FIGURE 45.1 (a) A typical tire tread depth gauge. The center movable plunger is pushed down into the groove of the tire. (b) The tread depth is read at the top edge of the sleeve. In this example, the tread depth is 6/32 inch.

FIGURE 45.2 Wear indicators (wear bars) are strips of bald tread that show when the tread depth is down to 2/32 inch, the legal limit in many states.
FIGURE 45.3 The tire tread runs around the circumference of the tire, and its sipes provide traction. The ribs provide grip, while the grooves direct any water on the road away from the surface. The sipes help the tires grip the road.

FIGURE 45.4 Hydroplaning can occur at speeds as low as 30 mph (48 km/h). If the water is deep enough and the tire tread cannot evacuate water through its grooves fast enough, the tire can be lifted off the road surface by a layer of water. Hydroplaning occurs at lower speeds as the tire becomes worn.

FIGURE 45.5 Typical construction of a radial tire. Some tires have only one body ply, and some tires have more than two belting plies.
The major splice of a tire can often be seen and felt on the inside of the tire. The person who assembles the tire usually places a sticker near the major splice as a means of identification for quality control.

Tire construction is performed by assembling the many parts of a tire together on a tire-building machine.

After the entire tire has been assembled into a completed “green” tire, it is placed into a tire-molding machine where the tire is molded into shape and the rubber is changed chemically by heat. This nonreversible chemical reaction is called vulcanization.
FIGURE 45.9 Notice that the overall outside diameter of the tire remains almost the same and at the same time, the aspect ratio is decreased while the rim diameter is increased.

FIGURE 45.10 (a) Tire size designation includes cross-sectional width and aspect ratio. (b) Cross-sectional view of a typical tire showing the terminology.

FIGURE 45.11 Typical sidewall markings for load rating and speed rating following the size.
CHAPTER 45
Tires and Wheels

FIGURE 45.12 The E.C.E. symbol on a sidewall of a tire. Notice the small ‘s’ at the end, indicating that the tire meets the "pass-by" noise limits.

FIGURE 45.13 A typical door placard used on a General Motors vehicle indicating the recommended tire inflation. Note that the information also includes the size and speed rating of the tire as well as the recommended wheel size.

FIGURE 45.14 A label placed on the box of a manufacturer’s vehicle indicating the recommended tire pressures. Note that the information also includes the size and speed rating of the tire as well as the recommended wheel size.
Tires and Wheels

FIGURE 45.14
Conicity is a fault in the tire that can cause the vehicle to pull to one side due to the cone effect, resembling a tire.

FIGURE 45.15
Notice the angle of the belt material in this worn tire. The angle of the belt fabric can cause a "ply steer" or slight pulling force toward one side of the vehicle.

FIGURE 45.16
Slip angle is the angle between the direction the tire is heading and the direction it is pointed.
FIGURE 45.17 Typical Uniform Tire Quality Grading System (UTQGS) ratings imprinted on the tire sidewall.

FIGURE 45.18 Typical DOT date code. This tire was built the 52nd week of 2010.

FIGURE 45.19 Cutaway of a run-flat tire showing the reinforced sidewalls and tire pressure sensor.
FIGURE 45.20 A conventional tire on the left and a run-flat tire on the right, showing what happens when there is no air in the tire.

FIGURE 45.21 The PAX run-flat system is composed of three unique components—a special asymmetrical wheel, a urethane support ring, and a special tire.

FIGURE 45.22 The Tire Performance Criteria (TPC) specification number is imprinted on the sidewall of all tires used on General Motors vehicles from the factory.
The size of the wheel is usually cast or stamped into the wheel. This wheel is 7 inch wide.
The letter "J" refers to the contour of the bead seat area of the wheel.

The wheel rim well provides a space for the tire to fit during mounting; the bead seat provides a tire-to-wheel sealing surface; the flange holds the beads in place.
FIGURE 45.26 Offset is the distance between the centerline of the wheel and the wheel mounting surface.

FIGURE 45.27 Back spacing, front spacing, or tire distance from the mounting pad to the edge of the rim. Most custom wheels use this measurement method to indicate the location of the mounting pad relative to the rim.

FIGURE 45.28 Bolt circle is the diameter of a circle that can be drawn through the center of each lug hole or stud. The bolt circle is sometimes referred to as PCD for pitch circle diameter.
FIGURE 45.29 Measuring the bolt circle on a five-lug wheel is difficult, but a quick and easy way includes measuring as shown to determine the approximate bolt circle of a five-lug wheel.

FIGURE 45.30 Measure center-to-center distance and compare the distance to the figures in the chart to determine the diameter for a five-lug bolt circle.

FIGURE 45.31 A typical JWL symbol for the Japan Wheel Light Metal standard mark.
FIGURE 45.32 (a) A rubber snap-in style tire valve assembly. (b) A metal clamp-type tire valve assembly used on high-pressure (over 60 PSI) tire applications such as is found on many trucks, RVs, and trailers. The internal Schrader valve threads into the valve itself and can be replaced individually, but most experts recommend replacing the entire valve assembly every time the tires are replaced to help prevent air loss.

FIGURE 45.33 Various styles of lug nuts.

FIGURE 45.34 Check the tire information placard, usually located on the driver’s door or door jamb, for the specified tire size and inflation pressures.
UNFIGURE 45.2 Visually check the tires for abnormal wear or damage.

UNFIGURE 45.3 Remove the tire valve cap and visually check the condition of the valve stem.

UNFIGURE 45.4 Check inflation pressure by pushing the tire-pressure gauge straight onto the end of the tire valve. If a hissing sound is heard, the reading will not be accurate.
Read the pressure and compare to specifications. Use an analog or digital gauge if possible, which have been proven to be more accurate than a mechanical pencil-type gauge.

Visually check the tires for abnormal wear or damage.

The blade of the tire tread depth gauge is pushed down into the groove of the tire at its lowest point.
UNFIGURE 45.8 Remove the gauge from the tire and read the tread depth at the metal housing. Tread depth is usually measured in 1/32" of an inch.

UNFIGURE 45.9 If the top of Lincoln’s head is visible, then the tread depth is less than 2/32 inch, the legal limit in many states.