

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

## **VELOCITY AND ACCELERATION NOTES**

Velocity is \_\_\_\_\_ in a given \_\_\_\_\_.

- Therefore, knowing the velocity of a moving object means you know the \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.

Example: An airplane is moving 885 km/h west to California.

True or False: You can affect the velocity of a moving object without affecting the speed.

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Acceleration is the \_\_\_\_\_ in velocity of an object.

An object accelerates if it:

- speeds up (\_\_\_\_\_ acceleration)
- slows down (negative acceleration, also referred to as \_\_\_\_\_)
- changes \_\_\_\_\_

True or False: An object that is traveling at a constant speed can be accelerating.

$$\text{Acceleration} = \frac{\text{Final velocity} - \text{Original velocity}}{\text{Total time}}$$

Ex: A car accelerates from rest to 27 m/s in 9 seconds. Find the car's average acceleration.

Original speed = 0 m/s

Final speed = 27 m/s

Time = 9 seconds

$$\text{Acceleration} = \frac{27 \text{ m/s} - 0 \text{ m/s}}{9 \text{ s}} = \frac{27 \text{ m/s}}{9 \text{ s}} = 3 \text{ m/s}^2$$

Note: If speed is measured in meters per second (m/s) and time is measured in seconds, the unit of acceleration is meters per second per second, or  $\text{m/s}^2$ .

Practice (show your work):

1. A falling raindrop accelerates from 10 m/s to 30 m/s in 2 seconds. What is the raindrop's average acceleration?

Final speed:

Original speed:

Time:

2. What is a race car's average acceleration if its speed changes from 0 m/s to 40 m/s in 4 seconds?

3. How can a car be accelerating if its speed is constant at 65 km/h?