

5.2 Projectile Motion

LEARNING TARGETS

5.2 I can interpret, analyze, and calculate the motion of a zero launch angle projectile.

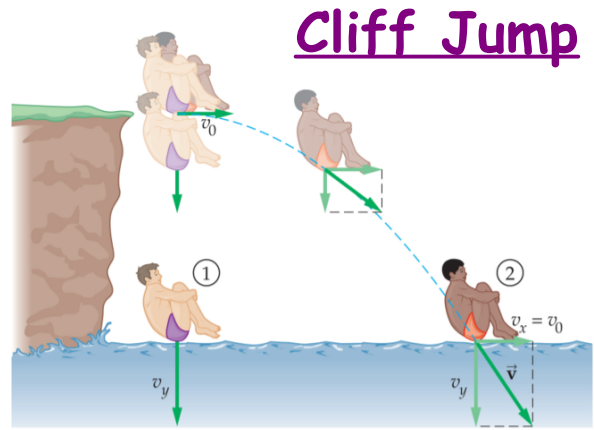
ZERO LAUNCH ANGLE

A toy car that is traveling 0.800 m/s runs off the edge of a table that is 1.225 m high.

a) How far from the base of the table will the car land?

x
 $x_0 = 0$
 $x_f = ?$
 $a_x = 0$
 $v_{0x} = 0.800 \text{ m/s}$
 $x_f = v_{0x} t$
 $x_f = (0.800 \text{ m/s})(0.5 \text{ s})$
 $x_f = 0.400 \text{ m}$

y
 $y_0 = 0$
 $y_f = 1.225 \text{ m}$
 $a_y = 9.8 \text{ m/s}^2$
 $v_{0y} = 0$
 $y_f = y_0 + v_{0y} t + \frac{1}{2} a_y t^2$
 $y_f = \frac{1}{2} a_y t^2$
 $\sqrt{\frac{2y_f}{a_y}} = t$
 $t = 0.5 \text{ s}$



ZERO LAUNCH ANGLE

A toy car that is traveling 0.800 m/s runs off the edge of a table that is 1.225 m high.

a) How fast will the car be traveling on impact?

0.800 m/s
 $v_{0x} = 0.800 \text{ m/s}$
 $v_{0y} = 0$
 $y_0 = 0$
 $y_f = 1.225 \text{ m}$
 $a_y = 9.8 \text{ m/s}^2$
 $v_f^2 = v_x^2 + v_y^2$
 $v_f^2 = v_{0y}^2 + 2 a_y (y_f - y_0)$
 $v_{fy} = \sqrt{2 a_y y_f} = 4.9 \text{ m/s}$
 $v_f = \sqrt{v_{0x}^2 + v_{fy}^2}$
 $v_f = 4.96 \text{ m/s}$