

Acceleration Story Problems
Integrated Science: Physics/Design

Name: _____ Per. ____

1. While traveling along a highway, a driver slows from 24 m/s to 15 m/s in 12 seconds. What is the automobile's acceleration? (Remember that a negative value indicates a slowing down or deceleration.)

$$a = \frac{v_f - v_i}{t} = \frac{15 \text{ m/s} - 24 \text{ m/s}}{12 \text{ s}} = \frac{-9.0 \text{ m/s}}{12 \text{ s}} = -0.75 \frac{\text{m/s}}{\text{s}} \quad (\text{m/s}^2)$$

2. A parachute on a racing dragster opens and changes the speed of the car from 85 m/s to 45 m/s in a period of 4.5 seconds. What is the acceleration of the dragster?

$$a = \frac{v_f - v_i}{t}$$

$$a = \frac{45 \text{ m/s} - 85 \text{ m/s}}{4.5 \text{ s}} = \frac{-40 \text{ m/s}}{4.5 \text{ s}} = -8.9 \text{ m/s/s} \quad (\text{m/s}^2)$$

3. A helicopter's speed increases from 25 m/s to 60 m/s in 5 seconds. What is the acceleration of this helicopter?

$$a = \frac{v_f - v_i}{t}$$

$$a = \frac{60 \text{ m/s} - 25 \text{ m/s}}{5 \text{ sec}} = \frac{35 \text{ m/s}}{5 \text{ s}} = 7 \text{ m/s/s} \quad (\text{m/s}^2)$$

4. As she climbs a hill, a cyclist slows down from 25 m/s to 6 m/s in 10 seconds. What is her deceleration? (Be sure your answer has the correct number of significant digits.)

$$a = \frac{v_f - v_i}{t}$$

$$a = \frac{6 \text{ m/s} - 25 \text{ m/s}}{10 \text{ s}} = \frac{-19 \text{ m/s}}{10 \text{ sec}} = -2 \text{ m/s/s} \quad (\text{m/s}^2)$$

5. A runner goes from 2.0 m/s to 10. m/s. in 6.0 seconds. What is the runner's acceleration? (Be sure your answer has the correct number of significant digits.)

$$a = \frac{v_f - v_i}{t}$$

$$a = \frac{10. \text{ m/s} - 2.0 \text{ m/s}}{6.0 \text{ sec}} = \frac{8.0 \text{ m/s}}{6.0 \text{ s}} = 1.3 \text{ m/s/s}$$

6. A skateboarder traveling at 7.0 meters per second rolls to a stop at the top of a ramp in 3.0 seconds. What is the skateboarder's acceleration?

$$a = \frac{v_f - v_i}{t} = \frac{0.0 \text{ m/s} - 7.0 \text{ m/s}}{3.0 \text{ s}} = -2.3 \text{ m/s/s}$$