

## Vertical Motion Model PFG

used to determine the height of a projectile  
(an object thrown into the air, but with no power of its own)

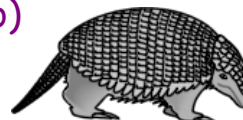
$$h = -16t^2 + vt + s$$

t = time the object has been in the air (in seconds)

v = initial vertical velocity (in feet per second)

s = initial height of object (in feet)

(if an object is dropped from a height, v = zero)



EX:

An armadillo jumps straight into the air with an initial velocity of 14 ft/sec. After how many seconds does it land on the ground?

$$\begin{aligned}
 h &= -16t^2 + vt + s \\
 0 &= -16t^2 + 14t + 0 \\
 -16t^2 + 14t &= 0 \\
 -2t(8t - 7) &= 0
 \end{aligned}$$

$$t = 0, \frac{7}{8} \text{ sec}$$

$$\frac{7}{8} \text{ sec}$$

