PHYSICS
*IN*MOTION
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Unit 2B
Speed and Velocity
Note-Taking Guide and Questions to Consider TEACHER

Answer the following.

1. Define speed in your own words.

   Speed is how fast something goes; average speed is the total distance

   an object travels divided by the total time.

2. Why does a car speedometer only have positive values, even though you can move in reverse?

   Speed is a scalar quantity, and scalar quantities are always positive

   because they do not involve direction.

3. Fill in the equation for average speed below:

   $$\text{average speed} = \frac{\textit{total distance}}{\textit{total time}}$$

4. Define velocity in your own words.

   Velocity is also how fast something goes, but with importance given to the direction in which it is moving.

5. Because velocity is a _vector_ quantity, _direction_ matters.

6. Fill in the equation for average velocity below:

   $$\text{average velocity} = \frac{\textit{total displacement}}{\textit{total time}}$$

7. How does instantaneous velocity differ from average velocity?

   Instantaneous velocity is how fast and in what direction something is going at a specific moment in

   time; average velocity is how fast and in what direction something went over a certain time period.

Answer the following.

8. If you travel at a constant velocity, how does the average velocity compare to the instantaneous velocity throughout the trip?

   If velocity is constant, it does not change; therefore, the instantaneous velocity at any point in time will

   be the same as the constant velocity throughout, and the average velocity will also be the same value.

9. Sketch a position versus time graph below for an object traveling at a constant positive velocity.
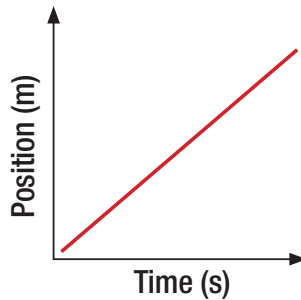
10. Will an object's average velocity and average speed always be the same? Explain what happens when the two are not equal.

    No, an object's average velocity and average speed will not always be the same. If the object changes

    direction, then the distance traveled and the displacement will be different. If these two values are

    different, then speed and velocity will also differ.

11. Complete the Venn diagram below to compare and contrast speed and velocity.