DETERMINING SPEED (VELOCITY)

Name _____

Speed is a measure of how fast an object is moving or traveling. Velocity is a measure of how fast an object is traveling in a certain direction. Both speed and velocity include the distance traveled compared to the amount of time taken to cover this distance.

$$\text{speed} = \frac{\text{distance}}{\text{time}} \qquad \text{velocity} = \frac{\text{distance}}{\text{time}} \text{ in a specific direction}$$

Answer the following questions.

1. What is the velocity of a car that traveled a total of 75 kilometers north in 1.5 hours?

   _____

2. What is the velocity of a plane that traveled 3,000 miles from New York to California in 5.0 hours? _____

3. John took 45 minutes to bicycle to his grandmother's house, a total of four kilometers. What was his velocity in km/hr? _____

4. It took 3.5 hours for a train to travel the distance between two cities at a velocity of 120 miles/hr. How many miles lie between the two cities? _____

5. How long would it take for a car to travel a distance of 200 kilometers if it is traveling at a velocity of 55 km/hr? _____

6. A car is traveling at 100 km/hr. How many hours will it take to cover a distance of 750 km? _____

7. A plane traveled for about 2.5 hours at a velocity of 1200 km/hr. What distance did it travel? _____

8. A girl is pedaling her bicycle at a velocity of 0.10 km/min. How far will she travel in two hours? _____

9. An ant carries food at a speed of 1 cm/s. How long will it take the ant to carry a cookie crumb from the kitchen table to the ant hill, a distance of 50 m? Express your answer in seconds, minutes and hours. _____

10. The water in the Buffalo River flows at an average speed of 5 km/hr. If you and a friend decide to canoe down the river a distance of 16 kilometers, how many hours and minutes will it take? _____

FORCE AND ACCELERATION

Name _____

A force is a push or a pull. To calculate force, we use the following formula,

$$F = ma \qquad \text{where} \quad F = \text{force in newtons}$$
$$m = \text{mass in kg}$$
$$a = \text{acceleration in m/sec}^2$$

Example: With what force will a rubber ball hit the ground if it has a mass of 0.25 kg?

Answer: $F = (0.25 \text{ kg}) (9.8 \text{ m/s}^2)$
$F = 2.45 \text{ N}$

Solve the following problems.

1. With what force will a car hit a tree if the car has a mass of 3,000 kg and it is accelerating at a rate of 2 m/s²?

    Answer: _____

2. A 10 kg bowling ball would require what force to accelerate it down an alleyway at a rate of 3 m/s²?

    Answer: _____

3. What is the mass of a falling rock if it hits the ground with a force of 147 newtons?

    Answer: _____

4. What is the acceleration of a softball if it has a mass of 0.50 kg and hits the catcher's glove with a force of 25 newtons?

    Answer: _____

5. What is the mass of a truck if it is accelerating at a rate of 5 m/s² and hits a parked car with a force of 14,000 newtons?
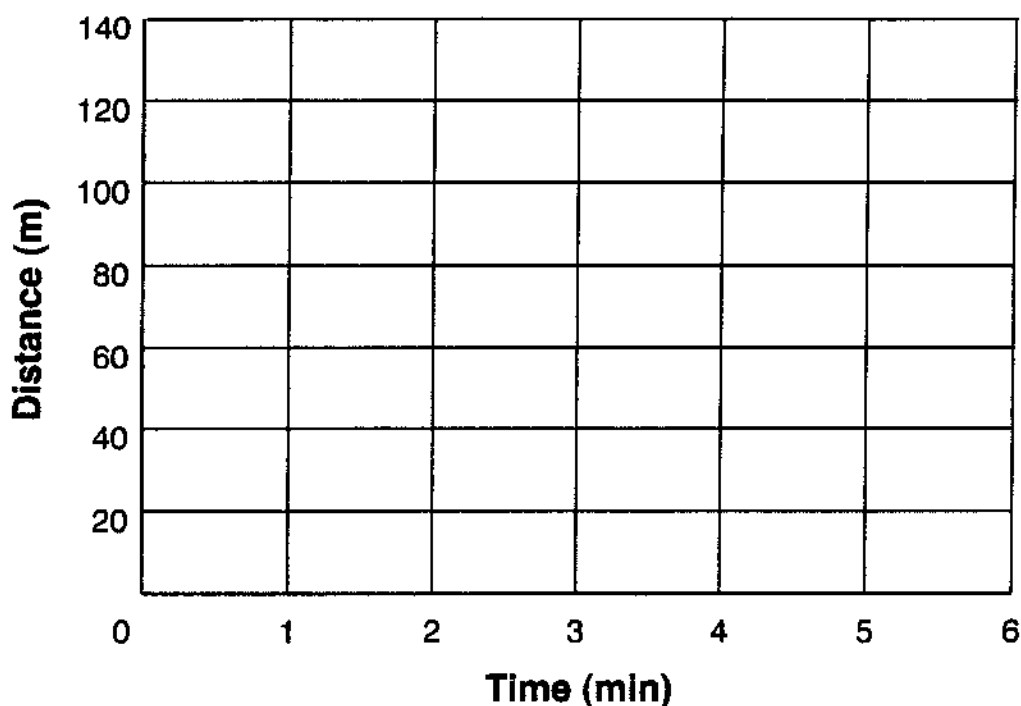
    Answer: _____

CALCULATING AVERAGE SPEED

Name _____

Graph the following data on the grid below and answer the questions at the bottom of the page.

Time (min)	Distance (m)
0	0
1	50
2	75
3	90
4	110
5	125

$$\text{Average Speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

1. What is the average speed after two minutes? _____

2. After three minutes? _____

3. After five minutes? _____

4. What is the average speed between two and four minutes? _____

5. What is the average speed between four and five minutes? _____