

2.26.20

## Graphing: Average Speed and Converting 1

### Today's Objectives:

- Calculate how fast a car goes
- Learn avg speed equation
- How to convert units
- Take real world data



# Car Lab #1: Calculate your car's speed

## Materials

- Car
- Meter stick (can measure in inches, centimeters or meters)
- Timer (cell phone, measure in seconds)

## Data

- How far did your car drive? (number and a unit)
- How long did it drive for? (number and a unit)
- Take the average of 3 trials.

## Calculations

Divide distance over time to calculate your car's speed. (number and a unit)

Show your work in your lab book, circle your answer!

## Graphing: Average Speed

When we write speeds in physics,  
it is always in this form:

$$\frac{\text{distance traveled}}{\text{time elapsed}} = \frac{\text{how far you went}}{\text{how long it took.}}$$

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

$\bar{V}$ : Avg Speed  
 $d$ : distance  
 $t$ : time

$$\text{Average Speed} = \frac{\text{distance}}{\text{time}}$$

1. You drove at 50 miles per hour for 3 hours. How far did you go?

$$50 = \frac{d}{3}$$

$$d = 150 \text{ miles}$$

2. Dan drove at 35 miles per hour, covering 200 miles. How long did it take?

$$35 = \frac{200}{t}$$

$$\frac{\cancel{35}t}{\cancel{35}} = \frac{200}{35} = 5.714 \text{ hr}$$

Unit Conversion - changing one unit to another.  
(Distance  $\rightarrow$  distance)

Given  $\downarrow$

$$\underline{1 \text{ mile}} = 5280 \text{ ft}$$

$$\underline{1 \text{ ft}} = 12 \text{ in}$$

500 miles is how many inches?

$$\begin{array}{r|l} 500 \cancel{\text{ miles}} & 5280 \cancel{\text{ ft}} \\ \hline & 1 \cancel{\text{ miles}} \end{array} \quad \begin{array}{r|l} 12 \text{ in} & \\ \hline & 1 \cancel{\text{ ft}} \end{array}$$

$$31,680,000 \\ = \text{in}$$



(Speed to speed conversion)

Convert 35 m/s into miles per hour.

1 meter = 3.28 ft

1 mile = 5280 ft

1 hr = 3600 s

|                         |                       |                       |                            |
|-------------------------|-----------------------|-----------------------|----------------------------|
| <del>35</del><br>meters | 3.28<br><del>ft</del> | 1<br>miles            | 3600<br><del>seconds</del> |
| 1 <del>seconds</del>    | 1<br><del>meter</del> | 5280<br><del>ft</del> | 1 hrs                      |

only for Speed  
Speed  
Conversions.

78.7  
mile  
hour

**When police officers make an Average Speed trap,  
what two measurements do they need to take?**

1)

..

2)