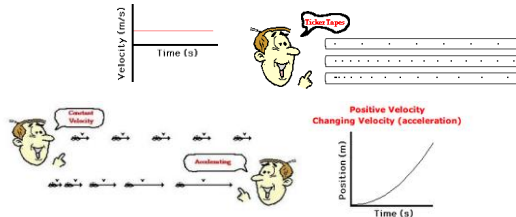


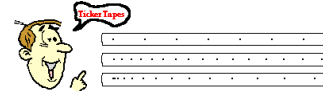
Representing Motion

- Another common way of representing motion is using diagrams and graphs.

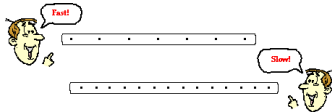


Ticker Tape Diagrams

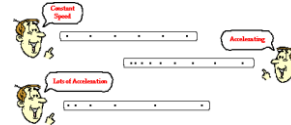
- A tape is attached to an object and threaded through a device that places a tick at regular intervals of time.
- As the object moves, it drags the tape through the "ticker," thus leaving a trail of dots.



- The distance between dots represents the object's position change during that time interval.
- A large distance between dots indicates that the object was moving fast while a small distance means the object was moving slow.

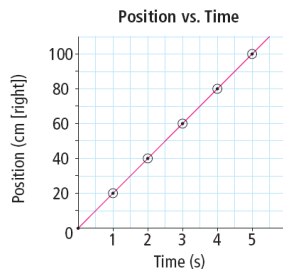


- A changing distance between dots indicates a changing velocity and thus an acceleration.
- A constant distance between dots represents a constant velocity and therefore uniform motion.

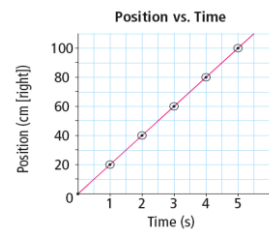


Graphing Motion

- A position-time graph plots position data on the vertical axis (y-axis) and time on the horizontal axis (x-axis).

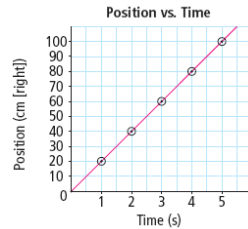


- Uniform motion is represented by a straight line on a position-time graph.



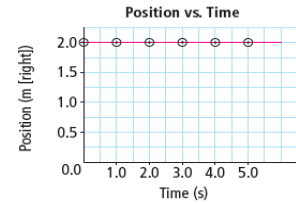
Positive Slope

- Slants up to the right.
- Indicates an object travelling in the positive direction (ie: North, East, to the right, up, etc.)



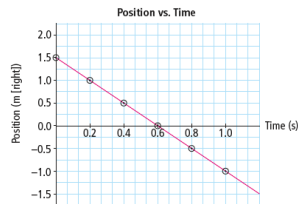
Zero Slope

- Horizontal line.
- Indicates that the object is stationary.



Negative Slope

- Slants down to the right.
- Indicates an object travelling in the negative direction (ie: South, West, to the left, down, etc.)



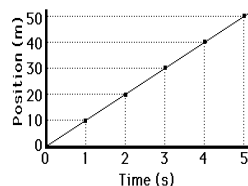
Calculating the Slope of a P-T Graph

- The slope of a graph is represented by:

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

Finding Slope

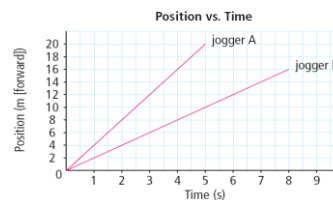
1. Pick two points on the line and determine their coordinates.
2. Determine the difference in y-coordinates (rise).
3. Determine the difference in x-coordinates (run).
4. Divide the difference in y-coordinates by the difference in x-coordinates (rise/run or slope).



For points (5 s, 50 m) and (0 s, 0 m):
 $\text{slope} = \frac{50\text{ m} - 0\text{ m}}{5\text{ s} - 0\text{ s}} = 10\text{ m/s}$

For points (5 s, 50 m) and (2 s, 20 m):
 $\text{slope} = \frac{50\text{ m} - 20\text{ m}}{5\text{ s} - 2\text{ s}} = 10\text{ m/s}$

Example



Which jogger's motion has a greater slope?
 Which jogger is moving faster?
 What is the slope of each line?
 What is each jogger's speed?

Slope on a P-T Graph

- On a position-time graph the slope is the change in position ($\Delta \vec{d}$) divided by the change in time (Δt). We know this as speed!

$$slope = \frac{\Delta \vec{d}}{\Delta t} = speed$$

Any Questions?