

Lab - Measuring Speed

Purpose: To measure an object moving under constant speed and determine the speed graphically. To measure the speed of a rolling ball and determine the object's average speed over different intervals of travel.

Procedure:

Part 1: Graphically determining constant speed.

Devise an orderly procedure to measure the speed of an object that you believe is moving at constant speed. In this procedure it is desired to determine the speed of the object graphically. Write the procedure below. When writing the procedure make sure you ask yourselves the following questions:

- What object am I using that will move at a constant speed?
- How many data points am I going to take to ensure I get an accurately represented graph?
- What quantities do I need to measure? How will I mark these places on the ground?
- How am I going to plot the data?
- How am I going to ensure the data is precise?
- What will my data table/list look like?

Data Table/List:

Analysis:

1) Construct a graph that will have a trendline that determines the constant speed of the object graphically.

2) What is the constant speed of the object?

3) Is there any indication in your graph of a speeding up or slowing down? Explain.

4a) Take the final time and the final distance and find the average speed of the object. Is this average speed the same as the constant speed?

b) If the speeds are the same, what does that tell you? If the speeds are not the same, what does that tell you?

Part 2: Measuring average speed of a rolling ball.

Devise an orderly procedure that will determine the average speed of a rolling ball over different intervals. You need to measure the same ball over at least 5 different intervals to account for its average speed and any change of the speed. When writing the procedure make sure you ask yourselves the following questions:

- How will I ensure the ball is rolling at the same speed when released?
- How will I mark the points I need to measure?
- If asked to determine the average speed in each interval, will the data I collect be able to determine it?
- If asked to determine the average speed over the ball's entire trip, will the data I collect be able to determine it?
- What will my data table/list look like?

Data Table/List:

Analysis:

1) Calculate the average speed for each interval.

2) Is the rolling ball speeding up, slowing down or remaining constant speed? How can you tell?

3) Determine the average speed of the entire trip of the ball. Show your calculation for this:

4a) No matter how you calculated #3, there is another way to determine the average speed. Calculate the average speed in another way. (If you need a hint, talk to your teacher!)

b) Was the answer to #3 and #4 the same? Why or why not?

Conclusion: