artsNOW
Integrated learning solutions

UNIT: GEOMETRY
SCULPTING WITH GEOMETRY: EXPLORING ANGLES AND LINES WITH ALEXANDER CALDER (Lesson 2 of 5)
Grade Band: 4
Content Focus: Visual Arts & Math

LEARNING DESCRIPTION

In this lesson, students will create sculptures inspired by the artist, Alexander Calder, to demonstrate their understanding of types of angles, parallel lines, and perpendicular lines.

LEARNING TARGETS

Essential Questions	"I Can" Statements
How do artists use geometry in their artwork? What are the defining attributes of polygons?	I can create a Stabile inspired by the artist, Alexander Clader, that is free-standing. I can draw polygons with parallel lines, right angles, acute angles, and obtuse angles. I can identify parallel lines, right angles, acute angles, and obtuse angles.

GEORGIA STANDARDS

Curriculum Standards	Arts Standards
4.GSR.7.1 Recognize angles as geometric shapes formed when two rays share a common endpoint. Draw right, acute, and obtuse angles based on the relationship of the angle measure to 90 degrees. 4.GSR.8.1 Explore, investigate, and draw points, lines, line segments, rays, angles (right, acute, obtuse), perpendicular lines, parallel lines, and lines of symmetry. Identify these in two-dimensional figures. 4.GSR.8.2 Classify, compare, and contrast polygons based on lines of symmetry, the presence or absence of parallel or perpendicular line segments, or the presence or absence of angles of a specified size and based on side lengths.	VA4.CR.1 Engage in the creative process to generate and visualize ideas by using subject matter and symbols to communicate meaning. VA4.CR.4 Understand and apply media, techniques, processes, and concepts of three-dimensional art. VA4.RE.1 Use a variety of approaches for art criticism and to critique personal works of art and the artwork of others to enhance visual literacy. VA4.CN.2 Integrate information from other disciplines to enhance the understanding and production of works of art. VA4.CN.3 Develop life skills through the study and production of art (e.g. collaboration, creativity, critical thinking, communication).

SOUTH CAROLINA STANDARDS

Curriculum Standards	Arts Standards
4.G.1 Draw points, lines, line segments, rays, angles (i.e., right, acute, obtuse), and parallel and perpendicular lines. Identify these in two-dimensional figures. 4.G.2 Classify quadrilaterals based on the presence or absence of parallel or perpendicular lines. 4.G.3 Recognize right triangles as a category, and identify right triangles. 4.G.4 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.	**Anchor Standard 1:** I can use the elements and principles of art to create artwork. **Anchor Standard 2:** I can use different materials, techniques, and processes to make art. **Anchor Standard 7:** I can relate visual arts ideas to other arts disciplines, content areas, and careers.

KEY VOCABULARY

Content Vocabulary	Arts Vocabulary
• Right angle - An angle whose measure is exactly 90° • Acute angle - An angle whose measure is between 0° and 90° • Obtuse angle - An angle whose measure is between 91° and 180° • Equilateral triangle - A three-sided figure with sides of equal length • Isosceles triangle - A three-sided figure with two sides of equal length • Scalene triangle - A three-sided figure with no sides equal in length • Parallelogram - A quadrilateral with both pairs of opposite sides parallel • Pentagon - A five-sided polygon • Rectangle - A parallelogram with four right angles • Rhombus - A parallelogram with four sides of equal length • Square - A plane figure with four equal straight sides and four equal angles • Trapezoid - A quadrilateral with at least one pair of parallel sides	• Stabile - A type of sculpture created by the artist, Alexander Calder; these sculptures are geometric and abstract • Sculpture - A form of art that is three-dimensional • Shape - An enclosed line; in art, shape can be geometric or organic • Line - A mark connecting two points • Form - One of the seven elements of art; an object that has three-dimensions

MATERIALS

- Thin cardboard (such as cereal boxes) or styrofoam plates
- Scissors
- Note cards
- Rulers
- Examples of Alexander Calder's artwork
- "Small City"
- "Object in Five Planes"
- *Optional: Oil pastels*

INSTRUCTIONAL DESIGN

Opening/Activating Strategy

- Begin the lesson by guiding students through a directed drawing.
- Pass out note cards and markers/crayons/colored pencils to students.
- Read the following instructions. Project the instructions on the board as you give them.
    - Choose a color. Draw one vertical line from the top to the bottom of your paper.
    - Using a new color, draw a line that is parallel to that line.
    - Using a new color, draw a line that is perpendicular to both lines.
    - Using a new color, draw two polygons that have acute angles. They should be different sizes.
    - Using a new color, draw two polygons that have obtuse angles. One should overlap something else on your paper.
    - Finally, using a new color draw one large polygon that has a right angle.
- Have students compare their artworks with a neighbor. Students should check each other's artwork using the instructions on the board.

Work Session

- Based on what the teacher sees needs to be revisited after the directed drawing, review concepts with students.
- Next, show students images of the artist, Alexander Calder's sculptures, such as "Small City" or "Object in Five Planes". Tell students that Calder called his geometric and abstract sculptures Stabiles.
    - Ask students to talk with a neighbor about what they see in the image–shapes, lines, colors, etc.
    - Allow time for students to share. Direct their attention to the types of shapes, angles, and lines that they see.
- Tell students that they will be creating their own sculptures inspired by Calder's Stabiles.
- Assign students partners. (This can also be done individually if desired.)
- Provide students with the materials and criteria for their Stabiles.
    - Sample criteria:
        - Stabile must include at least four polygons.
        - Stabile must show an example of a polygon with a right angle, a polygon with an acute angle, and a polygon with an obtuse angle.
        - Stabile must have a polygon with parallel lines.
    - Have students create a sketch of their design for their Stabile.
    - Pass out scissors and either thin cardboard or styrofoam plates.
    - Students should draw their polygons on the material prior to cutting.
    - Show students how to attach two shapes together by cutting small slits in the sides and fitting them together.
    - *Optional: Students can add color using oil pastels prior to assembling their Stabiles.*
        - *If using color, ask students to consider how they might use color intentionally. For example, all triangles might be cool colors (blue, green, teal, and purple) and all quadrilaterals might be warm colors (red, pink, orange, yellow).*
    - Students' Stabiles should be able to stand on their own.

- Pass out a new note card to students. Students should write on the notecard how they showed each of the criteria in their Stabile. Students will submit this along with their Stabiles for assessment.

Closing/Reflection

- Have students display their Stabiles on desks or tables. Conduct a gallery walk so that students can observe where their classmates showed the criteria in their Stabiles.
- Discuss as a class how each artwork displayed the same criteria but was different in the way students showed the criteria creatively.
- Ask students to reflect on what they would do differently if they could create their Stabile again.

ASSESSMENTS

Formative

- Teachers will assess learning by observing:
  - Whether students understand the vocabulary in the activator
  - Whether students can identify geometric concepts in Calder's Stabiles
  - Students' collaboration with their partners to design and create their own Stabiles using the established criteria

Summative

CHECKLIST:

- Students can create a Stabile inspired by Clader that is free-standing.
- Students can draw polygons with parallel lines, right angles, acute angles, and obtuse angles.
- Students can explain how they showed parallel lines, right angles, acute angles, and obtuse angles in their Stabiles.
- Students can identify parallel lines, right angles, acute angles, and obtuse angles in their classmates' Stabiles.

DIFFERENTIATION

Accelerated:

- Add additional criteria to students' Stabiles, such as different types of triangles, specific angle measurements, or incorporate calculating perimeter and surface area.
- Require students to use color in their artwork. Alternatively, students can add line patterns and designs on cardboard.

Remedial:

- Reduce requirements for students' Stabiles.
- Provide templates of polygons for students to trace and cut out.

ADDITIONAL RESOURCES

CREDITS

U.S. Department of Education- STEM + the Art of Integrated Learning
Ideas contributed by: Katy Betts

**This integrated lesson provides differentiated ideas and activities for educators that are aligned to a sampling of standards. Standards referenced at the time of publishing may differ based on each state's adoption of new standards.*