

SOLAR LESSON PLAN *GEOMETRY*

Age Level: 4th grade

Subject(s) Area: Mathematics

Materials Needed: Smart Board, Geometric pattern blocks, Un-lined paper, Grid paper, Coffee straws, Scissors, Pencils, Colored Pencils, Ruler, and Yarn

Standards:

4.G.3: Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

Objectives:

What will the students know or be able to do? At what Bloom's Taxonomy Level? To what accuracy?

The students will **explain** the concepts of symmetry and line of symmetry orally and written with *95% accuracy*.

The students will **construct** different models regarding symmetry using the above listed materials at *85% accuracy*.

Learning Activities:

Technology: Smart board

Required Vocabulary:

- Symmetry: exact parts between two things
- Line of symmetry: imaginary line where you could fold something and it creates two equal parts

***Whole Groups instruction not listed per request.**

Instructional Methods:

- **Below Level:**
 - I would start off in small groups (depending on number of students) and have the students each start out with a pre-cut square piece of paper. I would give the instructions to fold the paper in half in order to make two equal sides. I would continue this step with different shaped pieces of paper such as a rectangle, and an equilateral triangle. With each piece of paper, I would have the students fold it in half and point out the line of symmetry. Then I would have them try and fold it another way in order for them to see if there is more than one line of symmetry for each different shape.
 - In small groups or independently (depending on number of students) I would give them geometric pattern blocks in the shapes of square, rectangle, triangle,

and hexagon along with a maximum of 10 pieces of yarn to represent the line(s) of symmetry. I would instruct them to take one shape, e.g. the hexagon, and have them show me all of the possible lines of symmetry using the pre-cut pieces of yarn.

- Independently, I would have the students continue a previously drawn pattern. The instructor would draw only half of the following shapes on **grid paper**: square, rectangle, equilateral triangle, and hexagon (the instructor will choose which portion of the shape to draw such as the right half of the hexagon or the upper half of the square) along with the line of symmetry in a different colored pen/pencil. The student(s) will then complete the rest of the shape, using the grid paper as a guide for the proper dimensions of the shape.
- **At Level:**
 - Independently or in small groups (depending of number of students) I would again do the folding paper activity mentioned above. This time, I would have the shapes of square, rectangle, hexagon, equilateral triangle, and isosceles right triangle. The same steps as before will be applied here, the students will fold the shape to make the halves symmetric and then point out the line of symmetry (the fold). I would then have them try and fold the same shape a different way to create a new line of symmetry.
 - In small groups, I would have the students use the geometric pattern blocks, this time using all of the shapes in the geometric pattern block kit, and as many pieces of yarn as the students need. I would have them place as many yarn pieces together in a solid line to represent their line of symmetry. Students are then free to use as many geometric blocks needed to create half of the shape of their creation on one side of the line of symmetry. This shape/figure can be completely random and up to each individual student. Once the students finish half of their shape, we would rotate stations and finish the other half of a new shape/figure that another classmate created.
 - Independently, I would have the students continue a previously drawn pattern. The instructor would draw only half of the following shapes on **unlined paper**: square, rectangle, equilateral triangle, isosceles right triangle, and hexagon (the instructor will choose which portion of the shape to draw such as the right half of the hexagon or the upper half of the square) along with the line of symmetry in a different colored pen/pencil. The student(s) will then complete the rest of the shape using their best estimation skills, or a ruler if they find it necessary.
- **Above Level:**
 - In small groups, students will use as many pieces of yarn and as many coffee straws necessary. Using the yarn to make a line of symmetry, students will use coffee straws to make half of any shape/figure they want to. The students are free to cut the straws in order to create the figure they want to. Once students have completed half of their figure, they then will rotate to a new station and complete the other half of someone else's figure using the correct number and size of coffee straws. By using the straw instead of the predetermined geometric blocks, the students are free to be more creative and have more of a challenge by matching up the sizes and correctly cutting the straws from one side to the next.
 - Independently, I would have the students continue a previously drawn pattern. The instructor would draw only half of any figure/shape she chooses. The shape

can be a completely random assortment of lines and not a shaped commonly used. This will be done on **unlined paper**. As before, the instructor is free to draw whichever portion of the figure she wants, then she will switch the color of her pen and draw the line of symmetry. The student must then complete the remaining portion of the figure using their best estimation skills and a ruler if they find it necessary.

Assessment:

Formative: I would ask different questions throughout the different stages of the learning in these activities. I would ask during the full instructional time “What is symmetry?” I would then draw examples of a line of symmetry and then ask them to point out the line. I would then ask students “What is a line of symmetry?” I would draw a few more examples and then ask the students to have small group discussions on “What do you notice when the line is here?” (the line will not be the line of symmetry.) I would listen to answers and then ask the following for a turn-and-talk “Name some shapes with or without lines of symmetry” I would then listen to the discussion and have some answers spoken to the class.

Summative: The summative assessment will be similar in most areas, but different in some, for each level of learning. The following link provides the components for the test with some revisions that I have listed below. <file:///C:/Users/Kelsie/Downloads/math-g4-m4-topic-d-lesson-12.pdf> The test will be the same in the following questions:

- Finish drawing the shape (on grid paper and unlined paper) Question #3 on *page 195 of the above document*.
- Is this line the correct line of symmetry? If not, draw (one of) the correct line(s) of symmetry. *Adaptation on question #1 on page 194 and question #1 on page 196 of the above document.*
- Short answer: Name a shape without symmetry. (This is to see if the students were listening during the discussion).
- Bonus: Have a picture of a 3-D shape. State or draw where the line of symmetry should be. (This is a bonus question because the standard deals with 2-D shapes, not 3-D shapes).
- Draw the line(s) of symmetry using different colored pencils for each new line of symmetry. *Question #2 on page 194 of the above document.*
 - **Below Level:** This level will only have the following shapes to draw the lines of symmetry for: Equilateral triangle, Square, and a Rectangle.
 - **At Level:** This level will only have the following shapes to draw the lines of symmetry for: Rectangle, Hexagon, and an Isosceles triangle.
 - **Above Level:** This level will only have the following shapes to draw the lines of symmetry for: Right Isosceles Triangle, Octagon, and a Circle. **With the circle, there are infinite lines of symmetry. I would make the requirement to be “Draw at least 5 lines of symmetry.” I would then ask the following question “What do you notice about the Lines of symmetry in this circle?” (Hopefully, students will realize the lines of symmetry are the diameter of the circle and they all intersect at the center of the circle). I would then ask them “Draw a line that isn’t a line of symmetry.”*