

Name _____ Date _____ Hour _____



Calculating and Comparing Speed

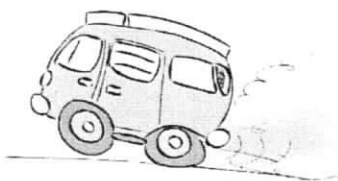
Pre Lab Questions

1. What is speed?

2. Describe the speeds of three common vehicles. How do they compare with each other, how do they compare with your speed when walking or running?

3. Choose two amusement park rides that you have ridden in the past, describe how those rides made you move, how did the speed of those rides change throughout the ride?

Background Information



Speed is a scalar quantity that refers to "how fast an object is moving." Speed can be thought of as the rate at which an object covers distance. A fast-moving object has a high speed and covers a relatively large

distance in a short amount of time. Contrast this to a slow-moving object that has a low speed; it covers a relatively small amount of distance in the same amount of time. An object with no movement at all has a zero speed.

A cheetah can run at a speed of almost 120 km/hour and is the fastest runner in the world. A horse can reach a speed of 64 km/h; and the fastest snakes slithers at a speed of about 3 km/h. The average walking speed of a man is 5.0km/h or about 3.1 *mph*. The fastest recorded speed for a human 44.6 km/hr or about 27 *mph*. In today's lab you will be calculating the speed of you and your group members under different conditions.



Procedure

1. Use a meter stick to mark off 10m.
2. Have your partner use a stopwatch to determine how fast can travel the entire 10 m distance. Practice using the stop watch a couple of times to ensure you are operating it properly.
3. Determine with your partners how you are going to travel, you will be timing yourselves while walking, running, and one other method. (Hint, you could walk backwards, walk heel to toe, skip, crawl, jog, speed walk, etc.)
4. Determine who will go first, have your partner begin timing as soon as you step off the starting line, you should continue running, walking, skipping, etc. until you cross the finish line at the end of the ten meters. Record your time in the data table. Repeat this procedure for 3 trials, recording the time for each trial.
5. Repeat the procedure for the other group members. Everyone must participate!
6. Continue with the other methods of locomotion, i.e. walking, skipping, etc. You should completely fill out the data tables for each method and each partner.
7. Calculate the average speed of each participant by dividing the distance traveled by the average time. Fill in the appropriate data table column.
8. Covert the average speed of each participant form m/s to km/h by multiplying the values by 3.6. Fill in the appropriate data table column.

Data Tables

Data Table 1: Walking

	Trial 1	Trial 2	Trial 3	Average Time (s)	Distance (m)	Average Speed (m/s)	Average Speed (km/h)
Partner 1							
Partner 2							
Partner 3							

Data Table 2: Running

	Trial 1	Trial 2	Trial 3	Average Time (s)	Distance (m)	Average Speed (m/s)	Average Speed (km/h)
Partner 1							
Partner 2							
Partner 3							

Data Table 3: _____ (Group choice: Skipping, crawling, hopping, walking backwards, etc)

	Trial 1	Trial 2	Trial 3	Average Time (s)	Distance (m)	Average Speed (m/s)	Average Speed (km/h)
Partner 1							
Partner 2							
Partner 3							

Use a separate sheet of paper to answer the following questions from today's lab. Use complete sentences when appropriate, as well as show all work when performing calculations.

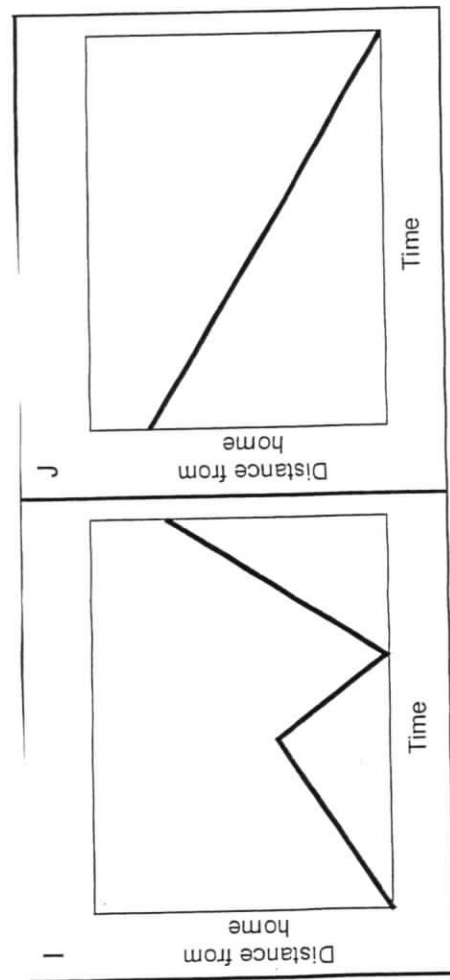
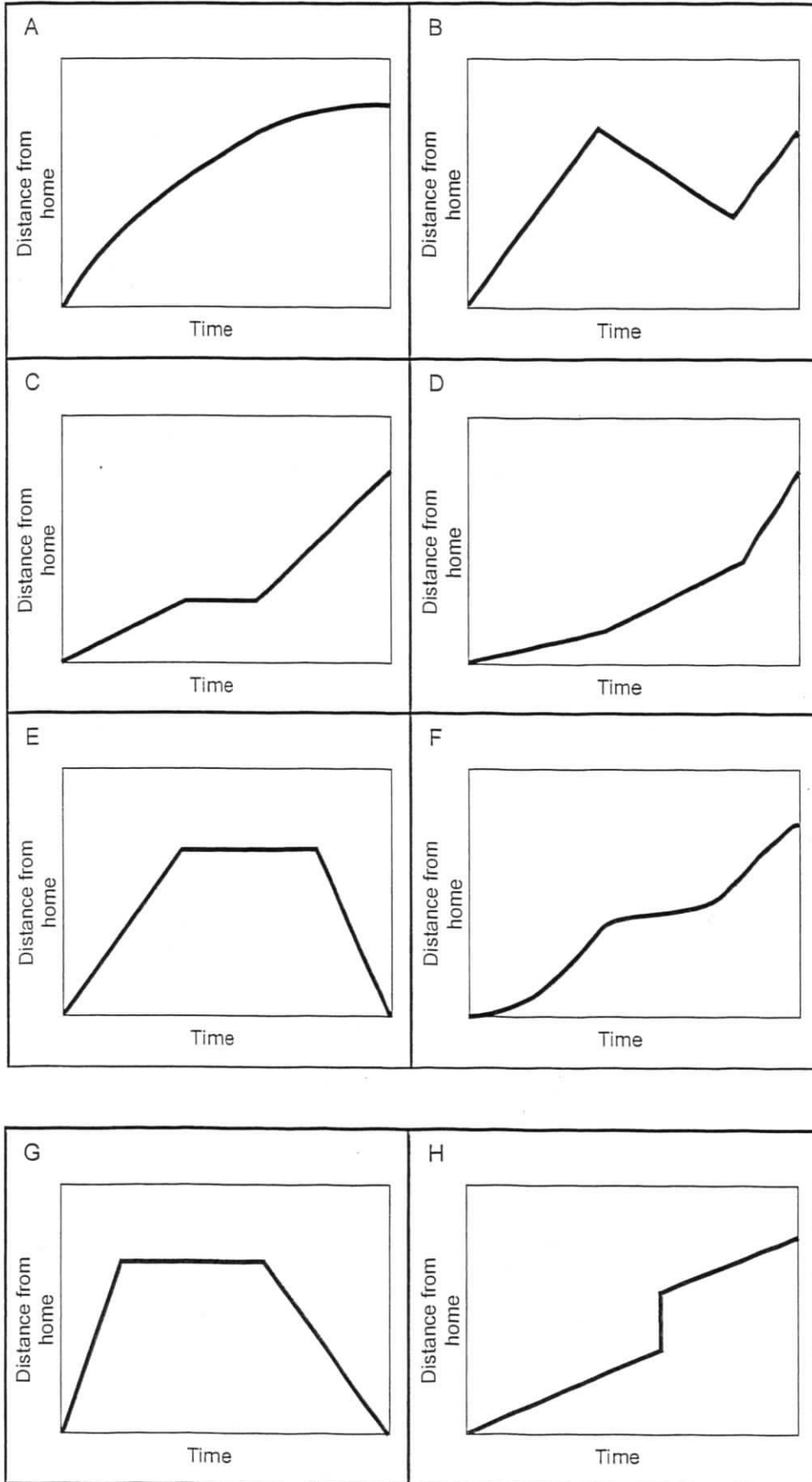
Post Lab Questions

1. How did your speed change throughout the lab? Which method was your fastest speed, slowest, etc.?
2. How did your speed compare with your partners' in each activity? Who was the fastest, slowest, etc.?
3. Think back to the beginning information, how does your speed compare with the animals talked about in the intro? If you were to race, who would win? Who would be dead last?
4. Calculate the average speed in miles per hour for each group member in each method of locomotion. (hint, to convert from km/h to mi/hour simply multiply by 0.6214)

Summary Questions

5. Which best describes the definition of speed?
 - a. How fast an object moves
 - b. How far an object moves
 - c. How far an object moves in a given time period
 - d. How far an object moves in a given direction
6. Which of the following best describes a formula for calculating speed?
 - a. Time/distance (T/D)
 - b. Distance/time (D/T)
 - c. Distance + Displacement /time (D^2/T)
 - d. Time /Distance + Displacement (T/D^2)
7. Which of the following could be a speed measurement?
 - a. 2.5 meters
 - b. 2.5 seconds/meter
 - c. 2.5 meters/second
 - d. 2.5 meters/second/second

Card Set A: Distance–Time Graphs



Card Set B: Interpretations

<p>1. Tom ran from his home to the bus stop and waited. He realized after 10 minutes that his watch was an hour slow and he had missed the bus. He walked home.</p>	<p>2. Tom ran up the hill by his house, and then he took a short rest at the top before running back down the other side.</p>
<p>3. Tom skateboarded from his house toward the park gradually building up speed as he traveled. He slowed down for a patch of rough cement then sped up again to cruising speed.</p>	<p>4. Tom walked slowly toward the traffic light, it turned green so he increased his speed as he jogged across. Once safely across he glanced down at his watch and realized he was late for his date so he started running.</p>
<p>5. Tom left his home for a run, but he quickly realized running was wearing him out way to fast, his pace slowed until he came to a complete stop.</p>	<p>6. Tom walked to the store at the end of his street; he bought a soda and then ran all the way back home.</p>
<p>7. Tom went out for a walk with some friends. He suddenly realized he had left his wallet behind. He ran home to get it and then had to run to catch up with the others.</p>	<p>8. This graph is just plain wrong. How can Tom be in two places at once?</p>
<p>9. After the party, Tom walked slowly home daydreaming about Rebecca.</p>	<p>10. Tom ran to Rachel's house for dinner, upon arriving he noticed she was not home so he turned around and started back toward home. Within minutes, he saw Rachel driving up the street; he turned around and ran back to her house.</p>
<p>11. Tom lives approximately 5 blocks from the local high school, every morning he walks with James to school at a constant speed.</p>	