



# Chapter 5

## Matter in Motion

### Section 3

# Friction: A Force That Opposes Motion

# Friction

- A force that opposes motion between two surfaces that are touching
- Can cause a moving object to slow down and eventually stop
- Amount of friction depends on the force pushing the surfaces together

Still confused?

# Types of Friction

- Kinetic Friction – friction between moving surfaces

- Rolling kinetic friction – bicycles, cars, skateboards, etc



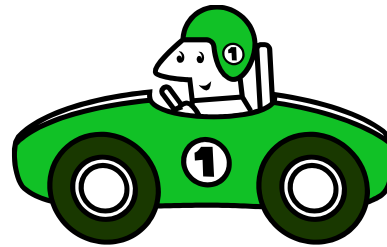
- Sliding kinetic friction – brakes on a car, writing with a pencil, etc

- Static Friction – friction between nonmoving objects

- Example: a book placed on a desk

# Helpful Friction

- Starting a car – tires push against ground and car begins to roll



- Stopping a car – brakes create friction on axles, causing the car to slow and finally stop



← Tread on a tire increases friction, helping a car to stop

# Harmful Friction

- Friction also causes wear on things
  - Engine parts
  - Clothes (holes in socks and jeans)
  - Erosion



# Increasing and Decreasing Friction

- Increasing friction makes surfaces rougher
  - Force increases friction: the more force used on sand paper, the faster item is sanded
  - Sand scattered on icy roads increases friction, making the roads safer
- Decreasing friction makes surfaces smoother
  - Lubricants like oil reduces friction between surfaces
  - Rolling friction is smoother than kinetic friction

