Activity 6: **Describing the Motion of an Object with Constant Speed**

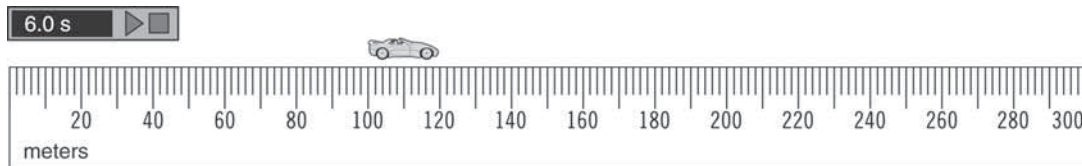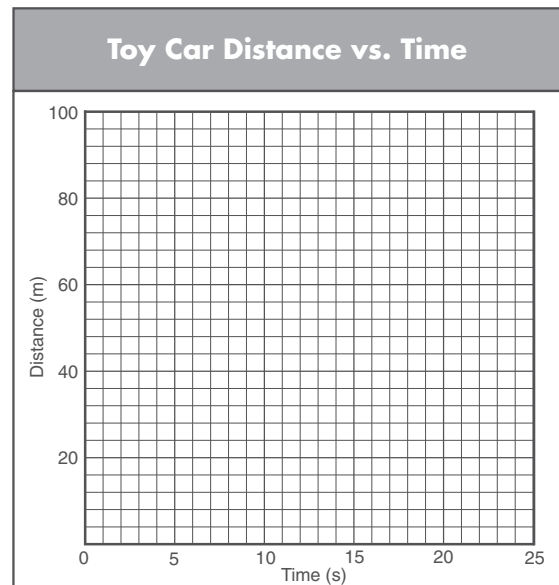Name   Date   Class

Part 1
Determining the Speed of Objects

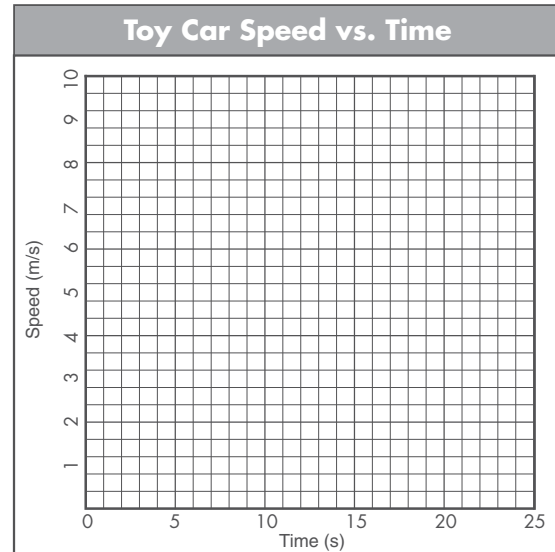**(Questions 1-4)** A toy car is moving along at a constant speed.

1. From the information in the table below, construct a graph of *Distance versus Time* for the toy car.

Table: Position of Toy Car versus Time	
Distance (m)	Time (s)
0	0
14	2
28	4
42	6
56	8
70	10
84	12

Toy Car Distance vs. Time

2. What is the speed of the toy car mentioned in the problem above? Show your work.

3. Using the speed value you calculated in Question 2 on the previous page, sketch a graph of *Speed versus Time* for the toy car.

Toy Car Speed vs. Time

(graph with vertical axis labeled Speed (m/s) from 1 to 10, horizontal axis labeled Time (s) from 0 to 25)

4. Complete this sentence:

The speed of the toy car _____ *(increases, decreases, stays the same)* as time increases.

5. Three cars travel at different constant speeds.

_____ The red car travels 110 miles in 2 hours.

_____ The green car travels 45 miles in one hour.

_____ The blue car travels 30 miles in 30 minutes.

Determine and *rank* the speeds (in miles per hour, or "mph") of each car from greatest to least.

Part 2
Finding Distance Traveled and Time Taken

If you know the speed of an object and the distance it travels, you can figure out the time it takes to travel that distance. Likewise, if you know the speed and the time, you can figure out the distance traveled. You have learned that:

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

You can solve this equation for *distance* by multiplying both sides by *time*:

$$\text{Speed} \times \text{Time} = \text{Distance}$$

To solve the equation for *time*, divide each side of the equation for *distance* by *speed*:

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

For example, suppose Sofia rides her bike at a speed of 9 miles per hour for 4 hours. How far does she travel? Use the equation for distance traveled:

$$\text{Distance} = \text{Speed} \times \text{Time} = 9 \text{ mph} \times 4 \text{ hours} = 36 \text{ miles}$$

Now, suppose Sofia was bicycling uphill at 4 miles per hour (abbreviated mph) for 12 miles. How long does the trip take? Use the equation for time taken:

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}} = \frac{12 \text{ miles}}{4 \text{ mph}} = 3 \text{ hours}$$

Use these examples as guides to answer the following questions.

1. If a car travels with a constant speed of 80 km/h for 6 hours, how far does it travel? Show your work.

2. If a jogger moves at a constant speed of 3 m/s along a sidewalk that is 99 meters long, how long does it take the jogger to run the length of the sidewalk? Show your work.

3. A jet travels with a constant speed of 600 mph between two cities separated by 4500 miles. How long does the flight take?

   a) 1.3 h

   b) 6.5 h

   c) 7.5 h

   d) 27 h

4. Rachel walks to a movie theater to see a film with her friend Ali. Moving at a constant speed of 6 km/h, Rachel takes 0.75 hours (45 minutes) to walk from her home to the theater. How far away is the theater from Rachel's home?

   a) 4.50 km

   b) 8.00 km

   c) 6.00 km

   d) 5.25 km

5. What is the slope of the line plotted in the graph below?

   a) 3.0

   b) 2.2 $\left(\frac{11}{5}\right)$

   c) 2.0

   d) 0.4 $\left(\frac{2}{5}\right)$
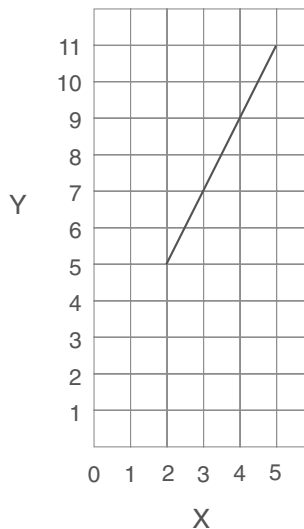
(Questions 6–8) The diagrams below show the positions of four cars at 12:00 noon (top) and their positions six minutes later (bottom). Positive positions correspond to locations east of position = 0 km. The graph shows how their positions change with time between 12:00 and 12:06 p.m.
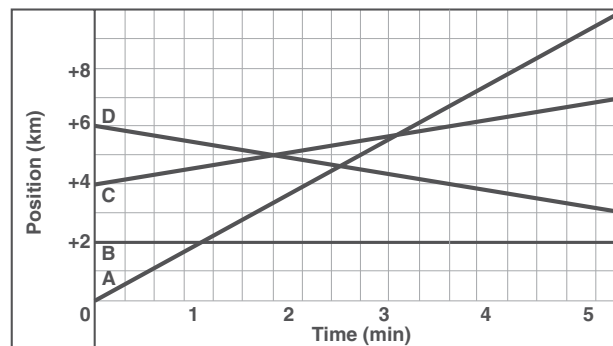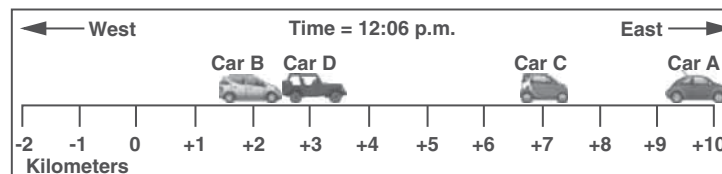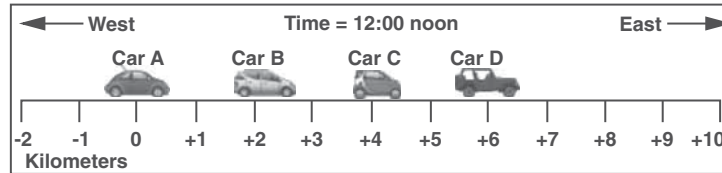
6. Which car has the highest speed? Remember the connection between speed and slope!

   a) Car A

   b) Car B

   c) Car C

   d) Car D

7. Although all four cars are pointed to the right (east), one car is moving left (west) in reverse gear. Which car is moving in reverse?

   a) Car A

   b) Car B

   c) Car C

   d) Car D

8. Which car is not moving?

   a) Car A

   b) Car B

   c) Car C

   d) Car D

9. Which of the following graphs shows a linear relationship between x and y?

(a)

(b)

(c)

(d)