Session #328, Beatini
Hand-Held Technology + Hands-On Activities = CCSS Success!

Algebra
The Cheerios Lab #1

Name(s):

Period: Date:

Materials: small cup of Cheerios, jar lids of various sizes, centimeter ruler

Can you find a relationship between the number of Cheerios that lie flat around the outside of a lid and the diameter of the lid? The goal of this lab is to determine if there is a mathematical model that represents this relationship.

Investigation

A) Measure the diameter of the jar lid in centimeters.

B) Make a ring of Cheerios around the lid. Do not use broken pieces!

C) Count the number of Cheerios used for your ring.

D) Record the diameter and the corresponding number of Cheerios in the table.

Diameter of Lid (in cm.)	Number of Cheerios

Analysis

1. Let x represent diameter of the jar lid, and let y represent the number of Cheerios. Use an appropriate viewing window and make a scatter plot of the data. What do you notice about the graph?

2. Describe the shape of the graph. Do the points appear to be linear?

3. Use your calculator to find an appropriate model to represent the relationship for the data. Write your equation in the space below with all values rounded to the nearest hundredth. Write the r and r^2 values obtained from your calculator to the nearest ten thousandth.

Equation: _____ r = _____ r^2 = _____

4. Store your equation on the [Y=] screen. Graph your equation over the scatterplot. How well does your equation fit your data?

5. What is the real world meaning of the y-intercept for your equation? Do you think this is possible? Explain!

6. What is the real world meaning of the slope for your equation? Do you think this is possible? Explain!

7. Use your equation to find the number of Cheerios that are needed to make a ring around a trash can lid that has a diameter of 55 cm.

8. What is a reasonable domain for this model? Explain!

Algebra
The Cheerios Lab #2

Name(s):

Period: Date:

Materials: small cup of Cheerios, jar lids of various sizes, centimeter ruler

Can you find a relationship between the number of Cheerios that lie flat inside a lid and the diameter of the lid? The goal of this lab is to determine if there is a mathematical model that represents this relationship

Investigation

E) Measure the diameter of the jar lid in centimeters.

F) Fill the lid with Cheerios one layer deep. Do not use broken pieces!

G) Count the number of Cheerios in the lid.

H) Record the diameter and the corresponding number of Cheerios in the table.

Diameter of Lid (in cm.)	Number of Cheerios

Analysis

1. Let x represent diameter of the jar lid, and let y represent the number of Cheerios. Use an appropriate viewing window and make a scatter plot of the data. What do you notice about the graph?

2. Describe the shape of the graph. Do the points appear to be linear?

3. Use your calculator to find an appropriate model to represent the relationship for the data. Write your equation in the space below with all values rounded to the nearest hundredth. Additionally, write the r^2 value obtained from your calculator to the nearest ten thousandth.

Equation: _____ r^2 = _____

4. Store your equation on the [Y=] screen. Graph your equation over the scatterplot. How well does your equation fit your data?

5. Use your equation to find the number of Cheerios that are needed to fill a trash can lid that has a diameter of 55 cm.

6. What is the real world meaning of the y-intercept for your equation? Do you think this is possible? Explain!

7. What is a reasonable domain for this model? Explain!

THE KNOTS LAB

60 Points

NAME(S):

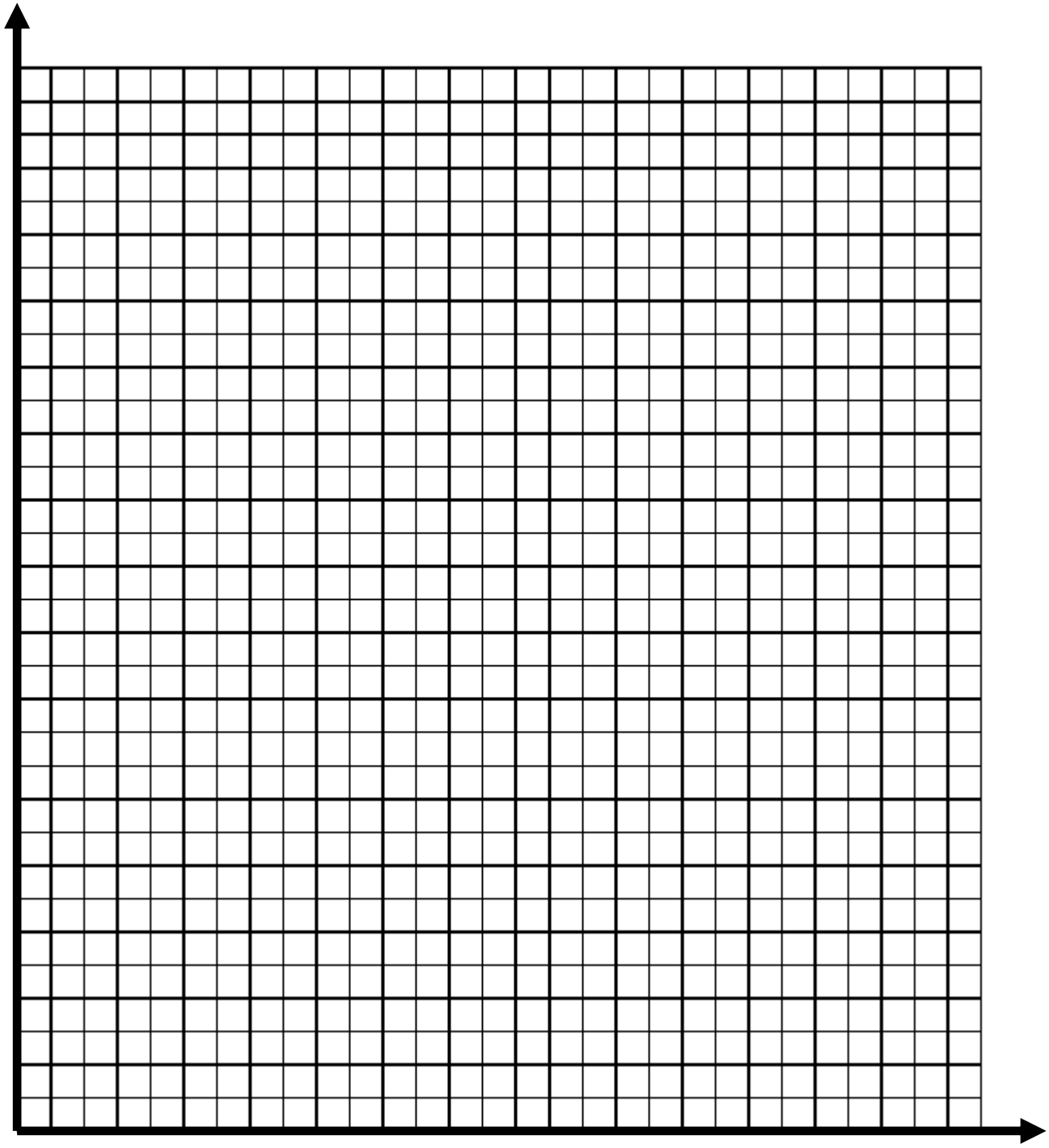
PERIOD: DATE:

1. You will collect data showing how the length of the rope changes as you tie more knots in the rope. Before your group begins, discuss what you expect to find out. Write your groups prediction about what you think will happen in the space below. (2 pts.)

2. Measure the length of the rope before you tie any knots, and record the length in the table below. Tie one knot in the rope, measure the new length, and record it in the data table. Continue tying knots in the rope, measuring and recording the data until you have six or seven knots. [HINT: Tie the knots as close to each other as possible so that you can get the requisite number of knots.] (4 pts.)

Number of Knots	Length of Knotted Rope (cm)
0	
1	
2	
3	
4	
5	
6	
7	

3. Graph your data, the length of the rope is a function of the number of knots. Be sure to write a title on your graph, draw the axes, label your axes and provide a scale! What pattern does the data seem to form? Answer below! (16 pts.)



4. Find the equation of the best-fit line that represents length of the rope as a function of the number of knots. Use the linguine to help you "eyeball" the line. Identify the points your group used to find the equation of this line in slope-intercept form. Show all steps and work. Round all coefficients to the nearest hundredth. **Then graph the line accurately on your scatterplot! (10 pts.)**

The points are:_____

The equation of the line is:_____

5. What is the slope of your line and what is its real-world meaning? (4 pts.)

6. What is the y-intercept of your line and what is its real-world meaning? (4 pts.)

7. Does the thickness of the rope itself have anything to do with the results? Explain! (4 pts.)

8. Does the type of knot have anything to do with the results? Explain! (4 pts.)

9. Theoretically, what is the maximum number of knots you could tie in your rope? Explain your answer! (3 pts.)

10. What is the x-intercept of your line and what is its real-world meaning? (3 pts.)

11. A rope is 563 cm. long. Each knot changes the length of the rope by 8.5 cm. Write an equation of a line in slope-intercept form that can be used to determine the length of the rope for any given number of knots. (3 pts.)

12. Using your calculator, create a scatterplot and find the line of best fit. What is the equation of the line of best fit determined by the calculator? How close is your equation of best fit line to the line determined by the calculator? Can you explain for any discrepancy if there is any? (3 pts.)