

## Acceleration

Acceleration: the rate at which velocity changes.

Units:  $\text{m/s}^2$  (meters per second squared)

Acceleration refers to increasing speed, decreasing speed, or changing direction.

Whenever an object's speed increases, the object accelerates.

Deceleration or negative acceleration can occur too.

For an object moving in a straight line:

$$\text{Acceleration} = \frac{\text{Final speed} - \text{Initial speed}}{\text{Time}}$$

\*The initial speed of an airplane is 0 m/s. The final speed is 40 m/s in 5 seconds.

$$\text{Acceleration} = \frac{40 \text{ m/s} - 0 \text{ m/s}}{5 \text{ s}} = \text{Acceleration of the plane is } 8 \text{ m/s}^2.$$

*Math sample problem*

As a roller coaster car starts down a slope, its speed is 4m/s. But 3 seconds later, at the bottom, its speed is 22 m/s. What is its average acceleration?

Math Practice:

1. A falling raindrop accelerates from 10 m/s to 30 m/s in 2 seconds. What is the raindrop's average acceleration?

2. Some cars can accelerate from rest to 27m/s in 9 seconds. Find the car's average acceleration.