Friction

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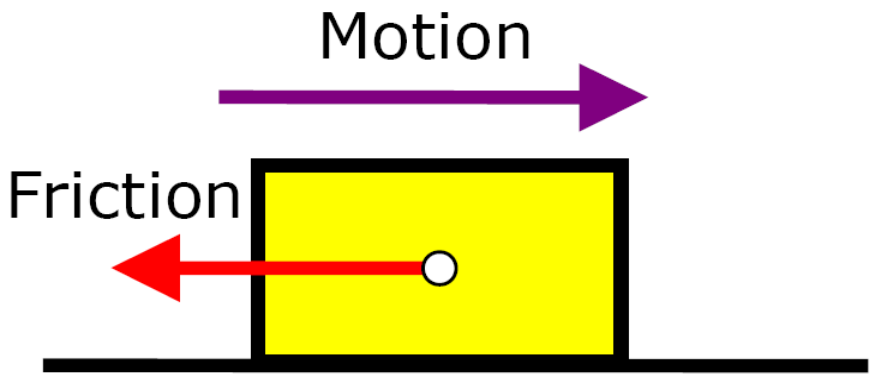
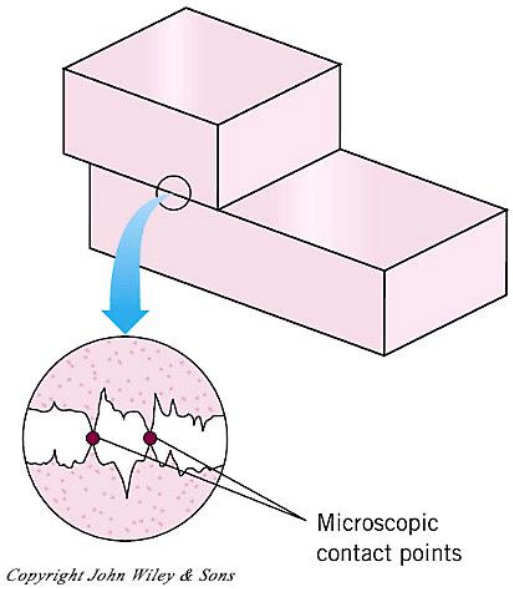
Friction is the force that opposes the motion between two surfaces that are in contact. The direction of the force is parallel to the surface and in a direction that opposes the slipping of the two surfaces.



To understand the cause of friction, you must recognize that on a microscopic scale, all surfaces are rough. When two surfaces rub, the high points of one surface temporarily bond to the high points of the other. The electromagnetic force causes this bonding.



There are two types of friction, static friction and kinetic friction:

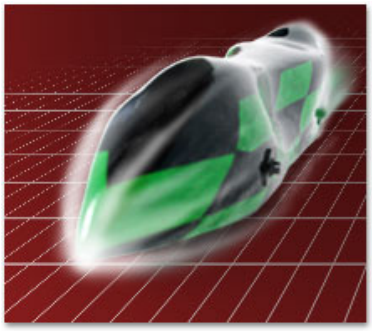
Static Friction is force that opposes the start of motion. There is a maximum static friction which causes the object to remain at rest unless the applied force is greater than the force of static friction. The maximum static friction is called **starting friction**. It is the amount of force that must be overcome to start a stationary object moving.

Kinetic Friction is the force that opposes the motion of two objects that are in motion. Different types of kinetic friction have different names, depending on the situation.

Sliding friction affects a toboggan

Rolling friction affects a bicycle

Fluid friction affects a boat moving through water and an airplane flying through air



Key Points

Friction depends on the nature of the materials in contact and the relative smoothness of their surfaces.

Static friction is always greater than kinetic friction.
It is harder to break a bond of two objects that are not moving.

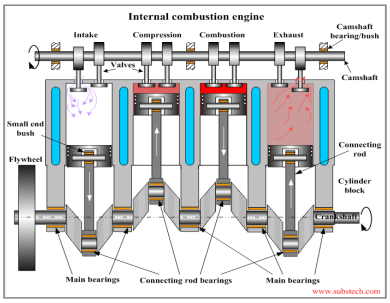
Friction is practically independent of the area of contact.

Friction is dependent on the force holding the two surfaces together (Force of Gravity/Weight)

Depending on the circumstance, we may want to increase friction or decrease friction.

Good Friction
- Winter Tires
- Adhesives (Tape)
- Writing
- Sporting Activities
- Starting a Fire
- Sliding/Coasting

Bad Friction
- Moving parts on an engine
- Sports Injuries
- Airplanes
- Opening a Jar



Intro to Friction Worksheet