

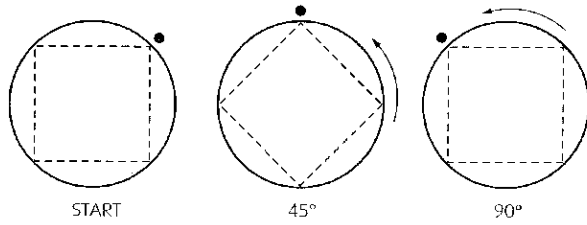
Line Symmetry

K-6

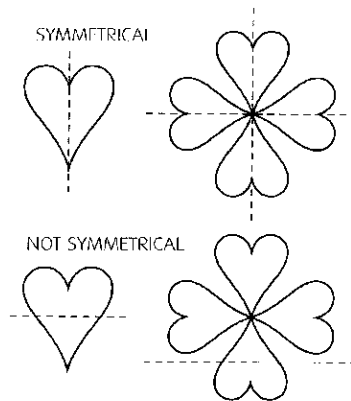
MATERIALS:
 piece of string about 12" long
 symmetry cards, pages 124--125
 scratch paper
 color crayons

Rotational Symmetry

Imagine that a circle has been imposed over a square. Find the center of the imaginary circle. That point is also the center of the square. If the square can be rotated around that point and fits into its outline one or more times before it reaches the starting point, then we say that it has rotational symmetry. We divide the number of times it fits into its outline into 360° and that gives us the degrees of rotation. So we say that a square has 90° of rotation because it can fit into its outline 4 times ($360/4$) if it is rotated around a central point. You can check rotational symmetry of other shapes in the same way.



If you can fold a figure in half so that the two sections match exactly, the figure has a line of symmetry.





This is about
investigating symmetry
and using visual and
spatial skills.

How

- Work with a partner. Pick a symmetry card and use your string (stretch it out) to determine how many lines of symmetry each shape has. Move the string around or move it from side to side.
- As you move your string around, have your partner verify that a line (or lines) of symmetry exists.
- How do you know when a shape does or does not have symmetry? How can you prove it?
- Name some things in your home that have lines of symmetry.
- Print your name. Which letters in your name have line symmetry?
- Try finding the lines of symmetry in other letters of the alphabet.
- What is unique about the circle and its symmetry?

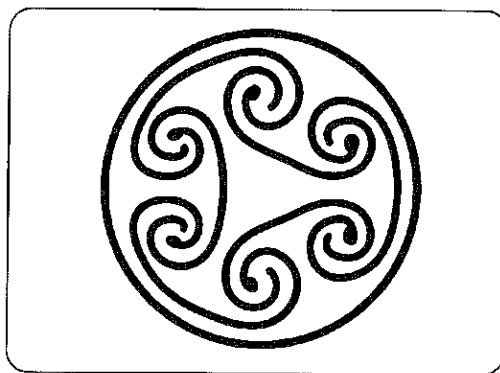
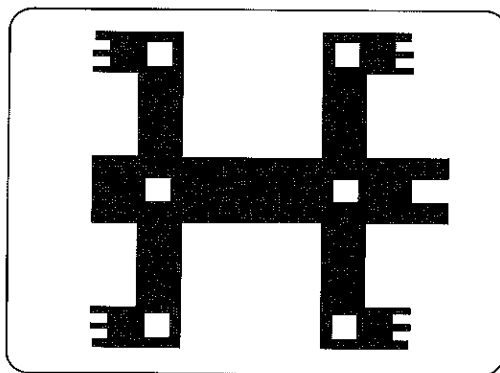
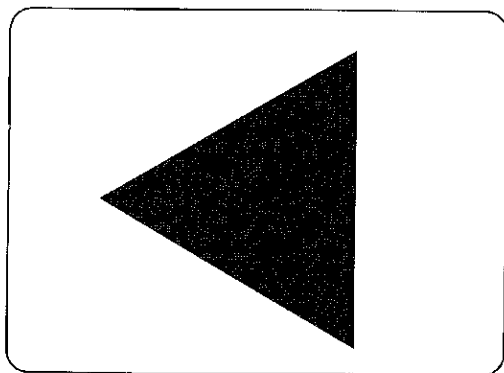
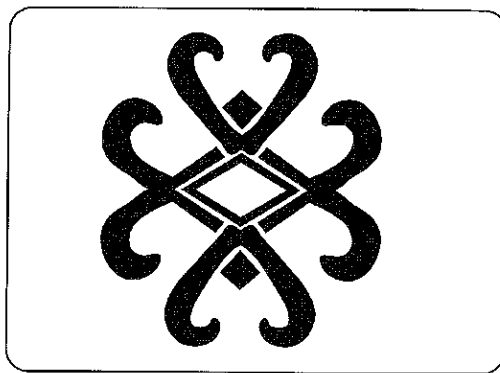
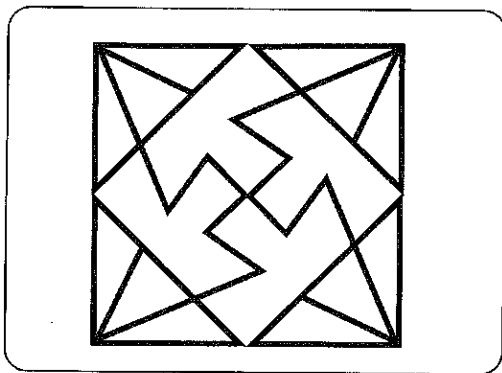
Here's More

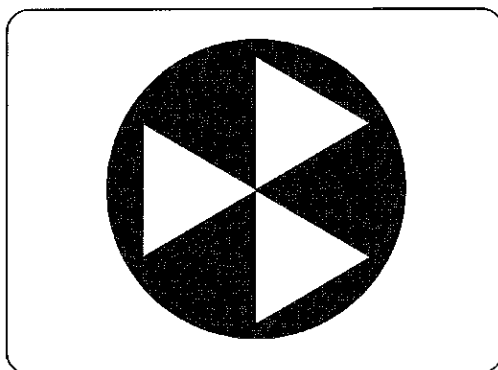
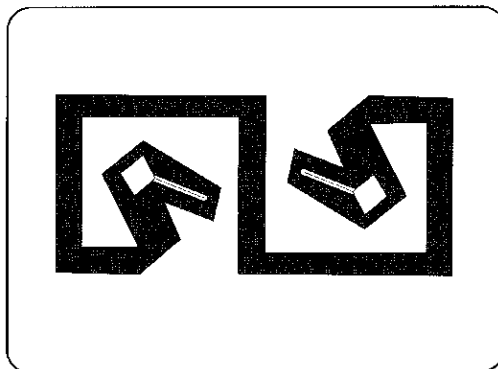
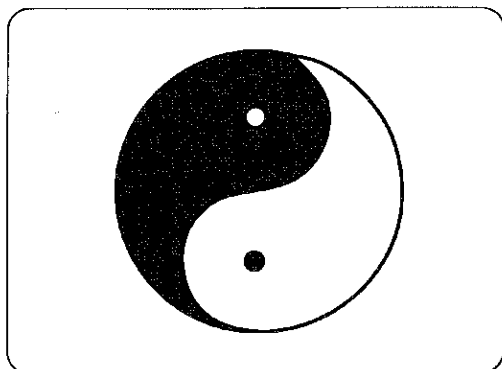
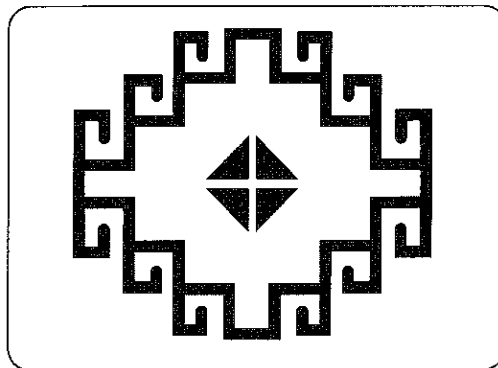
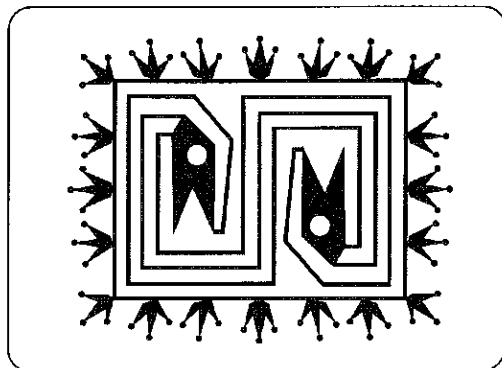
- Create some of your own shapes that have line symmetry.
- What percent of the letters of the alphabet have lines of symmetry?
- For more symmetry activities, see the original *FAMILY MATH* book.



DESIGN CARDS

LINE SYMMETRY

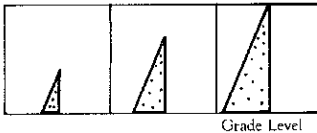




DESIGN CARDS

L I N E S Y M M E T R Y

Pentastquare Activities



TOOLS

Pencil

2 cm graph paper
(see page 80)

Scissors

Tiles or paper squares

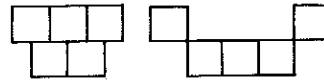
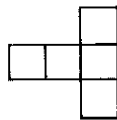
Why

To develop spatial visualization skills

- ▶ This activity will help students see **congruent** shapes and use a systematic approach for identifying characteristics of shapes. Two figures are **congruent** if they are exactly the same size and shape. ◀

How

- This is a series of activities using shapes made of five squares.
- Use the tiles or paper squares at first to explore different arrangements, then record the results on graph paper.
- In arranging the five squares, the rule is that each of the squares must share a full side with at least one other square, and that wherever the squares touch, it must be with full sides touching.



This is a pentastquare.

These are not pentastquares.

- Make as many pentastquares as you can, recording each on graph paper.

- ▶ For this activity, we will consider pentastquares that are **congruent** as the same. If you can move, flip, or rotate one shape so that it fits exactly on another, the two shapes are congruent. These pentastquares are **not** different they are congruent. ◀



- Study the pentastquares carefully. Mark an X on those that you think can be folded up into an open box.
- Cut out all of the pentastquares and fold them to check.

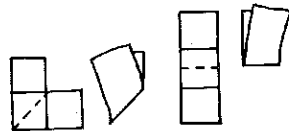




- Sort out the pentasquares into those that will make a box and those that will not make a box. Look at the group that will not make a box and talk together about what you see and why you think those shapes didn't work.

More Ideas

- For younger children, try to find all the different arrangements that can be made with three squares, then four squares. None of these will fold into a box, but they can be sorted into those that have symmetry and those that do not. Cut out each shape and see if it can be folded in half to show that it is symmetrical. Not all of these shapes will work, but most of them will.



- For older children look for all of the shapes that have six squares. Some of these will make a cube. If your children are interested in the project, try the shapes that have seven squares. There are a **lot** of them, so this activity will take extra time.





Copy-Cats

THIS IS ABOUT

- Δ symmetry
- Δ spatial reasoning
- Δ using scissors

YOU WILL NEED

- Δ some blank sheets of paper or the grid paper
- Δ paste, scissors
- Δ some cut-out shapes in different colors or designs, beans, or small macaroni

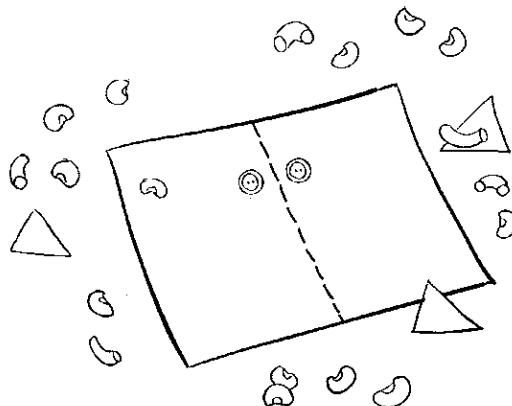
GETTING READY

Fold your paper in half. Each partner chooses a side that will be their space.

Share the shapes or items between the two partners so that each person has an identical set of items. For example, each person should have the same kind and number of red triangles, pinto beans, elbow macaroni, and so on.

ACTIVITY

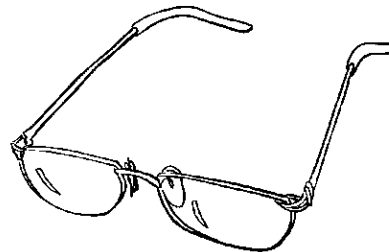
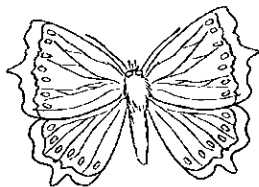
1. Have your child place a shape anywhere on her side of the paper. You copy by placing an identical shape (and color) on your side.





2. Continue taking turns and copying until you've taken five turns each, or until you think you have enough things on your page.
3. Once you think that your sides "match," paste or glue the objects to the paper.
4. How closely did your partner copy your design? How can you find out?
5. Try it again. This time you go first.

Can you and your child think of some things that already look the same on both sides? This is called "symmetry."



INSIGHT

Be the copy-cat first. This way, you provide a model for your child. Let your child choose which work should be displayed. Ask questions about why that particular piece was chosen. This is the beginning of children looking at their own work and learning to make decisions about what they like or do not like about it.