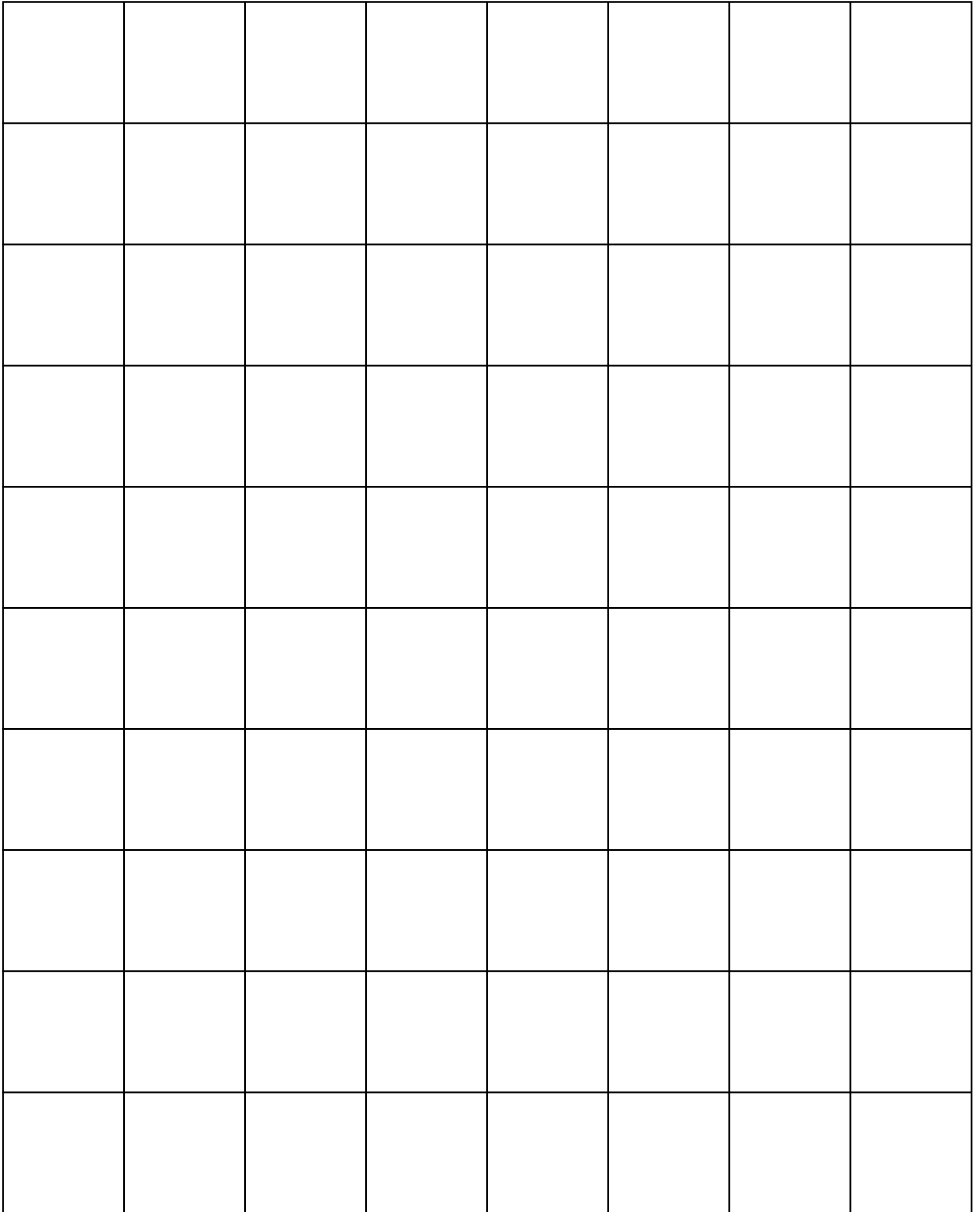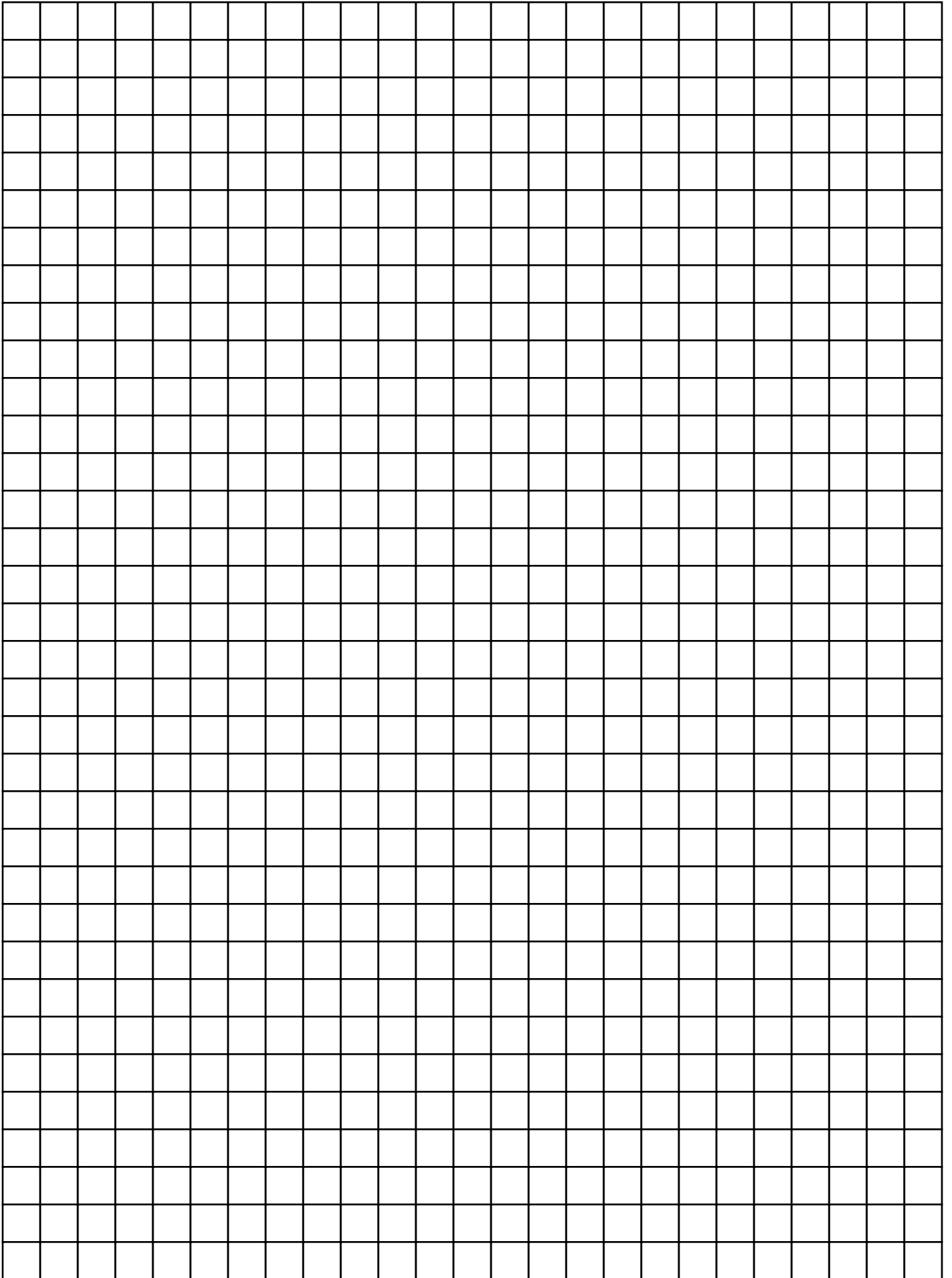## AREA AND PERIMETER: Fixed Perimeters

Directions: You will be given a loop of non-stretchy string that is exactly 24 units long. The task is to decide what different-sized rectangles can be made with a perimeter of 24 inches. You may want to use a 1-inch grid to place your string on. Each different rectangle can be recorded on grid paper with the area noted.

An alternative to the string loop is to simply use centimeter grid paper to try to find rectangles with a perimeter of 24.

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 265)

AREA AND PERIMETER: Fixed Areas

Directions: You will be given 36 square tiles such as color tiles. The task is to see how many rectangles can be made with an area of 36 – that is, using all 36 tiles to make filled-in rectangles, not just borders.
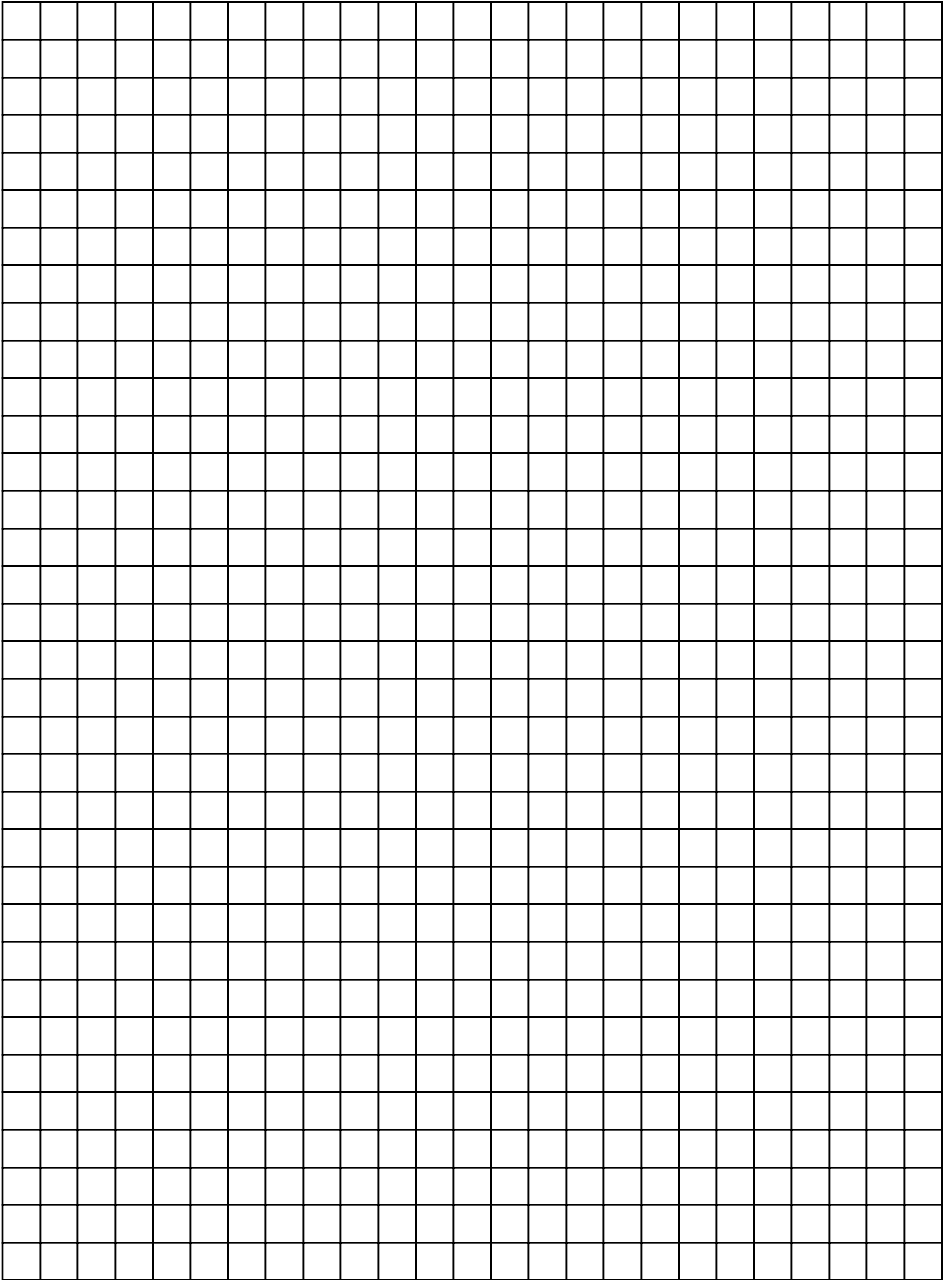
Each new rectangle should be recorded by sketching the outline and the dimensions on grid paper. For each rectangle, determine and record the perimeter.

Rectangle Dimensions (w x h)	Area	Perimeter

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 265)

1.   For each rectangle, did the perimeter stay the same? Is that what you expected?

_____

_____

_____

_____

_____

_____

2.   When is the perimeter big and when is it small?

_____

_____

_____

_____

_____

3.   How can you be sure that you have created all possible rectangles?

_____

_____

_____

_____

_____

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 265)

COMPARISON ACTIVITIES: Capacity Lineup

Directions: Given a series of five or six labeled containers of different sizes and shapes, the task is to order them from least capacity to most. Work in groups to come up with a solution and also explain how you arrived at it.
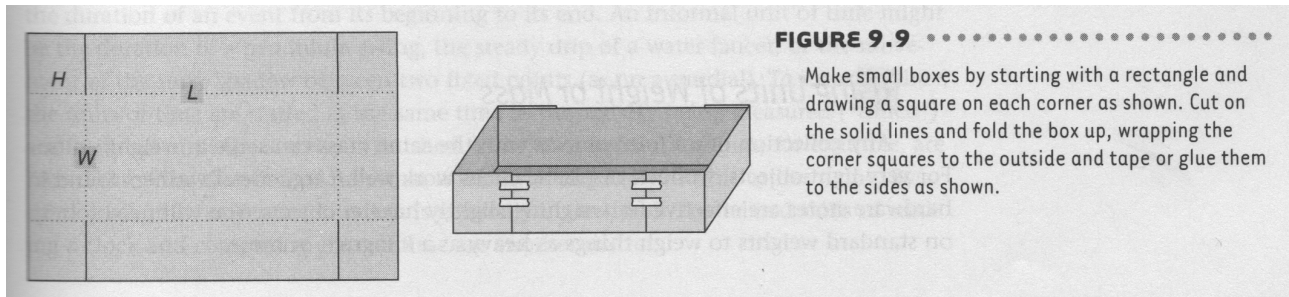
1. Draw the containers, from least capacity to most.

2. Explain how you arrived at your answer to Question 1.

_____

_____

_____

_____

_____

_____

_____

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 266)

USING UNITS OF VOLUME AND CAPACITY: Box Comparison – Cubic Units

Directions: You will be given a pair of small boxes that the teacher has folded up from poster board, exactly one block, and an appropriate ruler. (For example, for 2 cm cubes, the ruler will have a unit equal to 2 cm.) For the boxes, the teacher used unit dimensions that match the block.

Some suggested box dimensions: 6 x 3 x 4   5 x 4 x 4   3 x 9 x 3
   6 x 6 x 2   5 x 5 x 5

Your task is to decide which box has the greater volume or if they have the same volume. Below, use words, drawings, and numbers to explain your conclusions.

FIGURE 9.9

Make small boxes by starting with a rectangle and drawing a square on each corner as shown. Cut on the solid lines and fold the box up, wrapping the corner squares to the outside and tape or glue them to the sides as shown.
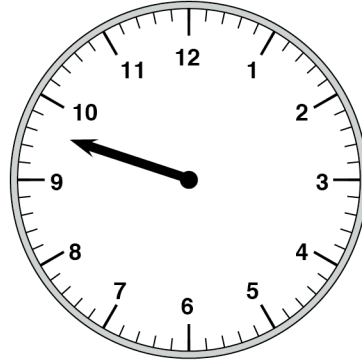
CLOCK READING: One-Handed Clocks

Directions: One each clock, an hour hand has been drawn. For each clock, write the digital time and draw a minute hand on the clock where you think it would be.

1.

2.

3.

4.

5.

6.

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 270)
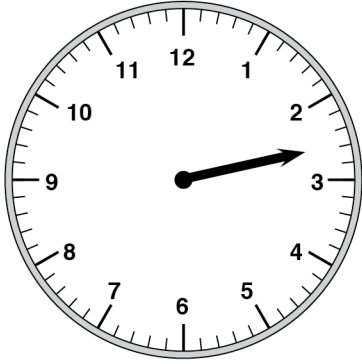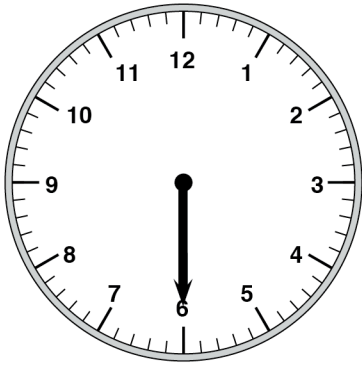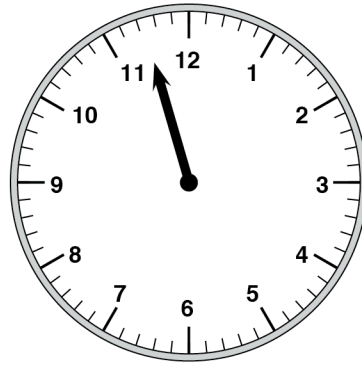
Directions: One each clock, draw an hour hand and a minute hand. Then, write the digital time. Make sure that the digital time corresponds with the placement of the two hands.

7.

:

_____

8.

:

_____

9.

:

_____

10.

:

_____

11.

:

_____

12.

:

_____

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 270)
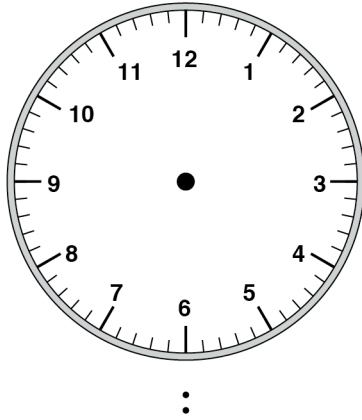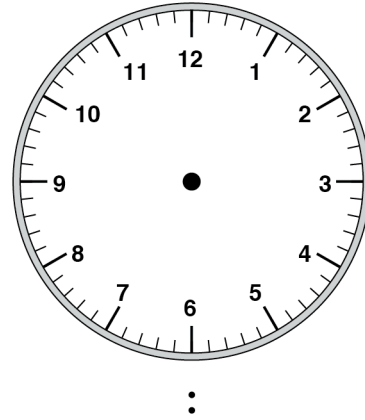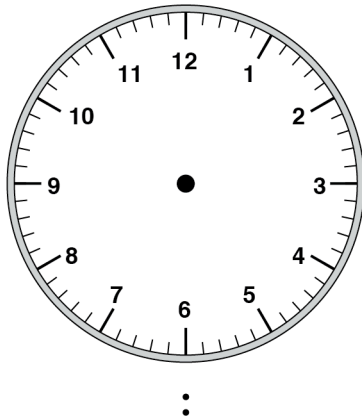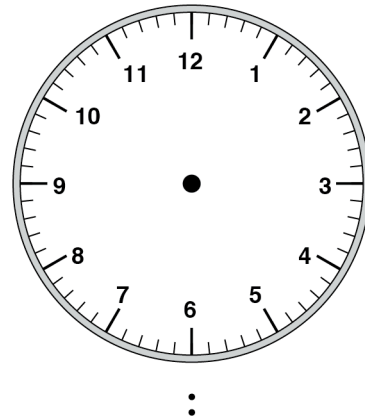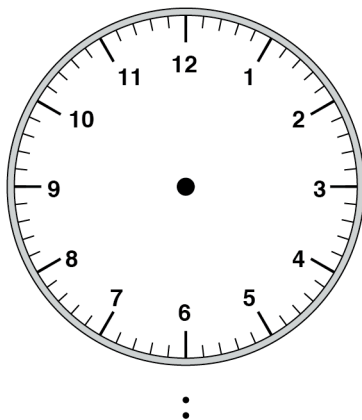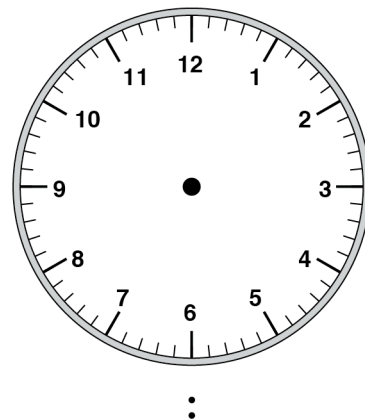
USING UNITS OF ANGULAR MEASURE: A Unit Angle

Directions: Each student will be given an index card or a small piece of tagboard. Draw a narrow angle on the tagboard using a straightedge and then cut it out. The resulting wedge can then be used as a unit of angular measure by counting the number that will fit in a given angle.
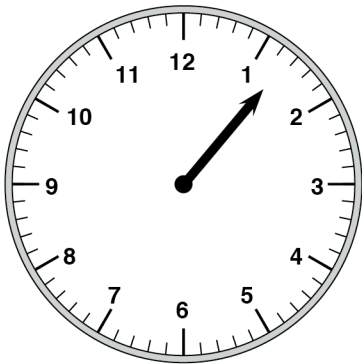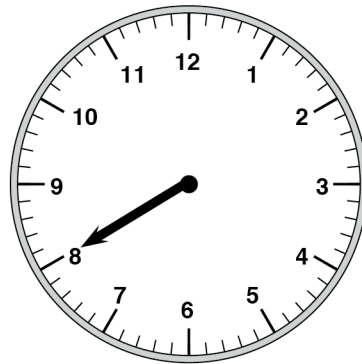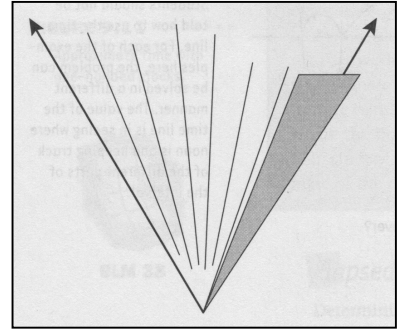
For each angle, use your unit to measure and then record its size. Because students make their own angles, the results will differ.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 272)
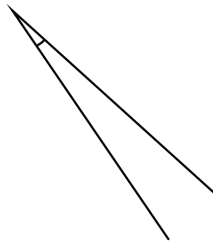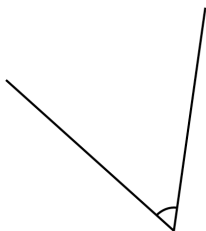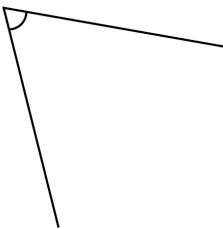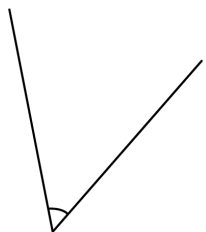
<u>INSTRUCTIONAL GOALS</u>: About One Unit

Directions: The teacher will give you a model of a standard unit. Search for things that measure about the same as that one unit.

For example, to develop familiarity with the meter, the teacher might give you a piece of rope 1 meter long, and have you make a list of things that are about 1 meter. Keep separate lists for things that are a little less (or more) or twice as long (or half as long). Find familiar items in your daily lives.

In the case of lengths, be sure to include circular lengths. Later, you can try to predict if a given object is more than, less than, or close to 1 meter.

Unit: _____		
_____	_____	_____

Unit: _____		
_____	_____	_____

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 275)

Unit: _____		
_____	_____	_____

Unit: _____		
_____	_____	_____

Unit: _____		
_____	_____	_____

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 275)

<u>INSTRUCTIONAL GOALS</u>: Familiar References

Directions: For each unit of measure on which the class is focusing, make a list of at least five familiar things and measure those things using that unit. The measures should be rounded off to nice whole numbers.

For lengths, include long and short things; for weight, find both light and heavy things; and so on.

Unit: _____	
Object	**Measurement**

Unit: _____	
Object	**Measurement**

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 276)

Name _____ 183 Date _____

Unit: _____	
Object	**Measurement**

Unit: _____	
Object	**Measurement**

Unit: _____	
Object	**Measurement**

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 276)

Name _____   184   Date _____

<u>INSTRUCTIONAL GOALS</u>: Personal Benchmarks

Directions: Measure your body. About how long is your foot, your stride, your hand span (stretched and with fingers together), the width of your finger, your arm span (finger to finger and finger to nose), the distance around your wrist and around your waist, and your height to waist, to shoulder, and to head?

Body Part	Measurement
foot	
stride	
hand span (stretched and with fingers together)	
width of your finger	
arm span (finger to finger)	
arm span (finger to nose)	
distance around your wrist	
distance around your waist	
height to waist	
height to shoulder	
height to head	

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 276)

<u>INSTRUCTIONAL GOALS</u>: Guess the Unit

Directions: Find examples of measurements of all types in newspapers, on signs, or in other everyday situations. Present the context and measures, but without units.

The task is to predict what units of measure were used. Discuss your choices.

Object / Where was it found?	Measurement

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 277)

MEASUREMENT ESTIMATION ACTIVITIES: Estimation Quickie

Directions: Select a single object such as a box, a watermelon, a jar, or even the principal. Each day select a different attribute or dimension to estimate. For a watermelon, for example, you can estimate its length, girth, weight, volume, and surface area.

_____

_____

_____

_____

_____

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_____

_____

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_____

Adapted from _Teaching Student-Centered Mathematics: Grades 3-5_ (p. 280)

MEASUREMENT ESTIMATION ACTIVITIES: Estimation Scavenger Hunt

Directions: Conduct a measurement scavenger hunt. Teams are given a list of measurements and have to find things that are close to having those measurements. No measuring instruments are permitted.

A list might include the following items:

- A length of 3.5 m
- Something that weighs more than 1 kg but less than 2 kg
- A container that holds about 200 ml

The students can suggest how to judge results in terms of accuracy.

Measurement	Object	Accuracy

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 280)

MEASUREMENT ESTIMATION ACTIVITIES: E-M-E Sequences

Directions: Use estimate-measure-estimate sequences. The teacher will select pairs of objects to estimate that are somehow related or close in measure but not the same. Estimate the measure of the first and check by measuring. Then, estimate the second.

Here are some examples of pairs:

- Width of a window, width of a wall
- Volume of a coffee mug, volume of a pitcher
- Distance between the eyes, width of the head
- Weight of a handful of marbles, weight of a bag of marbles

Object #1	Estimate	Measurement
Object #2	Estimate	Measurement

Object #1	Estimate	Measurement
Object #2	Estimate	Measurement

Object #1	Estimate	Measurement
Object #2	Estimate	Measurement

Object #1	Estimate	Measurement
Object #2	Estimate	Measurement

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 280)

Name _____   189   Date _____

Object #1	Estimate	Measurement
Object #2	**Estimate**	**Measurement**

Object #1	Estimate	Measurement
Object #2	**Estimate**	**Measurement**

Object #1	Estimate	Measurement
Object #2	**Estimate**	**Measurement**

Object #1	Estimate	Measurement
Object #2	**Estimate**	**Measurement**

Object #1	Estimate	Measurement
Object #2	**Estimate**	**Measurement**

Object #1	Estimate	Measurement
Object #2	**Estimate**	**Measurement**

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (p. 280)

Name _____   190   Date _____

REPEATING PATTERNS: Predict Down the Line

Directions:
- Before you begin to extend each pattern, draw what element will be in the designated position.
- In writing, provide a reason for your prediction. You should then extend the pattern and check your prediction.
- Circle "Y" for correct or "N" for incorrect.

If the prediction is incorrect, examine your reasoning and try to figure out why the prediction was off.
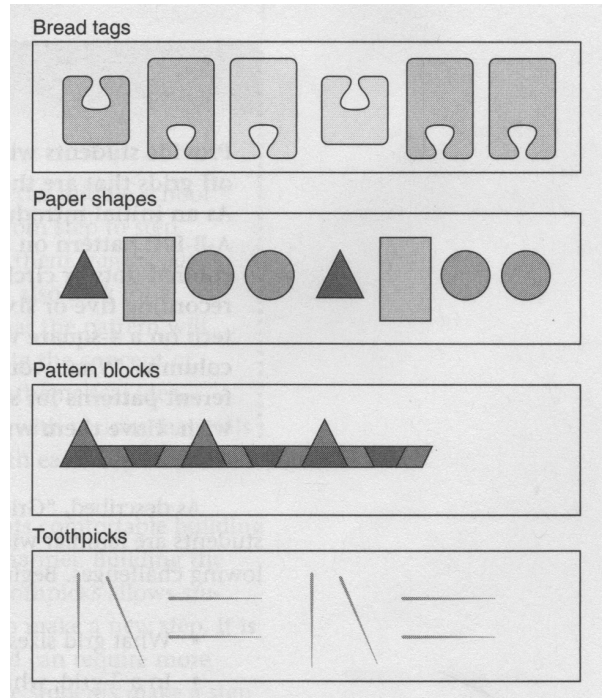
Bread tags

Position 10	Reasoning	Correct?	
		Y	N

Position 15	Reasoning	Correct?	
		Y	N

Position 23	Reasoning	Correct?	
		Y	N

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (pp. 291-292)

Name _____   191   Date _____

Paper shapes

Position 12	Reasoning	Correct?	
		Y	N

Position 18	Reasoning	Correct?	
		Y	N

Position 74	Reasoning	Correct?	
		Y	N

Pattern blocks

Position 13	Reasoning	Correct?	
		Y	N

Position 23	Reasoning	Correct?	
		Y	N

Position 105	Reasoning	Correct?	
		Y	N

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (pp. 291-292)

Toothpicks

Position 15	Reasoning	Correct?	
		Y	N
Position 16	Reasoning	Correct?	
		Y	N
Position 125	Reasoning	Correct?	
		Y	N

Adapted from *Teaching Student-Centered Mathematics: Grades 3-5* (pp. 291-292)