

SECTION 11.2 NOTES: SPEED = VELOCITY

DECEMBER 3, '14

- SPEED - THE RATIO OF THE DISTANCE AN OBJECT MOVES TO THE AMOUNT OF TIME THE OBJECT MOVES.

$$\text{SPEED} = \frac{\text{DISTANCE}}{\text{TIME}} = \frac{d}{t}$$

- CAR EXAMPLE $\Rightarrow \frac{\text{MILES}}{\text{HOUR}} = \frac{\text{DISTANCE}}{\text{TIME}}$

- DROPPING PEN EXAMPLE $= \frac{d}{t} = \frac{6 \text{ ft}}{1 \text{ sec}}$

- IN SCIENCE WE USE METERS & SECONDS TO MEASURE SPEED. $S = \text{M/S} \Rightarrow \text{FORMULA SHEET}$

- AVERAGE SPEED - IS COMPUTED FOR THE ENTIRE DURATION OF A TRIP. $\bar{S} = \frac{\text{TOTAL DISTANCE}}{\text{TOTAL TIME}} = \bar{S} = \frac{d}{t}$

EXAMPLE 1

- YOU RUN 100 METERS IN 20 SECONDS THEN JOG 300 METERS FOR THE NEXT 180 SECONDS. WHAT IS YOUR AVERAGE SPEED?

$$\bar{S} = \frac{d}{t} = \frac{100 + 300}{20 + 180} = \frac{400 \text{ m}}{200 \text{ s}} = \boxed{2 \text{ m/s}}$$

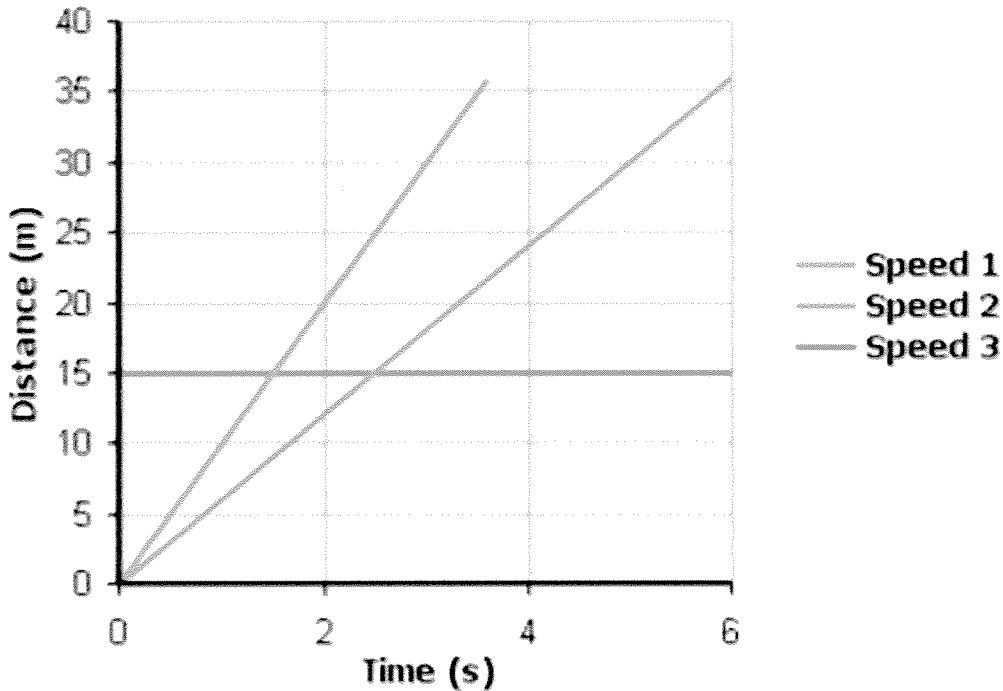
- INSTANTANEOUS SPEED - THE RATE AT WHICH AN OBJECT IS MOVING AT A GIVEN MOMENT IN TIME.

- VELOCITY - A DESCRIPTION OF BOTH SPEED & DIRECTION

$$V = \frac{d}{t}$$

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Graphing Motion (Speed) Notes:



• THE SLOPE OF THE LINE ON A DISTANCE-TIME GRAPH IS SPEED. (POSITION)

$$\text{SLOPE} = \frac{Y_2 - Y_1}{X_2 - X_1}$$

$$\text{SLOPE 1} = \frac{20 - 0}{2 - 0} = \frac{20}{2} = 10 \text{ m/s} \Rightarrow \text{FAST}$$

$$\text{SLOPE 2} = \frac{12.5 - 0}{2 - 0} = \frac{12.5}{2} = 7.5 \text{ m/s} \Rightarrow \text{SLOW}$$

$$\text{SLOPE 3} = \frac{15 - 15}{2 - 0} = \frac{0}{2} = 0 \text{ m/s} \Rightarrow \text{NO SPEED}$$