**Friction**

Friction is a force whose direction goes against an applied force.

2 kinds of friction:

**Static Friction**: Frictional force that is exerted when an object is stationary (not moving).

Ff,s ˂ μFn

Static frictional force is less than or equal to the coefficient of friction X normal force

μ: greek letter mu, coefficient of friction. Unitless number that indicates how rough or smooth a surface is.

High μ: rough (sand paper)  
Low μ: smooth (ice)

**Kinetic Friction:** A frictional force that is exerted against an applied force when an object is moving.  
(Sliding friction)

Ff = μ FN

Friction = coefficient of friction X normal force

**Example of Kinetic Friction**

A 950kg car has run out of gas and is being pushed with a force of 3,000N. If the coefficient of friction of the road is 0.3, (a) draw a free body diagram and (b) find the acceleration of the car.

FN = 9,310N

Find the car’s weight:  
FW = mg  
  
Fw = (950kg)(9.8m/s2)  
  
Fw = 9310 N

FA = 3,000N

Ff = 2793N

Because the car is not on an   
  
incline, the Fw = FN

Find the Frictional Force:

FW = 9,310N

Find the car’s acceleration:

a = F/m

a = 207N / 950kg

a = 0.218 m/s2

Ff = μ FNFf = 0.3 (9310N)  
Ff = 2793N