

Force & Motion

Section 2: Acceleration



Velocity includes the speed of an object and the direction of its motion. While speed includes the direction of an object, velocity does not. For example, if a severe storm is headed your way, it's important to know not only the speed at which it's traveling but also the direction the storm is heading.

Acceleration is the rate of change of velocity.

Acceleration occurs when an object changes its speed, its direction, or both. To calculate the acceleration of an object, the change in velocity is divided by the length of time interval over which the change occurred.

Acceleration (a) = change in velocity / time

$$a = \frac{v_f - v_i}{t}$$

A soccer player is running at 7 m/s. She then trips and comes to stop. This took 3 seconds. What is the acceleration?

Accelerating quickly puts a lot of force on an object. Acceleration can either be positive or negative, depending on the speed and direction. **Positive acceleration** can be seen when a plane speeds up in order to take off. **Negative acceleration** can be seen when a bike slows down.

Review:

1. Define velocity.
2. When does acceleration occur?
3. Compare positive acceleration to negative acceleration.