FIGURE 38.1 A clutch assembly attached to the engine crankshaft at the rear of the engine.

FIGURE 38.2 (a) When the clutch is in the released position (clutch pedal depressed), the clutch fork is applying a force to the release (release) bearing, which pushes on the diaphragm spring, releasing the pressure on the friction disc.
FIGURE 38.2  (b) When the clutch is in the engaged position (clutch pedal up), the diaphragm spring exerts force on the clutch disc, holding it between the flywheel and the pressure plate.

FIGURE 38.3  A hydraulic clutch linkage uses a master cylinder and a slave cylinder.

FIGURE 38.4  A typical clutch master cylinder and reservoir mounted on the bulkhead on the driver’s side of the vehicle. DOT 3 brake fluid is used in the hydraulic system to operate the slave cylinder located on the bell housing.
FIGURE 38.5  The clutch pedal linkage moves the clutch fork, which then applies a force against the release bearing, which then releases the clamping force the pressure plate is exerting on the clutch disc.

FIGURE 38.6  A typical clutch friction disc that uses coil spring torsional dampers that absorb the initial shock of engagement and help dampen engine firing in pulses being transmitted into and through the transmission/transaxle.

FIGURE 38.7  The flywheel has a friction surface for the clutch and has gear teeth that are used by the starter motor to rotate the engine for starting.
FIGURE 38.8  Gear ratio is determined by dividing the number of teeth of the driven (output) gear (24 teeth) by the number of teeth on the driving (input) gear (12 teeth). The ratio illustrated is 2:1.

FIGURE 38.9  A manual transmission on a restored muscle car showing the bell housing, transmission, extension housing, and shifter.

FIGURE 38.10  Cross-section of a five-speed manual transmission showing the main parts.
FIGURE 38.11 A typical shift mechanism is designed not only to give the driver a solid feel when shifting but also to prevent two gears from being selected at the same time. The shift mechanism also prevents shifting into reverse except from the neutral position.

FIGURE 38.12 The shifter fork fits into the groove of the synchronizer sleeve. When a shift is made, the sleeve is moved toward the speed gear. The sleeve presses the stop ring synchronizer ring against the cone area of the speed gear. The friction between the stop ring and the speed gear causes the speed of the two to become equal, permitting the sleeve to engage the gear clutch teeth of the speed gear. When this engagement occurs, the shift is complete.

FIGURE 38.13 A partially disassembled manual transaxle showing the final drive assembly and some of the bearings and gears.
FIGURE 38.14 Some manual transmissions/transaxles require synchromesh transmission fluid.

FIGURE 38.15 Typical rear-wheel-drive power train arrangement. The engine is mounted longitudinal (lengthwise).

FIGURE 38.16 A simple universal joint (U-joint).
FIGURE 38.17 A Cardan U-joint used on the drive shaft on a rear-wheel drive vehicle.

FIGURE 38.18 A constant velocity (CV) joint can operate at high angles without a change in velocity (speed) because the joint design results in equal angles between input and output.

FIGURE 38.19 A drive axle shaft (also called a half shaft) on a front-wheel drive vehicle showing the inner and outer CV joints. The rubber boots that cover the joints and hold in the grease should be inspected for tears or other faults due to road debris.
FIGURE 38.20 The differential assembly changes the direction of engine torque and increases the torque to the drive wheels.

FIGURE 38.21 The difference between the travel distance of the drive wheels is controlled by the differential.

FIGURE 38.22 When the vehicle turns a corner, the inner wheel slows and the outer wheel increases in speed to compensate. This difference in rotational speed causes the pinion gears to “walk” around the slower side gear.
FIGURE 38.23 (a) A two-wheel-drive vehicle equipped with a standard differential. (b) A four-wheel-drive vehicle equipped with a limited-slip differential.

LOW-FRICTION SURFACE

FIGURE 38.24 A typical transfer case is attached to the output of the transmission and directs engine torque to the rear or to the front and rear differentials.

FIGURE 38.25 The controls for the transfer case on a Chevrolet four-wheel drive pickup truck.
FIGURE 38.26 An identification tag on the housing of a transfer case. This identification information is often needed to be sure that the correct parts or fluids are purchased.

FIGURE 38.27 Some transfer cases require the use of special fluids. Always check service information for the exact fluid needed.