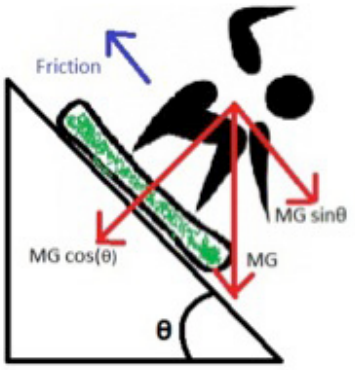
Shell Tutorial Center

Newton's Second Law

force = mass x acceleration

Forces which need to be considered in these problems include weight, normal force, friction, and any other pushes or pulls on the object. If the object is on a slanted plane then the normal force, N, will not equal the weight.



$$\sum F = m \cdot a$$
$$W = m \cdot g$$
$$f = \mu \cdot N$$

Note: If a = 0, then $\sum F = 0$ and *f* (friction) always opposes motion.

1. Write equations for x and y directions.
   $\sum F_y = N - W \cdot \cos\theta - 0$
   $\sum F_x = m \cdot a_x = W \cdot \sin\theta - f$
2. Solve for the normal force, N.
   $N = W \cdot \cos\theta$
3. Find the frictional force.
   $f = \mu \cdot N$ (Note μ depends upon the surface and will be given)
4. Solve for the acceleration.
   $\sum F_x = m \cdot a_x = W \cdot \sin\theta - \mu \cdot W \cdot \cos\theta$
   $a_x = \frac{W \cdot \sin\theta - \mu \cdot W \cdot \cos\theta}{m} = G(\sin\theta + \mu \cdot \cos\theta)$

By: E. D. Ledoux, Anuj Dube, Aaron McDonald, Ramzy Muhsen, Yilang Guo, Evan Terrell