Name: _____

Science 7 *Remember Velocity is Speed in a specific direction. Date: 10-10-17

Motion

Aim: I can accurately read a motion graph and determine when a difference in speed is taking place.

Do Now:

1. A vehicle travels 2345 m west (d, direction) in 315 s (t) toward the evening sun. What is its average velocity? (Remember: Speed and Velocity are calculated the same way except velocity has a direction attached. Velocity=distance/time)

Formula	$V = \frac{d}{t}$
Substitution	$V = \frac{2345\ m\ west}{315\ s}$
Final Answer with Units	$V = 7.4\ m/s\ west$ (−) *Remember* Velocity includes direction

2. A roller coaster car (V_i) rapidly losing velocity as it rolls up hill. As it starts up the slope, its velocity is 22 m/s. But 6 seconds (t) later, near the top of the slope, its velocity is 4 m/s. (V_f) What is its average acceleration?

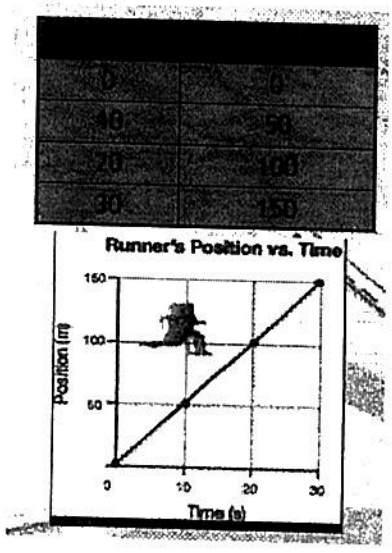
Formula	$a = \frac{V_f - V_i}{t}$ V_f - final velocity, V_i - intial velocity
Substitution	$a = \frac{4\ m/s - 22\ m/s}{6\ sec} = \frac{-18}{6}$
Final Answer with Units	$a = -3\ m/s^2$

Notes: Graphing Motion

Mary is training for a race. Calculate her speed when she is running for 10s, 20 s and 30 s.

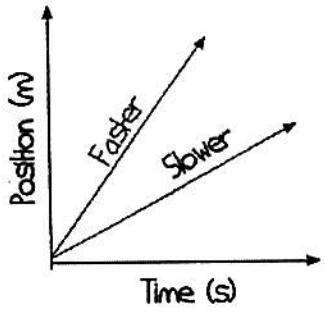
Marys' Speed at 10s	Marys' Speed at 20s	Marys' Speed at 30s
$S = \frac{d}{t}$ $S = \frac{50\ m}{10\ s}$ $S = 5\ m/s$	$S = \frac{d}{t}$ $S = \frac{100\ m}{20\ s}$ $S = 5\ m/s$	$S = \frac{d}{t}$ $S = \frac{150\ m}{30\ s}$ $S = 5\ m/s$

She is traveling at 5 m/s speed.

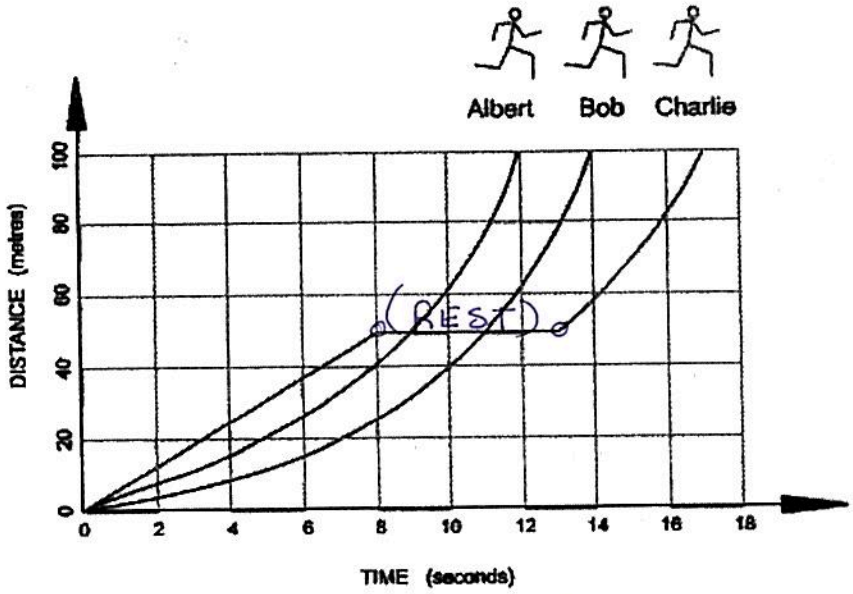


Slope:

- The steepness of a graph line; the ratio of the vertical change (the rise) to the horizontal change (the run).
- A bigger slope means a steeper line which means a faster speed.



Let's Practice: Albert, Bob and Charlie are running a race. Use the graph below to answer the following questions.

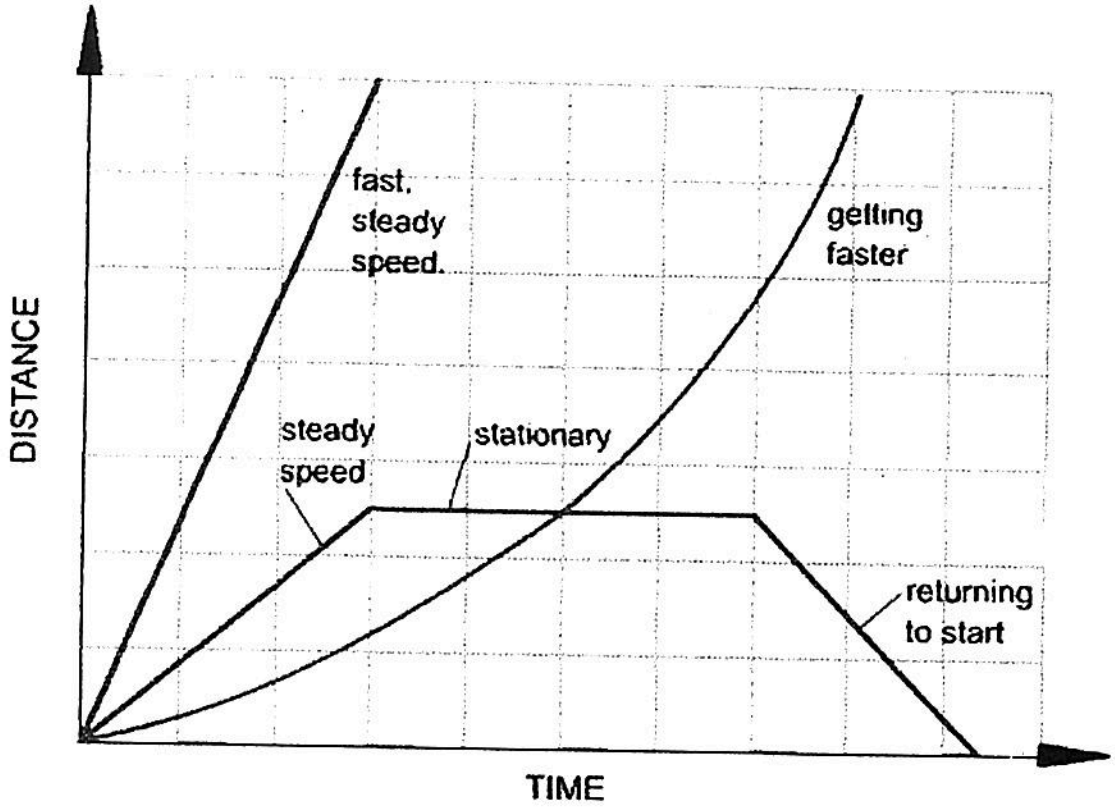


1. Which runner won the race? Albert
2. Which runner stopped for a rest? Charlie
3. How long did he stop for? 5 seconds $\begin{array}{r} 13s \\ -\ 8s \\ \hline 5s \end{array}$
4. How long did Bob take to complete the race? 14 seconds
5. Calculate Albert's average speed. $S = \frac{d}{t}$ $S = \frac{100m}{12s} = 8.3\ m/s$

Albert's average speed = 8.3 m/s

NAME: _____ DATE: 10/10/17 PERIOD: _____

Graphing Motion



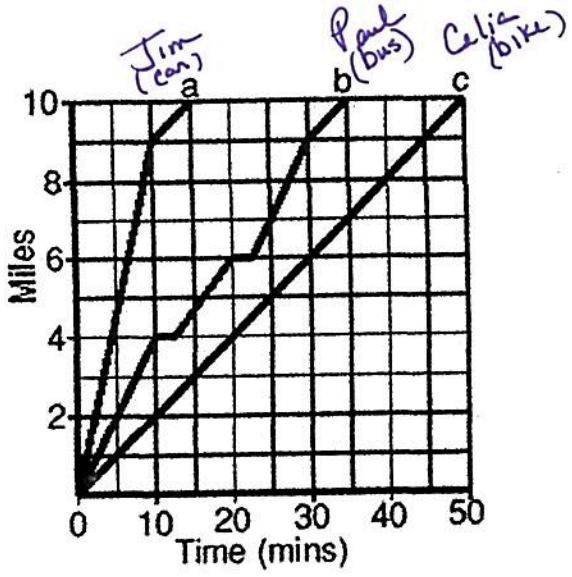
Distance/Time Graph:

- **Flat, horizontal line = no motion (stopped)**
- **Straight line sloping upward = constant speed away from start**
- **Straight line sloping downward = constant speed towards start**
- **Curved line = changing speed (acceleration)**

The graph shows how 3 teachers traveled from their homes in the same village to their school in a town 10 miles away.

Paul traveled by bus, Celia traveled by bicycle, and Jim traveled by car.

The lines on the graph are labeled "a", "b", and "c".



Match one line to each of the teachers explaining your reasons.

a. Jim traveled by car. He got home first

b. Paul took the bus. The lines show stops made by the bus

c. Celia traveled by bicycle so she probably did not hit traffic, but it took her longer.