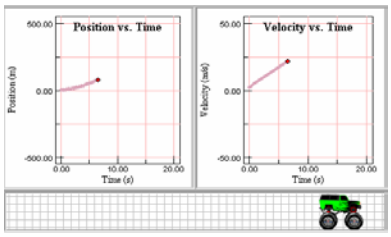
Worksheet for Exploration 2.4: Set the x(t) of a Monster Truck



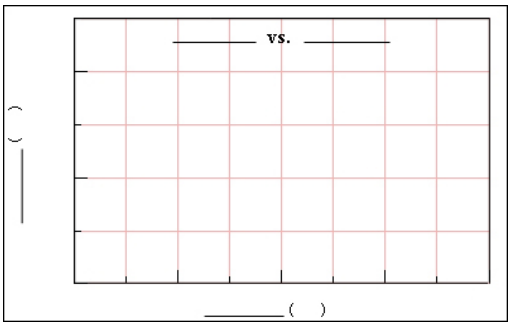
By now you have seen the equation $x = x_0 + v_0*t + 0.5*a*t^2$. Perhaps you have even derived it for yourself. But what does it really mean for the motion of objects? Restart.

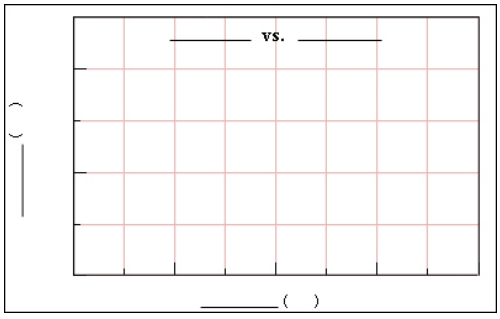
The animation allows you to explore all three terms in the equation: the initial position by changing x_0 from -50 cm to 50 cm, the velocity term by changing v_0 from -15 cm/s to 15 cm/s, and the acceleration term by changing a from -5 cm/s^2 to 5 cm/s^2.

Use the animation to guide your answers to the following questions **(position is given in centimeters and time is given in seconds)**.

a. How does changing the initial position affect the position vs. time graph?

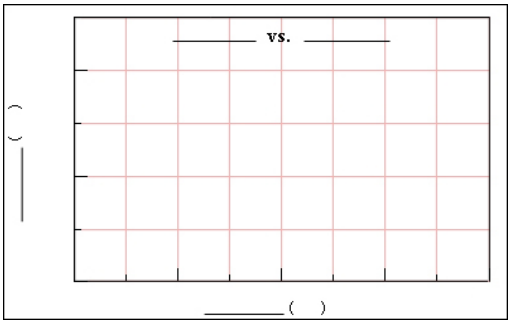
i. Make a sample set of graphs to justify your answer in (a).

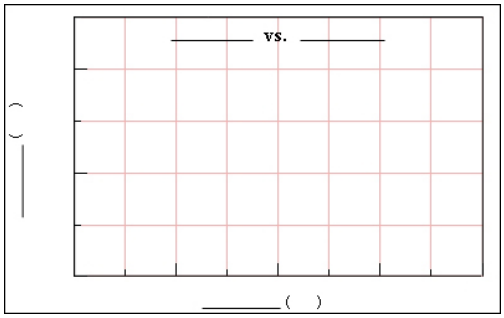




b. How does changing the initial position affect the velocity vs. time graph?

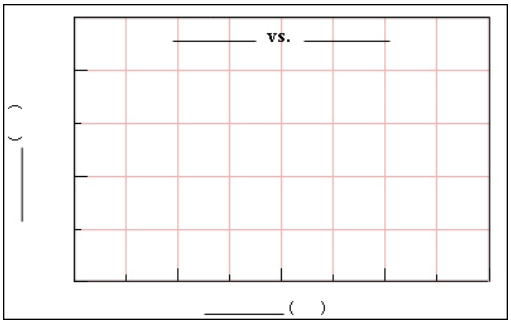
i. Make a sample set of graphs to justify your answer in (b).

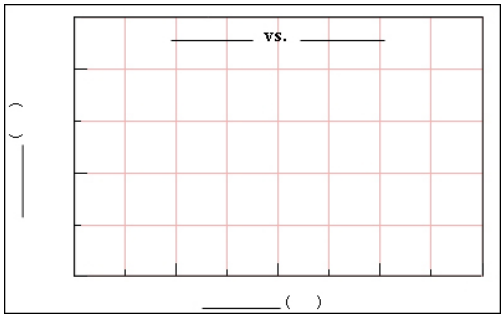




c. How does changing the initial velocity affect the velocity vs. time graph?

i. Make a sample set of graphs to justify your answer in (c).





d. How does a positive initial velocity vs. a negative initial velocity affect the velocity vs. time graph?

ii. Make a sample set of graphs to justify your answer in (d).