
Name: _____

Science, Technology, and Engineering UI L5

Period: _____

Knowledge Builders - Day 1 (Virtual Lab)

Date: _____

Standards:

SI #4: Analyze & interpret data.

SI #5: Develop descriptions, models, explanations, and predictions.

1. Can a graph show your height changes over a year's time? How?

You could use a line graph. The horizontal axis might show each of the 12 months or each of the 52 weeks, and the vertical axis might show height in centimeters.

2. Can you name some possible units of measurement for graphing height vs. weight?

Possible units of measurement for height are feet and inches, as well as meters and centimeters. Possible units of measurement for weight are pounds and ounces, as well as kilograms and grams.

3. On a distance (y axis) vs. time graph (x axis), what is the meaning of a straight horizontal line?

The object being studied is at a fixed point from its reference position.

4. On a distance (y axis) vs. time graph (x axis), what is the meaning of a straight vertical line?

This is an error! At any particular time, the object being studied is at a given location. An object cannot be at more than one place at the same time!

5. The timer begins when the boat crosses the start line and not when it leaves the pier. Why do you think this is so?

The experiment is about graphing the motion of an object (in this case, a boat) that is moving at a constant velocity. The boat achieves its constant velocity where it crosses the start line.

6. When an object moves in a straight line at a constant speed, is the distance vs. time graph always a straight line?

Yes.

7. How would you go about testing your hypothesis about the kinds of patterns that exist for different kinds of motion

To collect data from as many possible different kinds of motion, say constant and accelerated, and to graph them in order to find patterns.

8. What are the advantages of using a computerized simulation to study the motion of the boat?

The simulation shows the boat moving at a constant velocity. This is difficult to achieve in real life where boats are exposed to currents, waves, wind, etc. The simulation gives us precise measurements which are also very difficult to obtain.

9. Why don't we see the boat stop?

The experiment graphs the motion of a boat moving at constant velocity. When a boat comes to a stop, it is slowing down. In other words, its velocity is changing.

10. How can you explain that in this experiment, your measurements led to precise straight line segments?

The simulation generated ideal data. Such ideal measurements are not usually available in real field experiments.

11. When objects move at a constant speed along a straight line, the distance vs. time graph is linear. When the speeds are different, how do the graphs differ?

The greater the speed, the steeper the slope of the graph.

12. What is the shape of the distance versus time graph of an object that is accelerating?

When an object is accelerating, the shape of the distance versus time graph is curved. In fact, the curve shown in the graph is a segment of a geometric form called a parabola.

13. What is acceleration?

In physics, acceleration is the change in velocity over time. Velocity can change in two ways: a change in speed or a change in direction.

14. How can you describe the graphs showing the motion of an object whose speed is constantly changing?

The graphs are not linear.

15. Assume that a boat cruising in a straight line begins to slow down at a constant rate. What would its graph look like?

Nonlinear.