

Some common physics terms:

- **Velocity:** speed in a direction
- **Acceleration:** change in velocity over time
- **Inertia:** an object's resistance to change in motion
- **Mass:** the matter in an object (more mass has more inertia)
- **Weight:** the force of gravity
- **Net force:** combination of all forces on the same object

Newton's Laws

1. Every object continues in a state of rest or uniform motion unless an unbalanced force acts
2. The acceleration of an object is proportional to the force, inversely proportional to the mass and in the direction of the force $\left(a = \frac{F}{m}\right)$
3. Whenever an object exerts a force on a second object, the second object exerts an equal and opposite force on the first object $\left(\vec{F}_1 = -\vec{F}_2\right)$

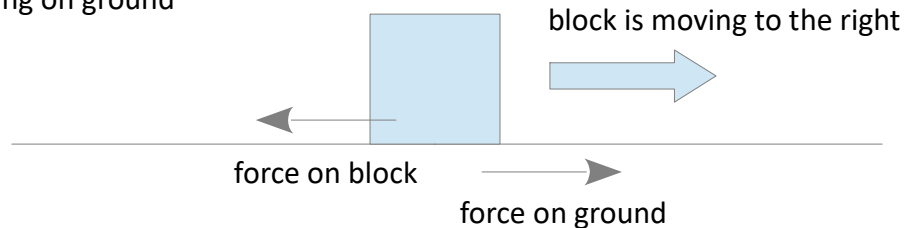
Newton's Laws in Plainer English

1. Objects don't speed up, slow down or change direction unless pushed or pulled.
2. The heavier an object, the harder it is to push or pull.
3. Push or pull something and it will push or pull back.

Friction

Friction is a force that acts to oppose the motion of two bodies in contact. It increases with speed.

Example: block sliding on ground



Notice that the forces obey Newton's third law (equal opposite force on each body).

Remember: The tail of the arrow is always on the object *experiencing* the force.

Falling Objects

Acceleration due to gravity has the symbol g . On Earth, $g = 9.8 \text{ ms}^{-2}$.

The weight of any object is $F = mg$.

A falling object reaches terminal speed when the force of friction cancels out the weight. When this happens the net force is zero, so the object doesn't accelerate.

Normal Reaction Force

The upward force on an object by the ground underneath it. This cancels out the weight of the object. Sometimes called just "normal force" (the normal is the direction out at 90° to the surface).