

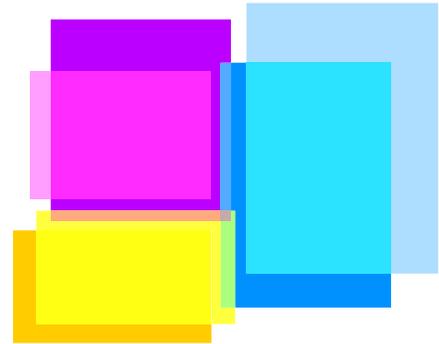
CONSTRUCTING TASK: RECTANGLES RULE!

APPROXIMATE TIME: 1 Day

STANDARDS FOR MATHEMATICAL CONTENT

MCC.3.MD.7 Relate area to the operations of multiplication and addition.

MCC.3.MD.8 Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.



STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

In this task, students will use given perimeters to draw rectangles and compare areas of various rectangles.

When drawing rectangles with a given perimeter, it might be helpful for some students to share methods of finding rectangles with the correct perimeter. Some students might use trial and error or an organized list; others might realize they need to find two numbers that add up to half of the perimeter. By sharing strategies, some students might be able to use more efficient methods. However, allow students to use a method that makes sense to them.

Once students have finished with the task, post the students' work so that students can see several different examples of rectangles with the same perimeter arranged in order by area. Ask students to compare their work with others and engage them in a discussion of the relationship between perimeter and area. Students should notice that the narrower the rectangle, the smaller the area. Also, students should notice that the largest area is found in rectangles that are squares or as close to a square as possible, given the perimeter. Students may also notice properties of rectangles: four right angles, four sides, and opposite sides equal.

Students should have had prior experience determining area and perimeter.

ESSENTIAL QUESTIONS

- What is the relationship between perimeter and area?
- How can rectangles have the same perimeter but have different areas?

MATERIALS

- “Rectangles Rule” student recording sheet
- Construction paper
- Glue and scissors

GROUPING

Individual Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Students will follow the directions below from the “Rectangles Rule” student recording sheet. Assign each pair of students a perimeter. Possible perimeters are 12, 18, 24, 34, and 36.

Directions:

1. On the dot paper below, draw all the rectangles you can with the same perimeter.
My perimeter is _____.
2. Find the area and record it inside the rectangle. Show how you found the area.
3. Cut out the rectangles and order them from smallest area to largest area.
4. Glue them on construction paper in order.
5. Write a paragraph explaining what you notice about how the shape of a rectangle and its area are related.

FORMATIVE ASSESSMENT QUESTIONS

- Have you found all of the rectangles possible? How do you know?
- What strategies are other students using to find rectangles with the given perimeter?
- What do you notice about the shape of the rectangles?
- How are shape and area related?
- Other than perimeter, what do all of these rectangles have in common?

DIFFERENTIATION

Extension

- Given a rectangle with a perimeter of 36 units, what is the smallest possible area it could have? What is the largest possible area? How do you know?

Intervention

- Use graph paper or geoboards instead of dot paper to count the square units.

TECHNOLOGY CONNECTION

http://nlvm.usu.edu/en/nav/frames_asid_172_g_2_t_3.html?open=activities Geoboard with area/perimeter activity (Look for the activity titled, “Shapes with Perimeter 16.”)
http://highered.mcgraw-hill.com/sites/0072532947/student_view0/grid_and_dot_paper.html
Printable dot and graph paper

Name _____ Date _____

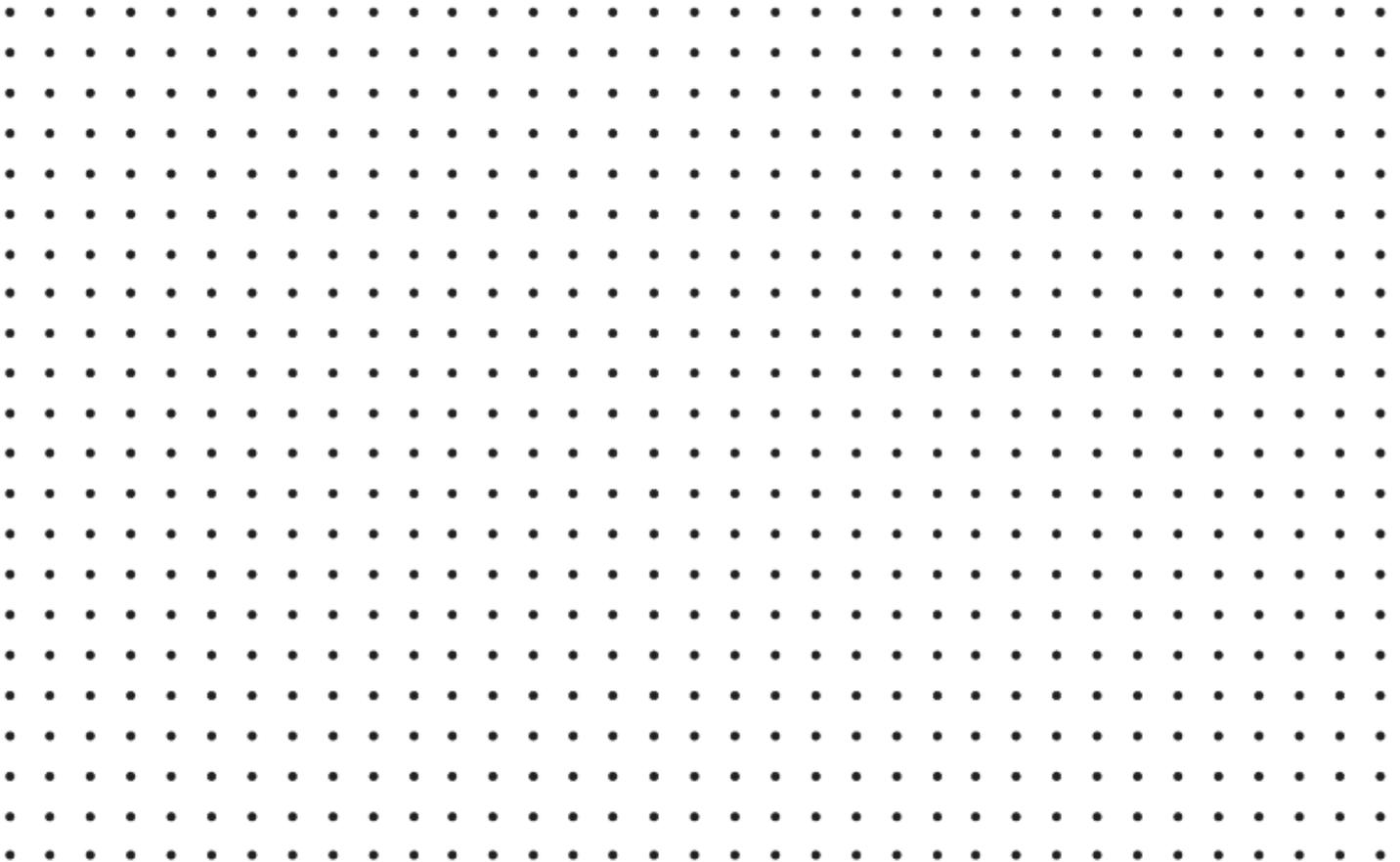
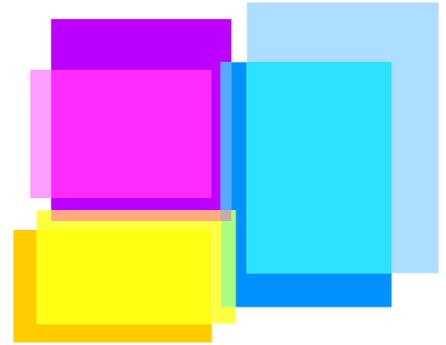
Rectangles Rule

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(if you need more dot paper, please ask)