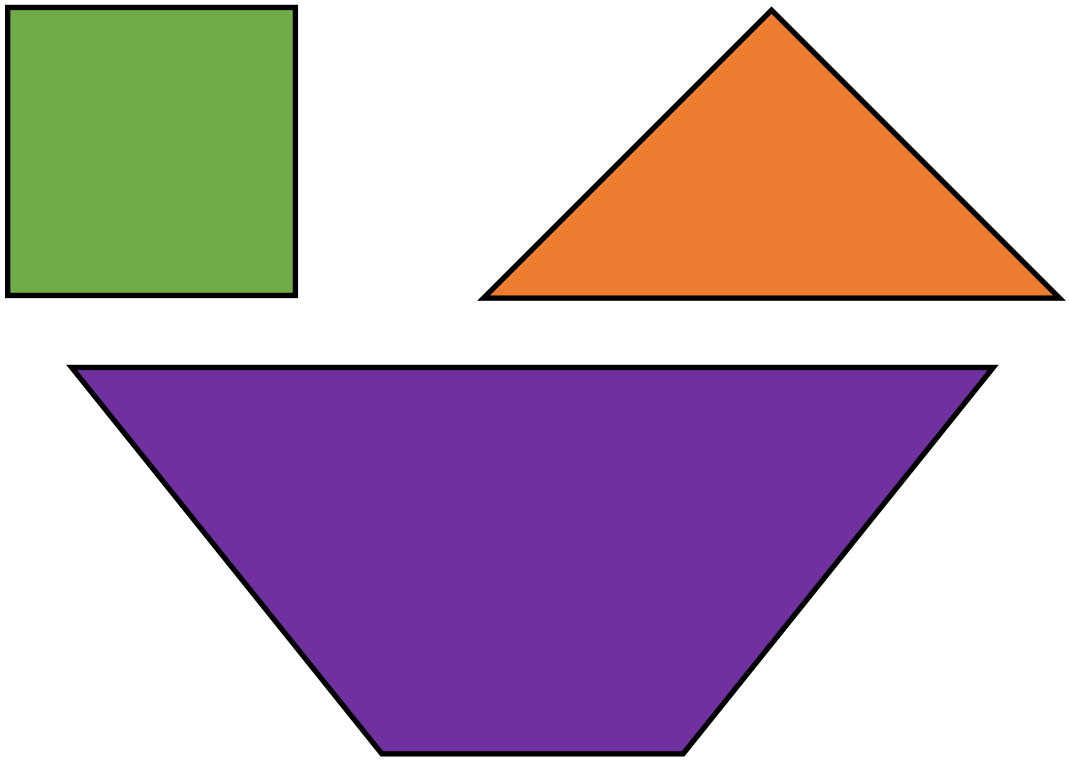
MATH FOR ALL

Dividing Shapes

Rich Problems Engage Higher-Order Thinking



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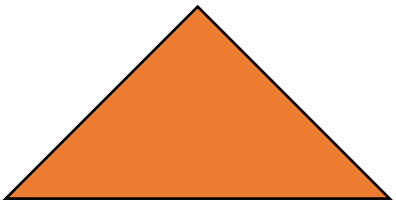
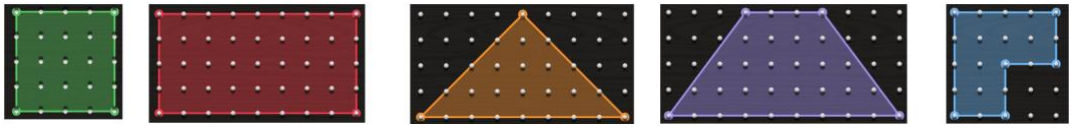
Educator—Working by yourself or with a partner

Complete the activity as described on the handout. As you do, consider the following questions.



- How do you know the sections you made are **congruent**?
- How does the perimeter of the larger shape compare to the perimeter of one of the sections?
- How does the area of the larger shape compare to the area of one of the sections?
- You might have noticed that some of the shapes can be divided into smaller versions of the larger shape. (These smaller versions are **similar** to the larger shape.) Can this be done with all of the larger shapes?
- What were **your** challenges in completing this activity? What are some of the instructional practices (included in this package) that might be helpful for someone with similar challenges?

Note: This activity can be completed using the online geoboard at go.edc.org/mfageoboard. For the sake of this activity, be sure to use the following setups, but feel free to experiment with other sizes and shapes.



Note: If neither a printer nor online access is available, you can use the annotation tools in your PDF reader to draw the divisions.

Working with a class of students

For this activity, students can work independently or as partners. Each student needs their own handout and, if working in pairs, each student should capture the work on their own page. Be sure to reiterate the meaning of **congruent**, if necessary.

NOTE: For question 2, most of the shapes can be divided into four sections using smaller versions of the larger shape. The trapezoid is the one exception in this activity. To engage more of their higher-order thinking, consider asking additional questions such as how the perimeter of one section compares to the perimeter of the large shape, or having them describe any other patterns they see, or encourage them to explore other shapes and make a conjecture about which shapes can be divided into smaller similar shapes and which ones can't.

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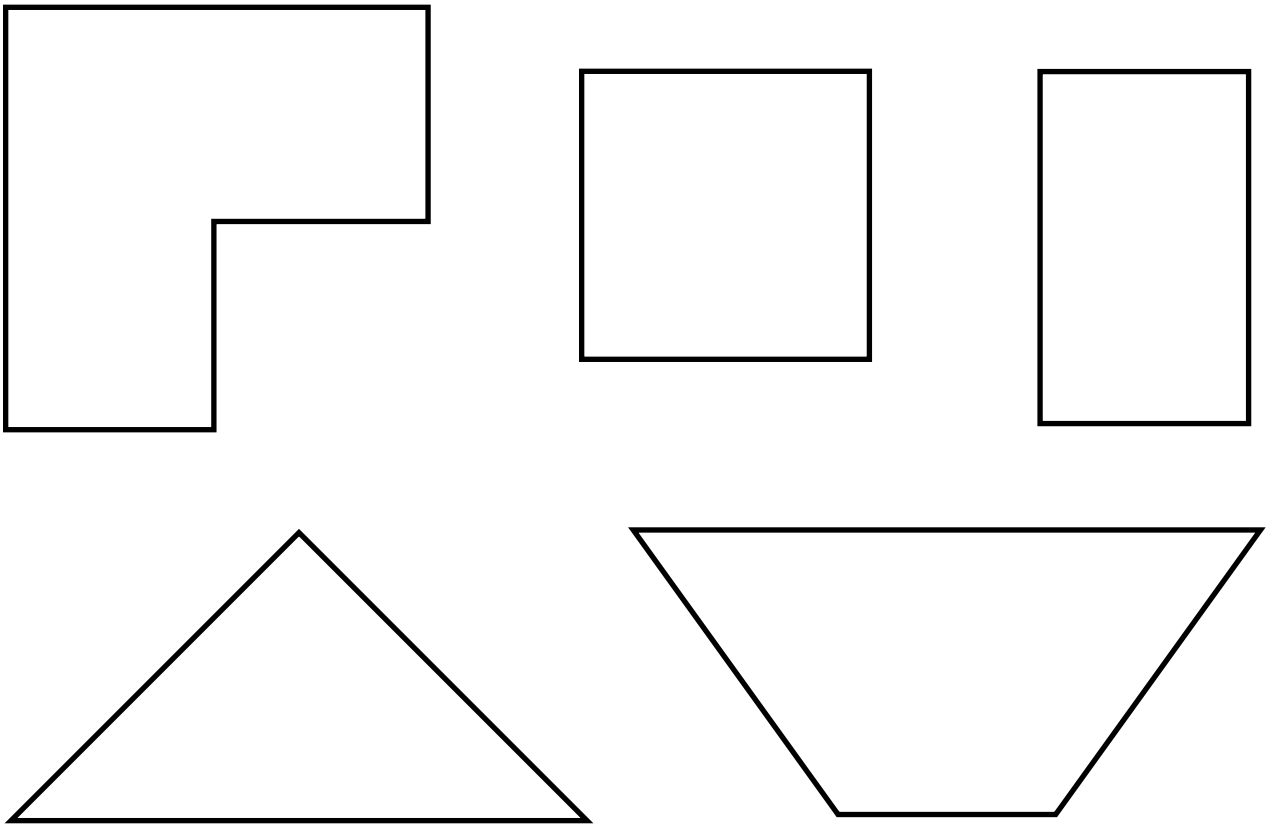
Your mission: Draw lines that divide each of these large shapes into four **congruent** sections. "Congruent" means that they are exactly the same size and shape.



1. How does the area of each of the small sections compare to the area of the large shape?

2. You may have noticed that some of the shapes can have sections that look the same as the larger shape, but are smaller. Can this be done on ALL of the shapes? If you believe yes, show how. If you think no, explain why not.

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Think about a student in your classroom (focal student). Which of the following instructional practices might work for him or her? How would you use these practices?

Instructional Practices	How would you use these practices with your focal student (and others) in your classroom?
Use concept mapping.	
Encourage students to model a problem using diagrams and manipulatives.	
Model problem-solving steps and approaches.	
Post a written or pictorial chart that shows the steps for solving problems or for critical thinking.	
Model critical thinking steps and approaches.	
Post a written or pictorial chart that shows the steps for critical thinking.	
Conduct a self-assessment after completion of a problem or activity.	
Have students demonstrate or write about the steps they went through in solving a problem or analyzing an idea.	
Have students work in mixed-ability groups.	
Use problems that are relevant to students' experiences and interests.	
Allow and encourage the use of calculators.	