

# Symmetry

## Overview

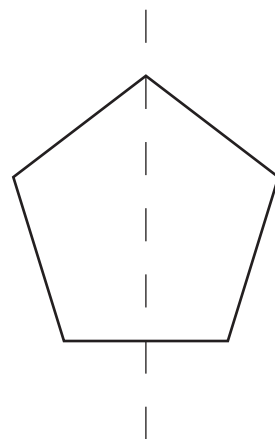
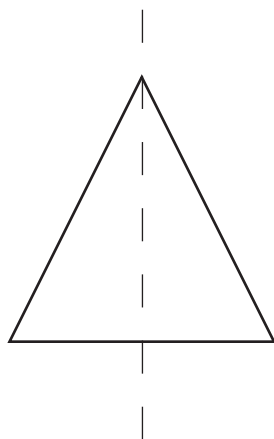
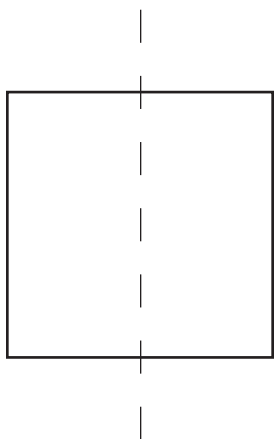
When you start looking, you will see symmetry all around you. Symmetry is a beautiful part of our world, in nature and in art as well as mathematics and design.

Symmetry is a property of shapes or objects that are the same when reflected (mirrored) along a center line, called an *axis*. The axis is like an imaginary line down the middle of a shape, and if you were to fold the shape along this line, the halves would be the same. In fact, an object can have more than one axis of symmetry.

There are several different kinds of symmetry; in this activity we are going to learn about a specific kind of symmetry called *bilateral symmetry*. Bilateral symmetry is when an object can be divided into two equal halves that mirror each other. If you look in the mirror, you will see that your face is bilaterally symmetrical because you can imagine a line down the middle of your face, and each side appears the same. Many animals display this kind of symmetry: insects, butterflies, crabs, birds, horses, dogs, so many!

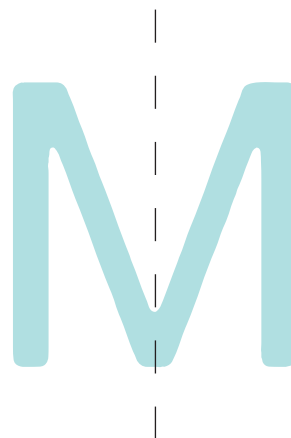
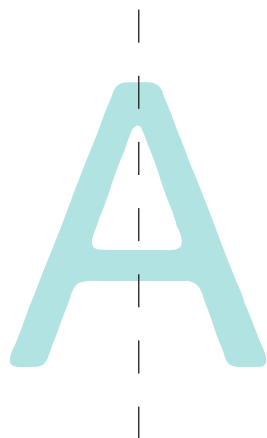
### Examples with shapes

These shapes all have bilateral symmetry - they can be divided down the middle, and each side reflects (mirrors) the other side. Imagine these shapes were on a piece of paper, and you could simply fold them in half along the dotted line, so that both sides would line up.



### Examples with letters

Many letters also have symmetry! Here you see two letters - A and M - that have bilateral symmetry, because you can divide them in half down the middle and they look the same on either side. *Can you think of other letters that have this same kind of symmetry? Can you think of letters that do not have symmetry?*



## Examples in Nature

Each wing of the butterfly is reflected on the other side - you can imagine a vertical line that goes through the middle and divides the butterfly wings into two mirrored sides.

The shapes of these leaves are also symmetrical - if you folded each of these leaves in half, you would see that each side is the same.



# Symmetry

## Activity 1

### Materials

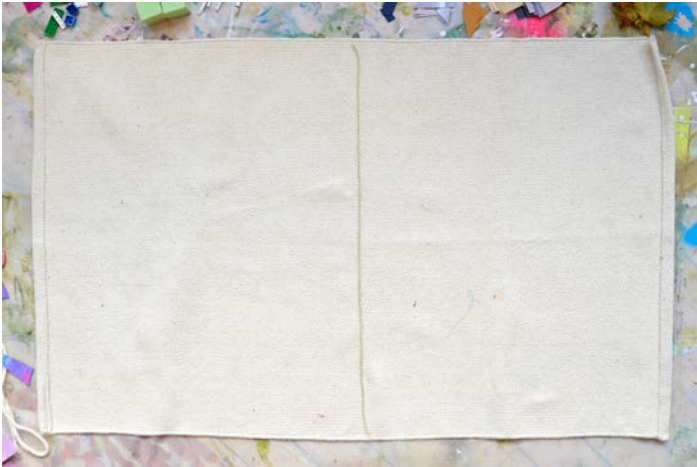
- miscellaneous found objects:
  - such as beads, fabric scraps, paper shapes/cut-outs, sticks, leaves, seeds, beans, toys, blocks, Legos
  - \*Have at least two of each object
- string or tape



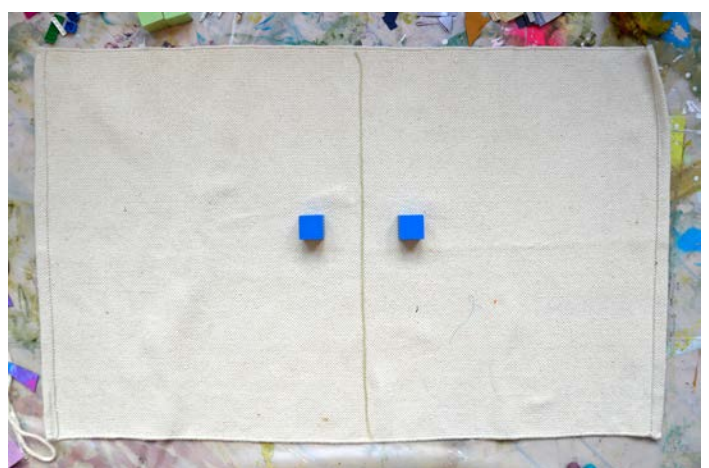
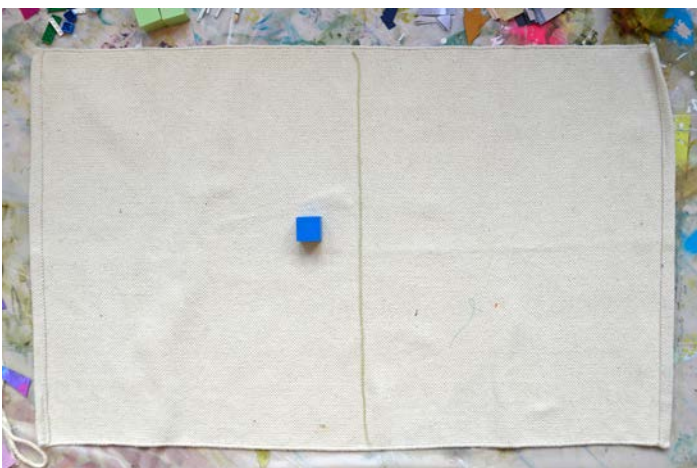


## Steps

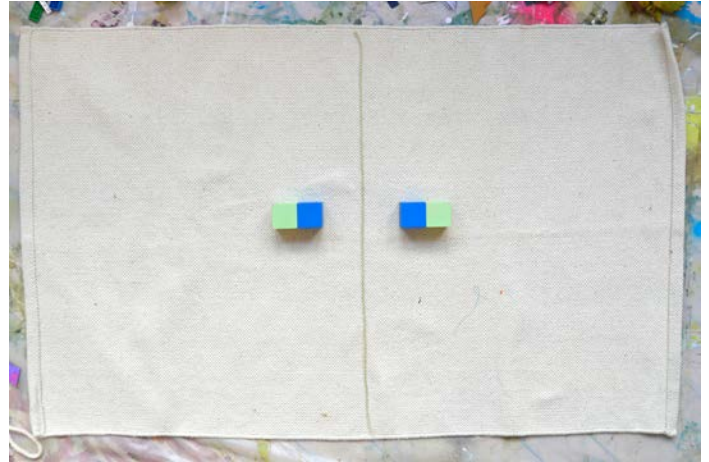
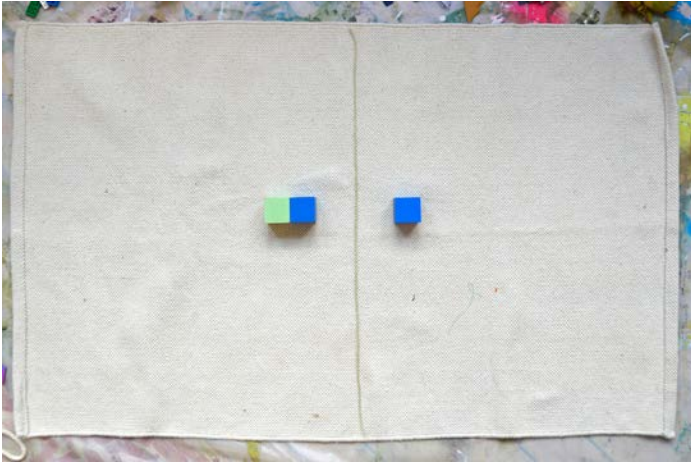
1. Find a large space on the floor or on a table; you can use a rug if you have one.
2. Gather all of the miscellaneous items. Place a piece of string vertically in the middle of the workspace, so that it draws a line vertically, dividing the space into two sides. *This is called our axis of symmetry. This means that on each side of this line, the same thing will be reflected.*



4. Place a single object on the left side of the string. *If this string is our axis of symmetry, what would the other side look like?* Depending on the age of the child, either demonstrate how to place a corresponding object on the right side of the string, or invite the child to try. If you have a small mirror that can easily be placed on the ground, this can be helpful in demonstrating how symmetry will appear. *Both sides are not just the same, they are reflected. What does this mean? They are mirrored images of each other.*
5. Demonstrate how this creates a mirrored image. You can show with your finger that the object is the same distance from the string on either side.



6. Place another object on the left side. Invite the child to place the corresponding object on the right side. *Is it a mirrored image of the left? How do you know?*
7. Take turns going back and forth - placing one object on the left, and the child placing the corresponding object on the right.
8. Switch so that the child places objects on the left, and continue to go back and forth.
9. When you reach a stopping point, together confirm that the image you have created together is symmetrical.



### **Variations**

- a. Use the same process to create a recognizable image such as a face or an animal or a butterfly.
- b. Lay out an entire composition on the left side with several objects, and invite the child to recreate the symmetrical image on the right.
- c. Create a new line of symmetry such as a horizontal line, or diagonal. Next you can use 2 lines of symmetry, such as a vertical line and a horizontal line of symmetry.











