20.3: Kinetic Friction

Once you push on an object enough to get it moving, there is a kinetic frictional force that will tend to slow it down unless you keep pushing on it. If you apply just enough force to keep it moving at a constant velocity, then the force you're applying will be exactly equal to the the kinetic frictional force, which, like the static frictional force, is found to be proportional to the normal force:

$$f_k = \mu_k n \tag{20.3.1}$$

Here f_k is the static frictional force, n is the normal force, and μ_k is the coefficient of kinetic friction. The direction of the force of kinetic friction is always opposite the direction in which the body is moving.

If you push an object with a force less than f_k, it will not move, and will be held in place by the static frictional force f_s. If you push it with a force greater than f_k, it will accelerate with an acceleration $a = (F_{\text{app}} - f_k)/m$, where F_{app} is the applied force.