Friction
Lesson Notes

What is Friction?
Friction is the force that resists the motion of two surfaces moving past one another.

What Causes Friction?
Friction is caused by **intermolecular (IM) attractions** between particles of the two adjoining surfaces.

Two Types of Friction
1. **Static Friction** ($F_{frict\text{-}static}$)

   Static friction force is the friction that resists the motion of two stationary surfaces past one another. Static friction resists the onset of motion.

2. **Kinetic Friction** ($F_{frict\text{-}kinetic}$)

   Kinetic friction force is the friction force that resists the sliding of two moving surfaces past one another.

What Variables Affect Friction?
1. **Normal Force (F_{norm})**
   The force with which the two surfaces are pressed together.
2. Coefficient of Friction (μ)
   The nature of the two surfaces that are sliding across each other.

Mathematics of Friction
Kinetic Friction:

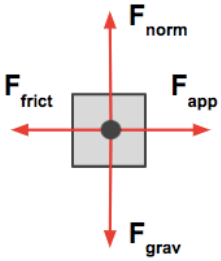
$$F_{frict\text{-}kinetic} = \mu_{kinetic} \bullet F_{norm}$$

Static Friction:

$$F_{frict\text{-}static} \leq \mu_{static} \bullet F_{norm}$$

Kinetic Friction Problem

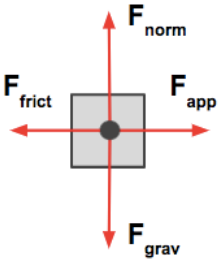
The coefficient of kinetic friction between an 86-kg desk and the wood floor is 0.38. What force must be applied to move the desk at a constant speed?



Solution

Static Friction Problem

The coefficient of static friction between an 86-kg desk and the floor is 0.45. What force must be applied to the desk to get it started moving?



Solution