Speed

Objectives:

$$\text{Average Speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

1. To understand that speed is a component of motion
2. To understand that speed is the rate of distance and time
3. To use units of the metric system correctly

Procedures:

1. ____Write the title of your lab and draw the data-table on your CB
2. ____Crete a race track that is 150 cm long and mark a "start" line with tape, and mark the "end" at the end of the track.
3. ____Tape the ramp on the "start" mark
4. ____Record the "distance" (length of the ramp) on your data-table
5. ____Lift the untapped side of the ramp to a 10 cm height (use to ruler to measure height)
6. ____Drop the marble and measure the time from the "start" to the "end" (Do not start the timer when the marble is at the top of the ramp. Make sure to start the timer when the marble hits the "start" line, and stop it at the "end")
7. ____Record the "time" on the data-table
8. ____Repeat steps 4 to 7, but now lift the ramp to 15 cm height.
9. ____Repeat steps 4 to 7, but now lift the ramp to 20 cm height.
10. ____Use the formula to calculate the speed

11. ____Answer the questions below the data-table on your CB

Height	Distance	Time	Speed
10 cm			
15 cm			
20 cm			

Question 1: How does the height of the ramp affect the speed of the marble?

Question 2: What will happen to the speed if the marble was dropped from a 5 cm height?

Velocity

$$\text{Average Speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

Objectives:

1. To understand that velocity is a component of motion
2. To understand that velocity has speed and direction
3. To use units of the metric system correctly

Procedures:

1. ____Use your CB in "landscape" form
2. ____Write the title of your lab and draw the data-table on your CB
3. ____ Measure the length of the table from side to side and record it in your data table under "distance". Use the units "cm" for centimeters.
4. ____Start the timer and push the car slowly at a constant speed across the entire length of the table. Record the "time" on your data table in seconds "s" under "slow car"
5. ____Use the compass to record the "direction" in which the car traveled
6. ____Use the formula to calculate the speed. Record the speed and direction of the car under "Velocity"
7. ____ Start the timer and push the car at a fast constant speed across the entire length of the table. Record the "time" on your data table in seconds "s" under "fast car"

8. ____Answer the questions below the data-table on your CB

Motion	Distance	Time	Direction	Velocity
Slow				
Fast				

Question 1: How is speed different from velocity?

Question 2: What are the components of Velocity?

Motion Vocabulary

1. **Motion**- is a change in position of an object with respect to time. Motion is typically described in terms of displacement, distance (scalar), velocity, **acceleration**, time and speed.

2. **Speed-** is a scalar quantity that refers to "how fast an object is moving." Speed can be thought of as the rate at which an object covers distance

3. **Velocity-** is a vector quantity that refers to "the rate at which an object changes its position."

4. **Acceleration-** is a vector quantity that is defined as the rate at which an object changes its velocity. An object is accelerating if it is changing its velocity.