Slope, Pi, and Lines

NAME _____

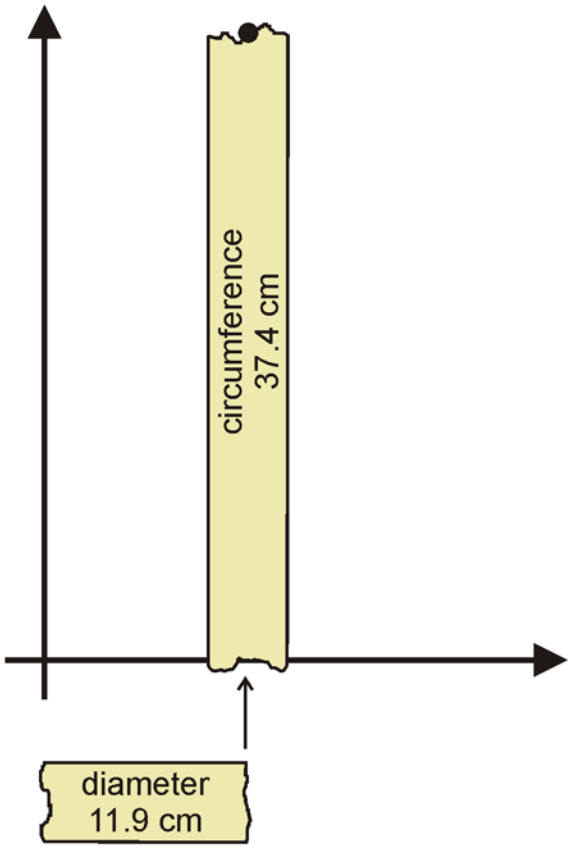
In this activity, you will measure the circumference and diameter of several circles, and then graph the relationship between circumference and diameter.

Your group should have a roll of masking tape, a pair of scissors, and at least three circular objects of various sizes.

A. Wrap masking tape around one of the circles, overlapping the edges. Select a place to cut through the masking tape, peel it off the object, and label it "circumference." Measure its length and write the measurement on the tape.

B. Stretch a length of tape from one side of the object to the other that passes through the center of the circle. Trim the tape at the edges of the circle and label this strip as "diameter." Measure its length and write the measurement on the tape.

C. On the graph, place the tape of the diameter under the *x*-axis. Then place the circumference tape vertically, so that it is parallel to the *y*-axis. Plot a point at the top of the circumference strip and label its coordinates. (See diagram below.)



(MCC9-12.G.GMD.1)

1. Repeat Steps A–C for the other circles. Record a summary of the results in the table below.

Object	Diameter	Circumference

2. Draw a straight line that approximates the points on your graph.

3. For the line in your graph, where does the *y*-intercept occur? Where *should* the *y*-intercept occur? Explain what the *y*-intercept means in terms of diameter and circumference.

4. What is the approximate slope of the line on your graph?

5. What does the slope of your line represent? What two quantities are being compared?

6. How does the slope of your line compare to a decimal approximation of π?

7. What equation relating C (circumference) and d (diameter) would be an exact equation of the line going through the points (d, C) generated by the circles? What is the exact slope of that line?

8. What does it mean to say that π is a ratio?

9. What does it mean to say that the slope of a line is a ratio? In this activity, what quantities were being compared?

10. For the slope of any line, describe what types of quantities are being compared.