5.2(B) Zero Launch Angle Projectiles

LEARNING TARGETS

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

5.2 Projectile Motion

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?

ZERO LAUNCH ANGLE

Run or Drop?

Cliff Jump

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?

\[
\begin{align*}
X & = 0 \\
X_f &= x_0 + v_{ix} t + \frac{1}{2} a_x t^2 \\
X_f &= (0.800 m/s)(0.5 s) \\
X_f &= 0.400 m \\
\end{align*}
\]

\[
\begin{align*}
Y & = 0 \\
Y_f &= y_0 + v_{iy} t + \frac{1}{2} a_y t^2 \\
1.225 m &= (0)(0.5 s) + \frac{1}{2} (-9.8 m/s^2)(0.5 s)^2 \\
1.225 m &= -1.225 m \\
\end{align*}
\]

\[
\begin{align*}
v_{fx}^2 &= v_{ix}^2 + 2a_x x_f \\
v_{fx} &= \sqrt{v_{ix}^2 + 2a_x x_f} \\
v_{fy} &= \sqrt{2a_y y_f} \\
&= 4.9 m/s \\
v_{fy} &= (0 m/s) + a_y t \\
&= 4.9 m/s \\
\end{align*}
\]