Learning Objectives

- Identify the major parts and assemblies of the suspension system
- Describe the basic function of each suspension system part and assembly
- Compare the various types of suspension systems
- Discuss safety procedures when working on a suspension systems
Front Suspension

- Coil springs
- Shock absorber
- Control arm
- Cross member
- Front disc brake
Rear Suspension

- Stabilizer bar
- Track rod
- Center link
- Shock absorber
- Trailing link
1. A DEAD AXLE is a solid rear axle on a front-wheel drive vehicle.

2. A CONTROL ARM is a moveable lever that fastens the steering knuckle to the vehicles’ body or frame.
Suspension Designs

Independent Suspension

“Dead Axle”
3. The BALL JOINT is a swivel joint that allows the control arm and steering knuckle to move up or down and from side-to-side.

4. The SHOCK ABSORBER keeps the suspension from continuing to bounce up and down after spring compression and extension.
Ball Joints

- Wheel
- Steering knuckle
- Hub and wheel bearing assembly
- Drive axle shaft
- Upper ball joint
- Lower ball joint
Shock Absorbers

- Compression
- Extension

- Piston rod
- Reservoir
- Bypass spring
- Restriction ports
- Piston
- Compression head orifice
- Compression head
- Piston rod seal
- Inner cylinder
- Restriction ports
- Extension orifice
- Extension valve
- Extension valve spring
- Replenishing valve
5. JOUNCE BUMPERS are hard blocks of rubber that keep the suspension parts from hitting the frame when the car hits large bumps or holes.

6. A MacPHerson STRUT SUSPENSION only uses one control arm to support each wheel.
MacPherson Strut

Parts of a MacPherson Strut Assembly

- Strut rod nut
- Upper strut retainer
- Bumper (rebound)
- Body mounting tower
- Retainer
- Isolator
- Retainer
- Strut damper
- Strut bearing
- Upper spring seat
- Rubber bumper (jounce)
- Dust shield
- Coil spring
- Lower spring seat
- Strut shock absorber
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7. The SPRING(S) supports the weight of the vehicle, while allowing the vehicle to move up and down.

8. The STEERING KNUCKLE provides support for mounting wheel hubs, bearing and tire and wheel assemblies.
Control Arm & Steering Knuckle
9. The **SWAY ARM** is used to keep the body from rolling or leaning excessively during sharp turns.

10. A **CONTROL ARM BUSHING** is a sleeve with a rubber or composite insert that allows the control arm to swing up and down on the frame.
The sway bar links connect the Sway bar to the control arms.
Control Arm

The separate parts that make up the control arm assembly.
An Electric Height Control system uses height sensors and an electronic control module to control the operation of a small electric air compressor, which maintains the correct ride height.
Active Control Suspension

An Active Suspension System uses a hydraulic pump to provide pressure to operate the rams.
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