

How a Car Works

Have you ever wondered what happens when you press on the brake pedal or what makes the tires turn? Explore these exhibits to discover how a car works!

Think About It

- Where are the moving parts that make each device work?
- What are the different **forces** that affect each device?
- Can you think of other ways to do the same work?

Path

SPEEDOMETER

- What do you see the magnet do to the copper ring as you turn the crank faster?
- If copper is not **magnetic**, why do you think the magnet makes the copper ring move?



DIFFERENTIAL

- Try to stop one wheel while you turn the center disc to make the wheels spin. What happens to the other wheel? What do the **gears** do?
- Why do you think it is important to make sure both wheels always move at the same speed?



CAR DISC BRAKE

- Start the tire spinning. What happens to the pressure gauge when you push the pedal on the right?
- Spin the tire again. What do you see happen if you push the pedal on the left?



MUFFLER

- What do the Styrofoam beads do when the noise starts? Can you change how they move?
- Try building a muffler with the parts supplied. What kind of muffler do you think will work best? Why?



CAR TURN SIGNAL

- Switch the signal on and watch the metal strip. How does it turn the light on and off?
- **Electricity** moves through the **bimetallic strip** when the signal is turned on. Why do you think the strip bends?



TRAFFIC SIGNAL

- How do the discs, or **cams**, control the pattern of the lights?
- What do you think modern traffic lights might use to control the pattern instead of cams?



What's Going On?

Cars and other road vehicles have changed the way we live. At first they were slow, noisy and dangerous, but engineers and designers are always making improvements to vital parts like the **engine**, **brakes**, and **suspension**. All of the parts of a car work together to help make the **work** and transfer of **energy** more **efficient**. Using **simple machines** is one way to do this. Gears, levers, inclined planes, screws, wheels, pulleys and wedges are all used in cars to help make the work easier.

How to use this guide

To help guide your visit, we have developed this learning pathway to explore a specific topic using some of the exhibit components.

1. Follow this path as you explore the gallery, try a different path, or create your own path and follow where your curiosity takes you!
2. Look up the words in bold in the vocabulary list on the back.



Learn More About It!

Cars And How They Work

DK Publishing, 1992

R. Sutton

Car

Random House, 1990

C. Vorderman

How It Works: How Things Work

Readers Digest, 1995

Sally Nankivell-Aston, et al.

Science Experiments With Simple Machines

Franklin Watts, 2000

A. Mason, et al.

Simple Machines (Starting With Science)

Kid Can Press, 2000

D. Macauley and N. Ardley

The Way Things Work

Dorling Kindersley, 2004

D. Macauley

The New Way Things Work

Houghton Mifflin Books, 1998

Transportation Educational Links

<http://www.ohtm.org/eduLnksPg.html>

Bimetallic Strip - A long, thin, rectangle with a different kind of metal on each side.

Brake - A device that uses **force** to create enough **friction** to slow down a moving object.

Cam - A rotating disc that converts circular motion into motion in a straight line.

Differential - A device that uses **gears** to keep the tires on each side of a car or truck always moving at the same speed.

Efficient - The ability to do work without a loss of time or energy.

Electricity - An effect caused by the motion of charged particles.

Energy - The ability to do work. It can come in many forms, including kinetic (or motion) and potential.

Engine - Anything that converts heat (or thermal) energy to mechanical energy for moving parts.

Friction - The **force** of resistance caused by the motion of two objects that are touching.

Force - A push or a pull.

Gear - A system of two or more interlocking pieces so that the motion of one piece controls the speed and turning effect of the others.

Magnetic - The ability to be effected by a force called magnetism, sometimes caused by a flow of **electricity**.

Simple Machines - The group of 7 devices that only require the application of a single force to work.

Suspension - A system that keeps the wheels of a car on the ground, without bumping or sliding.

Work - Force multiplied by distance.