

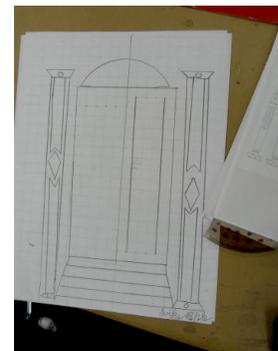
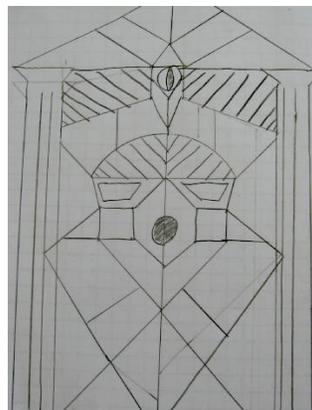
ARTS IMPACT—ARTS-INFUSED INSTITUTE LESSON PLAN (YR2-AEMDD)

LESSON TITLE: Polygons in Symmetry: Architectural Entry Design

Visual Art and Math Lesson

Artist-Mentor – Meredith Essex

Grade Level: Fourth Grade



Enduring Understanding

Repetition of geometric shapes, lines, and reflections can be found in and used as symmetrical elements in architectural design.

Geometry Search Journal

Target: Identifies geometric shapes/figures, lines, and transformations in architecture.

Criteria: Draws, labels, and describes properties/attributes of polygons, parallel and perpendicular lines, congruence and reflections seen in buildings.

Target: Designs an entrance and architectural details for a building.

Criteria: Represents door, window(s), lighting, steps/stairs, and columns or arch.

Target: Organizes and creates transformations in balance using polygons.

Criteria: Draws closed straight-sided shapes/figures as features on either side of a line of symmetry.

Target: Uses craftsmanship and accuracy in architectural drawing.

Criteria: Uses a ruler, graph/grid paper, and protractors to create identically repeated lines and shapes/figures.

Teaching and Learning Strategies

Introduction to Arts-Infused Concepts through Classroom Activities:

Arts-Infused Concepts: Shape and Balance; Polygons; Parallel and Perpendicular lines; Symmetry/ Reflections

- Go on a school walk and notice the entrances to the buildings. What shapes/figures/lines are used and how they are similar or different?
- Find and record polygons in symmetry in the classroom environment and buildings.
- Find parallel, perpendicular, vertical and horizontal lines.

1. **Introduces images from *Tacoma in Style*, *Brooklyn Stoop* by Jacob Lawrence, and *Untitled* by Carrie Mae Weems** as well as photos of regional buildings: *Prompt: This is a lesson that is a visual art lesson and a math lesson at the same time. Architects are artists who design buildings.*

Fourth Grade—Visual Art and Math—Polygons in Symmetry: Architectural Entry Design

Repetition of geometric shapes/figures and lines and transformations are used in design of architecture. What features from entrances to buildings do we see in the art?

Student: Analyzes art resources.

2. Guides students in identifying functional and aesthetic needs of entries: *Prompts: Why is the entrance to a building important? (Access!) It also needs to attract attention or stand out, so people can find it easily. What are some of the elements that an entrance to a building needs? (beauty, balance, inviting). . . .Why are doors vertical rectangles? (To enable humans to walk through them.) What does an entrance need? Let's make a list: Doors to enter, windows, lights for illumination at night, steps, railing, or stairs if the building is elevated off the ground...What about arches and columns—what do they do? (They support roofs—often porch roofs shelter entries...) What is the visual effect of columns or arches? Do they attract attention, make you want to pass under them?*

Student: Participates in discussion

3. Facilitates student identification of geometric shapes/figures and lines, in reflection in an architectural entry. *Prompts: Partner with the student next to you and look closely at a picture of an entry to a building that I have provided for each pair (or projected on the document camera for everyone to look at). Silently, find, draw and label, in your Geometry Search Journal, polygons, congruent shapes/figures, parallel and perpendicular lines, and examples of symmetry. This is a 5 minute exercise. When you have finished, share your findings with your partner and see if you both found the same or different elements.*

Student: Analyzes architecture and records findings in Geometry Search Journal.

Embedded Assessment: Criteria-based peer critique; criteria-based teacher checklist

4. Demonstrates designing an entry way using graph paper, ruler, protractor and shape/figure templates as tools. *Prompts: I am going to design an entry way for a building. My I am using congruent polygons, since the whole design to create symmetry. I will need to include door, window(s), lighting, steps/stairs, and column or arch. Notice when I start out, I am starting close to the center of the graph paper by drawing a line of symmetry to guide me. Why do I use graph paper as a tool? . . .to guide making straight (vertical, horizontal) parallel and perpendicular lines. How can graph paper help me create symmetry? I can count squares to make sure that my shapes/figures have similar properties/attributes on either side of my line of symmetry. My protractor and my ruler are also tools that I am using to help my shapes/figures be more precise. I am using polygons—straight-sided shapes/figures, so I will be using my ruler to draw them. As I am figuring out where my door, windows, lights, etc. are, I am using dots to help me: I am counting squares and making a dot as a guide to map out where the corners of each element of my entry will be.*

Student: Observes demonstration, responds to questions.

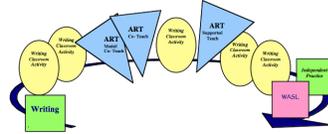
5. Guides students in creating building entry design. *Prompts: remember that we are using the tools for craftsmanship in our drawing—making clean precise lines. Draw on the graph/grid paper lines using your ruler every time! That is what they are there for! Check with your partner to make sure that you are creating a design in symmetry, and that you have all of the elements needed for your entry. You can elaborate once you have the basics—adding decoration, planters, fancy tile or stone-work etc, still using the tools.*

Student: Creates building entry design.

Embedded Assessment: Criteria-based peer critique

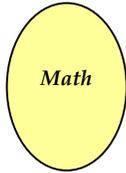
6. Facilitates criteria-based reflection: entry designs are displayed on the board. *Prompts: Name the polygons that you used in your design: what kinds of polygons did you use for windows, columns, and other details?* Student: Participates in class critique.

Embedded Assessment: Criteria-based class critique

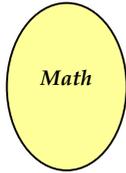


BEFORE next VISUAL ART lesson:

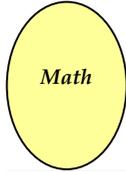
Math Centers



1. Organizes 3-dimensional blocks for entryways.



2. Designs buildings using only polygons with specific properties/attributes (i.e. parallelograms, rhombus).



3. Analyze symmetrical details of geometric designs from Native American or African Art.

Independent Practice: Flip to make a Reflection!

| Vocabulary | Materials and Community Resource | WA Essential Learnings & Frameworks |
|--|---|--|
| <p><u>Arts:</u> arch architecture balance column design detail entry</p> <p><u>Arts Infused:</u> geometric shape grid symmetry</p> <p><u>Math:</u> polygon reflection transformation</p> | <p>Museum Artworks: Jacob Lawrence, <i>Brooklyn Stoop</i>: Carrie Mae Weems, <i>Untitled</i> <i>Tacoma in Style</i>: published by the City of Tacoma</p> <p>Art Materials: Geometry Search Journal 2B graphite pencils</p> <p>1/2 or 3/8 inch graph paper: 8.5 x 11 in. white copy paper rulers and protractors or math kit shape templates</p> <p>white vinyl or art gum erasers</p> | <p><i>AEL 1.1 concepts</i>: geometric shape, parallel and perpendicular line <i>AEL 1.1.2 principles of organization</i>: balance <i>AEL 1.2 skills and techniques</i>: drafting <i>AEL 4.2 connections between arts and other content areas</i>: geometry</p> <p><i>MEL 1.3.4 geometric sense</i>: understands and applies single transformations using a reflection (flip)</p> <p>Math State Frameworks <i>Grade 3</i>: describes and compares congruent 2D figures; draws a shape that is congruent to a given 2D shape <i>Grade 4</i>: solves problems involving congruence (creates a design made out of congruent shapes, simulates reflections using objects; records results of reflection (flip), creates designs using reflections (flips) <i>Grade 5</i>: draws congruent figures and shapes in multiple orientations using a transformation</p> |

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LESSON TITLE: Polygons in Symmetry: Architectural Entry Design

ASSESSMENT WORKSHEET

| Disciplines | VISUAL ART AND MATH | VISUAL ART | VISUAL ART AND MATH | VISUAL ART | Total |
|-------------|--|---|---|---|-------|
| Concept | SHAPE: Geometric LINE: Transformations | Architectural Design | SHAPE: Symmetry | CRAFTSMANSHIP Repetition | 4 |
| Student | Draws, labels, and describes properties/attributes of polygons, parallel and perpendicular lines, congruence and reflections seen in buildings | Represents door, window(s), lighting, steps/stairs, and columns or arch | Draws closed straight-sided shapes/figures as features in reflection on either side of a line of symmetry | Uses a ruler, graph/grid paper, and protractors to create identically repeated lines and shapes/figures | |
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| Total | | | | | |
| Percentage | | | | | |

Criteria-based Reflection Questions: (Note examples of student reflections.)

Self-Reflection: *Name the polygons that you used in your design: what kinds of polygons did you use for windows, columns, and other details?*

Peer to Peer: *Check with your partner to make sure that you are creating a design of symmetry, and that you have all of the elements needed for your entry.*

Thoughts about Learning:

Which prompts best communicated concepts? Which lesson dynamics helped or hindered learning?

Lesson Logistics:

Which classroom management techniques supported learning?

Teacher: _____ Date: _____

ARTS IMPACT—ARTS-INFUSED LEARNING FAMILY LETTER

VISUAL ART AND MATH LESSON – Polygons in Symmetry—Architectural Entry

Dear Family:

Today your child participated in a **visual art and math** lesson.

- We talked about **architecture**—the art of designing buildings. We looked at several regional buildings as well as artwork that featured building **entries**.
- We identified **geometric shapes/figures, lines** and relationships we learned about in math (**reflections/flips**) in architecture.
- We thought about and included important elements in a **design** for the **entry** of a building: door, windows, lighting, steps, stairs, and the inviting **architectural elements** of a **column** or an **arch**.
- We created a **balanced design** for an architectural entry by organizing **polygons** (straight-sided shapes/figures), and arches or columns in **reflection** on either side of a **line of symmetry**. We used **rulers, protractors (or shape templates)** and **graph paper** to help us be more precise.

You could use geometry to sketch the buildings in your neighborhood noting the entry and how the architect made the entry inviting or not.

Enduring Understanding

Repetition of geometric shapes, lines, and reflections can be found in and used for elements in architectural design.