

Free fall notes:

Memorize! → Earth's Gravity
is always
 -9.8 m/s^2

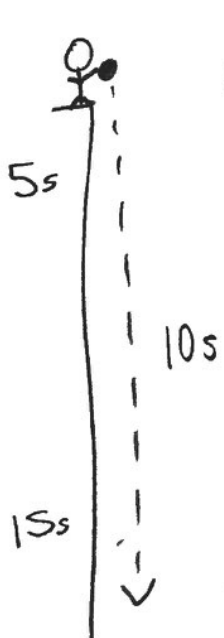
If an object is falling, it is falling at a constant rate of 9.8 m/s every second that it falls.

Example:

A rock is dropped off a cliff.

How fast is it going at 10 seconds?

What distance is the rock at 10 seconds?



At 10s:
Velocity:

$$V_f = V_i + at$$

$$V_f = 0 \text{ m/s} + (-9.8 \text{ m/s}^2)(10 \text{ s})$$

$$V_f = -98 \text{ m/s}$$

Distance:

$$d = V_i t + \frac{1}{2} a t^2$$

$$d = 0(10 \text{ s}) + \frac{1}{2}(-9.8)(10)^2$$

$$d = -490 \text{ m}$$

At 15s:
Velocity:

$$V_f = V_i + at$$

$$V_f = 0 \text{ m/s} + (-9.8)(15 \text{ s})$$

$$V_f = -147 \text{ m/s}$$

Distance:

$$d = V_i t + \frac{1}{2} a t^2$$

$$d = 0(15 \text{ s}) + \frac{1}{2}(-9.8)(15 \text{ s})^2$$

$$d = -1102.5 \text{ m}$$

At 5s:

Velocity:

$$v_f = v_i + at$$

$$v_f = 0 \text{ m/s} + (-9.8)(5 \text{ s})$$

$$v_f = -49 \text{ m/s}$$

Distance:

$$d = v_i t + \frac{1}{2} at^2$$

$$d = 0(5) + \frac{1}{2}(-9.8)(5)^2$$

$$d = -122.5 \text{ m}$$

See the trend:

5s

velocity:

-49 m/s

Distance:

-122.5 m

10s

-98 m/s

-490 m

15s

-147 m/s

-1102.5 m