

Step 1 5E Lesson Plan Format

Lines of Symmetry

teachHOUSTON Student Name:

Mentor Teacher Name:

Grade Level: 4th

Lesson Teaching Date:

Concept(s): An figure is symmetrical if the figure is capable of being divided by a line into 2 parts that are reflections of each other. A figure can have zero, one, or multiple lines of symmetry. Artwork is often symmetrical and even the human body is symmetrical. The field of architectures also uses the rules of symmetry in the construction of bulidings.

TEKS: 4.9 Geometry and spatial reasoning. The student connects transformations to congruence and symmetry. (C) Use reflections to verify that a shape has symmetry.

Objectives The student will be able to:	Evaluation Question for each Objective
1. Use reflections to determine whether a figure has line symmetry.	
2. Identify the number of lines of symmetry a figure has and draw them on a figure.	
3. Construct a figure with a given number of lines of symmetry.	

Material List and Advanced Preparations:

For each student:

- A mirror
- “Symmetry with Polygons” Activity Sheet

For each pair of students:

- An envelope with two pictures inside: one with line symmetry and the other without (use logos, pictures of stop signs, red lights, magazine clippings)

For each group:

- Set of shapes (rectangle, parallelogram, octagon, triangle, regular hexagon, hexagon, pentagon, rhombus, trapezoid, and right triangle)
- Pattern Blocks

Advanced Preparations:

- Create a transparency of “The Raggles and the Fraggles”
- Make copies of Evaluation and “Lines of Symmetry” handout

ENGAGEMENT		
What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Students Will Do
Display “The Raggles and the Fraggles” transparency on the overhead	<p>What is something that all Raggles have in common? <i>They look even</i> <i>They are the same on both sides</i> <i>They look more normal</i></p> <p>What is something that all Fraggles have in common? <i>They look lop-sided</i> <i>They are crooked</i> <i>They are not the same on both sides</i></p> <p>There is a mathematical name for shapes that look like Raggles. What is it?</p>	Students will examine the examples of Raggles and Fraggles and brainstorm possible criteria for each type of figure.

	<p><i>Symmetrical</i></p> <p>Can you think of anything in real life that is symmetrical?</p> <p><i>My face</i></p> <p><i>My desk</i></p> <p><i>The chalkboard</i></p>	
<p>Group the students in pairs and give each pair an envelope which contains two pictures: one that has line symmetry and another that does not.</p>	<p>How do you know that your picture is symmetrical?</p> <p><i>If I fold it in half, both sides are the same, just opposite</i></p> <p>Can a figure have more than one line of symmetry?</p> <p><i>yes</i></p> <p>Does anyone have a picture that has more than one line of symmetry? How did you know it has more than one line of symmetry?</p> <p><i>You can fold it in half horizontally or vertically (or diagonally) and it is the same on both sides</i></p>	<p>Each pair of students will decide which picture has symmetry and which does not. Pairs of students will present their pictures and explanations to the class.</p>

TRANSITION
Polygons of all sorts can also have lines of symmetry. Now you are going to find lines of symmetry of shapes.

EXPLORATION		
What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Students Will Do
<p>Divide the class into groups of four and pass out a “Lines of Symmetry” handout to each student.</p>		

EXPLANATION		
What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Students Will Do
Facilitate a class discussion surrounding the results of students' exploration.	<p>Does this polygon have symmetry?</p> <p>How many lines of symmetry does it have?</p> <p>Do you notice a pattern in the number of lines of symmetry a polygon has? <i>No, sometimes two of the same shape have different lines of symmetry. For example, #1 and #2 are both triangles, but one has symmetry and one doesn't.</i></p> <p>Which polygons have the same number of lines of symmetry as the number of sides? <i>triangle, square, hexagon</i></p> <p>What is true about these polygons? <i>Their sides are the same length</i></p>	Selected students will present their lines of symmetry to the class.

TRANSITION
You have found the lines of symmetry in given polygons. Now you are going to create your own shapes with symmetry.

ELABORATION

What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Students Will Do
Give each pair of students a set of pattern blocks.		Students will use pattern blocks to complete the following tasks: <ul style="list-style-type: none">• Create a shape with exactly 1 line of symmetry• Create a shape with no lines of symmetry• Create a shape with 2 lines of symmetry• Create a shape with more than 2 lines of symmetry• Create a symmetrical shape. Can you move one of the blocks and keep your shape symmetrical?

TRANSITION

Now you will get a chance to show what you have learned today.

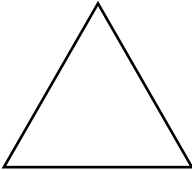
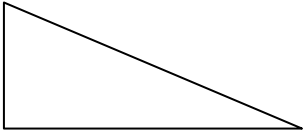
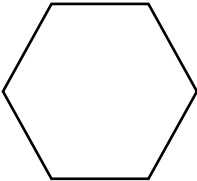
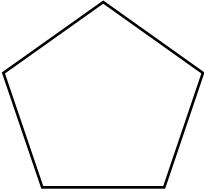
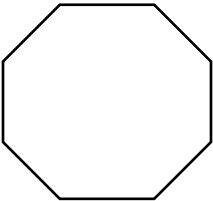
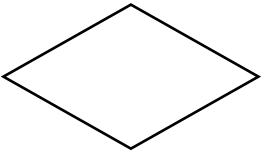
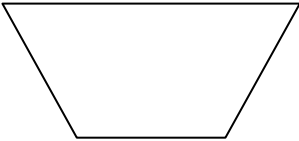
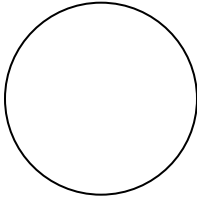
EVALUATION

An evaluation instrument is to be created. It should have at least 3 questions. Identify one lesson objective that matches each question.

Name: _____

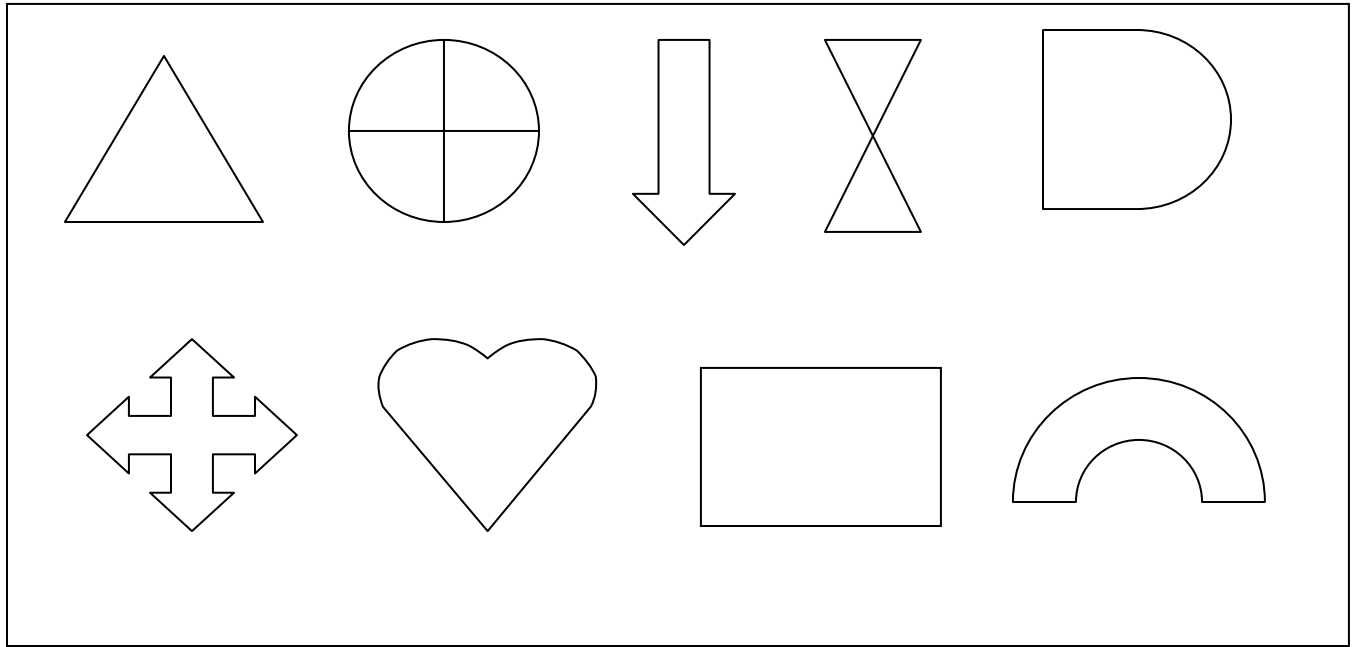
Lines of Symmetry of Polygons

Use the mirror to find all the lines of symmetry for each shape. Draw in the lines of symmetry on each shape and complete the table.

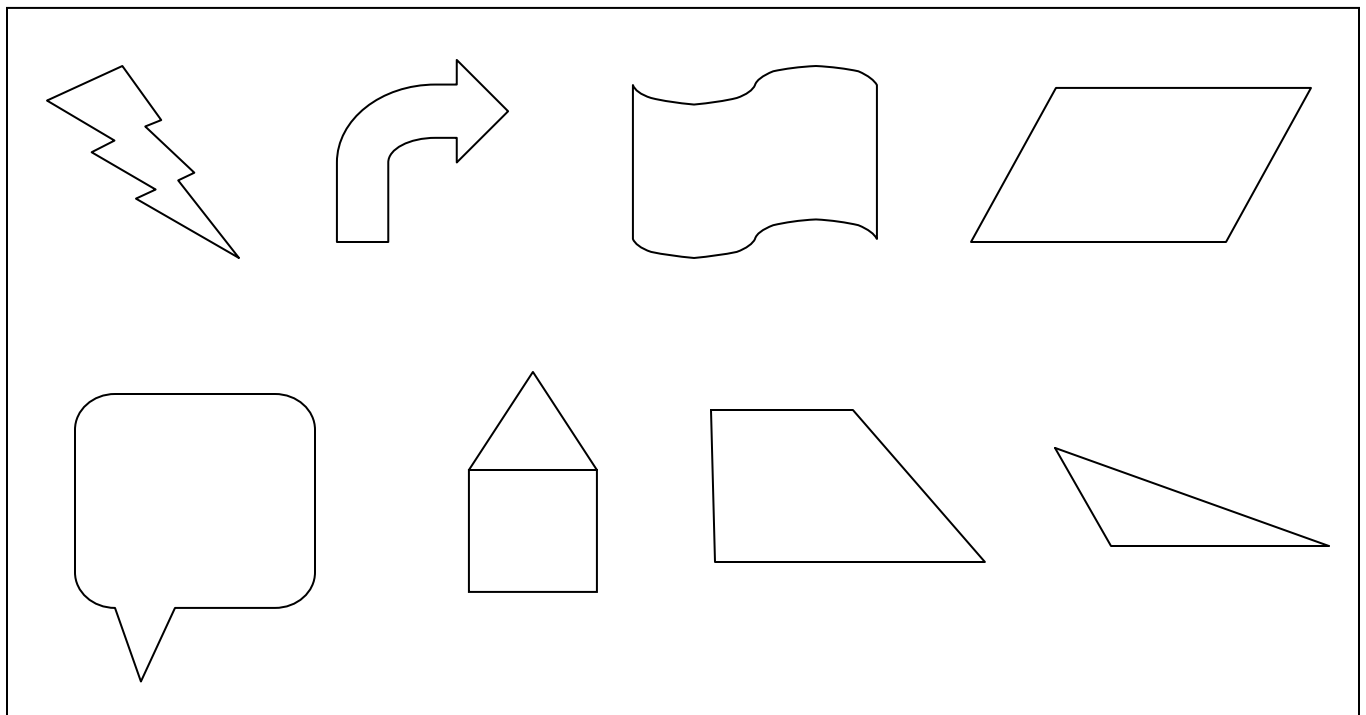
Shape	Number of Lines of Symmetry	Shape	Number of Lines of Symmetry
1. Name _____ 		2. Name _____ 	
3. Name _____ 		4. Name _____ 	
5. Name _____ 		6. Name _____ 	
7. Name _____ 		8. Name _____ 	

The Raggles and the Fraggles

Here are some examples of a Ragle.



Here are some examples of a Fraggle.



What is the difference between a Ragle and a Fraggle?