

# CURIOSITY AT HOME

## FAIR AND SQUARE



*Spatial reasoning is the skill you use to read a map, organize a toy drawer, or build a fort. This skill is also often used in art and math projects- it's the way we think about how objects relate to one another in a physical space. In this activity, challenge your spatial reasoning with a series of puzzles!*

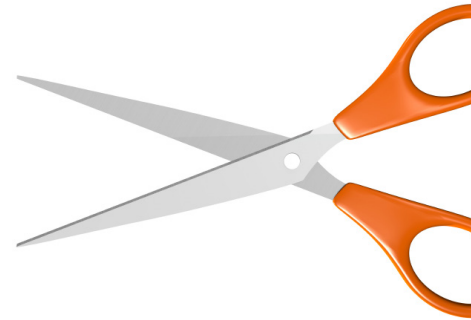
### MATERIALS

- Scrap paper
- Scissors
- Science notebook or paper
- Something to write with



### PROCEDURE

- Either trace or print the shapes below onto a piece of paper. Carefully cut out the first shape.
- Your goal is to make a single cut, dividing the shape into two pieces that can then be put back together to make a square. First, you'll want to carefully think through where you want to cut the shape, and make a line there with your writing tool.
- Cut the paper and try rearranging the shapes into a square.
- Did it work? Draw your resulting shape in your science notebook, showing how the two pieces fit together.
- No luck on your first try? Think about what you'll do differently, then copy the shape and try again.
- Try the same thing with the other two shapes.



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### EXPLORE MORE

Make up your own shape puzzles. Start out with a square, then cut and tape it into a new shape. Trace it on to a sheet of paper, then test it to make sure it can turn into a square. Share your puzzles with someone and see if they can solve it.

### DID YOU KNOW?

To solve the third square, you needed to look at not only the space being taken up by the object, but the surrounding *negative space*. Negative space is the term for the empty space surrounding an object, like the hole in a donut. Looking at negative space can be useful for solving problems like this one, and for drawing complex shapes in general.



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### K-2 GRADE EXPLORATION

- Design a shape puzzle using a triangle instead of a square. Share it with someone. Were they able to solve the puzzle?
- Make a different kind of puzzle. Draw a picture, then cut it into puzzle piece shapes. See if you or a friend can re-arrange it to put it back together.



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### 3–5 GRADE EXPLORATION

- Explore the following questions and write your observations in your science notebook. Are there some shapes that cannot be cut and re-arranged into squares? Make a shape that cannot be re-arranged into a square with a single cut. How is it different than the shapes you made into squares?
- Make a different kind of puzzle. Draw a picture, then cut it into puzzle piece shapes. See if you or a friend can re-arrange it to put it back together.



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### 6–8 GRADE EXPLORATION

Explore the following questions and write your observations in your science notebook.

- How do you know whether a shape will be able to be cut and rearranged into a square or not? Try a couple different variations and see if you can figure out a way to predict whether it will work or not.
- Experiment more with negative space. Draw a picture where the empty space between shapes makes an interesting outline or shape.



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