Name:_____ Date:_____

Speed and Velocity Lab

Materials:

- Measured area to perform the tests (20 meters)
- Stopwatch
- 2 Students

Procedure:

1. Find the spot that marks 20m from the starting line.
2. One team member will perform each of the tasks in the table below while the other student records the amount of time it takes to complete each task.
3. Trade positions with your teammate and record the second set of data.
4. Answer the questions on the back of this worksheet with using the data you just gathered.
5. Each student must hand in his/her own copy of the worksheet to receive a grade.

NOTE: SPEED WALKING IS WALKING AS FAST AS YOU CAN WITHOUT JOGGING OR RUNNING.

Data Tables:

Data for Person #1

	Distance (meters)	**Time (seconds)**	**Speed ($\frac{m}{s}$)**
Walking			
Walking backward			
Speed walking			
Hopping			

Data for Person #2

	Distance (meters)	**Time (seconds)**	**Speed ($\frac{m}{s}$)**
Walking			
Walking backward			
Speed walking			
Hopping			

Name:_____ Date:_____

Questions:

1. Which task provided the fastest speed?

2. Which task provided the slowest speed?

3. How far could you *speed walk* in 10 minutes? Use your speed from the 20m test to calculate the answer. Show your work or you will not receive credit.

4. How long would it take you to *hop* 300 meters? Use your speed from the 20m test to calculate the answer. Show your work or you will not receive credit.

5. How far could you *walk backwards* in one hour? Use your speed from the 20m test to calculate the answer. Show your work or you will not receive credit.

6. How long would it take you to *walk* (not speed walk) 1km? Use your speed from the 20m test to calculate the answer. Show your work or you will not receive credit.

7. What was your velocity when you were *speed walking*?

Section 11.1 Distance and Displacement

(pages 328–331)

This section defines distance and displacement. It presents methods of describing motion and introduces vector addition and subtraction.

Reading Strategy (page 328)

Predicting Write a definition for *frame of reference* in your own words in the left column of the table. After you read the section, compare your definition to the scientific definition and write a correct definition. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

Frame of Reference	
Frame of reference probably means	Frame of reference actually means

Choosing a Frame of Reference (pages 328–329)

1. Is the following sentence true or false? A frame of reference is not necessary to describe motion accurately and completely. _____
2. Movement in relation to a frame of reference is called _____. Circle the correct answer.

   distance motion relative motion

3. Imagine that you are a passenger in a car. Circle the letter of the best frame of reference you could use to determine how fast the car is moving relative to the ground.

   a. the people sitting next to you in the backseat
   b. a van traveling in the lane next to your car
   c. a signpost on the side of the road

Measuring Distance (page 329)

4. Define distance. _____.
5. Circle the letter of the SI unit best suited for measuring the length of a room in your home.

   a. kilometers
   b. meters
   c. centimeters

Measuring Displacements (page 330)

6. Is the following sentence true or false? Five blocks south is an example of a displacement. _____

7. What would your total displacement be if you walked from your front door, around the block, and then stopped when you reached your front door again? Circle the letter of the correct answer.

   a. one block
   b. zero
   c. the entire distance of your trip

Combining Displacements (pages 330–331)

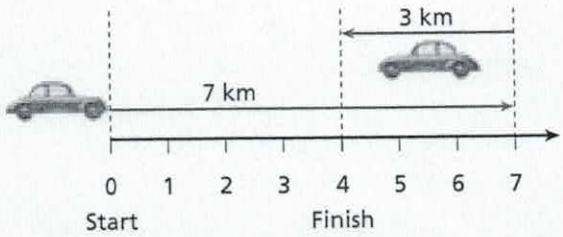
8. A vector is a quantity that has both _____ and _____. Circle the best answer(s).

   direction speed magnitude

9. Circle the letter of each answer that could describe the magnitude of a vector.

   a. length
   b. direction
   c. amount

For questions 10 and 11, refer to the figure below.



10. The magnitudes of the two displacement vectors are _____ and _____.

11. Because the two displacements are in opposite directions, the magnitude of the total displacement is _____.

12. The vector sum of two or more other vectors is called the _____. Circle the correct answer.

    added vector displacement vector resultant vector

Name _____ Class _____ Date _____

Section 11.2 Speed and Velocity

(pages 332–337)

This section defines and compares speed and velocity. It also describes how to calculate average speed.

Reading Strategy (page 332)

Monitoring Your Understanding After you read this section, identify several things you have learned that are relevant to your life. Explain why they are relevant to you. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

Facts About Speed and Velocity	
What Is Important	Why It Is Important

Speed (pages 332–334)

1. Define speed. _____

_____

2. Circle the letter of each sentence that is true for either instantaneous speed or average speed, but not both.

   a. It is measured in meters per second.

   b. It is measured at a particular instance.

   c. It is computed for an entire trip.

3. Is the following sentence true or false? You can determine how fast you were going at the midpoint of a trip by calculating average speed for the entire trip. _____

4. A student walked 2 km in .5 hour. Circle the letter of his average speed on the way to school.

   a. 0.5 km/h

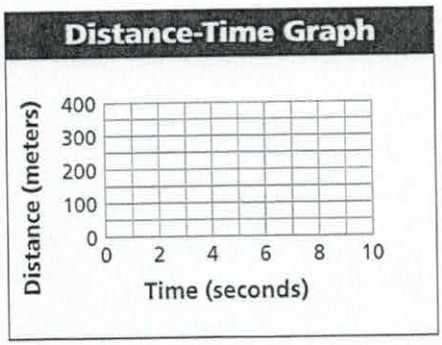
   b. 1.5 km/h

   c. 4.0 km/h

Name _____ Class _____ Date _____

Graphing Motion (page 334)

For questions 5 through 8, refer to the graph below.



5. Draw a point on the graph that represents 200 m traveled in 4 seconds. Draw a line connecting this point with the origin (0,0). Label this as line A.
6. Draw a point on the graph that represents 100 m traveled in 10 seconds. Draw a line connecting this point with the origin (0,0). Label this as line B.
7. Circle the letter of the average speed (slope) of line A.

   a. 10 m/s b. 20 m/s c. 50 m/s

8. Circle the letter of the average speed (slope) of line B.

   a. 10 m/s b. 20 m/s c. 50 m/s

Velocity (page 336)

9. Circle the letter of each sentence that describes a change in velocity.

   a. A moving object gains speed.
   b. A moving object changes direction.
   c. A moving object moves in a straight line at a constant speed.

10. Is the following sentence true or false? If a car travels around a gentle curve on a highway at 60 km/h, the velocity does not change.

    _____

Combining Velocities (page 337)

11. How do velocities combine? Circle the correct answer.

    a. by vector addition
    b. by vector subtraction
    c. by vector graphing