activity sheet 1

Name _____

SPAGHETTI BRIDGES: MODELING LINEAR RELATIONSHIPS

You will be collecting data on number of weights supported by spaghetti strands. Before you begin, answer these questions about your experimental design and plan for data collection.

1. What is the question that you are investigating?

2. What is the independent variable? How do you know?

3. What is the dependent variable? How do you know?

4. What variables will you control? Why?

5. How will you decide when you have collected enough data?

Collect data on the number of weights supported versus number of spaghetti strands.

Number of Spaghetti Strands	Number of Weights Supported

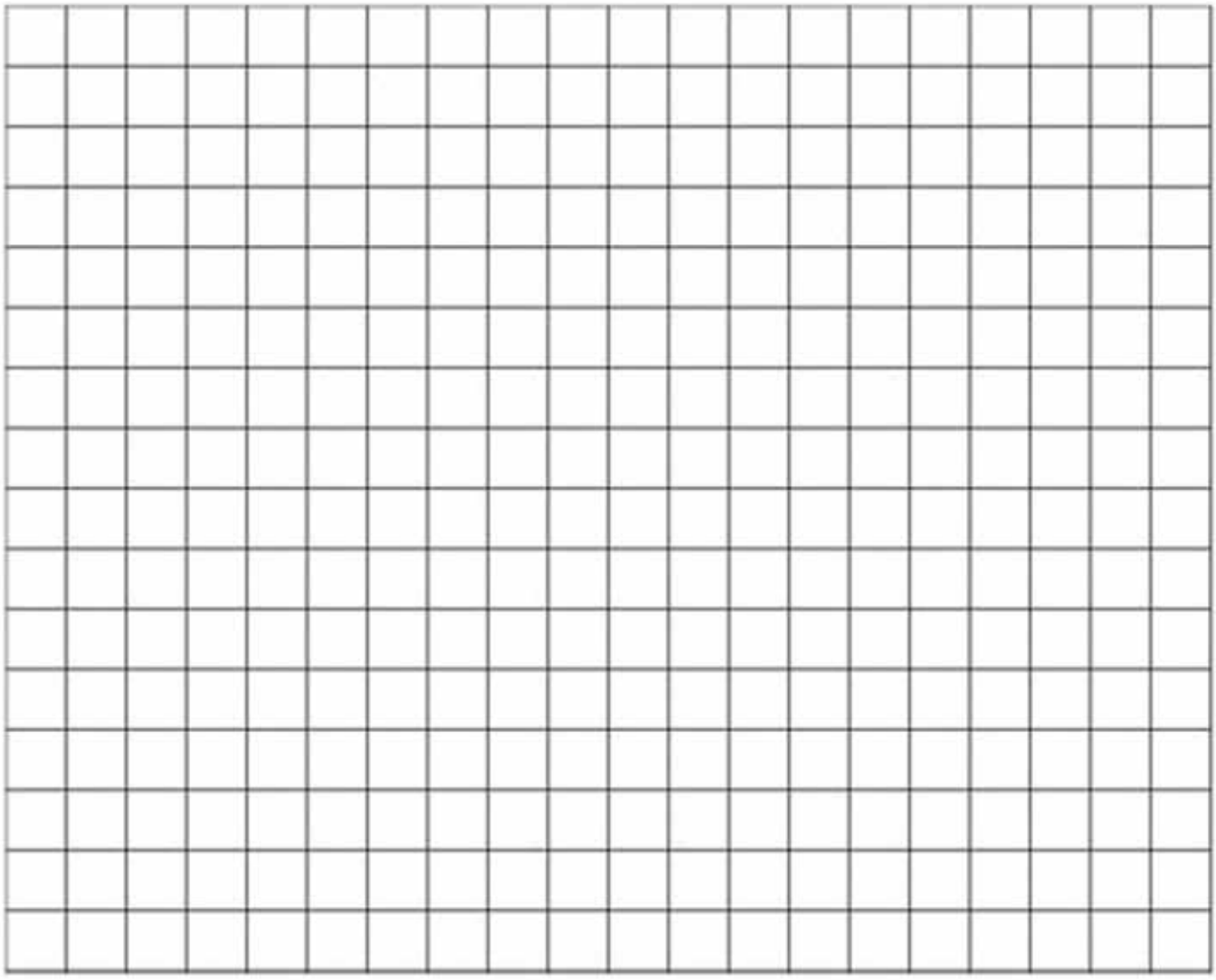
from the May 2016 issue of mathematics teaching in the MIDDLE SCHOOL

activity sheet 2

Name _____

SPAGHETTI BRIDGES: MODELING LINEAR RELATIONSHIPS

1. Graph your data. Place the independent variable (the number of spaghetti strands) on the *x*-axis and the dependent variable (the number of weights supported) on the *y*-axis. Appropriately label each axis, and include a title for your graph.



2. Draw the straight line that best represents your data. This is the best-fit line.

3. Use two ordered pairs to determine the slope (m) of the best-fit line.

4. Use the slope (m) and an ordered pair on the line to calculate the slope-intercept equation of the line: $y = mx + b$.

5. Write a word equation that describes your results.

6. Describe the meaning of slope and *y*-intercept in terms of your experiment.

from the May 2016 issue of mathematics teaching in the MIDDLE SCHOOL

Spaghetti Bridges: Modeling Linear Relationships

Cindy D. Kroon

ACTIVITY SHEET 1

Sample Answers

1. What is the relationship between the number of spaghetti strands and the number of weights supported?

2. The independent variable is the number of spaghetti strands because this is what is changing in the experiment.

3. The dependent variable is the number of weights supported because it is the response to change.

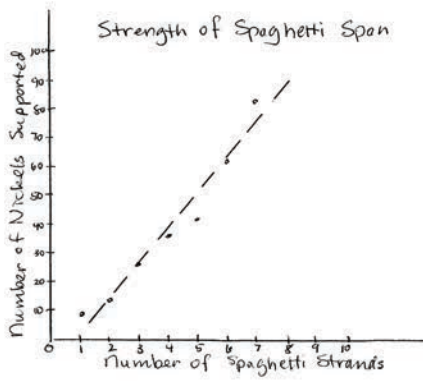
4 Controlled variables include the length of the spaghetti span (distance between supports) and distance from which the weights are dropped into the cup. Students might also attempt to control the timing of weight addition: Every 3 seconds and so on. These variables are controlled so that only the issue under study (number of spaghetti strands) is changed.

5. Answers will vary. Students may select an arbitrary number of trials, or stop when the supply of weights is exhausted.

ACTIVITY SHEET 2

Sample Answers

1.–2.



Sample Data

Number of Spaghetti Strands	Number of Weights Supported
1	9
2	14
3	26
4	36
5	42
6	63
7	84

3. Using (2, 14) and (6, 63) from best-fit line: Slope is 49/4 or 12.25. Using (6, 63) and slope of 12.25: $y = 12.25x - 10.5$.

4. The number of weights supported = 12.25 (number of spaghetti strands) – 10.5. Each spaghetti strand can support approximately 12.25 weights. The y-intercept is –10.5.

5. The slope describes the number of weights supported by each additional piece of spaghetti. The y-intercept represents the weight of the cup and string assembly before any additional weights are added.