Friction Flipped Lesson

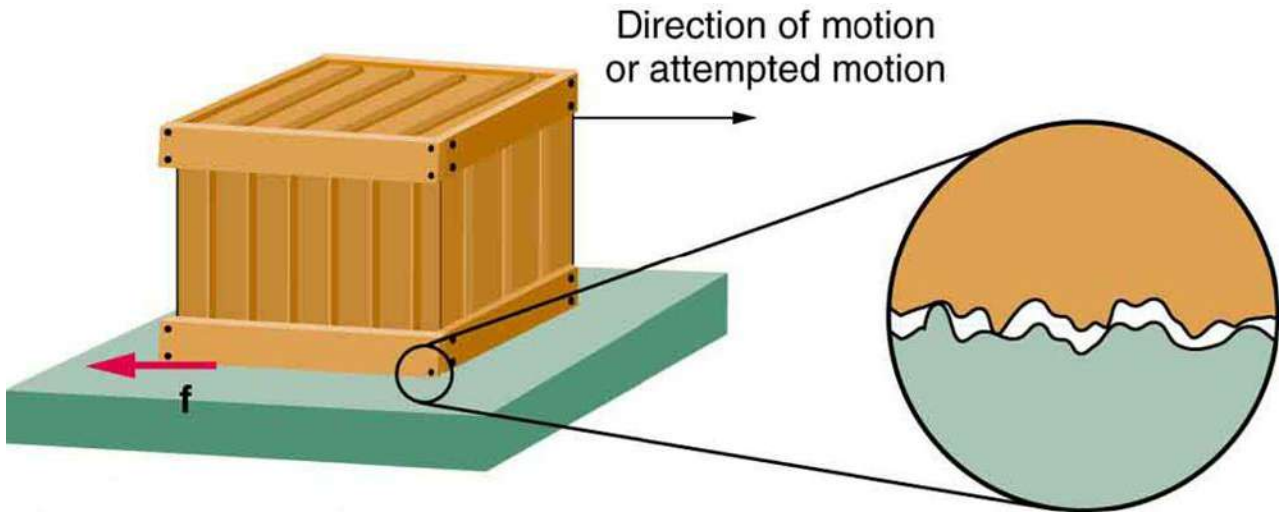
by Ms. Logan

Friction: What causes it?

Friction: A force present whenever an object moves or attempts to move that opposes motion.

- Affected by:
  - Material of surfaces
  - Normal Force

Recent debates and developments on friction: Is it caused by rough surfaces or electromagnetic bonding?



Two Types of Friction

1. **Static Friction:**
   - Present when the object is not moving
   - Minimum force needed to overcome a threshold to begin motion
2. **Kinetic Friction:**
   - Occurs when objects are in motion
   - Always less than static friction.

Formulas

STATIC FRICTION

$$F_s = \mu_s F_N$$

F_s = static friction

μ_s = coefficient of static friction

F_N = normal force

KINETIC FRICTION

$$F_k = \mu_k F_N$$

F_k = kinetic friction

μ_k = coefficient of kinetic friction

F_N = normal force

How do I calculate Normal Force?

On a flat surface…

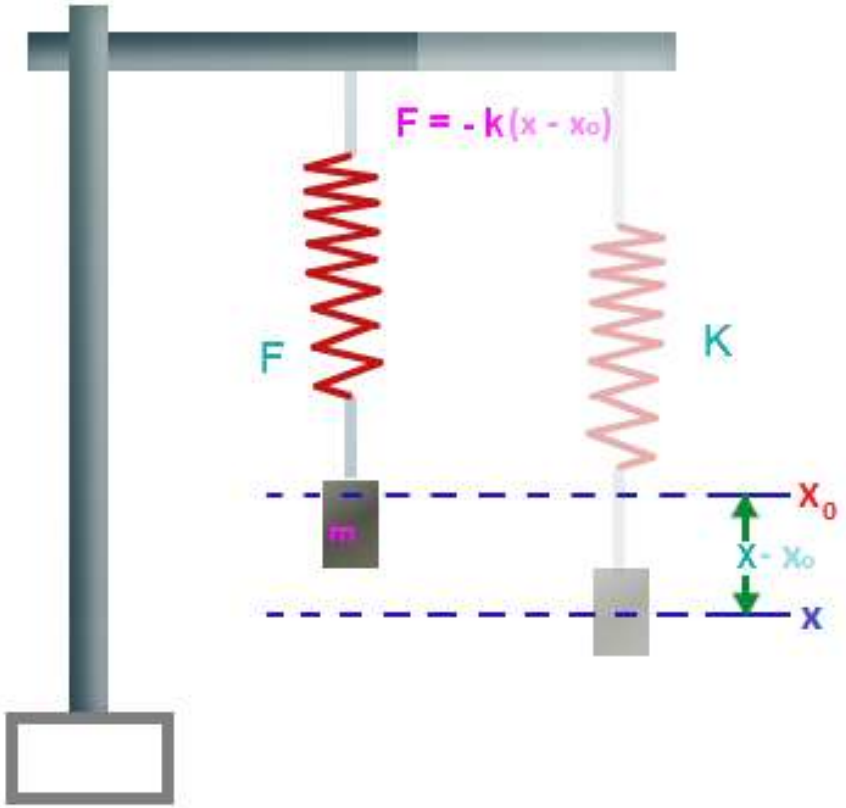
Normal Force = Weight

Weight = m*g

Problem

Gabe is pushing a refrigerator box that has a mass of 135 kg. If the coefficient of static friction is 0.47, what minimum force does he need to move the box?

Spring Force aka Hooke's Law



Hooke’s Law

A spring rests with a length of 6 cm. The spring has a mass of 4 kg that is placed on the spring and it moves to 8 cm. What is the spring constant of the spring?