ACTIVITY 5.7

Developing Concepts

Group Activity for use with Lesson 5.7

Investigating Linear Modeling

GROUP ACTIVITY
Work in a small group.

MATERIALS
- toothpicks
- graph paper

QUESTION How can you decide whether data can be represented by a linear model?

EXPLORING THE CONCEPT

The following figures represent the first five stages in a sequence.

1. Copy and complete the table showing the number of toothpicks used to make each figure.

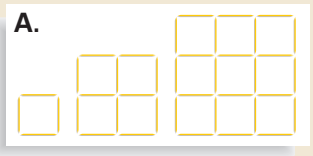
Number of squares in figure	1	2	3	4	5
Number of toothpicks	4	?	?	?	?

2. Make a scatter plot of the data. Put the number of squares on the horizontal axis. What do you observe about the data points?
3. Choose two points on the line and calculate the slope.
4. Write the equation of the line in slope-intercept form.
5. Use the equation to predict the number of toothpicks necessary to construct a figure with 10 squares. Check your result.

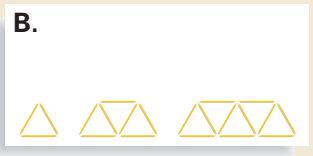
DRAWING CONCLUSIONS

The figures show the first three stages in a sequence. Each group member should choose one sequence and answer Exercises 1–4 individually.

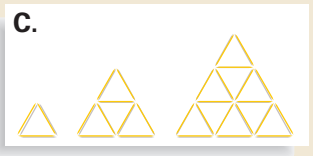
A.



B.



C.



1. Use toothpicks to make the next three figures in the sequence.
2. Make a table of the results. For each stage, give the number of small squares or small triangles in the figure and the number of toothpicks used.
3. Make a scatter plot of the number of small squares or small triangles as a function of the stage number.
4. Make a scatter plot of the number of toothpicks as a function of the number of small squares or small triangles.
5. Compare your scatter plots with those of others in your group. Which of the sequences can be modeled with a linear model? Which cannot? Explain.
6. If the data appear to fit a linear model, find an equation of the line.