Velocity-Time Graphs: Calculating Acceleration from Slope
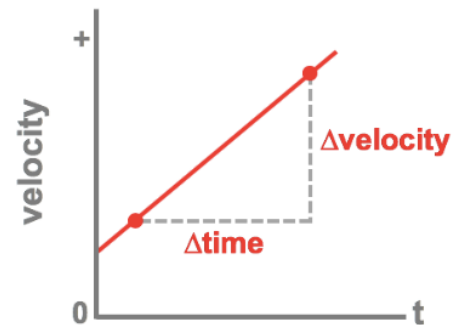## Lesson Notes

The slope of the line on a velocity-time graph provides the ratio of rise to run. For a velocity-time graph, this ratio is the ratio of Δvelocity/Δtime. By definition, this is the acceleration. So **the slope of the line on a velocity-time graph is the acceleration** of the object.

Slope is …

$$\frac{\Delta y}{\Delta x} = \frac{\Delta velocity}{\Delta time}$$

Acceleration is …

$$\frac{\Delta velocity}{\Delta time}$$

Therefore, **slope = acceleration.**

Calculating Slope of a v-t Graph

The slope of a line (**m**) is calculated as the rise/run ratio.
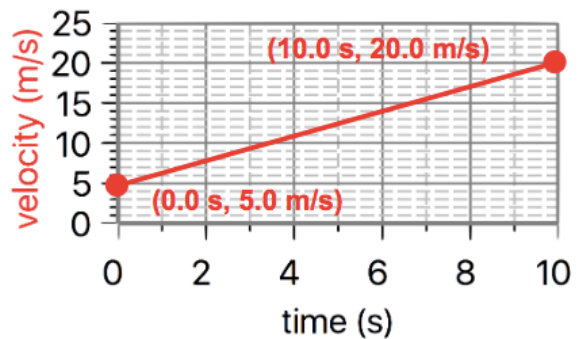
There are three simple steps
1. Pick 2 points on the line.
2. Find their x, y coordinates.
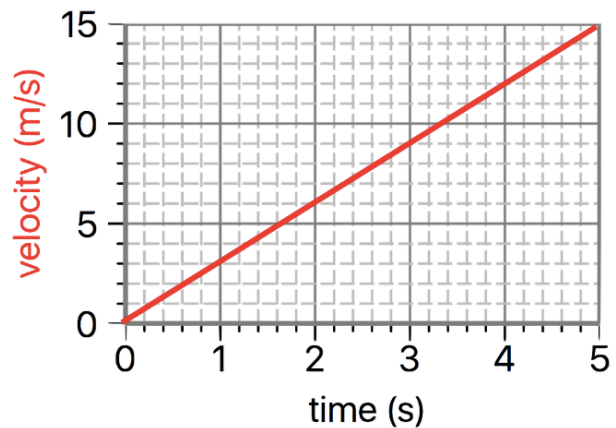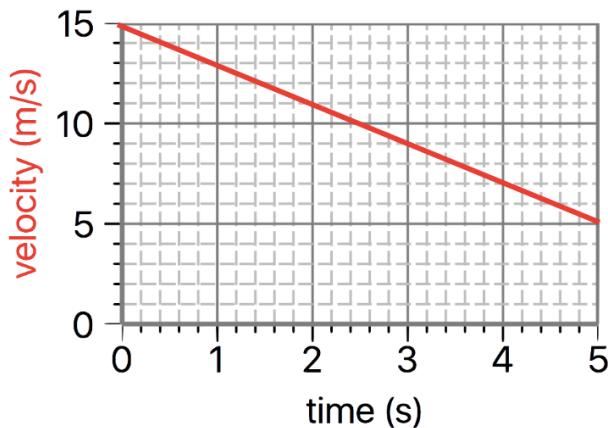3. Find the ratio $\Delta y/\Delta x$. (a.k.a. rise/run)

For graph at right …

Slope = rise/run = $(y_2 - y_1) / (x_2 - x_1)$
Slope = (20.0 m/s - 5.0 m/s) / (10.0 s - 0.0 s) = **1.5 m/s/s**

Use the three-step method to calculate the slope of the following two velocity-time graphs:

Your Turn to Practice

Calculate the acceleration of the objects represented by the following two graphs.