# 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

6-6

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 round...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.

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

6-6

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

Arts:

arch

architecture

balance

column

design

detail

entry

Arts Infused:

geometric shape

grid

symmetry

Math:

polygon

reflection

transformation

Museum Artworks:

Jacob Lawrence, Brooklyn Stoop:

Carrie Mae Weems, Unititled

Tacoma in Style: published by the City of Tacoma

Art Materials:

Geometry Search Journal

2B graphite pencils

1/2 or 3/8 inch graph paper: 8.5 x 11 in.

white copy paper

rulers and protractors or math kit shape templates

white vinyl or art gum erasers

AEL 1.1 concepts: geometric shape, parallel and

perpendicular line

AEL 1.1.2 principles of organization: balance

AEL 1.2 skills and techniques: drafting

AEL 4.2 connections between arts and other content

areas: geometry

MEL 1.3.4 geometric sense: understands and applies

single transformations using a reflection (flip)

Math State Frameworks

Grade 3: describes and compares congruent 2D

figures; draws a shape that is congruent to a given

2D shape

Grade 4: 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)

Grade 5: draws congruent figures and shapes in

multiple orientations using a transformation

Math

Math

Math

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

6-6

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

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ASSESSMENT WORKSHEET

Disciplines VISUAL ART AND MATH VISUAL ART VISUAL ART

AND MATH

VISUAL ART Total

4

Concept SHAPE: Geometric LINE:

Transformations

Architectural

Design

SHAPE: Symmetry CRAFTSMANSHIP

Repetition

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 straightsided

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

1.

2.

3.

4.

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22.

23.

24.

25.

26.

27.

28.

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:

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

6-6

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 (straightsided

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.