# Sample Lesson #3

Distance-Time Graphs

Motion is *movement, or a change in distance between an object and a reference point*. (This is also called displacement.) Motion can be studied using graphs. A **distance-time graph** can tell us whether an object is in motion or at rest. This type of graph illustrates *changes in distance or position over time*. Compare the two graphs below. How are they similar and how are they different from each other? In both graphs, time is changing. As we move from left to right across the graph, note that time is increasing. This is how both graphs are alike.

Look at the differences between the graphs. In Graph A, there is no change in position. The position of the object remains at the same level for the entire graph. In Graph B, the position is increasing. It starts at zero and moves upward across the graph. Because Graph A shows no change in position, we can tell that the object is not moving. In other words, the object in Graph A is at rest. The object in Graph B is showing a change in position; the object is in motion.
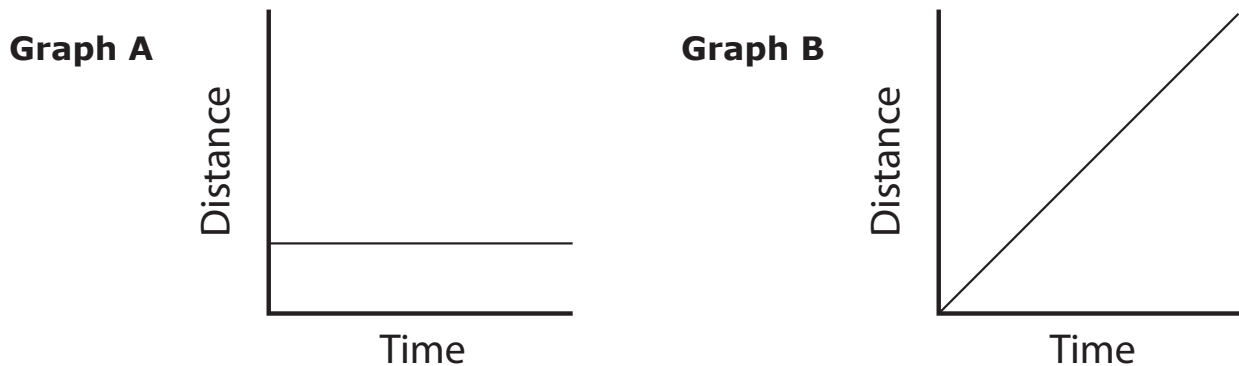
Distance-time graphs can also compare the speed of two different objects in motion. The tilt of the line, known as the **slope**, can show which object is moving faster and which is moving slower. Look at Graph Q. The two slanted lines represent two different objects. The line for **object 1** is much steeper than the line for **object 2**. This demonstrates that **object 1** is *changing distance more quickly* than **object 2**. In other words, **object 1** is moving faster. On a distance-time graph, a steeper line indicates faster movement.
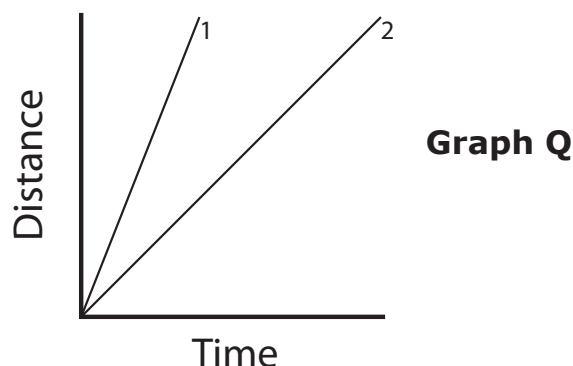
1 – 3.   Match the letter of the correct distance-time graph on the right to the appropriate description.

Graph X

Distance / Time

_____   two objects moving at the same rate of speed but starting at different positions

_____   two objects which travel at different rates but end up at the same position at the same time

Graph Y

Distance / Time

_____   two objects which end in the same position at different times
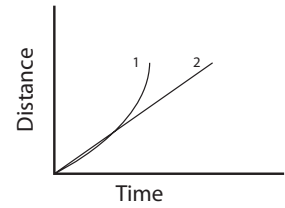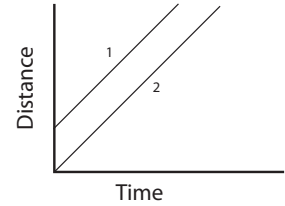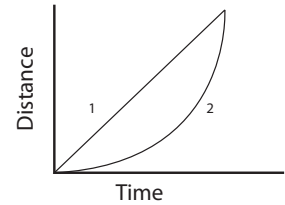
4.   _____ is a change in position over time.

Graph Z

Distance / Time

5.   Which is more certain, a hypothesis or a theory?

_____

6.   The (independent / dependent) variable is the variable that is controlled or manipulated by the experimenter.

7.   Which of the following does **not** belong to the arthropod group?

insects   crustaceans   arachnids   mammals

8.   What is the relationship in which both partners benefit?

commensalism   mutualism   parasitism

9.   Oceans are considered the largest _____ in the water cycle.

10.   Which of the following describes an ecosystem, but **not** a biome?

A)   limited to specific locations
B)   includes the living and nonliving organisms in the area
C)   takes climate into consideration