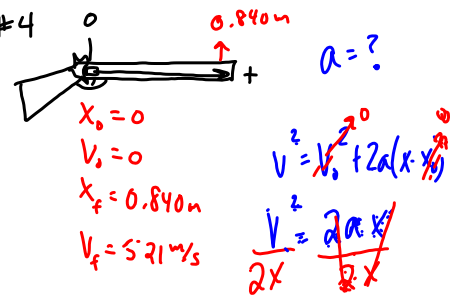


$$a = \frac{\Delta V}{t} = \frac{V_f - V_0}{t}$$

$$a = \frac{4.5 \text{ m/s} - (-3.0 \text{ m/s})}{2.5 \text{ s}}$$

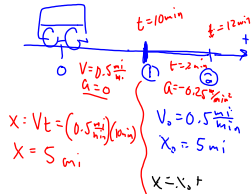
Worksheet #4



$$\frac{V}{2x} = a$$

$$162,000 \text{ m/s}^2$$

Worksheet #9



$$x = x_0 + v_0 t + \frac{1}{2} a t^2$$

$$x = (5 \text{ mi}) + (0.5 \text{ mi/min})(2 \text{ min}) + \frac{1}{2} (-0.25 \text{ mi/min}^2)(2)^2$$

$$x = 5 + 1 + -0.5$$

$$x = 5.5 \text{ mi}$$

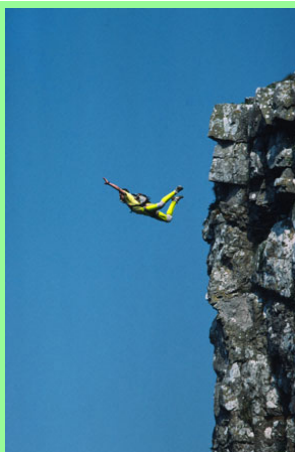
3.3 Freely Falling Objects

STANDARDS

3.1 I can interpret and analyze the motion of an object in free fall.



Free Fall is the motion of an object falling freely under the influence of gravity.



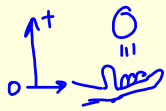
$g = 9.80 \text{ m/s}^2$ down

Equations

Equation
$v = v_0 + g t$
$x = x_0 + v_0 t + \frac{1}{2} g t^2$
$v^2 = v_0^2 + 2 g \Delta x$

Example

A ball is thrown straight upward at 15.2 m/s. What is the maximum height that the ball will reach?



$$V_0 = 15.2 \text{ m/s}$$

$$a = -9.80 \text{ m/s}^2$$

$$x_0 = 0$$

$$V_f = 0$$

$$x_f = ?$$

$$V^2 = V_0^2 + 2a(x - x_0)$$

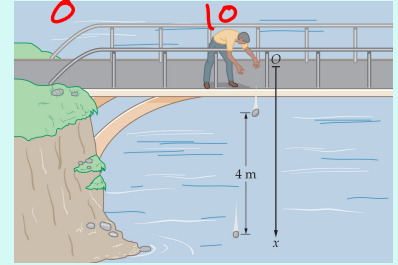
$$0 = V_0^2 + 2ax$$

$$x = \frac{-V_0^2}{2a} = 11.8 \text{ m}$$

FALLING STONES

You drop a rock from a bridge to the river below. When the rock has fallen 4 meters, you drop a second rock. As the rocks continue their free fall, does their separation increase, decrease, or stay the same?

$$V = V_0 + at$$



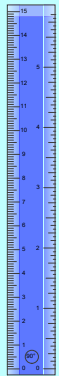
How Fast?

Purpose: Calculate human reaction time using free fall and the acceleration due to gravity.



Data:

1. Create a data table and record the dropping distance for 10 trials of catching the ruler.



Calculations:

1. Calculate your average dropping distance.
2. Use your average dropping distance, and the acceleration due to gravity, to calculate your average reaction time.

Make sure to label your calculations!

