Texas Driver Education
Classroom and In-car Instruction
Model Curriculum

Module Two

Texas Driver Responsibilities:

Preparing to Operate a Vehicle

- Driver Preparation Procedures
- Identifying Vehicle Control Devices
- Operating Vehicle Control Devices
- Vehicle Balance Considerations
- Standard Vehicle Reference Points

SUPPLEMENTAL MATERIALS

Texas Education Agency
Texas Department of Public Safety
Texas Department of Transportation

Driving Through
A New Century
Texas Education Agency

Fact Sheet
Module 2

F-2.1 PREVENTIVE MAINTENANCE CHECKS

The owner's manual of any vehicle will provide information about periodic maintenance. Emphasize need for periodic maintenance to be completed by qualified service personnel. Many vehicles can be driven 100,000 miles before the first scheduled engine tune-up. However, it is important to remember that certain items require service on a more frequent schedule. For instance, Ford Motor Company's 1999 maintenance schedule for most of its passenger cars, minivans, light trucks, sport utilities, vans, and 4x4s extends over 150,000 miles and includes the following examples:

Weekly self-checks:

Tire pressure options
- Maximum pressure listed on tire side-wall
- Vehicle manufacturer's recommendation for smooth ride

Tire tread wear or damage
- Tread wear bars showing
- Bald spots
- Cuffing (uneven wear on inside or outside tread areas)
- Bald center or side treads
- Cuts, stones, or metal fragments

Safety and Communication Accessories
- Headlights, tail lights, and turn signals
- Emergency lights and markers
- Emergency kit
- Windshield wipers

Heating Ventilation and Air Conditioner (HVAC)

Regular (1-2 Months) self-checks: (described on Transaprency T-2.4)

Check function of all interior and exterior lights
Check tires for wear and proper inflation
Check engine oil level
Check windshield washer solvent fluid level
Check brake fluid level
Check engine coolant level

Fact Sheet
Module 2

F-2.1 PREVENTIVE MAINTENANCE CHECKS

Self-check twice per year:

Check lap/shoulder belts and seat latches for wear and function
Check air pressure in spare tire
Check power steering fluid level
Check windshield washer spray, wiper operation, and clean wiper blades
Check parking brake for proper operation
Check and lubricate all hinges, latches, and outside locks
Check and lubricate door weather strips
Check and clean body and door drain holes

- Check safety warning lamps (brake, ABS, air bag, safety belt) for operation
- Check cooling system fluid level and coolant strength
- Check battery connections and clean if necessary
- Check transmission fluid level

Authorized Service Every 3,000-5,000 Miles:

Change engine oil and replace oil filter
Inspect tires for wear and rotate

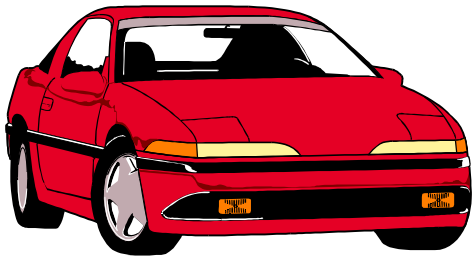
Authorized Service Every 15,000 Miles:

Inspect automatic transmission fluid level
Inspect brake pads/shoes/rotors/drums, brake lines, hoses, and parking brake system
Inspect engine cooling system
Inspect steering linkage, suspension and, if equipped, drive shaft and ball joints
Replace cabin air filter, if equipped

Authorized Service Every 30,000 Miles:

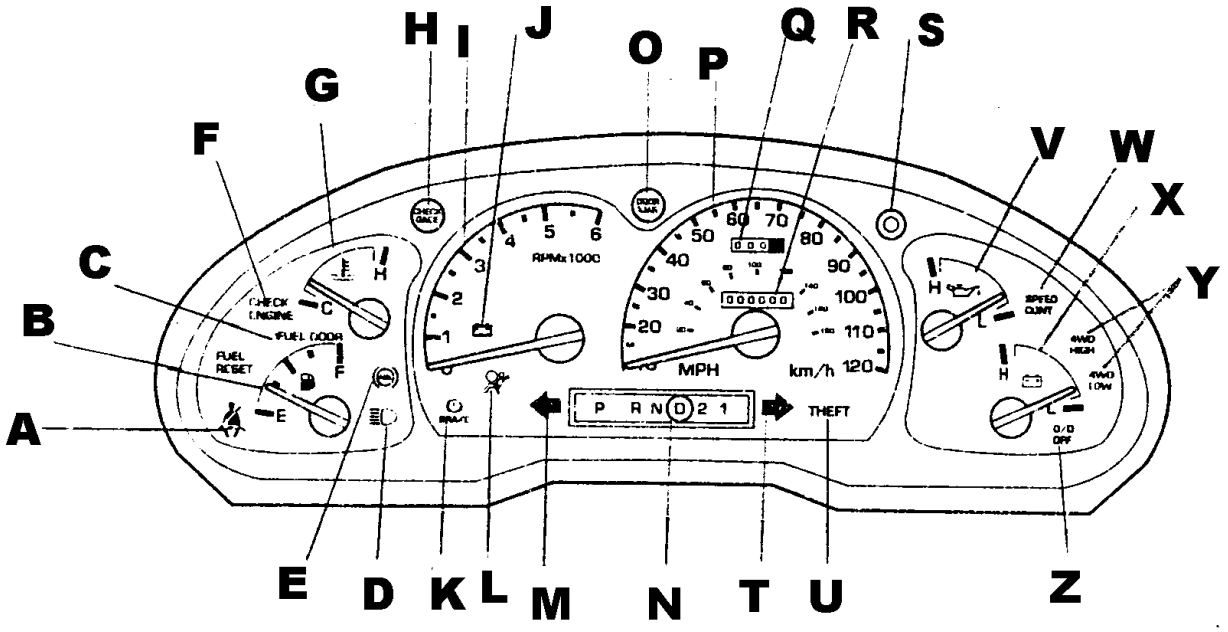
Inspect exhaust system and heat shield
Replace engine air filter
Replace fuel filter
Inspect accessory drive belts
Perform automatic transmission/transaxle service, if equipped

Check vehicle owner's manual for vehicle recommendations...



Fact Sheet Module 2

F-2.2 INSTRUMENT CLUSTER OF 1999 FORD RANGER TRUCK



A. Safety Belt
B. Fuel Gauge
C. Fuel Door
D. Headlight Beam Indicator
E. Anti-lock Brake System
F. Check Engine Light
G. Temperature Gauge
H. Check Gauge*
I. Tachometer*
J. Battery Warning Light*
K. Brake
L. Airbag
M. Left Turn Indicator
N. Gear Selection Indicator
O. Door Ajar*
P. Speedometer MPH/km/h
Q. Trip Odometer*
R. Odometer
S. Trip Odometer Reset
T. Right Turn Indicator
U. Theft*
V. Oil Pressure Gauge
W. Speed/Cruise Control
X. Battery Voltage Gauge
Y. 4WD High/Low*
Z. Overdrive On/Off*

*This indicator may not be found on all dashboards

Fact Sheet
Module 2

F-2.3 OPERATING VEHICLE CONTROL DEVICES

Regardless of whether the driver's hands grip the wheel in a balanced position on the upper or lower half of the wheel, before one hand releases the wheel to adjust any information, comfort, or control device, the hand not performing the action should be moved to the 7-8 or 4-5 o'clock position, depending on steering wheel opening. The driver should not place one hand at the top of the wheel when moving forward due to air bag injury potential and lack of balanced steering control.

It is critical to remember that when operating any vehicle control, comfort, or communication device the driver's attention must not be diverted from the path of travel for more than an instant. Controls perform the same function in each vehicle. However, location and characteristics not only vary from one type of vehicle to another, but between vehicles of the same make and model. Some of these differences are:

Steering: The steering wheel is always turned in the direction the driver wants the vehicle to move, whether moving forward or in reverse. However, the amount of steering input and energy needed will vary according to the type of steering, number of turns lock to lock, power assist, and speed of travel. Target the path of travel before starting any steering inputs. It is wise to have the vehicle in motion when using the steering wheel.

Steering Wheel Adjustment: The angle of the steering wheel is controlled by a lever located on the left or right side of the steering column in some vehicles. Other vehicles permit the driver to change the angle of the steering wheel by adjusting the steering column. An adjustment lever located on the bottom side of the steering column, near the firewall, permits the driver to raise or lower the steering column to achieve a better steering wheel angle.

Gear Selector Lever: In a vehicle with an automatic transmission, the gear selector lever is located either on the steering column or on a console located between the front seats. In a vehicle with a manual transmission, the shifting lever is located on the center console, on the floor to the right of the driver, or, in older vehicles, on the right side of the steering column.

Parking Brake: The parking brake is sometimes mistakenly referred to as an emergency brake. The purpose of the parking brake is to hold a vehicle in place when it is parked and to protect the transaxle, constant velocity joints, or transmission. *Many new vehicle owner manuals indicate that it is important to set the brake before putting the gear shifter in (P)ark.* Driver education students should be taught to follow this procedure. The parking brake may be either a foot-operated pedal located to the far left side of the driver's position or a hand-operated lever located to the right of the steering column or to the right of the driver on the floor or center console. To set a foot-operated parking brake, push down firmly on the pedal. Depending on the vehicle, one of two methods is used to release the brake. In some vehicles, the pedal is pushed down until a click is heard; then the pedal is released. In other vehicles, the brake release lever is located above the foot pedal on the underside of the dashboard. To set a floor or console mounted parking brake, simply pull back firmly on the lever. To release the brake, press down the button located on the top of the lever with the thumb and lower the lever.

Fact Sheet
Module 2

F-2.3 OPERATING VEHICLE CONTROL DEVICES

Cruise/Speed Control: This device allows a driver to select and travel at a set speed without having to keep a foot on the accelerator or the brake. The controls are located either on the steering wheel or a stem on the left side of the steering column. The control options include on/off, set/accelerate, and coast and resume. Speed control can be cancelled at any time by pressing the brake pedal or touching the off switch.

Ignition Switch: This switch locks the steering wheel and shifting lever, and enables the driver to start and turn off the engine or use the accessories. The ignition is located on the right side of the steering column near the dashboard or in the dashboard.

Accelerator Pedal: This foot-operated pedal is suspended from the firewall on the right side of the driver's position. Speed is controlled by adjusting even pressure on the pedal. Some vehicles have electronic adjustments for the foot pedals. Extensions are available for special needs of the driver in reaching the pedal with the foot in a proper position.

Brake Pedal: This pedal is located to the left of the accelerator. The driver slows the vehicle by applying a squeezing pressure on the pedal with the heel of the foot on the floor. How much and how rapidly the vehicle slows is determined by how much pressure the driver applies to the brake pedal and the friction between the tires and road surface.

Mirrors: Adjust the mirrors, inside and outside. For vehicles equipped with remote controlled outside mirrors, these controls may be located on the left side of the dash, the driver's side arm rest, or center console. However, no matter how the mirrors are adjusted, there are areas that cannot be seen and require drivers to turn their heads to check prior to making a move to the left or right. The Blindzone and Glare Elimination (BGE) technique promoted by George Platzer (1996), an automotive safety engineer and member of the Society of Automotive Engineers (SAE), may be used to train drivers. The inside rear view mirror becomes the primary mirror, and the left and right side view mirrors become directed to side view use only. The driver can move the head toward the window to get a right and left side view when pulling from the curb. The BGE setting allows the driver to have two useful views in the side mirror, and the instructor can use the right side mirror view as a rear view mirror (see Fact Sheet F-2.6).

Safety Belts: While safety belts protect occupants in a crash, they serve an equally important role of keeping the driver firmly in place behind the steering wheel, allowing better control of the vehicle. For maximum protection, the safety belt should be positioned under jackets, coats, sweaters etc., as low on the hips or thighs as possible. After fastening the belt, grasp the shoulder belt and pull upward to take up the slack in the belt across hips. Make sure that all passengers do the same.

Head Restraint: All new vehicles are equipped with head restraints to help reduce whiplash injuries if the vehicle is struck from the rear. Some vehicles are equipped with head restraints that can be adjusted up or down to position the restraint behind the middle of the occupant's head. Drivers should be sure that the restraint is adjusted to a position above the ear level to avoid serious neck injury in a rear collision. Some vehicles are equipped with head restraints that are built into the top of the seat and cannot be adjusted.

Horn: The horn is generally operated by pressing a button located on a steering wheel cross bar or on the pad on the lower half of the steering wheel above or below the air bag cover. It is usually marked with the horn symbol to indicate the location.

Turn Signal Lever: The turn signal lever has two uses. Located on the left side of the steering column, the lever is moved up to signal a movement to the right and down for a movement to the left. While the signal will cancel after a turn, the driver may have to cancel the signal manually after a slight turn.

The signal is used to indicate a lane change by moving the lever halfway up or down with the thumb hooked on the steering wheel. The signal begins to work as the halfway point is reached and can be manually held in this position or locked prior to a lane change. Manually holding in position allows the driver to easily release the lever prior to the movement so that a signal to turn will not be confused with the lane change or merge.

Door Locks: In vehicles equipped with manual locks, each door has its own locking device. An additional master control is usually located on the driver side arm rest in vehicles with electric door locks. Child safe rear door locks are an option.

Fact Sheet
Module 2

F-2.3 OPERATING VEHICLE CONTROL DEVICES

Hazard Flasher: The purpose of the hazard flashers is to warn other drivers of a problem and to increase their awareness of the presence of your vehicle. The switch for the lights is usually located on the top or right side of the steering column or on the dash. When operated, both front and rear turn signal lights flash.

Vehicle Lights: Some vehicles are equipped with daylight running lights which may operate the headlights without having the tailights on. It is recommended by the National Highway Traffic Safety Administration (NHTSA) to use the headights whenever the vehicle is moving, especially when not equipped with the daylight running lights. The light switch is often located on a steering stalk or on the dash panel to the left and is often a multi-purpose switch for parking lights, headlights, high beam, or low beam. A panel switch is often used to adjust the brightness of the dash panel lights and interior lights.

Windshield Wipers and Washers: This control is frequently located on the turn signal lever. Two switches are often involved, one that controls the speed of the wipers and a second that controls the washer fluid.

Hood Release: This lever is usually located on the left side of the driver's compartment under the instrument panel. In some vehicles it is located under or just to the right of the steering column. To open the hood, a second latch located in the front of the vehicle must be released.

Trunk Release: An option in some vehicles is to have a trunk release lever located on the floor just to the left of the driver's seat. In other vehicles, the release mechanism is a button located in the glove box.

Heater, Ventilation, and Air Conditioner: These control switches are located in a duster on the instrument panel. Some vehicles have a separate switch located on the instrument panel that operates a rear window defroster.

Seat Adjustment Controls: If manually controlled, the adjustment lever to move the seat forward or back is typically located at the lower front or right side of the driver's seat. A second lever or knob located on the left side of the seat in some vehicles allows the driver to change the angle of the seat back. In vehicles with electric power seats, the controls are usually located on the lower left side of the driver's seat or in a control cluster located on the side door panel.

Fact Sheet Module 2 F-2.4 UNDERSTANDING VEHICLE BALANCE CONCEPTS

Vehicle Balance

The most neglected area of traffic safety education is the area of vehicle balance. Few instructors adequately teach the kinesthetic sense when driving an automobile. However, a driver uses the feeling of motion consistently to judge acceleration, deceleration, and the loss of traction. The only other sense used more to operate a vehicle safely is vision. Vehicle balance refers to the distribution of the weight of the vehicle on the tires as they meet the ground. This downforce of the tire patch to the roadway is affected by tire pressure and the suspension geometry. The ideal tire patch size and balance for a vehicle is only reached when the vehicle is still. As soon as motion occurs, changes to the vehicle balance or weight on the tire patches changes. A transfer of weight from one point of the vehicle to another is caused by acceleration, deceleration, cornering, or a combination of these actions. If there is no acceleration or deceleration, the vehicle is traveling at a constant speed or stopped, the suspension is set on center and the steering and traction condition is considered to be in balance.

Maintaining Vehicle Balance. Maintaining vehicle balance results from:

- steering wheel balance;
- body position which allows the feet, legs, arms and hands to maintain a stable seat position to obtain a feeling of vehicle movement (kinesthetic feedback); and
- balance maintained through precise movements of steering, smooth and progressive acceleration, and controlled brake application.

Maintaining vehicle balance results from the driver's reaction to the vehicle's suspension set and its center of weight transfer. Basically the weight of a vehicle can be concentrated on one of five points on the chassis: the front of the chassis (over the front tire patches), the rear of the chassis (over the rear tire patches), the center of the chassis (distributed equally over the front and rear tire patches) based on speed changes, to the right of center (right two tire patches), or the left of center (left two tire patches) based on steering or surface changes. The magnitude of these weight changes and the driver's ability to maintain control of the vehicle is influenced by the rate of acceleration, brake application, steering input, surface traction, or combinations of these factors.

Students must understand that when driving newer model cars, the distance the steering wheel must be moved to perform most maneuvers is substantially less than was required with most cars during the 1980s and many models in the early 1990s. The number of turns, lock to lock, has in most cases been reduced from four to five turns to two to three turns. The lock to lock configuration reduction is a result of smaller steering wheel sizes and rack and pinion steering geometry changes. Without appropriate adjustment on the part of drivers, steering too quickly in combination with sudden brake application appears to have become a problem, particularly in the occurrence of single vehicle, run-off-roadway crashes.

As a result of the off-road crash potential, the use of hand-over-hand steering when driving a vehicle is no longer recommended and hand-to-hand steering is recommended. In slow movement activities when vision is limted, such as perpendicular parking, or very fast action movements, such as traction loss recovery, hand-over-hand is still recommended. Since drivers operate different types of vehicles, it becomes critical to teach more than one steering technique to new drivers.

Fact Sheet Module 2 F-2.4 UNDERSTANDING VEHICLE BALANCE CONCEPTS

Seating Position. In order to establish vehicle balance and improve ability to see, drivers should sit in a comfortable, erect position squarely behind the steering wheel. Adjust seat height so that the top of the steering wheel is in line with the top of the shoulders. The top of the wheel should never be more than one inch higher than the top of the shoulders. (In vehicles without power seats and/or adjustable steering columns or tilt steering wheels, some drivers will need to use a wedge-shaped driver's cushion.)

Proper distance from the steering wheel can be determined by extending the arm straight forward and adjusting the position of the seat, forward or back, until the top of the steering wheel is in line with the wrist joint. Drivers under five feet five inches in height or with short legs may need to use brake and accelerator pedal extensions to:

- comfortably reach and operate the pedals
- maintain a distance of 10 inches between their body and the steering wheel to reduce the chance of injury in the event of air bag inflation.

Changing Vehicle Balance from Side to Side (Roll). Sudden steering, acceleration, or braking inputs can affect vehicle balance from side to side.

Steering Movements. Weight or center of mass shifts to left or right side of vehicle depending on speed, traction and amount of steering input. Occupants may or may not feel forward movement toward the corner of the vehicle opposite the direction of the turn.

Brake and Steering Combinations. Depending on degree of steering and brake input, braking may improve traction, such as in trail braking through a turn, when performed at an appropriate speed. However, applying the brakes when cornering at too high a speed has little effect relative to slowing the vehicle, but may have a highly noticeable effect of producing traction loss due to severe weight shift.

Changing Vehicle Balance from Front to Rear (Pitch). Sudden steering, acceleration, or braking inputs can affect vehicle balance from front to rear. When acceleration is applied, weight or center of mass is transferred toward the rear of the vehicle. If acceleration is sudden and hard there is a noticeable drop of the rear of the vehicle and occupants feel rearward thrust.

Releasing Brake. Simply releasing pressure from the brake pedal results in a shift of weight to the rear.

Covering Accelerator. The purpose of covering the accelerator is to provide a smooth transition from brake release to progressive acceleration. It is similar to trail braking in that speed and vehicle balance are maintained prior to braking.

Light Accelerator Pressure. The purpose of light accelerator pressure is to maintain weight balance while maintaining slow forward motion or allowing speed to slow gradually with minimal weight shift.

Progressive Accelerator Pressure. Firm, steady acceleration to increase speed and gradually shift balance of vehicle to the rear suspension. This action eases steering control and improves rear wheel traction moving out of a turn or curve.

Thrust Accelerator Pressure. A firm push or thrust of accelerator used to shift more weight to the rear wheels for traction or to make a shift to a lower gear in a vehicle with an automatic transmission for increased rate of acceleration. This process is sometimes called for in passing and lane change maneuvers in higher speed traffic situations.

Changing Vehicle Load from Rear to Front (Pitch). Sudden steering, acceleration, or braking inputs can affect vehicle balance from rear to front. When brakes are applied, weight or center of mass is transferred to the front of the vehicle. If braking is hard, there is a noticeable drop of the hood and rise of the rear of the vehicle and occupants feel forward movement. The most efficient way to slow or stop your vehicle is to brake while traveling in a straight line. This allows the braking force to have an evenly distributed effect on all four wheels.

The ability to apply the correct pressure to the brake pedal is learned through experience and practice. However, each vehicle has a somewhat different "feel" with which a driver must become familiar. Apply too little pressure and the vehicle will not stop at the desired spot or within the distance available. Apply too much pressure and the brakes may lock up, and traction and directional control may be lost.

The key to good braking technique is to stabilize the foot and control brake pressure with the forces of the ankle and toes rather than thigh muscles. To facilitate this action place the heel of the foot on the floor in front of the brake pedal in such a manner that the foot forward of the ball makes contact with the pedal. This position better enables drivers to use the toes to make fine adjustments to pedal pressure and to pivot the foot more smoothly back and forth between the brake and accelerator. This also allows the driver to rest the right side of the foot against the center console or center hump for better control of speed while their foot is on the accelerator.

Releasing Accelerator. Simply releasing pressure on the accelerator results in a shift of weight to the front. The affect on the reduction in speed tends to be more noticeable in vehicles with rear wheel drive than in front wheel drive vehicles equipped with transaxles.

Cover Brake. The purpose of cover brake is to provide a smooth transition from acceleration to braking. It is similar to trail braking in that speed and vehicle balance are maintained prior to braking.

Controlled Brake (Squeeze On). Braking is done with sufficient brake pressure needed to slow the vehicle, while maintaining balance to avoid traction loss to front or rear wheels. It is important to remember that directional control (steering) becomes more difficult when using hard brake application.

Threshold Brake. Threshold braking is used to maximize the braking effect of the vehicle, lifting (unloading) the rear suspension, and lowering (loading) the front suspension, to provide maximum traction to the front tires for braking just short of lock up. If lock up does occur, steering control is regained by releasing brake pressure very slightly (2-3 degrees). As with controlled braking, control of the brake pedal is best maintained if the heel is on the floor.

Trail Braking (Squeeze Off). Trail braking is used to maintain speed and balance of the vehicle when steering is required prior to turning at an intersection or in a curve. This technique is often used in combination with or at the end of controlled or threshold braking.

Steering Wheel Control. Due to changes in steering ratios and effort needed to turn the wheel, recommendations relative to hand position on the steering wheel have become more flexible. In order to maximize vehicle control, normal steering control involves the balance of the steering wheel to avoid sudden movements and minimize steering wheel reversals.

Hand Position. Placing the hands at shoulder height (the left hand between 9 and 10 o'clock and the right hand between 2 and 3 o'clock allows for balanced shoulder strength to control the wheel. Placing the left hand between 7 and 9 o'clock and the right hand between 3 and 5 o'clock with the upper arms resting against the rib cage also improves stability by lowering the body's center of gravity and reduces unintended steering wheel reversals. Because of its more natural seating position, it also facilitates keeping both hands on the wheel and reduces upper and lower back pain often associated with trip driving. The driver's grip of the steering wheel should be firm but gentle. Grip the steering wheel by the outside rim. For greater sensitivity to information communicated by the vehicle, use fingers instead of palms of hands and keep thumbs up along the face of the steering wheel. Never turn the wheel while gripping it from the inside of the rim,

hand facing outward.

Steering Techniques. To steer when turning and moving forward, use both hands—one pushing; the other pulling. In general, when backing and turning, use one hand. Four types of steering movements will be used during various in-car exercises. They are: hand to hand, limited evasive steer, hand over hand, and one hand steer.

Hand to Hand Steering. Sometimes referred to as Push/Pull/Feed Steering but should not be confused with shuffle steering. Hand to hand steering permits the driver to make steering inputs ranging from very minor, one to two degrees, to gross adjustments up to a half turn of the wheel, while keeping both hands on the wheel for precision adjustments.

If turning through a slight curve, both hands will typically retain their original grip on the wheel, making only slight finger or wrist adjustments as necessary to maintain path of travel.

However, when moving through a turn, the hands may move up to 165 degrees (neither hand moves beyond the 6 or 12 o'clock positions). Depending on whether the driver initiates the turn by pulling the wheel down from the 3 or 9 o'clock position toward 6 o'clock, or pushing the wheel up from the 5 or 7 o'clock position toward 12 o'clock, the opposite hand slides up or down as appropriate to provide additional input or to stabilize steering. The process is reversed to return to a straight path. The wheel is not allowed to slip through the fingers to straighten when coming out of a turn and both hands are always on the wheel to make adjustments as necessary.

Hand to hand steering is particularly well suited for precision maneuvers, steering through curves, intersection entry and exit, and front wheel traction loss control (vehicle understeer).

Hand Over Hand Steering. Hand over hand steering is particularly well suited when speed of the steering movement is critical such as skid recovery in a rear wheel traction loss (vehicle oversteer). When used to control or recover from a skid, it is important to hold the wheel in a pattern that allows the driver to use the upper left third of the wheel when steering to the left and the upper right third when turning right. This procedure allows for maximum movement of the wheel with knowledge of its neutral position. Hand over hand steering is also useful when maneuvering in a space with limited sightlines, such as perpendicular parking in a congested shopping center. When using hand over hand steering, quick movements of the hands are recommended on entry to the maneuver, with smooth slow movements when returning the wheel upon completion of the maneuver.

Drivers should be aware that employing hand over hand steering under all conditions does expose one to some additional risk of injury to arms, hands, and/or face in the event of a crash that results in air bag inflation. Use of hand over hand as the primary steering technique raises the risk of off-road crash occurences.

Limited Evasive Steering. Crash studies indicate that inattention to the path ahead was the primary cause of nearly 21% of the reported crashes. However, 5.6% occurred as a result of failure to make a quick turn, or improper evasive action. Whether performed at low or high speed, a quick turn results in a shift of weight or center of mass to the left or right side of the vehicle.

Speed of travel and steering input have a direct influence on the level (increase) of weight transferred to the front corner opposite the direction of the turn with a reduction in the weight to the rear, particularly on the side in the direction of the turn.

When an error has been committed and closure is occurring at higher speeds, the quickness and amount of steering input needed to make a 12 foot lane change increases. This added, sudden, steering input coupled with the speed of travel, unless dampened by a smooth, rapid, limited steering effort is capable of generating sufficient weight transfer to cause a loss of directional control.

F-2.4 UNDERSTADING VEHICLE BALANCE CONCEPTS

The important points to remember are:

- In an evasive action, limited steering input of no more than 180 degrees (touch of the arms) must be quick and smooth with limited return steering to maintain vehicle balance.
- At higher speeds, the driver may control brake prior to initiating the steering action to transfer weight to the front wheels but must come off the brake or trail brake while steering for avoidance. As the speed increases, less steering input is needed to move the vehicle to the left or right.
- Keep in mind that if the vehicle is ABS equipped, stay with the brake while performing the limited steering inputs.
- The initial steering input moves the front of the car while the second input to the touch of arms moves the rear of the vehicle. It is critical to move the wheel back to the neutral position to stabilize the vehicle within the lane.

One Hand Steering. Movement of the steering wheel with one hand is recommended only for backing maneuvers which do not require full left or right turns or when operating information, safety, or comfort devices.

Backing and steering with one hand requires shifting one's hip and seat position so the driver's head can be turned to see past the head restraint. To improve balance, the driver's right arm is often draped over the back of the seat. Visual checks to the front should be made prior to starting the backing maneuver. The left hand grips the steering wheel near the top and is moved in the direction the driver wishes the rear of the vehicle go. The left hand at the bottom may be used to back a trailer. Sharp turns while backing may require the use of both hands. Since it is more difficult to maintain steering control when backing, all reverse movements should be made at slow speed.

Fact Sheet
Module 2

F-2.5 INTRODUCING TARGETING CONCEPTS

What is a Target? A target is a fixed object that appears in the center of the path you intend to drive.

Why Learn Target Usage? Target Usage Advantages:

- Helps drivers to visualize the space they intend to occupy.
- Beginning of learning to use a searching process.
- Gets the driver to look far ahead.
- Allows the driver to plan ahead.
- Increases steering accuracy.

Target: A fixed object that appears at the end and in the center of the path you intend to drive.

Target Use Advantages:

- Helps drivers to visualize the space they intend to occupy.
- Beginning of learning to use a searching process.
- Gets driver to look far ahead, rather than close to vehicle.
- Allows driver to plan ahead.
- Increases steering precision and reduces steering reversals.
- Develops skid avoidance skills.

To select a target, first decide where you want the vehicle to travel. Then aim for an object in the center of that path.

Target Area. 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 trying to identify a specific target. Identification of a specific target is only necessary while learning what a target is and how to identify the target area.

Target Area to Target Area. Target Area Searching requires identification of the condition of the target area as open or closed, red light or green, stopped traffic or moving, curve or hill crest, left curve or right curve, to give you a clear picture of what to expect ahead in the vehicle's targeting path.

After knowing what the condition is in your target area, you then should assess your 12-15 second range to see what zone changes can or do affect your targeting path. Make assessments of your other zones to see what your options are. Then select the best lane position and get the best speed control in order to achieve the lowest degree of risk en route to the target area. As you get within 4-6 seconds of a zone change, you reevaluate it to insure best control.

Closer to the target area, you re-evaluate the condition of the target area and begin assessing your next target area and the zone changes that you will encounter en route. This process of searching from one target area to the next target area is repeated continually.

Fact Sheet Module 2 F-2.6 PREVENTING BLIND SPOT CRASHES AND ELIMINATING MIRROR GLARE

Most drivers learned about blindzones (blind spots) in a driver education class and to look over their shoulders before changing lanes. Your first real encounter with a blindzone was probably when you tried to change lanes and got a horn blast in your ear. The adrenaline instantly kicked in as you reversed your maneuver. Your heart jumped to your throat, and you suddenly felt hot as you realized you had just made a dangerous mistake. You asked yourself, "What happened? Why didn't I see that car? Did I forget to look?"

Lots of people make that mistake every year, and sometimes it results in more than just a horn blast. The National Highway Traffic Safety Administration (NHTSA) has studied a category of accidents they call Lane Change/Merge (LCM) crashes. They estimate there are 630,000 LCM crashes with 225 fatalities annually. A NHTSA study found that about 60% of drivers involved in LCM crashes did not see the other vehicle, and about 30% of drivers misjudged the position or speed of the other vehicle.

All LCM crashes cannot be blamed on the blindzones, but blindzones are extremely important. They are not well understood by the average driver, yet they are involved in every LCM maneuver.

To understand why the blindzones are important, let's see how they are created. Most passenger cars are equipped with one inside mirror and two outside mirrors. The inside mirror provides the driver with the widest field of view and by far the most important about traffic to the rear. For this reason, drivers should consider the inside mirror their primary mirror. Transparency T-2.34 is a drawing showing the inside mirror's field of view when it is centered on the road. The marked regions are blindzones in which a vehicle cannot be seen in either the inside mirror or the driver's peripheral vision. To change lanes, the driver must turn and look into the blindzones to see if a vehicle is there.

Transparency T-2.34 shows the fields of view of the two outside mirrors. These outside mirrors have been set so that the sides of the car are just visible. The field of view of an outside mirror is about half that of the inside mirror. Note that the outside mirrors have reduced the size of the blindzones, but have added relatively little to the field of view seen in the inside mirror. Blindzones capable of hiding a vehicle still exist. With this setting of the outside mirrors, it is still necessary to turn and look into the blindzones when changing lanes. This setting is called the "Blindzone Setting".

Transparency T-2.35 shows how easily blindzones can be eliminated. The two outside mirrors are simply rotated outward to look into the blindzones instead of looking along the sides of the car. There are now four mini blindzones, but none is large enough to hide a vehicle. With this new setting, it is no longer necessary to turn and look into the blindzones. All that is required is a glance at the outside mirror to see if a car is there.

The new mirror setting has five major advantages.

First, turning to look into the blindzones, which can be uncomfortable and annoying, is no longer necessary.

Second, only a brief glance at the mirror is required to view the blindzone, as opposed to the longer time required when turning the head. At highway speeds, turning takes your eyes off the road for about 100 feet.

Third, glancing at the mirror leaves the forward scene in your peripheral view, while turning your head completely eliminates the forward view.

Fourth, the blindzones can be easily included in your visual scanning.

Fifth, at night, glare from the outside mirrors is virtually eliminated. The reason for this is that a following car's headlamps are not visible until the car moves into the blindzone, and at that point, the high intensity portion of the headlamp's beam does not hit the mirror.

This setting of mirrors is called the "Blindzone/Glare Elimination Setting", or "BGE Setting".

The BGE Setting requires turning the field of view of each outside mirror outward by about 15 degrees from the Blindzone Setting. For the driver's side mirror, this can be done by placing your head against the side window and then setting the mirror to just see the side of the car. Do the same with the passenger's side mirror, but position your head at the middle of the car. You should next check to see that the blindzones are truly eliminated. From the normal diving position, watch a car as it passes you. It should appear in the outside mirror before it leaves the inside mirror, and it should appear in your peripheral vision before leaving the outside mirror. This is your proof that the blindzones have been eliminated and that your

mirrors are correctly set.

When changing lanes with BGE Setting, you must *first* look in the inside mirror for vehicles approaching from the rear; *then* glance at the outside mirror to see if a vehicle is in the blindzone. A good rule to follow when changing lanes is that if you can see the entire front of a vehicle in the inside mirror, and that vehicle is not gaining on you, it is safe to change lanes provided there is no vehicle in the blindzone. This is similar to the rule used when passing which says wait until you see the front of the car you just passed before changing lanes.

The Blindzone Setting and BGE setting are both useful. For most driving situations the BGE Setting is best. Occasionally, the Blindzone Setting is required. This will be true when the rear window is blocked by cargo, or if you are in heavy stop and go traffic and a car on your bumper blocks your rear view of adjacent lanes.

When driving with the BGE Setting, most drivers initially feel a sense of confusion with the outside mirrors. You are not sure where they are pointed; you miss not seeing the sides of the car; and you do not know how to interpret what you see. Don't give up. The confusion will go away, especially if you do a few simple things.

First, understand that the inside mirror is truly your primary mirror. THE INSIDE MIRROR SHOWS YOU EVERYTHING EXCEPT THE BLINDZONES.

Second, do not look at the outside mirror except to see if a vehicle is in the blindzone. THE OUTSIDE MIRRORS SHOW YOU ONLY THE BLINDZONES.

Third, if you are in doubt about the position of the driver's side mirror, move your head to the side window and check to see that the side of the car is just visible. For the passenger's side mirror, move your head to the middle.

It will take time to overcome your previous habits and accept the new way, but it will happen. Perseverance will reward you with a new dimension in driving which will enhance your safety and comfort.

Platzer, G. (1996). "A Simple Way to Prevent Blindzone Accidents." SAE Technical Paper 950601. Copies available by calling: SAE Public Affairs (412) 776-4841 (7344), (412) 776-2103 FAX, or "www.sae.org".

Fact Sheet
Module 2

F-2.7 STANDARD VEHICLE REFERENCE POINTS

Definition of Reference Points. From the driver's seat, see some part of the vehicle as it relates to some part of the roadway, to know where the vehicle is actually located.

Reference Point Usage. Drivers cannot see the actual position of the car in relation to the roadway. The reason for this is that the driver's view of the road is blocked by the dashboard and by the hood of the car. Reference points can be developed to serve as a guide to overcome the vision problems a driver encounters. *Note: Reference points drawings are located on Transaprency T-2.36 and T-2.37.*

The reference point to tell where the right tires are located is the hood ornament. If the car doesn't have a hood ornament, the curb would appear to be at the center of the hood. When the front of the car is even with a line, the driver will see that line appear near the passenger's side mirror. When the car is 3-6 inches away from a line to the left, the driver will see that line appear to be one foot in from the edge of the left fender.

Standard Reference Points. The reference points presented show the way most drivers will see them. They are our "standard" reference points. When attempting to discover a reference point, first use the "standard" reference point. If the "standard" reference point was accurate for you, continue to use it. If any reference point cited varies, then make note of your "personal" reference point. It won't be more than a few inches away from the "standard" reference point. Once you succeed, remember the correct picture of your "personal" reference point for future use.

Reference points are the tools necessary for the driver to receive accurate feedback for successful performance. If a driver parks alongside a curb perfectly but didn't use reference points, there was no learning of what gave the perfect results. It would be difficult to repeat the same actions with the same results.

Lane Position Options. With the use of reference points you can accurately position your vehicle within a lane to gain best space management.

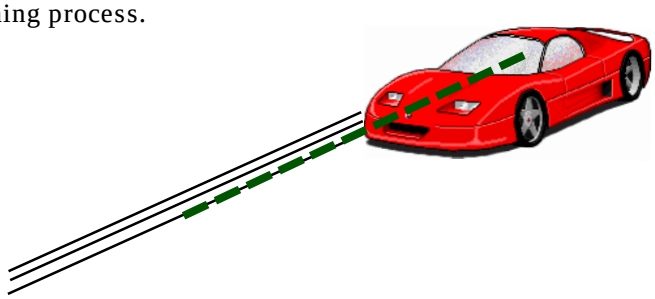
There are five choices for lane position without making a lane change. The Transparency T-2.37 shows the three most frequently used lane positions. The fourth and fifth positions—which require straddling the lane line to the left (LP4) or to the right (LP5)—are only used sparingly to momentarily control two lanes.

Most cars are less than six feet wide; the highway lanes are commonly 12 feet wide. That gives you six feet of empty space to the side without leaving the lane. There is enough room in most lanes to fit two cars.

- Lane Position One is where the car is centered within the travel lane.
- Lane Position Two is where the car is 3-6 inches away from the left line of the travel lane.
- Lane Position Three is where the car is 3-6 inches away from the right line of the travel lane. (Special LP3 - When there is no lane line, lane position three is at least three feet away from the curb or from the shoulder of the road.)

Why Learn Target Usage? Target Usage Advantages:

- Helps drivers to visualize the space they intend to occupy.
- Beginning of learning to use a searching process.
- Gets the driver to look far ahead.
- Allows the driver to plan ahead.
- Increases steering accuracy.



Mottola, F.R. (1997). "Empower Yourself." Interactive Driving Systems, Inc. Chesire, CT.
Copies available through Interactive Driving Systems, Inc., P. O. Box 98, Chesire, CT 06410. (203) 272-9391, (203) 250-0896 FAX.

Texas Driver Education
Classroom and In-car Instruction
Model Curriculum

Module Two

Texas Driver Responsibilities:

Preparing to Operate a Vehicle

- Driver Preparation Procedures
- Identifying Vehicle Control Devices
- Operating Vehicle Control Devices
- Vehicle Balance Considerations
- Standard Vehicle Reference Points

WORKSHEETS

Texas Education Agency
Texas Department of Public Safety
Texas Department of Transportation

Driving Through
A New Century
Texas Education Agency

W-2.1 Driver Preparations Name _____

List the pre-drive, driver readiness, starting, and securing tasks used when preparing to drive.

Pre-drive Tasks

-
-
-
-
-
-
-
-
-
-

Driver Readiness Tasks

-
-
-
-
-
-
-
-
-
-

Starting Tasks

-
-
-
-
-
-
-
-
-
-

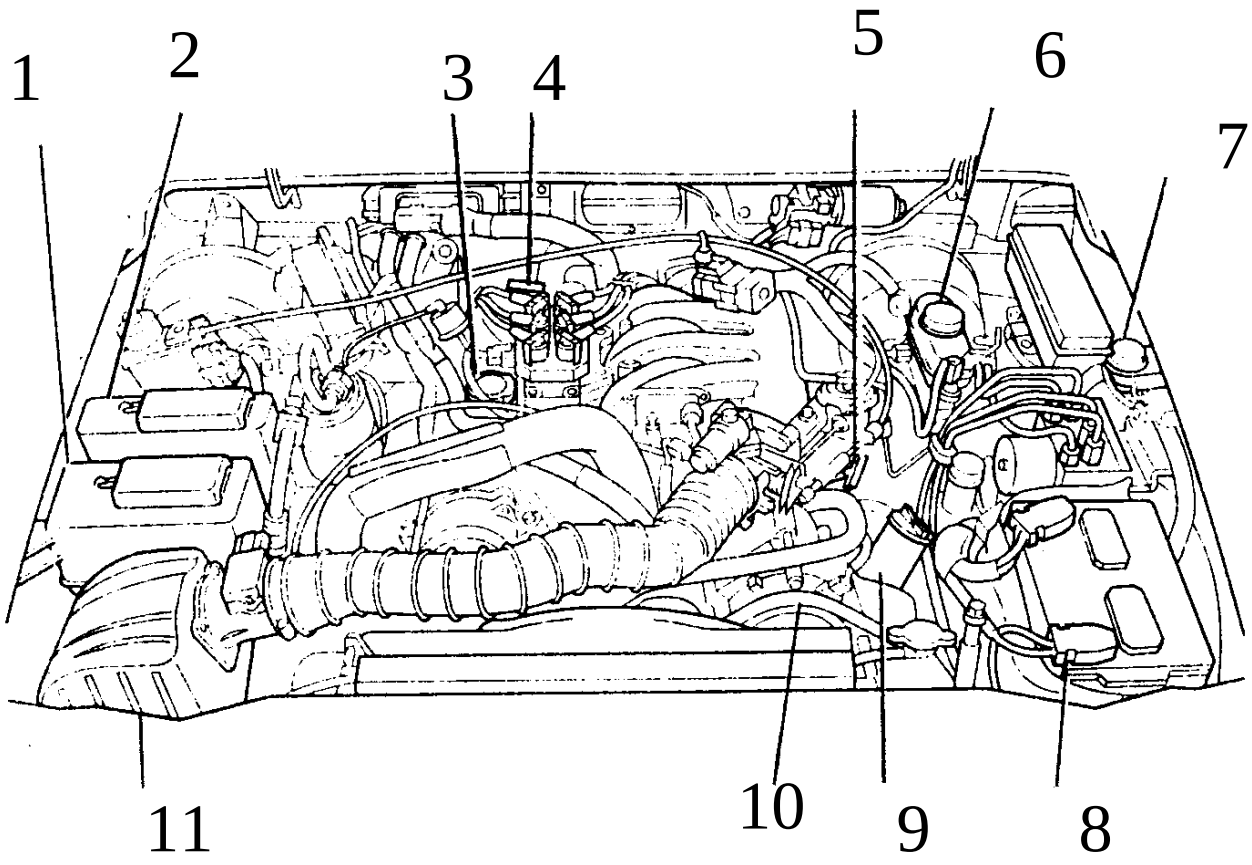
Securing Tasks

-
-
-
-
-
-
-
-
-
-

The driver education instructor may list tasks that are specific to the local program needs. For instance, the program may have a standard shift vehicle for use in program.

W-2.2 Under The Hood Checks Name _____

Using the picture with numbered lines leading to points on the engine, identify items that should be checked regularly to assure safe operation and to protect the engine.



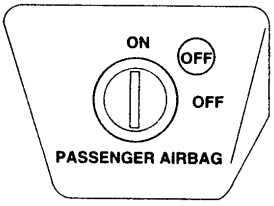
Check if found.

_____ 01. Engine Coolant Reservoir
_____ 02. Windshield Washer Fluid Reservoir
_____ 03. Engine Oil Filler Cap
_____ 04. Transmission Fluid Dipstick (Automatic Transmission)
_____ 05. Engine Oil Dipstick
_____ 06. Brake Fluid Reservoir
_____ 07. Clutch Fluid Reservoir (Manual Transmission
_____ 08. Battery
_____ 09. Power Steering Fluid Reservoir
_____ 10. Drive Belts
_____ 11. Air Filter Assembly

W-2.3 Control and Information Devices Name _____

Fill in the alert symbols, warning symbols, and control devices found on Transparencies T-2.11 and T-2.12 as a classroom activity

A.	_____	**N.**	_____	**AA.**	_____
B.	_____	**O.**	_____	**BB.**	_____
C.	_____	**P.**	_____	**CC.**	_____
D.	_____	**Q.**	_____	**DD.**	_____
E.	_____	**R.**	_____	**EE.**	_____
F.	_____	**S.**	_____	**FF.**	_____
G.	_____	**T.**	_____	**GG.**	_____
H.	_____	**U.**	_____	**HH.**	_____
I.	_____	**V.**	_____	**II.**	_____
J.	_____	**W.**	_____	**JJ.**	_____
K.	_____	**X.**	_____	**KK.**	_____
L.	_____	**Y.**	_____	**LL.**	_____
M.	_____	**Z.**	_____	**MM.**	_____
				NN.	_____



W-2.4 Control, Information, Comfort, and Safety Devices

Name _____

Label the Control and Information Devices as directed by the instructor during classroom discussion for a 1999 Ford Ranger pickup truck.

Left Control Panel

01. _____
02. _____
03. _____
04. _____

Functional Levers

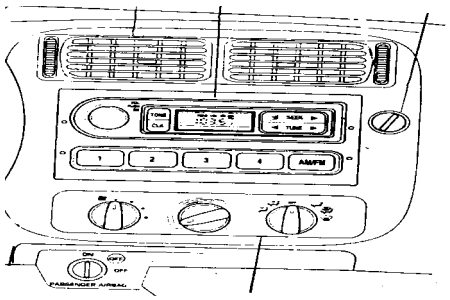
05. _____
06. _____
07. _____
08. _____

Passive Restraint

09. _____

Left Instrument Cluster

10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____



Center Instrument Cluster

20. _____
21. _____
22. _____
23. _____
24. _____
25. _____

Right Instrument Cluster

26. _____
27. _____
28. _____
29. _____
30. _____
31. _____
32. _____
33. _____
34. _____
35. _____
36. _____
37. _____

Auxiliary Panel Controls

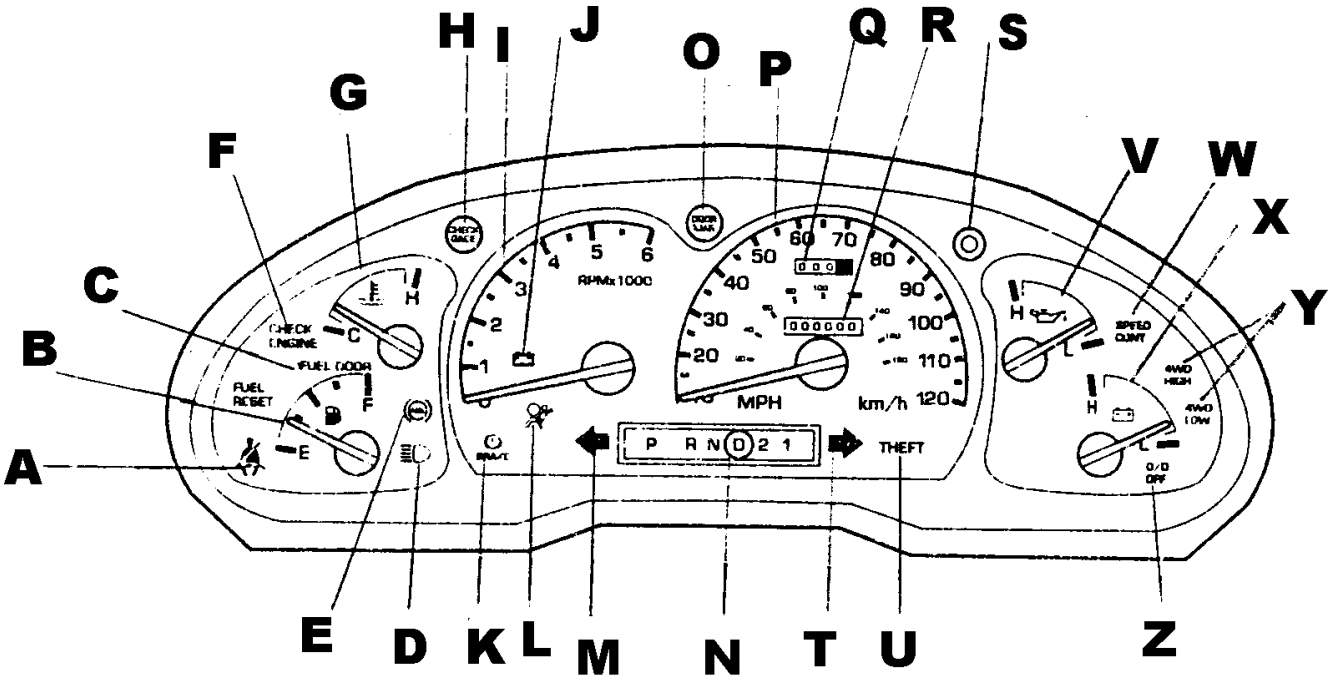
38. _____
39. _____
40. _____
41. _____
42. _____
43. _____
44. _____

W-2.5 Family Vehicle Instrument Cluster

Name _____

Instrument Panel Gauges Labeling Guide

Identify instruments and gauges on instrument panel of your family car or that of a friend and list below. Draw the instrument panel on the rear side of this sheet.



A. _____

B. _____

C. _____

D. _____

E. _____

F. _____

G. _____

H. _____

I. _____

J. _____

K. _____

L. _____

M. _____

N. _____

O. _____

P. _____

Q. _____

R. _____

S. _____

T. _____

U. _____

V. _____

W. _____

X. _____

Y. _____

Z. _____

W-2.6 Family Vehicle Equipment

Name _____

Use this worksheet to determine whether your family vehicle or that of a friend is equipped with the following Safety, Communication, Comfort, and Convenience devices and if so equipped, where the control levers, switches, or buttons are located.

Equipped	Yes/No	Location of control lever or switch
Tilt steering wheel	_____	_____
Auto. Transmission	_____	_____
Manual Transmission	_____	_____
Parking Brake	_____	_____
Cruise Control	_____	_____
Mirror Controls	_____	_____
Hazard Flasher	_____	_____
Headlights	_____	_____
Instrument Panel Light Switch	_____	_____
Hood Release	_____	_____
Trunk Release	_____	_____
Seat Control Manual	_____	_____
Seat Control Electric	_____	_____
Separate Turn Indicator Lever	_____	_____
Windshield Wiper Switch	_____	_____
Windshield Washer Switch	_____	_____
Air Bag Cut Off Switch	_____	_____
Electric Door Locks	_____	_____
Childproof Rear Door Locks	_____	_____

W-2.7 Vehicle Balance Concepts Name _____

Complete the following questions during the discussion of vehicle balance:

. Define Vehicle Balance:_____

_____

_____

. If a driver brakes too hard, the vehicle weight shifts to the _____.

. If a driver accelerates too hard, the vehicle weight shifts to the _____.

. If a driver steers too quickly to the right, the vehicle weight shifts to the _____.

. If a driver steers too quickly to the left, the vehicle weight shifts to the _____.

. Explain how seating position may affect the balance of your vehicle: _____

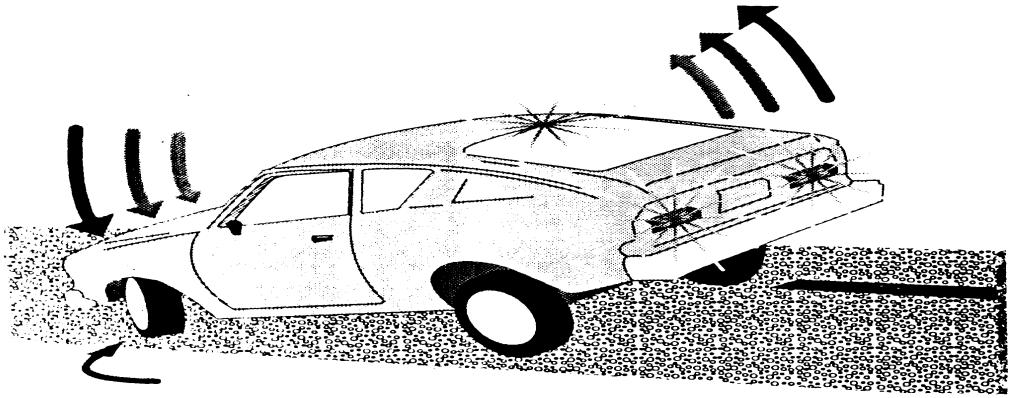
_____

_____

. What is the problem shown by the vehicle below? _____

_____

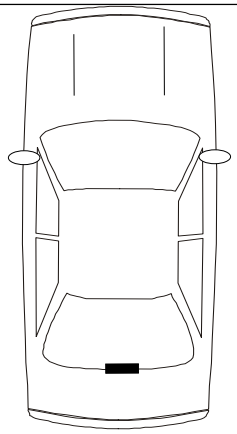
_____



W-2.8 Standard Vehicle Reference Points (Front and Right)

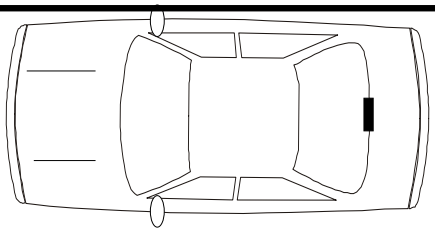
Name _____

Draw the standard reference points onto the vehicles below as requested:

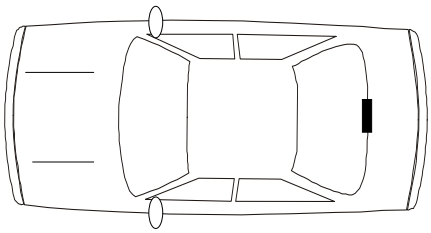


Front Limitation

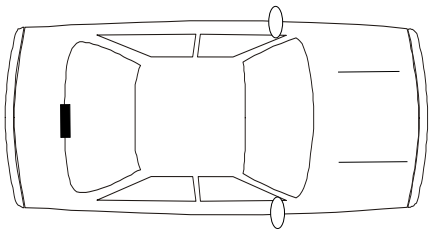
0-6 inches from the right



2-3 feet from the right



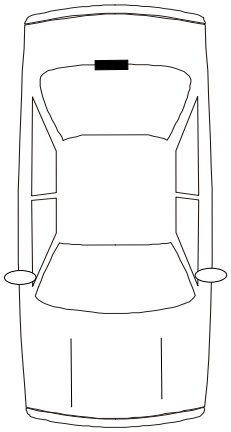
5-8 feet from the right



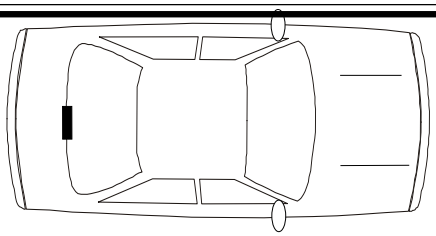
W-2.8 Standard Vehicle Reference Points Name _____
(Rear and Left)

Draw the standard reference points onto the vehicles below as requested:

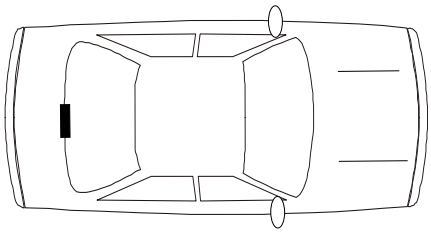
Rear Limitation



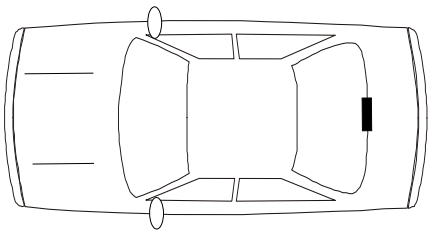
0-6 inches from the left



2-3 feet from the left



5-8 feet from the left



Texas Driver Education
Classroom and In-car Instruction
Model Curriculum

Module Two

Texas Driver Responsibilities:

Preparing to Operate a Vehicle

- Driver Preparation Procedures
- Identifying Vehicle Control Devices
- Operating Vehicle Control Devices
- Vehicle Balance Considerations
- Standard Vehicle Reference Points

EVALUATION AND ASSESSMENT

Texas Education Agency
Texas Department of Public Safety
Texas Department of Transportation

Driving Through A New Century
Texas Education Agency

MA-2.1 Preparing To Drive

Select the best answer and place the appropriate letter (A, B, C, D, or E) on the answer sheet provided.

1. What should a driver look for when checking around the outside of a vehicle?
   A. broken glass on vehicle
   B. tire condition
   C. fluid leaks
   D. debris on ground
   E. all of the above
2. Where should valuables be stored to avoid potential problems?
   A. right front floor board
   B. rear seat
   C. trunk
   D. glove compartment
   E. all of the above
3. When parked at a curb, from which direction should the driver approach the vehicle:
   A. from the rear
   B. from the front
   C. from the left side
   D. from the right side
   E. none of the above
4. When establishing a seating position, the driver should adjust for:
   A. driver foot pedal position
   B. driver hand position
   C. driver dead pedal position
   D. driver visual needs
   E. all of the above
5. When starting the vehicle, what should be the first task:
   A. place foot on brake
   B. place the gear selector in (P)ark or (N)eutral
   C. place the key in the ignition
   D. check or set the parking brake
   E. none of the above
6. When securing the vehicle, what should be the first task:
   A. Set the parking brake
   B. park in a legal, secure parking space
   C. place the gear selector in (P)ark
   D. turn off any accessories
   E. none of the above
7. When properly seated, the top of the steering wheel should be:
   A. no higher than the top of your shoulders
   B. no higher than your chin
   C. no higher than your ears
   D. no higher than the point at which you feel comfortable
   E. none of the above
8. The purpose of the parking brake is to:
   A. stop your vehicle on a slick surface
   B. stop your vehicle on in an emergency
   C. hold the vehicle in place when parked
   D. hold the vehicle only when parked on a hill
   E. all of the above
9. Which of the following symbols represents a safety belt reminder or warning?
   A.  B.  C.  D.  E. None of these

MA-2.1 Preparing To Drive

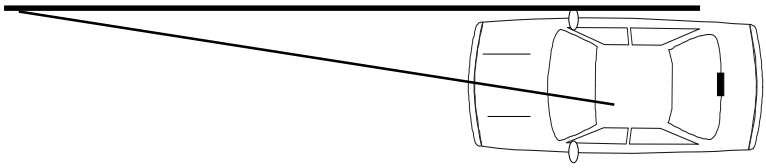
10. Which of the following symbols represent windshield defrosters?
    A.  B.  C.  D.  E. None of these

11. Which of the following symbols represent headlamp beam switch?
    A.  B.  C.  D.  E. None of these

12. Which of the following symbols represent oil pressure warning?
    A.  B.  C.  D.  E. None of these

13. Pulling or pushing the lights lever will:
    A. flash brake lights and turn signals
    B. turn on head lights and parking lights
    C. change to or from high to low beam
    D. dim dashboard high intensity
    E. all of these

14. What reference point is illustrated here?
    A. front alignment
    B. rear alignment
    C. 6 inches from side curb
    D. angle parking
    E. none of these



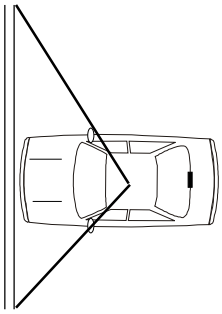
15. A vehicle that is in a balanced state:
    A. has more weight concentrated on the front tire patches while stopping
    B. has more weight concentrated on the rear tire patches while accelerating
    C. has weight concentrated over the four tire patches while stopped
    D. has more weight shifted to the left or right front tire patch while turning
    E. none of the above

16. Weight can be shifted to the front tire patches of the vehicle by:
    A. covering accelerator
    B. acceleration
    C. releasing the brake
    D. controlled braking
    E. all of the above

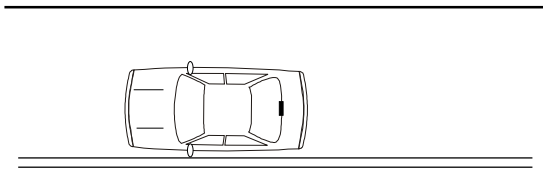
17. The oil pressure light comes on when the vehicle is moving on the highway. What does it mean?
    A. the oil filter should be changed
    B. the oil pressure is low
    C. the oil needs to be changed
    D. defective warning light
    E. none of the above

18. Hard brake application together with sharp steering input to the left results in:
    A. major weight shift to the front tire patches
    B. major weight shift to the left front tire patch
    C. major weight shift to right front tire patch
    D. major weight shift from the right rear tire patch
    E. none of the above

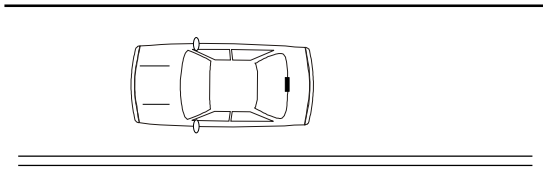
MA-2.1 Preparing To Drive



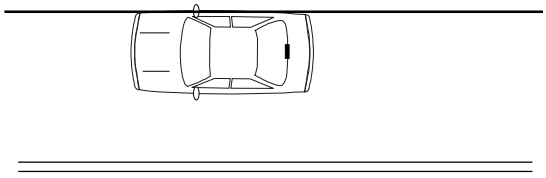
19. What reference point is illustrated here?
    A. front alignment
    B. rear alignment
    C. 6 inches from side curb
    D. angle parking
    E. none of these
20. Changes in automotive design without appropriate adjustment on the part of drivers that appear to contribute to off road crashes are:
    A. seat and steering wheel height
    B. improved brakes and reduced lock to lock turns in steering
    C. improved brakes and headlights
    D. reduced lock to lock turns in steering and improved headlights
    E. all of the above
21. What lane position is illustrated here?
    A. lane position one
    B. lane position two
    C. lane position three
    D. lane position four
    E. none of these



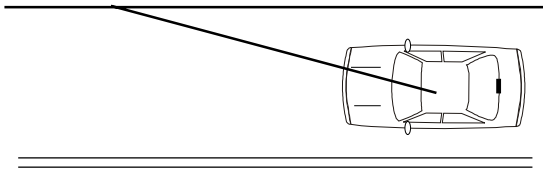
22. What lane position is illustrated here?
    A. lane position one
    B. lane position two
    C. lane position three
    D. lane position four
    E. none of these



23. Effective targeting allows the driver to:
    A. visualize the space they intend to occupy.
    B. begin learning to use a searching process.
    C. look far ahead.
    D. plan ahead.
    E. all of the above
24. What lane position is illustrated here?
    A. lane position one
    B. lane position two
    C. lane position three
    D. lane position four
    E. none of these



25. What reference point is illustrated here?
    A. front alignment
    B. rear alignment
    C. 6 inches from side curb
    D. 2-3 feet from right
    E. none of these



Module 2 Assessment Sheet

Name: _____

Date: _____

Score: _____

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____

Module 2 Assessment Answer Sheet

Name: ____ ASSESSMENT ANSWER SHEET _____

Date: _____

Score: 4 POINTS FOR EACH CORRECT ANSWER BELOW

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

Texas Driver Education
Classroom and In-car Instruction
Model Curriculum

Module Two

Texas Driver Responsibilities:

Preparing to Operate a Vehicle

- Driver Preparation Procedures
- Identifying Vehicle Control Devices
- Operating Vehicle Control Devices
- Vehicle Balance Considerations
- Standard Vehicle Reference Points

CLASS LESSON PLAN FORMATS

Texas Education Agency
Texas Department of Public Safety
Texas Department of Transportation

Driving Through
A New Century
Texas Education Agency

GRADE: HS MODULE: TWO TOPIC:

TOPIC ACTIVITIES TOPIC RESOURCES

Knowledge and Skills
The student is expected to:

The Instructor:

Module Two. Texas Driver Responsibilities--Preparing To Operate a Vehicle. The student recognizes the necessity of making routine vehicle checks and adjustments prior to and after entering the vehicle. identifies the location of alert and warning symbol lights, understands the operation of vehicle control and safety devices, investigates vehicle balance concepts, and analyzes standard vehicle reference points relationship to roadway position and vehicle placement.

LESSON CONTENT (Instructor Support Information)

GRADE: HS MODULE: TWO TOPIC:

TOPIC ACTIVITIES TOPIC RESOURCES

Knowledge and Skills
The student is expected to:

The Instructor:

LESSON CONTENT (Instructor Support Information)

Texas Driver Education
Classroom and In-car Instruction
Model Curriculum

Module Two

Texas Driver Responsibilities:

Preparing to Operate a Vehicle

- Driver Preparation Procedures
- Identifying Vehicle Control Devices
- Operating Vehicle Control Devices
- Vehicle Balance Considerations
- Standard Vehicle Reference Points

TRANSPARENCIES

Texas Education Agency
Texas Department of Public Safety
Texas Department of Transportation

Driving Through A New Century
Texas Education Agency