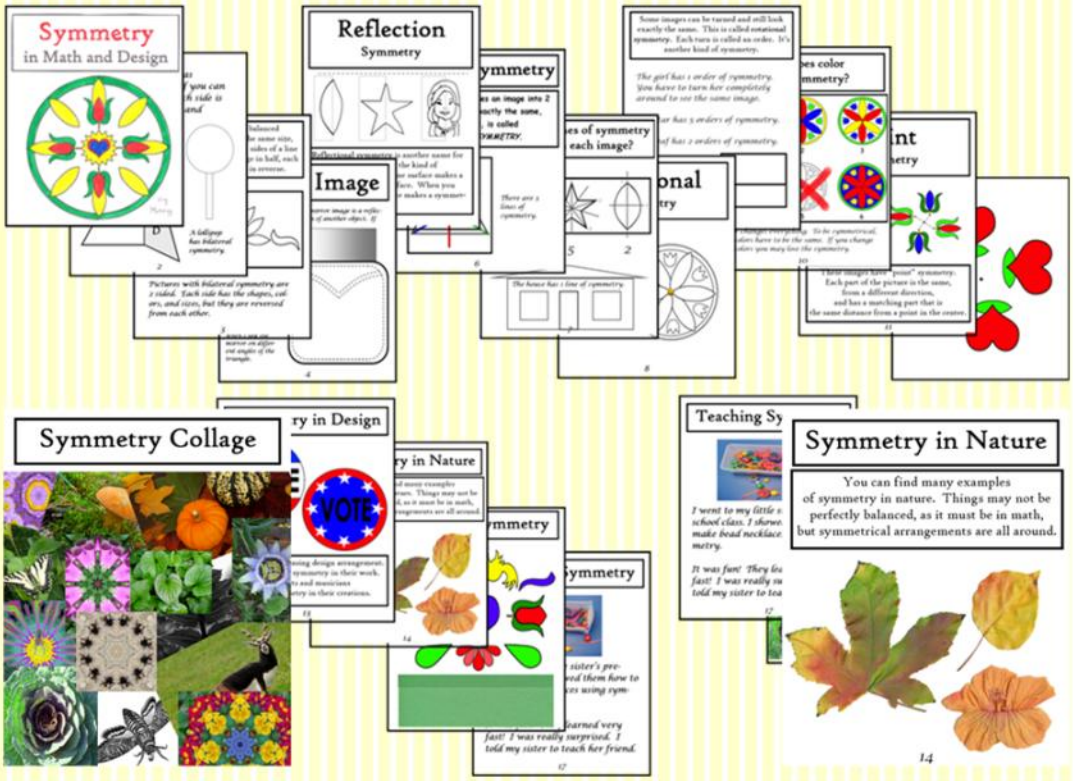
Symmetry
Interactive Notebook

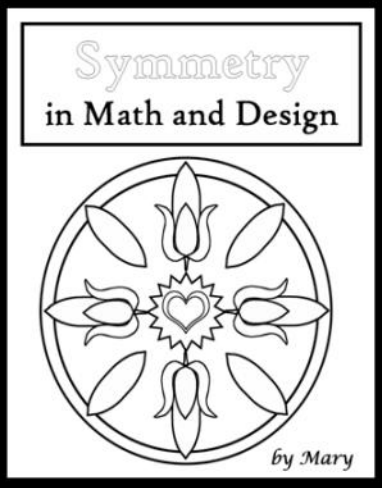


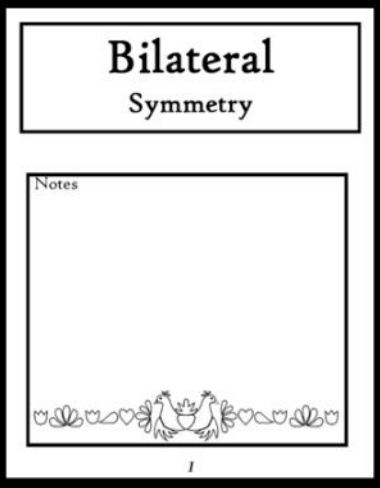
Grades 3-5, 10-12 Days to Complete

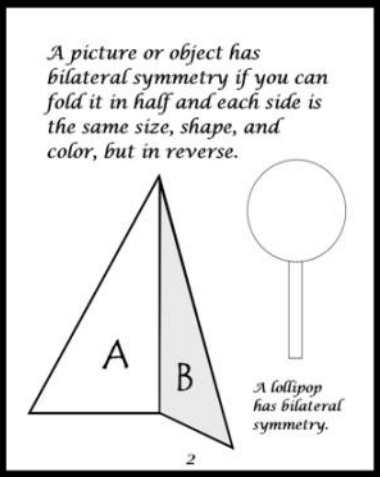
Thank you for taking the time to check out these materials for the study of symmetry. I hope you'll find it exciting and educational!

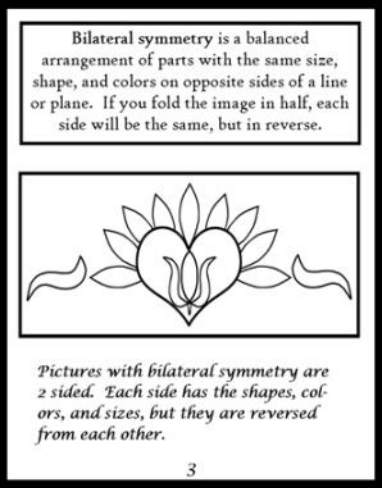
Sandie Flynn

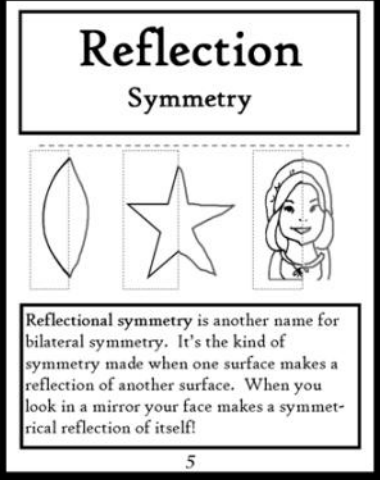
Symmetry Interactive Notebook







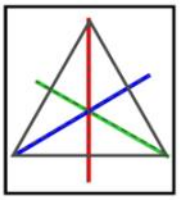




18 pages to run off per student.
Fits into a booklet made using 5 sheets of legal sized paper, folded and stapled in the middle.

Lines of Symmetry

The LINE that divides an image into 2 images that are exactly the same, but opposite, is called a *LINE OF SYMMETRY.*



There are 3 lines of symmetry.

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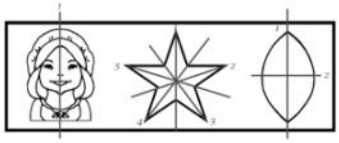
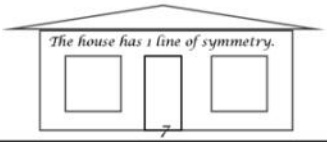
How many lines of symmetry are there in each image?



1 5 2



The house has 1 line of symmetry.

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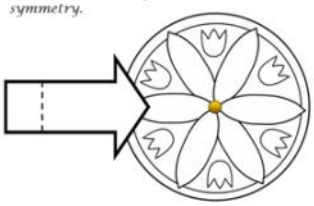
Rotational Symmetry

There are 6 orders of symmetry.



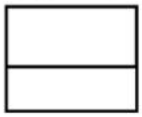
8

Some images can be turned and still look exactly the same. This is called rotational symmetry. Each turn is called an order. It's another kind of symmetry.

The girl has 1 order of symmetry. You have to turn her completely around to see the same image.

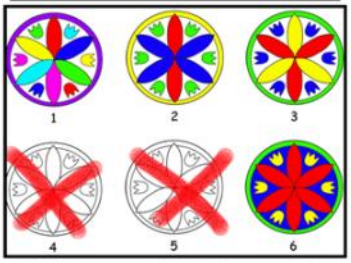
The star has 5 orders of symmetry.

The leaf has 2 orders of symmetry.



9

How does color affect symmetry?



Color changes everything. To be symmetrical, the colors have to be the same. If you change the colors you may lose the symmetry.

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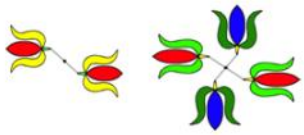
Point Symmetry



These images have "point" symmetry. Each part of the picture is the same, from a different direction, and has a matching part that is the same distance from a point in the center.

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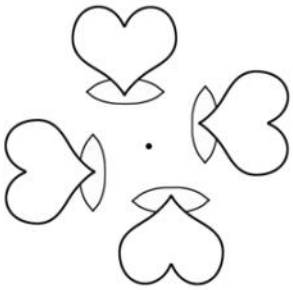

Symmetry in Design

Symmetry is a pleasing design arrangement. Artists often use symmetry in their work. Architects and musicians also use symmetry in their creations.

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Symmetry in Nature

You can find many examples of symmetry in nature. Things may not be perfectly balanced, as it must be in math, but symmetrical arrangements are all around.

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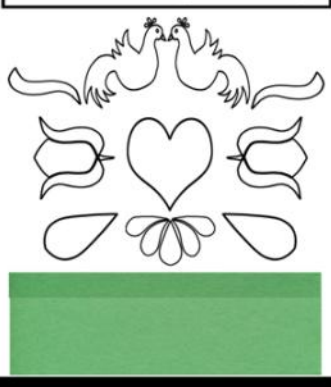
Fun with Symmetry



Symmetry Glossary

bye LAT er uhl

2 sided. 2 sides that match, but in reverse

bilateral

design

line of symmetry

OHR dur

The number of times you turn a picture and keep the same image.

order

reflection

rotational

symmetry

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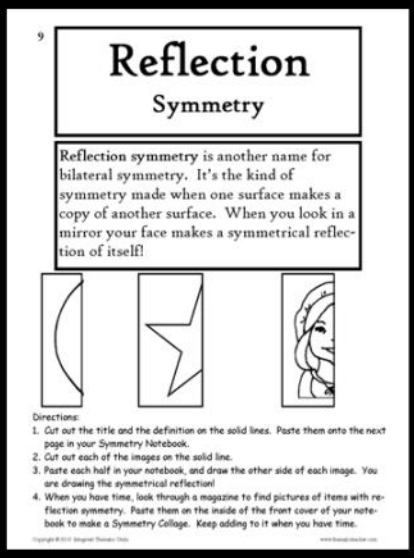
Symmetry Collage

Students read and follow directions to complete the activities in the notebook.



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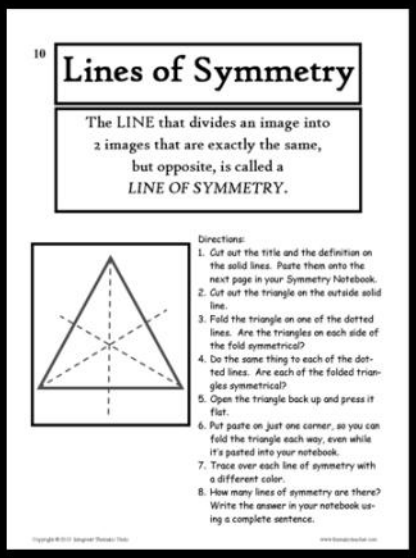
Reflection
Symmetry

Reflection symmetry is another name for bilateral symmetry. It's the kind of symmetry made when one surface makes a copy of another surface. When you look in a mirror your face makes a symmetrical reflection of itself!

Directions:
1. Cut out the title and the definition on the solid lines. Paste them onto the next page in your Symmetry Notebook.
2. Cut out each of the images on the solid line.
3. Paste each half in your notebook, and draw the other side of each image. You are drawing the symmetrical reflection!
4. When you have time, look through a magazine to find pictures of items with reflection symmetry. Paste them on the inside of the front cover of your notebook to make a Symmetry Collage. Keep adding to it when you have time.

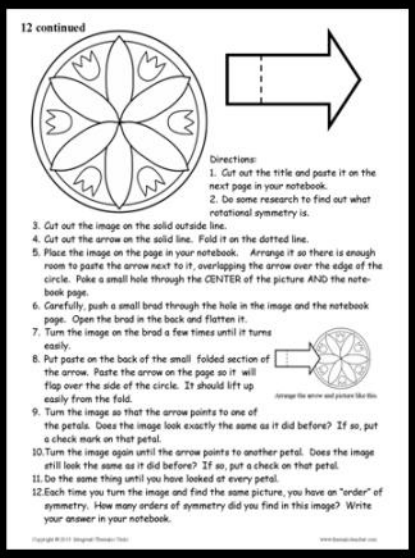


10

Lines of Symmetry

The LINE that divides an image into 2 images that are exactly the same, but opposite, is called a *LINE OF SYMMETRY.*

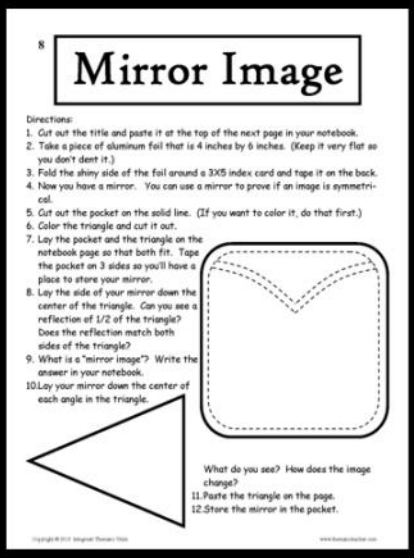
Directions:
1. Cut out the title and the definition on the solid lines. Paste them onto the next page in your Symmetry Notebook.
2. Cut out the triangle on the outside solid line.
3. Fold the triangle on one of the dotted lines. Are the triangles on each side of the fold symmetrical?
4. Do the same thing to each of the dotted lines. Are each of the folded triangles symmetrical?
5. Open the triangle back up and press it flat.
6. Put paste on just one corner, so you can fold the triangle each way, even while it's pasted into your notebook.
7. Trace over each line of symmetry with a different color.
8. How many lines of symmetry are there? Write the answer in your notebook using a complete sentence.



12 continued

Directions:
1. Cut out the title and paste it on the next page in your notebook.
2. Do some research to find out what rotational symmetry is.
3. Cut out the image on the solid outside line.
4. Cut out the arrow on the solid line. Fold it on the dotted line.
5. Place the image on the page in your notebook. Arrange it so there is enough room to paste the arrow next to it, overlapping the arrow over the edge of the circle. Poke a small hole through the CENTER of the picture AND the notebook page.
6. Carefully, push a small brad through the hole in the image and the notebook page. Open the brad in the back and flatten it.
7. Turn the image on the brad a few times until it turns easily.
8. Put paste on the back of the small folded section of the arrow. Paste the arrow on the page so it will flap over the side of the circle. It should lift up easily from the fold.
9. Turn the image so that the arrow points to one of the petals. Does the image look exactly the same as it did before? If so, put a check mark on that petal.
10. Turn the image again until the arrow points to another petal. Does the image still look the same as it did before? If so, put a check on that petal.
11. Do the same thing until you have looked at every petal.
12. Each time you turn the image and find the same picture, you have an "order" of symmetry. How many orders of symmetry did you find in this image? Write your answer in your notebook.

Arrange the arrow and picture like this.



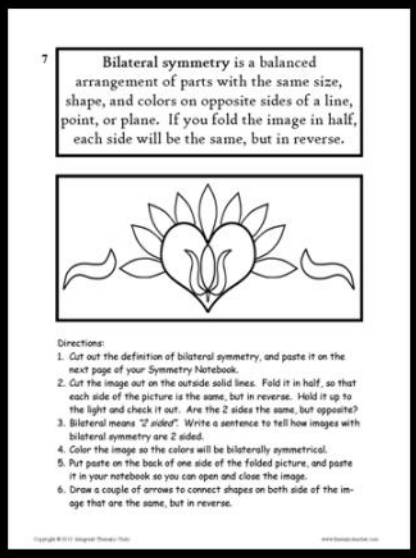
8

Mirror Image

Directions:
1. Cut out the title and paste it at the top of the next page in your notebook.
2. Take a piece of aluminum foil that is 4 inches by 6 inches. (Keep it very flat so you don't dent it.)
3. Fold the shiny side of the foil around a 3X5 index card and tape it on the back.
4. Now you have a mirror. You can use a mirror to prove if an image is symmetrical.
5. Cut out the pocket on the solid line. (If you want to color it, do that first.)
6. Color the triangle and cut it out.
7. Lay the pocket and the triangle on the notebook page so that both fit. Tape the pocket on 3 sides so you'll have a place to store your mirror.
8. Lay the side of your mirror down the center of the triangle. Can you see a reflection of 1/2 of the triangle? Does the reflection match both sides of the triangle?
9. What is a "mirror image"? Write the answer in your notebook.
10. Lay your mirror down the center of each angle in the triangle.

What do you see? How does the image change?

11. Paste the triangle on the page.
12. Store the mirror in the pocket.



7

Bilateral symmetry is a balanced arrangement of parts with the same size, shape, and colors on opposite sides of a line, point, or plane. If you fold the image in half, each side will be the same, but in reverse.

Directions:
1. Cut out the definition of bilateral symmetry, and paste it on the next page of your Symmetry Notebook.
2. Cut the image out on the outside solid lines. Fold it in half, so that each side of the picture is the same, but in reverse. Hold it up to the light and check it out. Are the 2 sides the same, but opposite?
3. Bilateral means *"2 sided"*. Write a sentence to tell how images with bilateral symmetry are 2 sided.
4. Color the image so the colors will be bilaterally symmetrical.
5. Put paste on the back of one side of the folded picture, and paste it in your notebook so you can open and close the image.
6. Draw a couple of arrows to connect shapes on both side of the image that are the same, but in reverse.