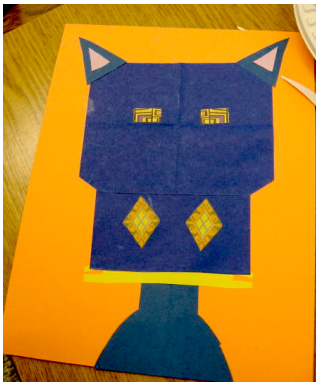
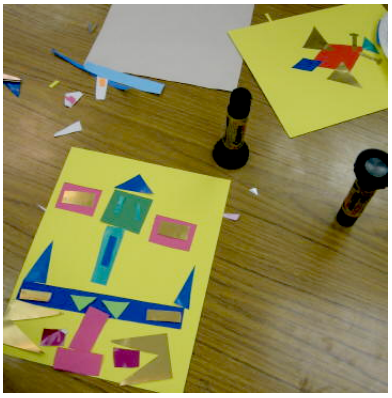
ARTS IMPACT—ARTS-INFUSED INSTITUTE LESSON PLAN (YR2-AEMDD)

LESSON TITLE: Polygons in Symmetry: Animal Inventions
Visual Arts and Math Lesson
Artist-Mentor – Meredith Essex Grade Level: Third Grade


Enduring Understanding
Use of symmetry with math shapes/figures can create balanced artistic organization and animal representation.

Target: Makes a symmetrical animal form.
Criteria: Links and layers polygons for bird, reptile/amphibian/insect with same color, location and size of shapes/figures on either side of a line of symmetry.

Target: Uses craftsmanship in collage techniques.
Criteria: Folds evenly, cuts smoothly, and glues securely—smooth and flat to paper.

Geometry Search Journal:
Target: Identifies and compares 2-D shapes/figures.
Criteria: Describes/labels and draws properties/attributes of diverse polygons in art.

Teaching and Learning Strategies
Introduction to Arts-Infused Concepts through Classroom Activities:

Arts-Infused Concepts: Symmetry; Polygons; Congruence; Shape; Balance
- Look for parallelograms, rectangles: Find and draw objects with lines of symmetry in Geometry Search Journal.
- Practice drawing symmetrical animals using only polygons.
- Practice folding and cutting paper to create a symmetrical shape—fold is line of symmetry.
- Practice cutting corners off of squares and rectangles to create triangles and trapezoids.

1. **Introduces *Egg and Cross* by Michael Gregory and, *Cross Road* by Victor Maldonado.**
Prompts: This is a lesson that is a visual art lesson and a math lesson at the same time. Balance in art can be created through organization of math shapes/figures in symmetry. In this art, what makes it balanced? Where can we draw a line of symmetry? Is the art "equal" on both sides of that line: what makes it equal?
Student: Participates in concept discussion.

2. Describes art making process. Reviews/introduces polygons. *Prompts: We will be creating a symmetrical animal collage by cutting and gluing geometric shapes/figures from math. In Math, we use the word "reflection" to describe symmetry. What are the properties/attributes of a polygon? What are some examples of polygons? (triangle, rectangle, trapezoid, hexagon, pentagon, square)*
Student: Shares knowledge of polygons.

3. Demonstrates cutting and arranging collage shapes/figures. *Prompts: Let's move some of these strips and rectangles/squares of paper around to help us imagine how our animals might come together. What types of animals most often have symmetry with shapes/figures that are polygons (birds, insects, reptiles). They can be invented sorts of animals—they do not need to be realistic! I am drawing some insects, reptiles, amphibians and birds on the board to help you visualize your animal. If I draw them from this point of view (side), can I draw a line of symmetry through them? How about if I draw them looking straight down? Your job is to create an animal using exclusively polygons arranged in symmetry! So. . . .when I cut with scissors what do I need to do to make polygons? (cut straight for multi-sided shapes/figures).*

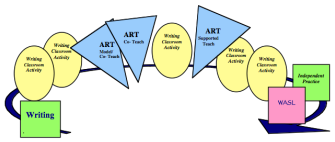
Since every shape/figure needs to have a congruent match on the other side of a line of symmetry, how many of each shape/figure do I need? (at least two). If I need a single, large symmetrical polygon, what would I do? I would fold and cut my shape/figure. What would be my line of symmetry? (the fold). When I start cutting more shapes/figures for legs, antenna, feet, etc and also adding details by layering shapes/figures, how can I transform a small square of paper into a triangle? I can cut diagonally across it. How can I make rectangles using just one cut (cutting a square in half)? How can I make more than one of the same polygon (layering, folding)? In order to create symmetry I need to have at least two congruent shapes/figures (same size, pattern or color) to place on either side of a line of symmetry.
Student: Observes planning and cutting demonstration, contributes ideas.

4. Demonstrates gluing techniques. *Prompts: Shapes/figures are arranged to create my animal before I glue them down—I have self-checked for symmetry and polygons. When I glue, notice that I turn the cut shapes/figures over on the scratch paper/glue book to protect my art and the desk. I run the glue stick over the edge of each polygon, and I securely rub the shape down to attach it smoothly so all edges are flat with the paper. Also, when I cut geometric shapes/figures from the paper provided, I always return a usable piece of scrap paper (also left in a geometric shape/figure) to the paper container that is a square or rectangle. This extends the life of high quality papers.*
Student: Observes gluing and paper management techniques.

5. Guides creative process. *Prompts: Visualize your animal and cut and arrange shapes/figures without doing any gluing before self-checking (and teacher checking) for polygons and symmetry. Glue down the big, basic shapes/figures, then add more symmetrical polygons for details, patterns and animal markings.*
Student: Creates collage.
Embedded Assessment: Criteria-based teacher checklist; criteria-based student self-assessment

6. Facilitates criteria-based reflection. Collages are displayed on the board**.** *Prompts: Point out and describe congruent polygons that you see in a peer's art. Draw the polygons you see and name the shape/figure properties/attributes (number of sides) in your* Geometry Search Journal*. Compare the shapes/figures in your journal with other polygons that you see. Where do you see that polygon again? Describe a technique that you used to create precise congruent shapes/figures. What were some of the challenges of creating symmetry in your art?*
Student: Participates in critique.

Embedded Assessment: Criteria-based class critique



After VISUAL ART lesson and before INDEPENDENT PRACTICE:

Math Centers:

Math

1. Find and draw lines of symmetry on capital and lower case letters.

Math

2. Make a list of polygons in the school building—windows, doors, tiles--enter in your Geometry Search Journal.

Math

3. Draw plants which are symmetrical or have symmetrical components. Glue half of a photo image (cut on line of symmetry) of a plant or animal to paper and draw the other matching side.

Independent Practice: Flip shapes—do they reflect? Look for lines of symmetry everywhere!

Vocabulary	Materials and Community Resource	WA Essential Learnings & Frameworks
Arts: balance collage Arts Infused: geometric shape hexagon line of symmetry pentagon rectangle square symmetry trapezoid triangle Math: congruent reflection polygon	**Museum Artworks::** Michael Gregory, *Egg and Cross* : Victor Maldonado, *Cross Road* **Art Materials:** 3x6, and 3x4 inch rectangles: 1, 2, 3 inch strips of fadeless multi colored craft paper colored card stock for background 8.5x11 in. optional: archival patterned paper (scrap-booking): 1, 2, 3 inch strips Geometry Search Journals glue books or newsprint glue sticks scissors	*AEL 1.1 concepts:* line, shape, symmetry *AEL1.1.2 principles of organization:* balance *AEL 1.2 skills and techniques:* collage *AEL 4.2 connections between arts and other content areas:* math *MEL 1.3.4 geometric sense:* understands and applies single transformations using a translation (slide) or 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 translations and reflections using objects; records results of a translation (slide) or reflection (flip), creates designs using translations (slides) or reflections (flips)

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ASSESSMENT WORKSHEET

Disciplines	VISUAL ART AND MATH			VISUAL ART AND MATH			VISUAL ART AND MATH	Total 7
Concept	SYMMETRY			CRAFTSMANSHIP			SHAPE	
Student	Links and layers polygons for bird/ reptile/insect/ amphibian with **same color** on either side of a line of symmetry	Links and layers polygons for bird/ reptile/ insect/ amphibian with **same location** on either side of line of symmetry	Links and layers polygons for bird/ reptile/insect/ amphibian with **same size** on either side of a line of symmetry	Folds evenly	Cuts smoothly	Glues secure-ly. Smooth and flat to paper	Describes/ labels and draws property/ attributes of diverse polygons in art	
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Total								
Percentage								

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

Self-Reflection: *Describe a technique that you used to create precise congruent shapes/figures. What were some of the challenges of creating symmetry in your art?*

Peer to Peer: *Point out and describe congruent polygons that you see in a peer's art. Draw it and name in your* Geometry Search Journal. *Compare with other polygons that you see.*

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: Animal Inventions

Dear Family:

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

- We talked about art **compositions** that are **organized in balance--symmetrical**. We found **lines of symmetry** in ***Egg and Cross*** **by Michael Gregory** and ***Cross Road*** **by Victor Maldonado**
- We made a **symmetrical animal collage** by linking and layering **straight-sided math shapes/figures (polygons)** for bird, reptile/amphibian/or insects on a line of symmetry.
- We used **craftsmanship** in collage techniques by folding and cutting **congruent** paper shapes/figures and securely gluing them with all edges flat with the paper.
- We reflected on our work by identifying and comparing math shapes/figures that we used. We talked about our challenges in creating symmetry in our art.

You could make collages of cities, gardens, or people using combinations of polygons. Many papers can be recycled and used in collages: packing materials, gift wrap, or catalogs.

Enduring Understanding

Use of symmetry with math shapes/figures
can create balanced artistic organization and animal representation.