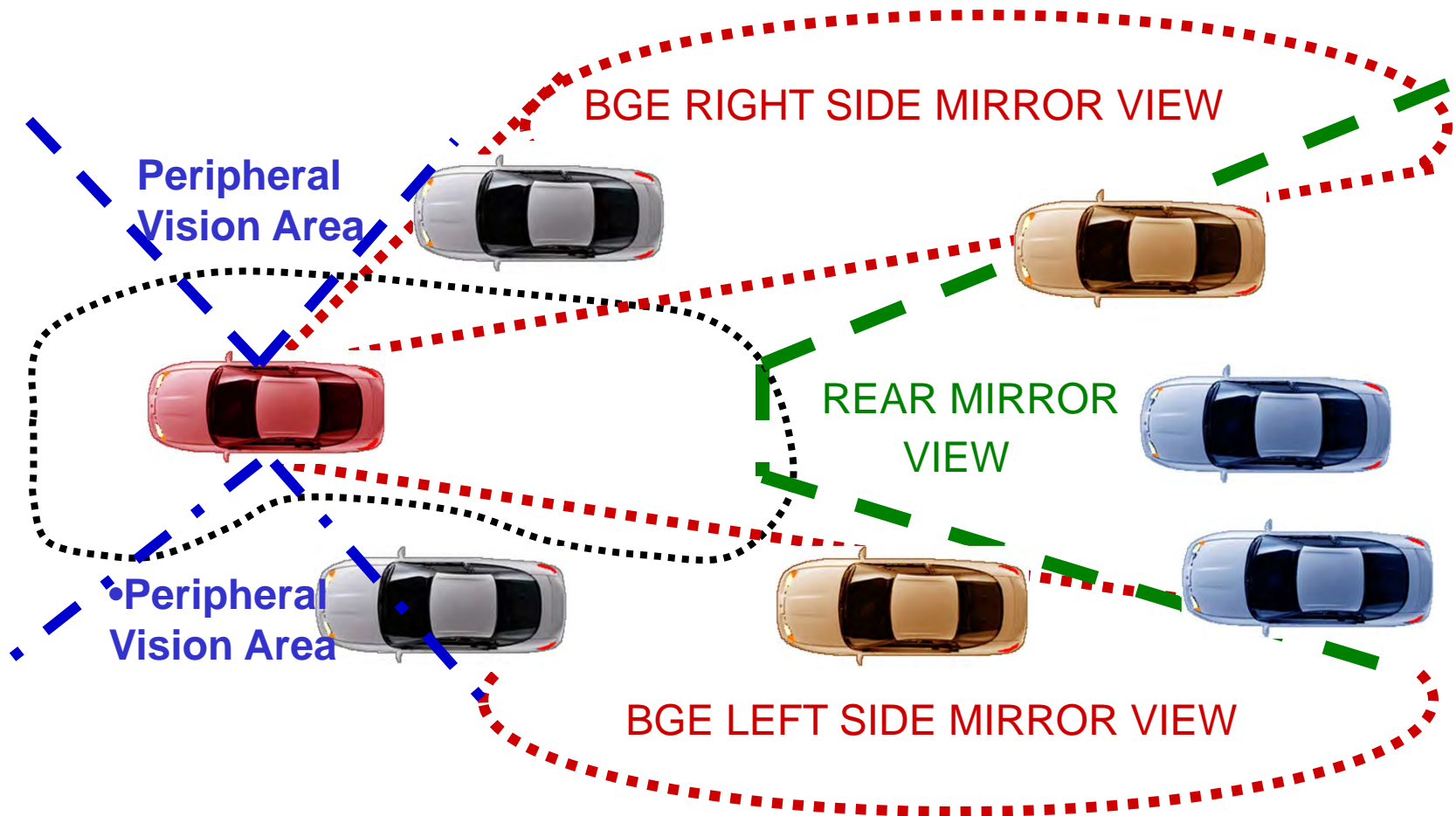
Traditional Mirror Views and Blind Spots



Notice the large blind zone areas and the overlap between the side and rear mirrors when using traditional mirror settings.

Mirror Blind Spot and Glare Elimination (BGE)

Adjusting the side mirror setting 15 degree outward (BGE) allows you to see the lanes to the sides and does not overlap as much with the area you can already see in your rear view mirror



Standard Referencing Points

Referencing Points:

- Provide visual cues to establish vehicle position.
- Relate part of the vehicle to some part of the roadway.
- Allow the driver to determine proper placement within a lane.
- Allow for reduced-risk lane positions.

**LEFT
Reference
Points**



← 6 inches from
line or median



← 3 feet from line
or median

**RIGHT
Reference
Points**



6 inches from →
line or curb



3 feet from line →
or curb

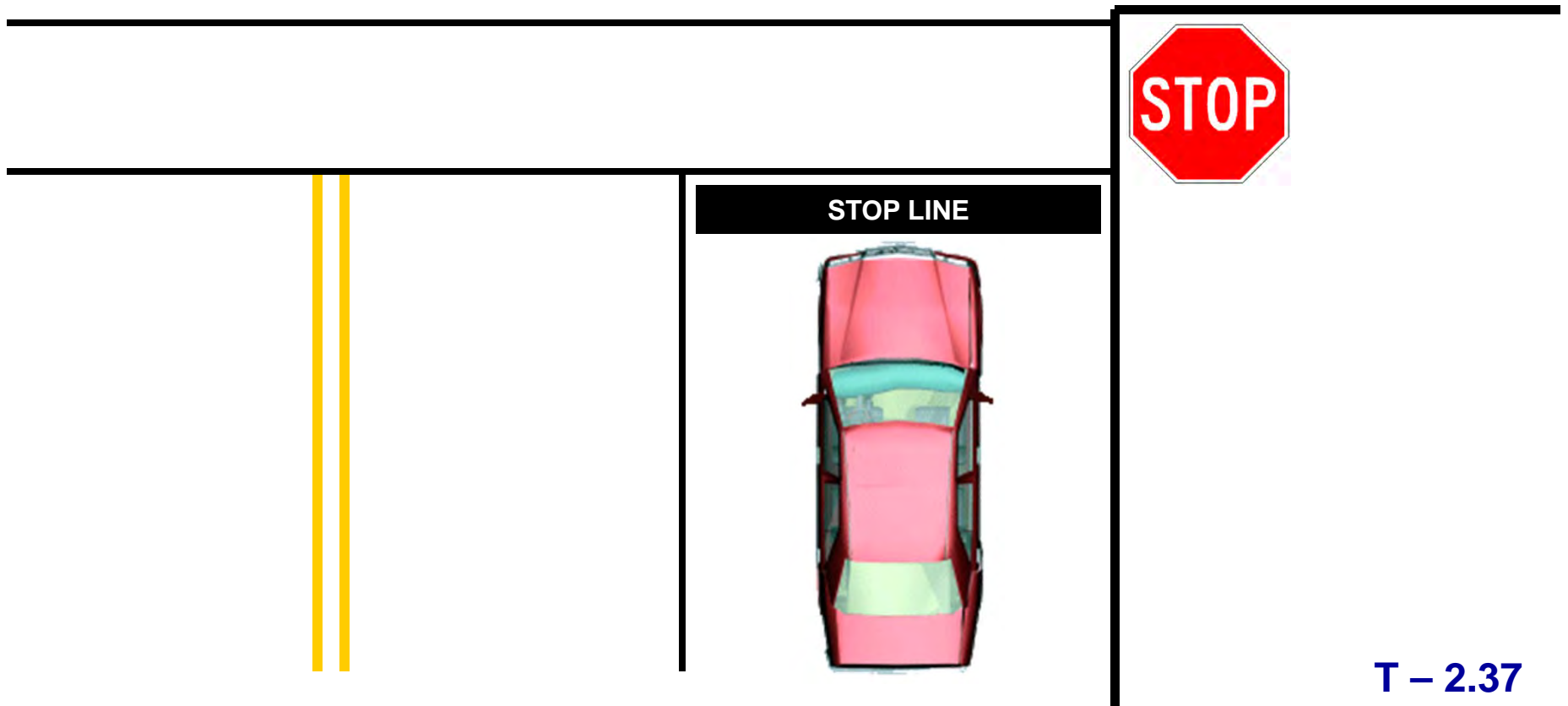
Front Limitation

Front Limitation



You will need to know where the front end of your vehicle is when you are:

- AT INTERSECTIONS
- IN A STOPPING POSITION
- PARKING



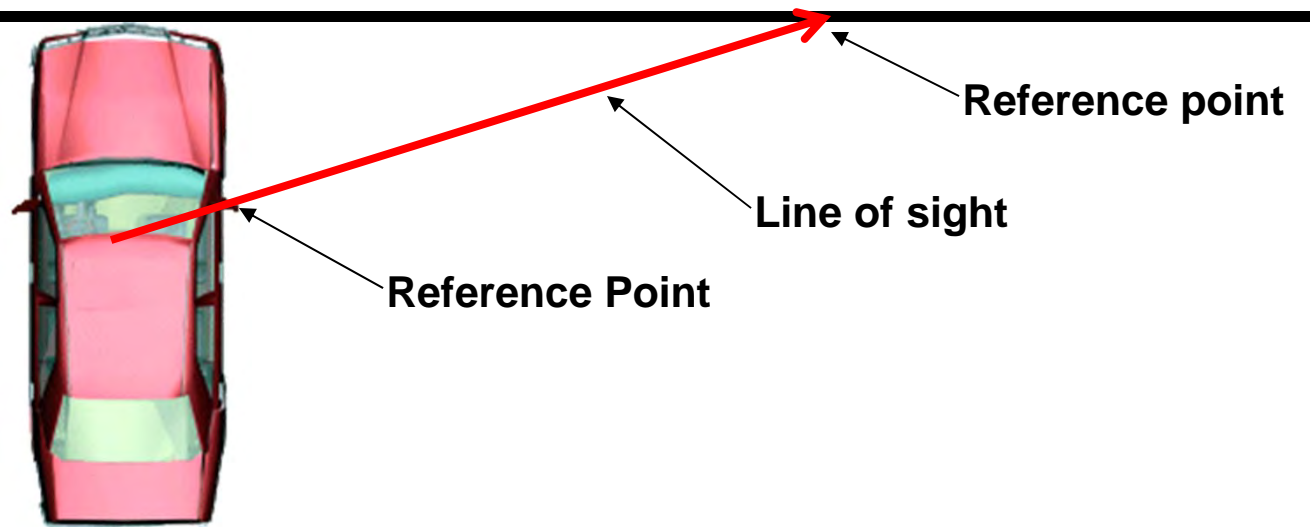
Front Limitation

Where are your visual reference points to determine **FRONT LIMITATION** ?



Front Limitation Reference Points

- To stop 3-6 inches from the line in front of your bumper, stop when **your line of sight** runs under the side view mirror reference point to the line in front of your vehicle.
- Maintain a normal driving position when targeting your reference point and do not lean forward or sideways.



Rear Limitation

You need to know where the rear of your vehicle is when you are:

- **BACKING**
- **PARKING**



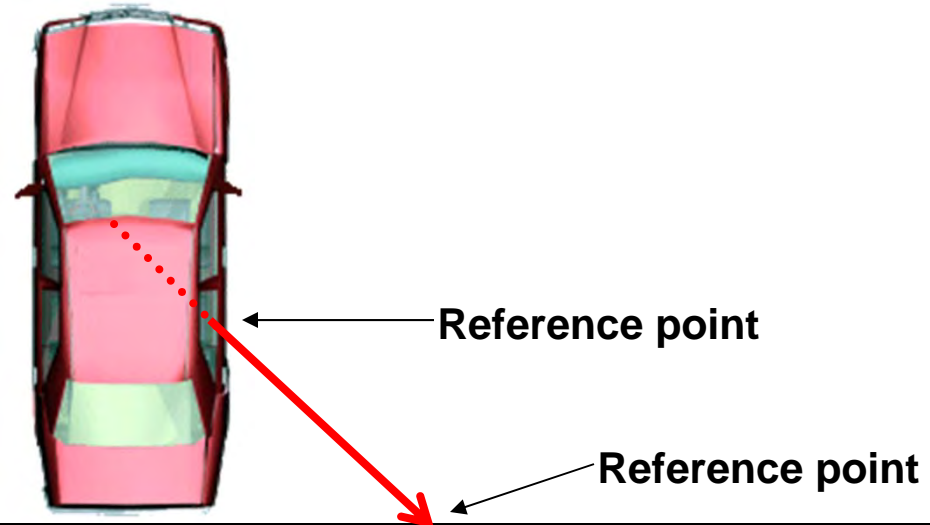
Rear Limitation

Where are your visual reference points for
REAR LIMITATION ?



Rear Limitation

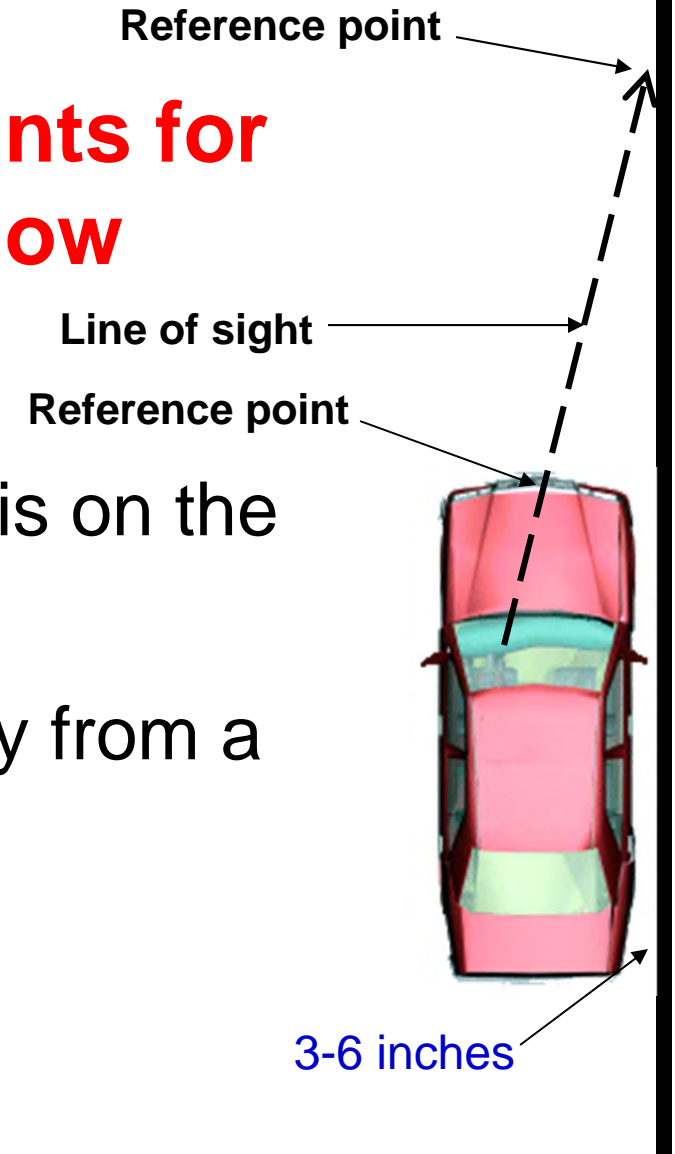
To align the rear bumper three to six inches from a line or curb, you need to stop when the line or curb appears near the middle of the rear right window when looking over the right shoulder.



Right Side Limitation

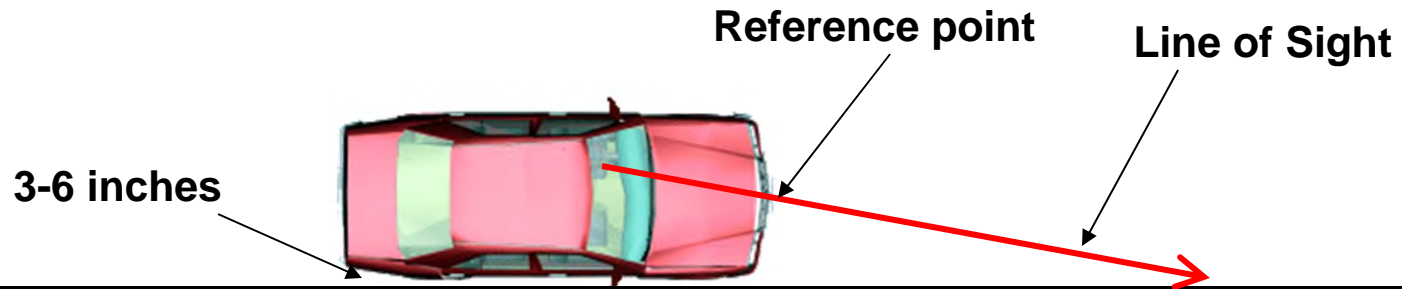
Establishing reference points for right side limitation will allow you to:

- know where the curb or line is on the right side of the street
- park parallel 3-6 inches away from a line or curb
- establish lane position 3

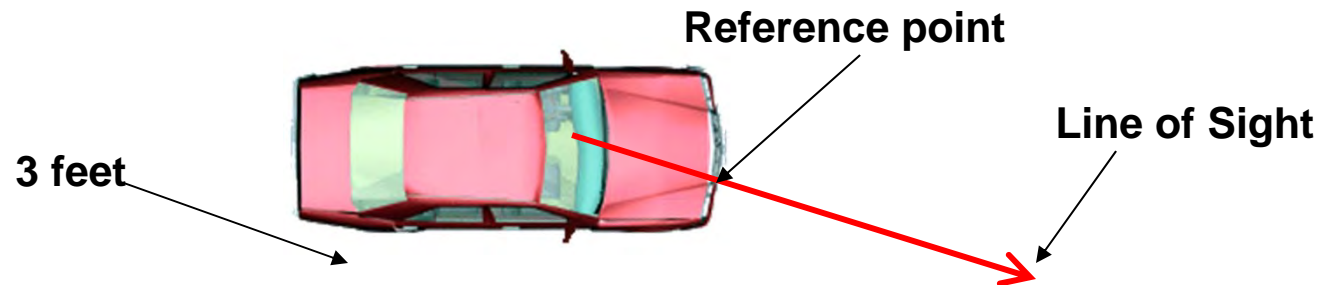


Right Side Limitation

The **right side limitation reference point** to position your vehicle 3-6 inches from the curb or line is the middle of your vehicle's hood.



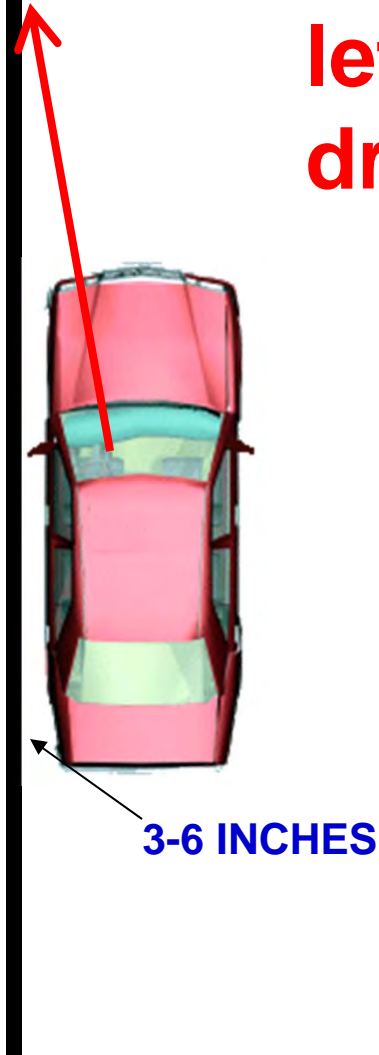
The **reference point** for 3 feet from the curb or line is the right 1/4 section of the hood.



Left Side Limitation

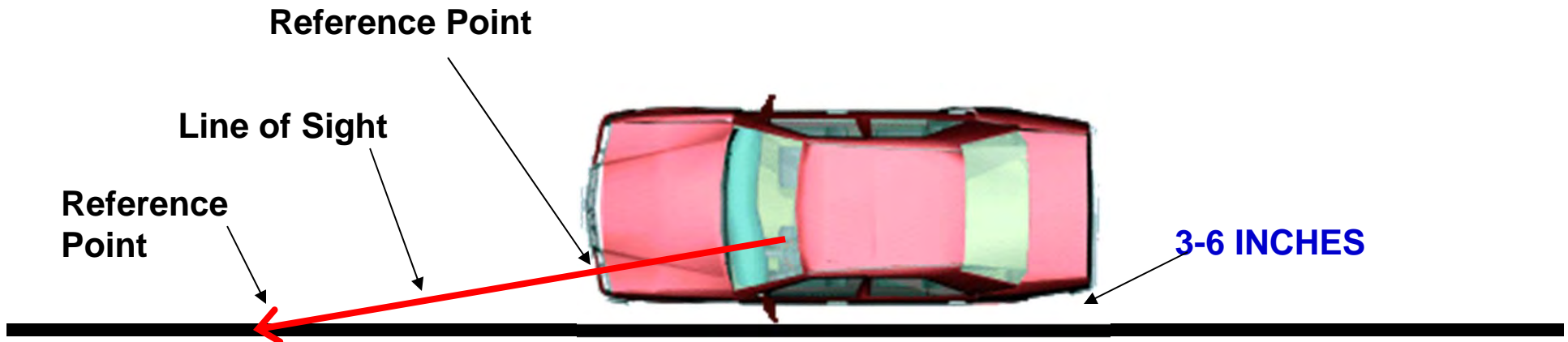
Establishing reference points for left side limitation allows the driver to:

- **determine position when parking on the left side of a one-way street (3-6 inches from the curb or line)**
- **determine lane position 2**

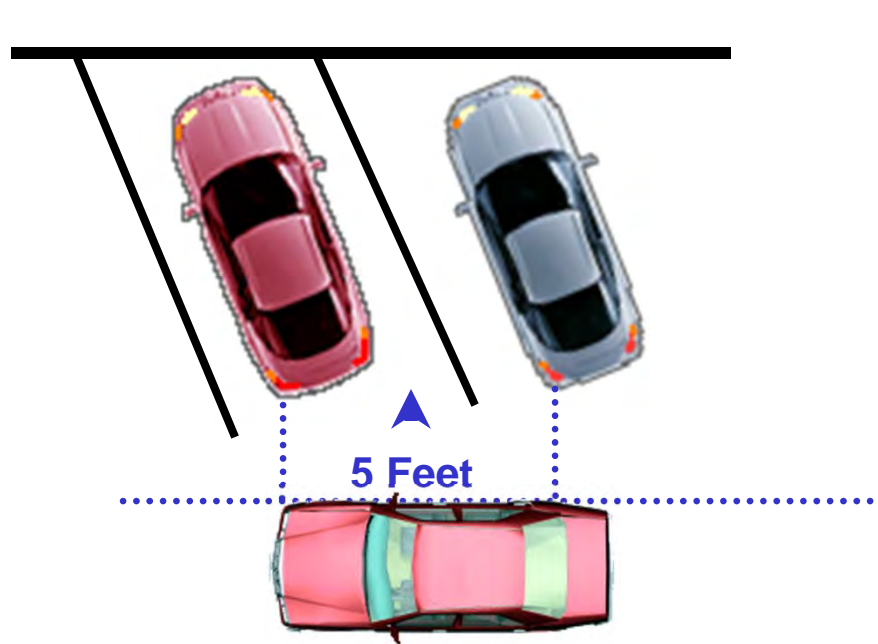


Left Side Limitation

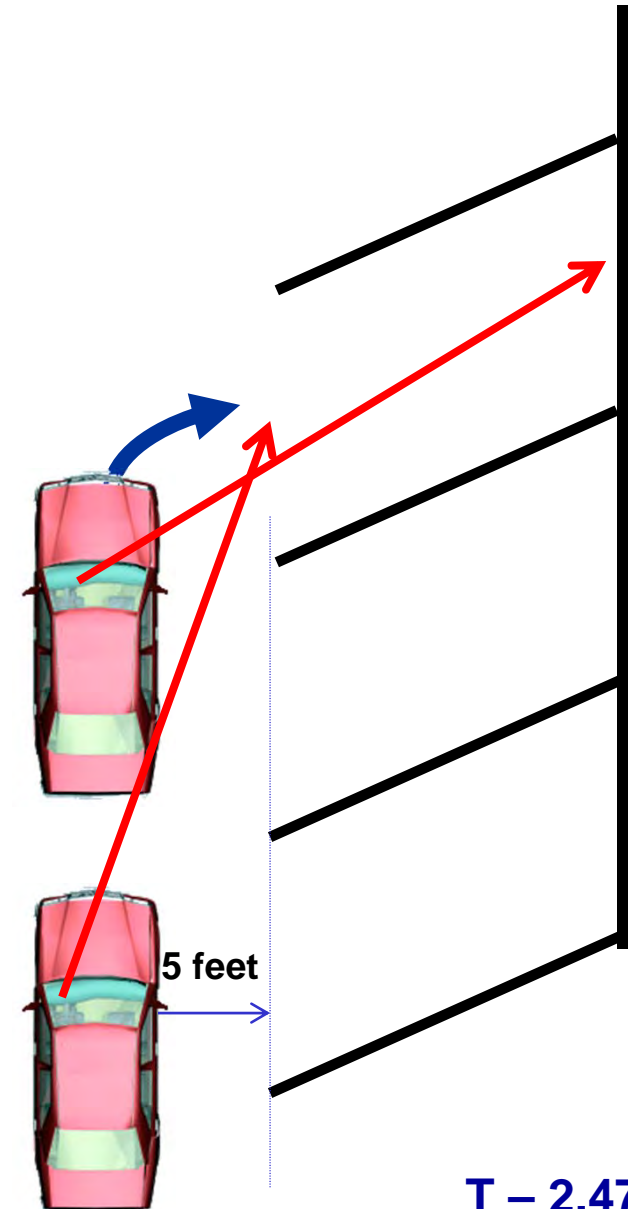
Your **left side limitation reference point** is about one foot from the left front corner of your car (it may be the seam between your left fender and the hood of your vehicle) to the curb.



Angle Parking

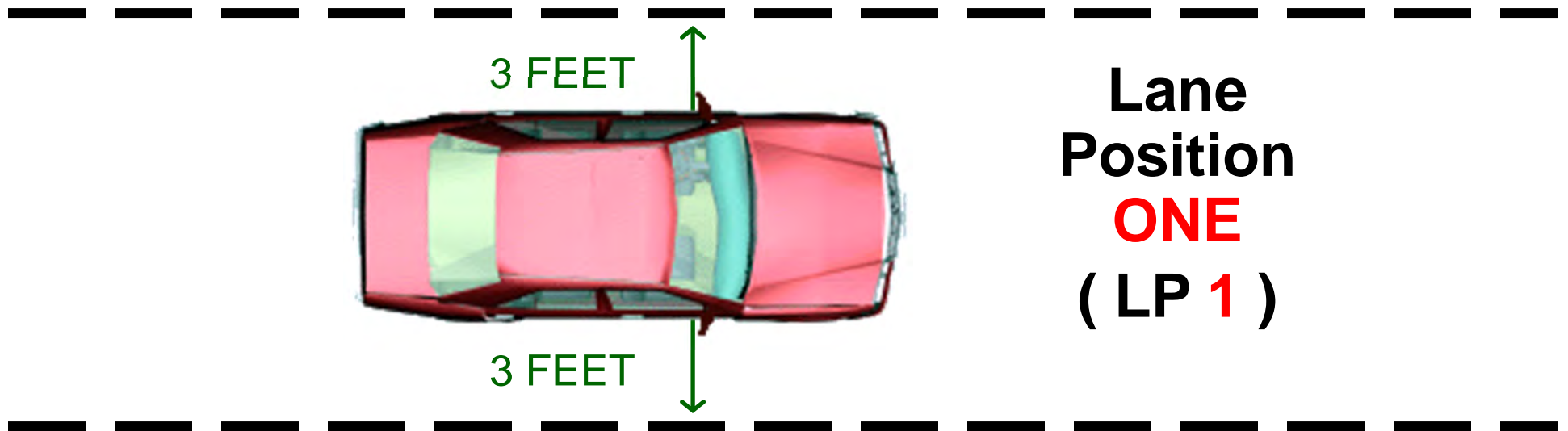


To angle park, place your vehicle 5 feet from the right side, target the middle of the parking space, and use the right front turning point to initiate steering towards the middle of space.



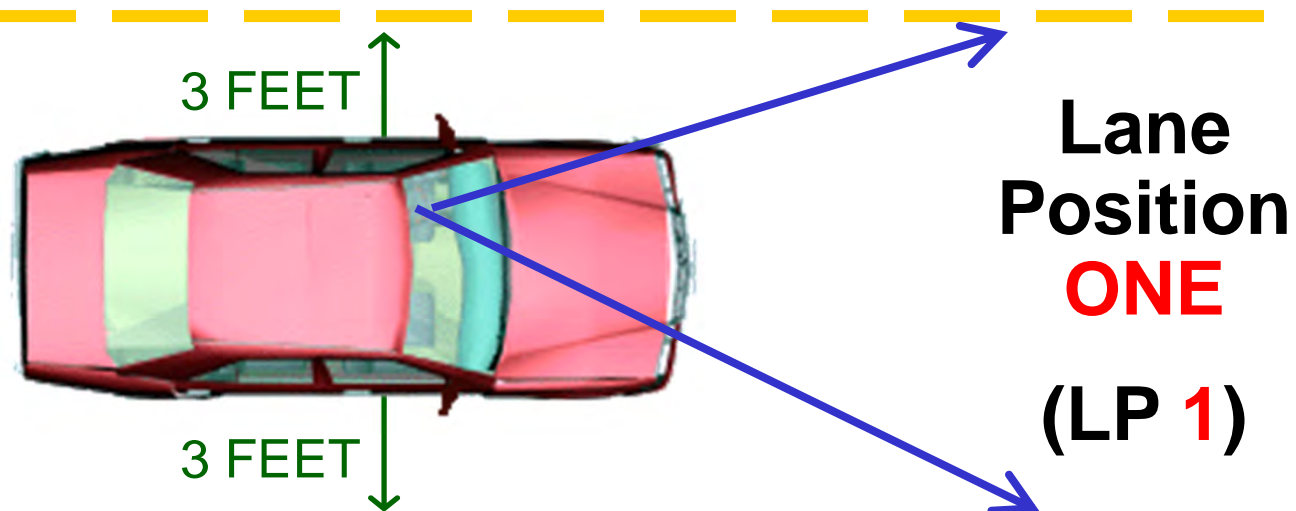
Lane Position # 1

- VEHICLE IS CENTERED IN THE LANE
- CAR IS 3 FEET AWAY FROM THE LINES ON YOUR RIGHT AND LEFT SIDES



Lane Position # 1

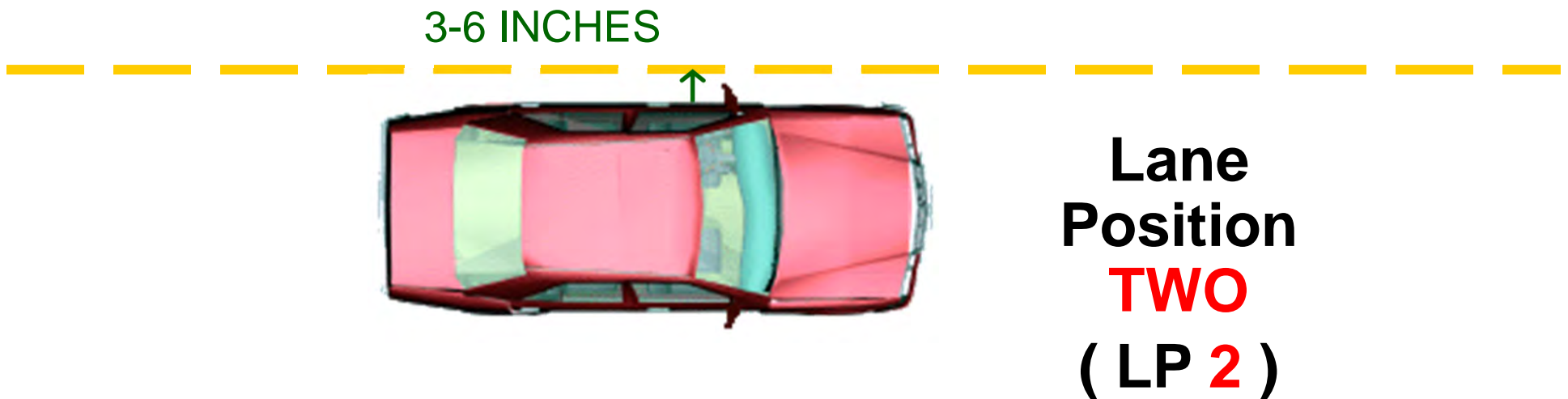
- Your left side **reference point** runs through the driver's side left fender to the line on the left side of the vehicle.
- Your right side **reference point** runs through the center of passenger's side right half of the hood to the line on the right side of the vehicle.



Note: Lane position #1 is the lane position used most often.

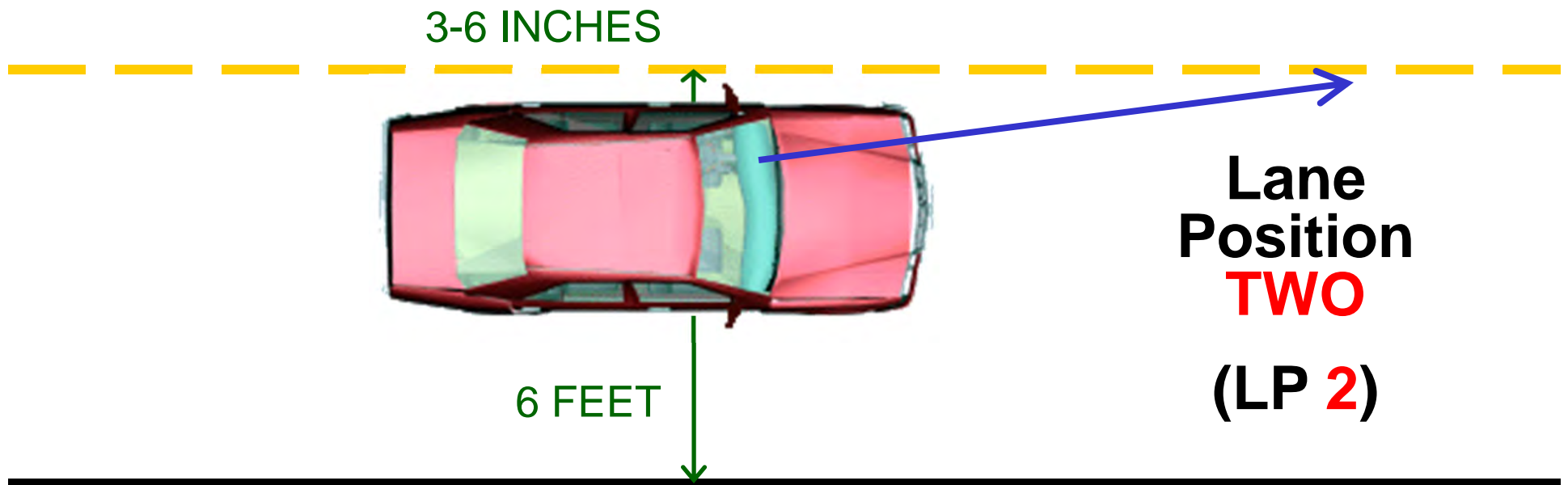
Lane Position # 2

- **VEHICLE IS 3-6 INCHES AWAY FROM LINE TO THE LEFT**



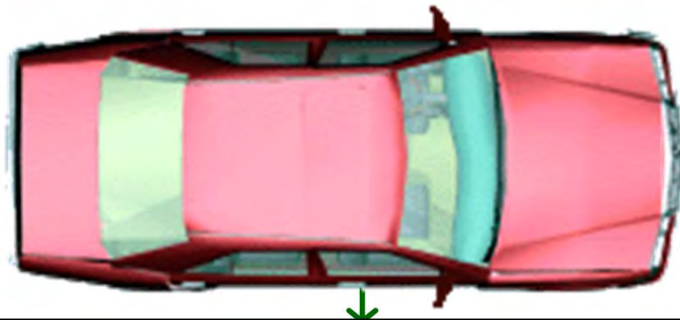
Lane Position # 2

Your **lane position #2** reference point is about 1 foot from left side (it may be the crease between the left fender and hood of the vehicle) to the curb.



Lane Position # 3

**CAR IS POSITIONED 3-6 INCHES
AWAY FROM EDGE OR LINE TO
THE RIGHT**

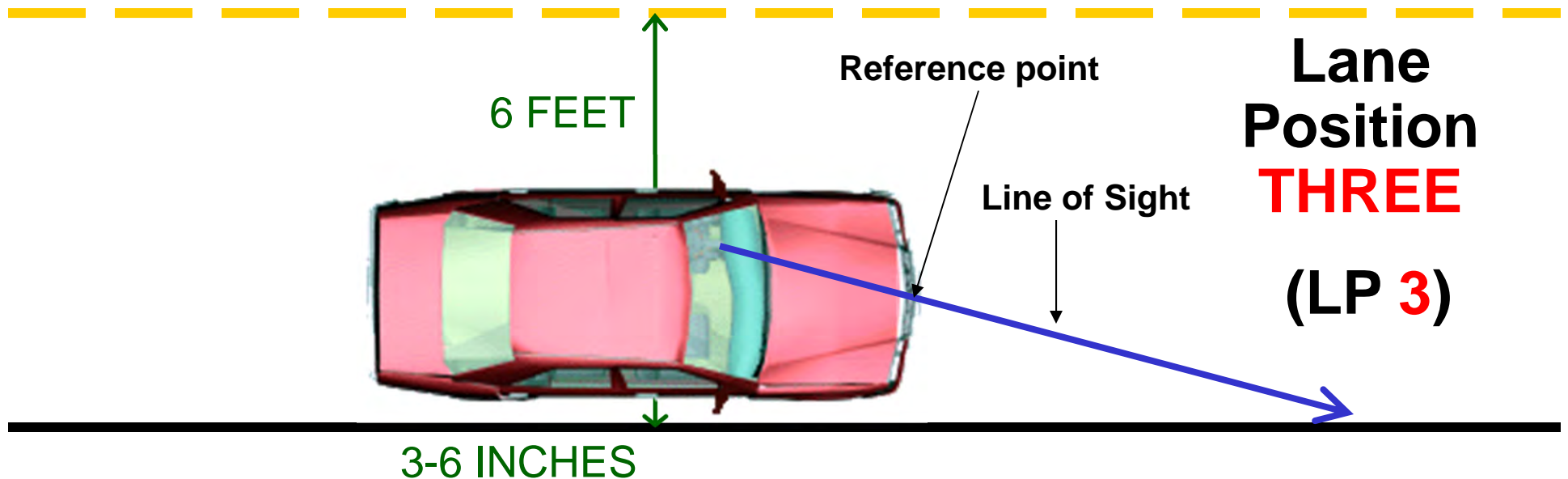


3-6 INCHES

Lane
Position
THREE
(LP **3**)

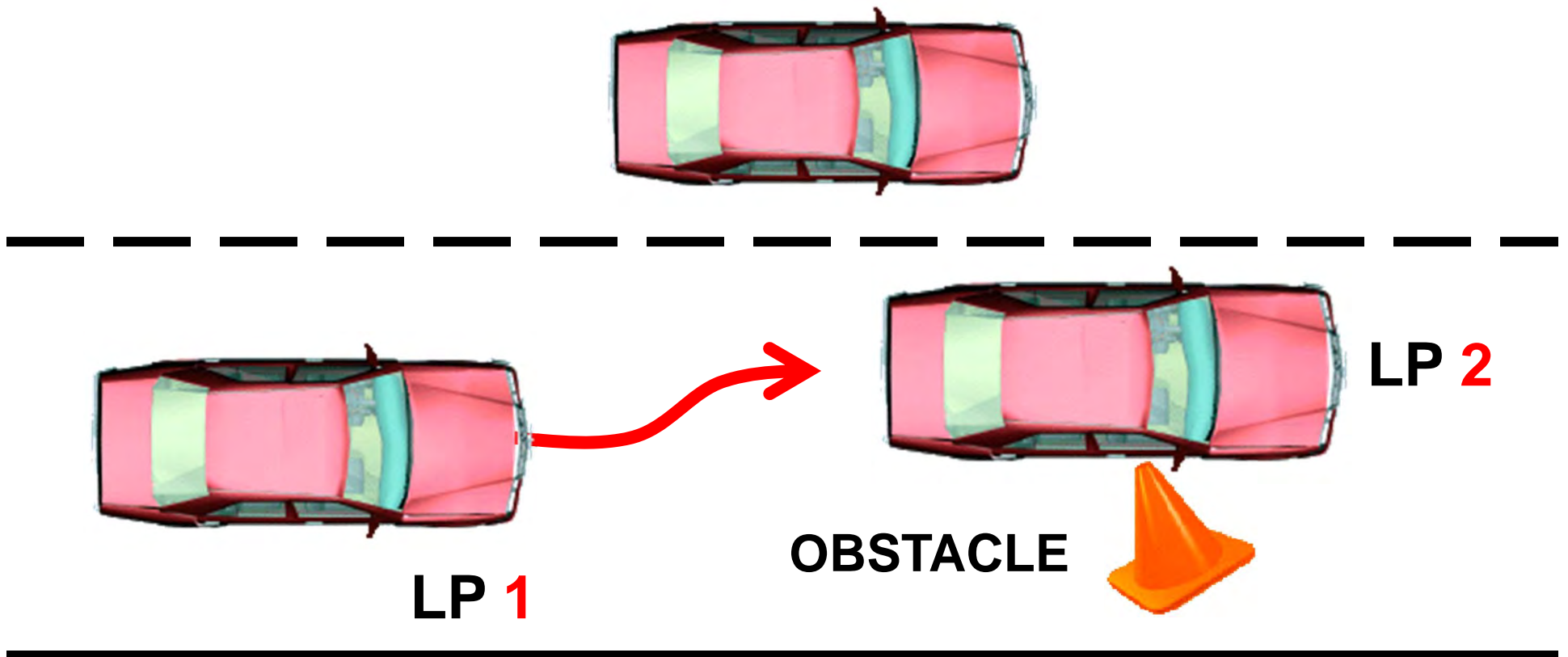
Lane Position # 3

Your lane position #3 reference point is through the center of your hood to the right edge of the roadway.



Lane Positions

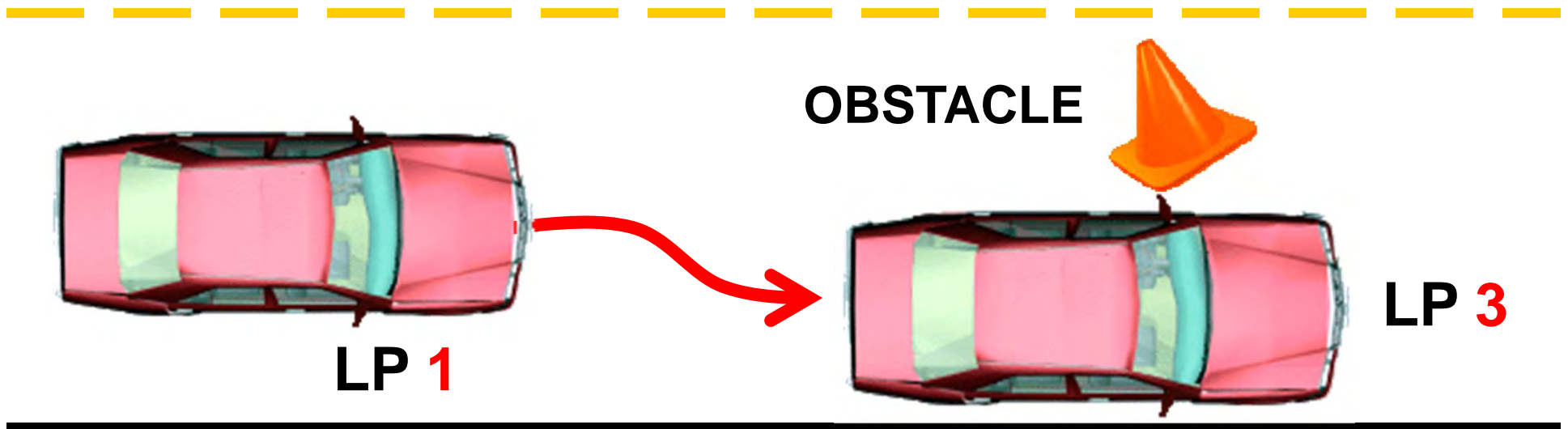
Position 2 is near the lane line to your left and is used when there is a restriction to your path of travel or your line of sight and you cannot move to the adjacent lane.



Moving from Lane Position **ONE** to **TWO**

Lane Positions

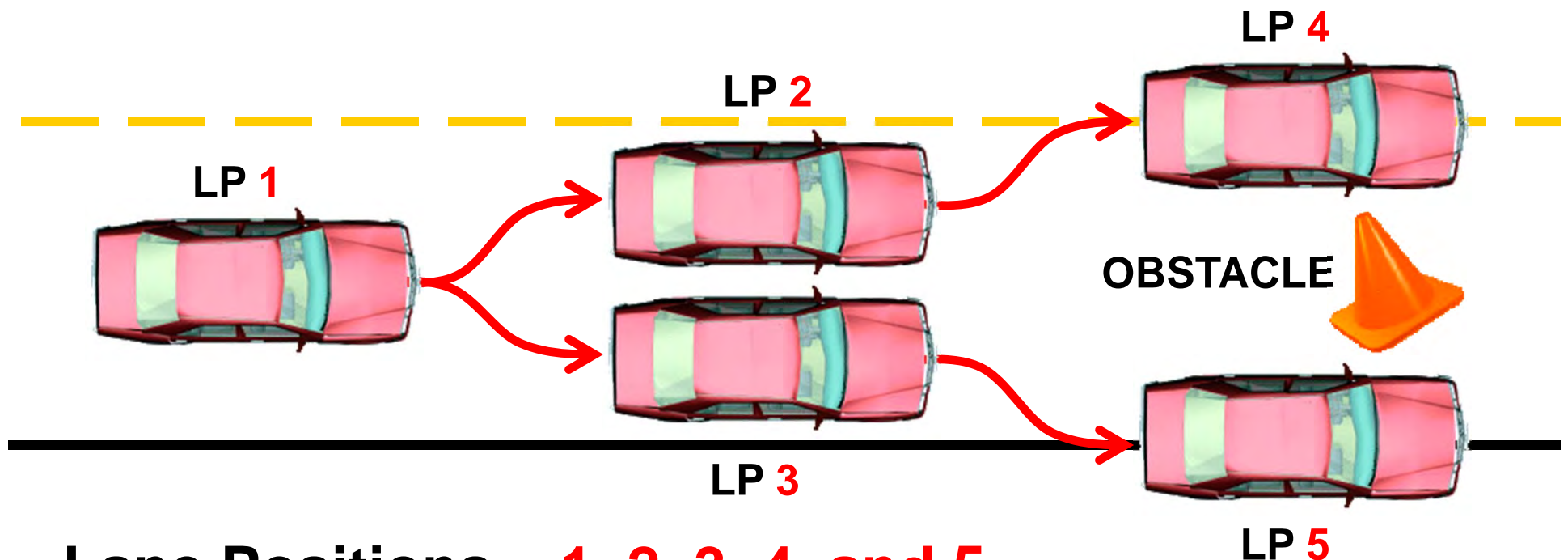
Position 3 is near the lane line to your right and is used when there is a restriction to your path of travel or line of sight and you cannot move out of the lane.



Moving from Lane Position **ONE** to **THREE**

Possible Lane Positions

The width of the lane allows drivers to make lane position adjustments to minimize risk and create more space between their car and problem situations.



Lane Positions – 1, 2, 3, 4, and 5