NAME: DATE

**VECTOR LAB: Map and Compass Lab**

Materials: metersticks, compass, graph paper, ruler, pen/pencil.

OBJECTIVES:

Create a series of vector directions that lead to a specific object.

Follow directions to locate a specific object.

Develop a standard notation for writing direction symbols.

Create a scale map.

Procedure

1. In this lab, you will select a fixed object/place within the BCHS courtyard and use standard physics notation to direct other students to the object. Your teacher will define the starting point (middle of the courtyard) for this activity. Select an object within the boundaries; the object you choose should be large and obvious, and it should be fixed in place so that other students will be able to find it by following your directions.

2. Plot out a course from the starting point to the chosen object. Remember to work quietly and to avoid disrupting classes and school traffic. You may measure your pace in meters and use your pace to count out the distance for each part of the course. Convert your pace to meters before recording the values for each distance.

3. You will break up the course into 5 to 10 different segments, and you will write each  
separate segment as a distance in meters and a direction (an angle beginning on the positive x-axis) for each segment of the journey. Each direction must contain a complete description of that segment, including the magnitude of the distance in meters and the angle. Use magnetic north as the positive y-axis. All student teams will be provided with a compass as they attempt to follow your directions.

4. Keep in mind that the directions may be used to describe the most direct path from  
the starting point to the object, broken up into 5 to 10 segments, or they may describe a complicated path with many changes of direction.

5. When you have completed steps that give an accurate description of a path  
between the starting point and the ending point create an ‘answer key’ or draw a map on a separate piece of paper. On the separate piece of paper, write your name and a description of the object you chose as the ending point, including a description of its location. Give both papers (directions and answer key/map) to your teacher and include a group name on each.

6. When everyone is finished creating their directions, the teacher will randomly pass out the directions to different groups. With a compass in hand, start your journey when you receive another group’s directions. Your teacher will keep the solutions paper with the name of the object until you have completed the journey.

Analysis Questions:

Make sure to keep a list of all your paces, distances and directions so you can draw it on a scale map

A. Do your direction describe the straight-line path to the object divided into 1  
parts, or do they describe a winding path to the object?

B. Is the path described by your directions the same length or longer than the  
straight-line path to the object? Can your cards be used to determine the  
straight-line path? Explain.

C. What was the most difficult part of creating the path to the object?

D. Are you confident that another group will be able to find the object using  
your direction cards? Explain why or why not.

E. Would another group be able to find the object using your direction  
if your steps were placed out of order? Explain your answer.

7. After your team finds the ending location, return to the teacher. Your teacher will then give the directions to another group, however the next group should shuffle the directions before beginning another journey. Your group will likewise shuffle the directions of another group and attempt to arrive at the intended final location.

F. Did shuffling the deck make it more difficult for you to locate the object?   
Explain why or why not.

G. Would you be able to place the cards in their original order? Explain why or why not.

H. Did you find the object described by the other group's cards? If not, explain what happened.

I. Explain the method you used to find the object, and include any tricks discovered while you were working.

J. Was the other group able to correctly identify the object described by  
direction cards?

