Name _____ Date _____ Class _____

Lesson Outline

LESSON 1

Position and Motion

A. Describing Position

1. A(n) _____ is a starting point you choose to describe the location, or position, of an object.

2. A(n) _____ is an object's distance and direction from a reference point.

3. A complete description of a position includes a distance, a(n) _____, and a reference point.

4. A good choice for a(n) _____ is something that is easy to find.

5. If a reference point changes, the description of an object's _____ will also change.

6. Changing a reference point does not change the actual _____ of an object.

7. When you describe an object's position, you compare its location to a reference _____.

8. A reference direction can be described as a(n) _____ direction. The opposite direction is the _____ direction.

B. Describing Position in Two Dimensions

1. When you describe position using two directions, you are using two _____.

2. Examples of _____ directions in two dimensions include "north and east" and "right and forward."

3. To find a position in two dimensions, first choose a reference _____. Next specify reference _____. Then determine the _____ along each reference direction.

C. Describing Changes in Position

1. _____ is the process of changing position. It is always described relative to a(n) _____.

2. It is possible to move with regard to one _____ and stay motionless with regard to another _____.

Lesson Outline continued

3. _____ is the length of the path an object moves along.
4. _____ is the difference between the initial position and the final position of an object.
5. Distance and displacement are equal only if the motion is in one _____.

Name _____ Date _____ Class _____

Lesson Outline **LESSON 2**

Speed and Velocity

A. What is speed?

1. _____ is a measure of the distance an object travels per unit of time.
2. Units of speed are units of _____ divided by units of time. The SI unit for speed is _____ per second.
3. _____ is the rate of change of position in which the same distance is traveled each second.
4. _____ is speed at a specific instant in time.
5. _____ is the total distance traveled divided by the total time it took to go that distance.
6. The equation for average speed is $v = \frac{d}{t}$, where the symbol v stands for average speed, d stands for total _____, and t stands for total time.

B. Distance-Time Graphs

1. Graphs that compare distance and time are called _____ graphs.
2. Constant speed is shown as a(n) _____ line on a distance-time graph.
3. Distance-time graphs can be used to compare the _____ of two different objects.
4. _____ lines on distance-time graphs indicate faster speeds.
5. Distance-time graphs can be used to _____ the average speed of an object. The difference in _____ between two points is divided by the difference in _____ between the same points.
6. When the slope of a line on a distance-time graph decreases, it means that the speed of the object is _____.
7. A(n) _____ line on a distance-time graph indicates that the motion has stopped.
8. When the slope of a line on a distance-time graph increases, it means that the speed of the object is _____.
9. Even when the speed of an object isn't _____, its average speed can be calculated from a distance-time graph.

Lesson Outline continued

C. Velocity

1. _____ is the speed and the direction of a moving object.

2. The velocity of an object can be represented by a(n) _____. The length of the arrow indicates the _____. The arrow points in the direction of the object's _____.

3. Velocity _____ when the speed of an object changes, when the direction in which the object is moving changes, or when the speed and the direction change.

Name _____ Date _____ Class _____

Lesson Outline **LESSON 3**

Acceleration

A. Acceleration—Changes in Velocity

1. _____ is a measure of the change in velocity during a period of time.

2. An object accelerates when its velocity changes as a result of increasing speed, decreasing speed, or a change of _____.

3. Like velocity, acceleration has a direction and can be represented by a(n) _____.

4. An acceleration arrow's direction depends on whether the _____ increases or decreases.

a. When the velocity of an object is increasing, the acceleration arrow points in the _____ direction as the velocity arrows.

b. When the velocity of an object is decreasing, the acceleration arrow points in the _____ direction as the velocity arrows.

5. When an object changes direction, the acceleration arrows point to the _____ of the curve along which the object is moving.

B. Calculating Acceleration

1. _____ is a change in velocity during a time interval divided by the time interval during which the velocity changes.

2. If SI units are used in the acceleration equation, then acceleration has units of _____.

3. If acceleration is negative, then it is _____ the direction of motion.

C. Speed-Time Graphs

1. A(n) _____ can be used to show how speed changes over time.

2. A speed-time graph has _____ plotted on the horizontal axis, which is the x-axis. _____ is plotted on the vertical axis, which is the y-axis.

3. The speed-time graph for an object at _____ is a horizontal line at $y = 0$.

Lesson Outline continued

4. If an object is moving at _____ speed, its speed-time graph is a horizontal line above the *x*-axis.
5. The speed-time graph for an object that is speeding up is a line that slants _____ toward the right side of the graph.
6. If an object is slowing down, its speed-time graph is a line that slants _____ toward the right side of the graph.
7. Speed-time graphs do not show what happens when velocity changes as the result of a change of _____.

D. Summarizing Motion

1. _____ can be described by one's direction and distance from a reference point.
2. Distance and displacement can be compared to find one's average _____.
3. Speed and direction describe one's _____.
4. If one's velocity is _____, that person is accelerating.