**Mapping Millbrook** Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part 1: Pacing and Determination of Pace Length**

To determine your **PL** (pace length) you will use a section of the sidewalk that has been measure off already. Start at one end and pace to the other, using a comfortable pace length and counting the steps from one end to the other. Do this three times and find an average to help establish consistency in determining pace length. When pacing is complete, divide the measured distance by the number of paces to determine your personal **PL**.

Paces: 1.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Avg:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Pace Length (**PL**):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Consistency in walking speed is the most important aspect because your pace length will tend to get shorter with a slower pace and longer when speed is increased.

**Part 2: Compass Directions and Bearings**

The **bearing** can be simply defined as the direction from one location to another. Bearings are expressed in degrees either east or west of true (geographic) north or south.



The compass you will be provided will have the features shown in the diagram above. The main part of the compass will be a flat platform (A) with a turnable dial (B). One end of the platform will have a dark-collared arrow (C). This direction of travel arrow will be used for taking our compass bearings.

Always try to hold the compass so that the platform is as nearly level as possible so that the magnetic compass needle (D) can swing freely as the compass is turned. The movable compass needle has two labeled ends. The red end points to magnetic north and the white end points toward magnetic south. You compass will also have an outline of an arrow (E) engraved on the floor of the compass under the compass needle. This orienting arrow will turn when the compass housing is turned.

With the dark platform arrow (C) pointed away from you, point (aim) the compass at an object. Next, rotate the compass housing dial (B) so that the north end of the freely moveable compass needle (D) lies directly over the orienting arrow (E) engraved inside the compass housing. Note that the compass housing ring (B) has degrees and directions engraved on its surface. Read the bearing in degrees by noting where the compass housing numbers lie directly above the indicator arrow (C) on the compass base.

**Part 3: The Pace and Compass Project**

Go out into the courtyard and find four locations that are spread apart (bench, tree, bird feeder, trash can, etc.). When ready, start with your back at the first object. Using the instructions above, determine the compass bearing to the next location. Record the bearing and carefully pace the distance between the two features.

Location 1:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Location 2:\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ Bearing:\_\_\_\_\_\_\_\_\_\_\_\_\_ Pace number:\_\_\_\_\_\_\_ = \_\_\_\_\_ft

Location 3:\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ Bearing:\_\_\_\_\_\_\_\_\_\_\_\_\_ Pace number:\_\_\_\_\_\_\_ = \_\_\_\_\_ft

Location 4:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Bearing:\_\_\_\_\_\_\_\_\_\_\_\_\_ Pace number:\_\_\_\_\_\_\_ = \_\_\_\_\_ ft

Location 1:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Bearing:\_\_\_\_\_\_\_\_\_\_\_\_\_ Pace number:\_\_\_\_\_\_\_ = \_\_\_\_\_ ft

Stand with your back against the new object and determine the bearing to the next object on your list. Record the new bearing, pace off the distance to that feature, and record the pace numbers. Repeat these steps for the remaining objects, making the last bearing point back to the starting point. Be careful at every step of the process.

**Part 4: Plotting the Data**

We now need to see if you can produce a map from the data collected during the pace and compass part of this exercise. Before starting to plot your data, multiply each of your pace numbers between features by the individual pace lengths (PL) to convert the pace distances to inches or feet.

We will be using a map scale of one inch equals 100 ft; therefore, one of the small squares on the paper equals 10 feet on the ground. The top of your plot is north.

Checking your measured distances, carefully determine where to begin your map. **HINT**: If you are not careful at this step, your map may run off the paper.

Use a standard circular protractor by placing the center point of the protractor on the starting point of your map, making sure the 0° (360°) point on the protractor rim is pointing to the top of the sheet of graph paper. It will help visualize the process if the starting point is also located ON one of the north-south lines.

Note the first compass bearing you determined. If it was, for example 60°, you would place a pencil dot on a point outside your protractor rim where the dial reads 60. With a ruler, determine the length of a line between your starting point and the location of the first pace and compass location outside.

Once you have measured the distance, draw a line on the map between your starting point and feature one. For instance, of the distance between your starting point and location 2 was 288 feet, using a scale of one inch equals 100 feet, you will need to draw a line 2.88 inches long. Make a clearly visible dot at the end of this line, draw a small circle around the far end of this first line, and label it with a number that indicates the site on your map.

Move the protractor starting point so that it is now located over the dot at the end of line one. Carefully orient the protractor so that north is correctly indicated (0° or 360° is toward the top of the paper and along a north-south line). Now mark the bearing to your location 3, plot the new direction, and mark the line length in the same way you determined the first site. Again, place a clearly evident dot at the end of the new line, circle it, and label the spot.

Continue plotting bearings and determining new location sites until you have completed the series. The excitement comes when you determine the very last bearing and measurement. **Did you end up exactly at your starting point?** If so congratulations! **If not, what happened?** Perhaps you were not successful the first time. The last step where you hopefully ended up exactly at your starting point is called “closing the loop” and is the goal of every surveyor or mapper.

It is not likely that you will close exactly, so don’t get too frustrated, but if you are far off, **you need to look for errors.** Address this in the space below.

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