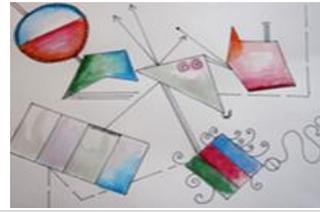


ARTS IMPACT LESSON PLAN

Visual Arts and Math Infused Lesson

Lesson Three: *Geometric Shapes in Action*

Author: Meredith Essex Grade Level: Primary



Enduring Understanding

Geometric shapes have specific attributes and can be partitioned into parts. Combining and orienting shapes and lines in different directions can create movement in composition.

Lesson Description (Use for family communication and displaying student art)

Students identify attributes of shapes and parts of shapes in pattern blocks and in art. Students then draw and cut out triangles, quadrilaterals, and irregular pentagons and hexagons to use as drawing templates. Templates are then traced in pen for a final composition. Direction of line and shape are arranged to create movement in composition. Students also partition shapes into halves, quarters, and thirds. Compositions are refined by adding linear details in pen and areas of color within shapes using watercolor pencil.

Learning Targets and Assessment Criteria

Target: Makes geometric shapes with specific attributes.

Criteria: Uses a ruler to draw quadrilaterals, triangles, and irregular pentagons and hexagons.

Target: Creates movement in composition.

Criteria: Orients shapes and lines in vertical, horizontal, and diagonal directions.

Target: Partitions shapes into equal shares.

Criteria: Uses a ruler to divide circles into halves and squares/rectangles into quarters and thirds.

Target: Refines composition.

Criteria: Adds details with line and emphasizes shapes with color using watercolor pencil techniques.

Vocabulary

Arts Infused:

Angle
Diagonal
Geometric shape
Hexagon
Horizontal
Pentagon
Triangle
Vertical

Math:

Fraction
Irregular
Part
Quadrilateral
Regular
Side

Arts:

Composition
Craftsmanship
Movement
Template

Materials

Museum Artworks or Performance

Seattle, WA

Seattle Art Museum

Tacoma, WA

Tacoma Art Museum

Materials

Math manipulatives: Pattern blocks;
White watercolor paper: 9x12"; Drawing pencil: 2H; Scissors; Protractors; Vinyl erasers; Caps for templates; Ultra fine tip black markers; Watercolor pencils; Ruler; Card stock: 5x8"; Small paint brushes; Paper towels; Water containers; Art mats; Arts Impact sketchbook; Blue painter's tape; Class Assessment Worksheet

Everyday Mathematics Connections

5.5 – Quadrangles

continued

Learning Standards

WA Arts Learning Standards

For the full description of each anchor standard and the grade level performance standards, see:

<https://www.k12.wa.us/student-success/resources-subject-area/arts/arts-k-12-learning-standards>

Creating

Anchor Standard 1: Generate and conceptualize artistic ideas and work.
Anchor Standard 2: Organize and develop artistic ideas and work.
Anchor Standard 3: Refine and complete artistic work.

Responding

Anchor Standard 9: Apply criteria to evaluate artistic work.

continued

Seattle Art Museum images:
Temple Wall Painting II, 1920, Paul
Klee, 52.107



Kit #2, 1967, Frederick Anderson,
68.205



Early Learning Guidelines (Pre-K – Grade 3)

For a full description of Washington State Early Learning and Child Development Guidelines see: <http://www.del.wa.gov/development/guidelines/> (2nd Grade): 6. Learning about my world: Math: Describe thinking when solving a math problem and discuss why he or she solved the problem in a particular way. Arts: Experiment with creating own artwork.

Common Core State Standards (CCSS) in Math

For a full description of CCSS Standards by grade level see:

<http://www.k12.wa.us/CoreStandards/Mathstandards/>

2.G.1. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
2.G.3. Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words *halves*, *thirds*, *half of*, *a third of*, etc., and describe the whole as two halves, three thirds, four fourths.

CCSS Mathematical Practices

- MP 4. Model with mathematics.
- MP 5. Use appropriate tools strategically.
- MP 6. Attend to precision.
- MP 7. Look for and make use of structure.
- MP 8. Look for and express regularity in repeated reasoning.

ICON KEY:

 = Indicates note or reminder for teacher

 = Embedded assessment points in the lesson

Pre-Teach

Sketchbook Activity: Practice drawing lines using a ruler. Draw straight-sided closed shapes oriented in different directions using just a pencil. Describe number of sides and angles.

Lesson Steps Outline

Day One

1. Warm-Up: Guide students to work in pairs to identify attributes of pattern blocks and combine equal parts to make whole shapes.

2. Introduce and guide math analysis and discussion of *Temple Wall Painting II* by Paul Klee from the Seattle Art Museum collection.

3. Demonstrate using a ruler to draw small quadrilaterals and triangles on tag board (for templates) with focus on craftsmanship.

 Criteria-based teacher checklist: Uses a ruler to draw quadrilaterals, triangles, and regular and irregular pentagons and hexagons.

4. Demonstrate using triangle, rectangle, and irregular hexagon and pentagon templates to draw shapes oriented in different directions in fine-tipped black pen.

 Criteria-based teacher checklist: Orients shapes in vertical, horizontal, and diagonal directions.

Day Two

1. Introduce *Kit #2* by Frederick Anderson from the Seattle Art Museum Collection and facilitate review of concepts through observing and analyzing art.

Criteria-based teacher checklist: Orients lines in vertical, horizontal, and diagonal directions.

2. Demonstrate and guide using rulers and pens to add lines oriented in different directions. Emphasize diagonals creating a sense of movement. Introduce circle templates (various caps and lids) and demonstrate dividing circle, square, and rectangle shapes into equal parts.

Criteria-based teacher checklist: Uses a ruler to divide circles into halves and squares/rectangles into quarters and thirds.

3. Demonstrate and guide refining composition by adding details in pen and watercolor pencil to selected shapes.

Criteria-based teacher checklist: Adds details with line and emphasizes shapes with color using watercolor pencil techniques.

4. Guide criteria-based peer assessment and group reflection.

Criteria-based student peer-assessment and group reflection: Reflects on use of shapes and fractions in art. Analyzes how direction of line and shape creates movement in composition.

LESSON STEPS

Day One

1. Warm-Up: Guide students to work in pairs to identify attributes of pattern blocks and combine equal parts to make whole shapes.

- *Talk with your partner about each pattern block shape. What is the name of each shape?*
- *Notice and talk about how many angles and sides each shape has.*
- *Combine two, three, or four of the same shape to make a bigger shape. How many equal parts do you see? Do you see halves, quarters, or thirds?*

2. Introduce and guide math analysis and discussion of *Temple Wall Painting II* by Paul Klee from the Seattle Art Museum collection.



■ The Seattle Art Museum's collection is available on-line at:

<http://www.seattleartmuseum.org/emuseum/code/collection.asp>. To find the images in this lesson, enter the accession number for the work of art in the search box on the collections page of SAM's website. Accession numbers for these works of art are listed in the materials box at the beginning of the lesson.

- *Name the geometric shapes (math shapes with names) you see in this picture.*
- *Do you see any places where shapes are divided into equal parts?*
- *Do you think the artist used math or math tools (ruler, templates?) to make this art? Describe.*

3. Demonstrate using a ruler to draw small quadrilaterals and triangles on tag board (for templates) with focus on craftsmanship.

- *Using math tools helps us be more precise and use good craftsmanship. Craftsmanship means care, thought, and time invested in our art. When we use a ruler, we need to spread our hand out and really press hard to keep it from slipping then move the pencil along the straight edge slowly and carefully.*
- *How many sides does a triangle have? How many angles? Practice drawing triangles by starting with one line and connecting another to it, and then joining the end of that line with the end of the first line.*
- *Another way to draw triangles and also quadrilaterals is to make three dots where you can imagine the angles of a triangle or quadrilateral and connect them using your ruler.*
- *Think about one more way to make a rectangle, square, or triangle. Hint: notice the corner of your paper. How can we use the corner for two sides of a shape?*
- *More advanced shapes have 5 or 6 sides. An irregular pentagon or hexagon does not need to have equal sides. Challenge yourself by drawing a shape with 5 or 6 sides using your ruler.*
- *Using good craftsmanship, open scissors wide with thumbs up and make long smooth cuts for each side. Put your name on each of your templates.*



Criteria-based teacher checklist: Uses a ruler to draw quadrilaterals, triangles, and regular and irregular pentagons and hexagons.

4. Demonstrate using triangle, rectangle, and irregular hexagon and pentagon templates to draw shapes oriented in different directions in fine-tipped black pen.

- *We cut out our shapes so we can use them as templates. Tracing around them will help us draw our shapes on this piece of watercolor paper.*
- *We can move our templates around before we trace around them to help us plan out our composition. Point your template shapes in different directions. Once you know where you want it, anchor your template down (much like the ruler), and slowly trace around the edge.*
- *To start, just trace around one of each kind of shape (it can touch but not overlap other shapes): triangle, rectangle, quadrilateral, irregular hexagon and pentagon.*
- *Remember to go slow using craftsmanship—also remember that artists don't make mistakes, they make changes: you can fix anything!*

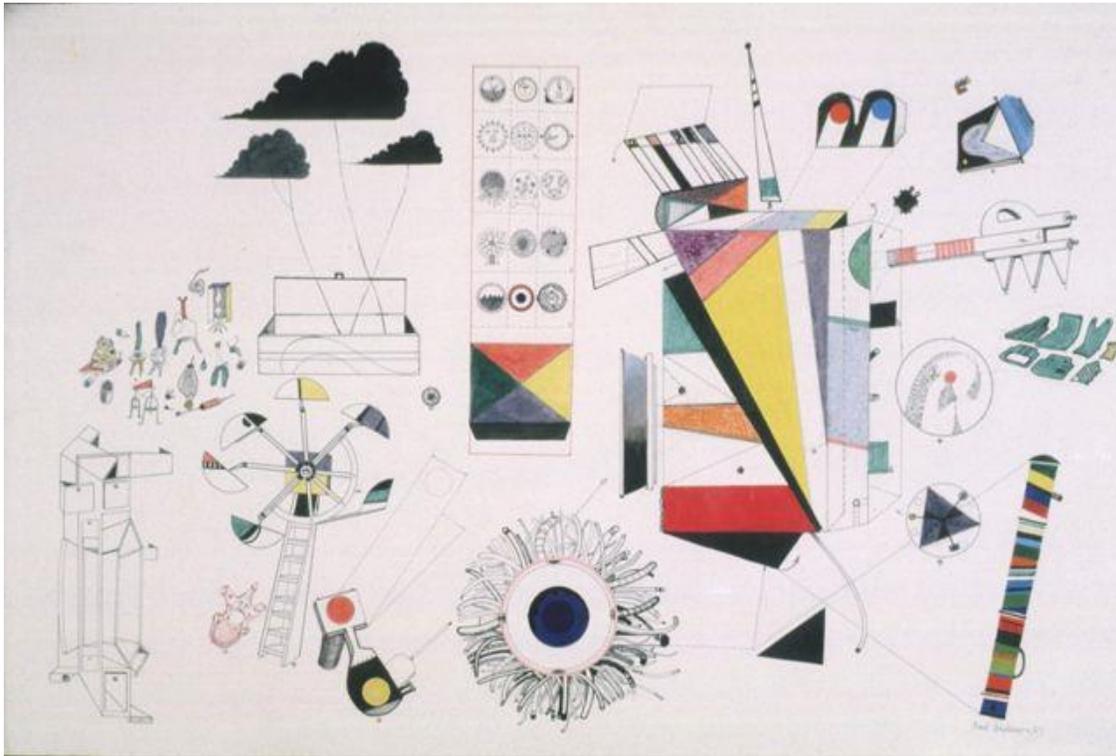


Have students write their name on all of their templates and paper, paper clip them all together, and hand them in for use the next day.

Criteria-based teacher checklist: Orients shapes in vertical, horizontal, and diagonal directions.

Day Two

1. Introduce *Kit #2* by Frederick Anderson from the Seattle Art Museum collection and facilitate review of concepts through observing and analyzing art.



- *Name the geometric (math shapes with names) you see in this picture. How many angles/corners, how many sides?*
- *Do you see any places where shapes are divided into equal parts?*
- *Where do we see lines in this art? What direction do they go in?*
- *When we look at this art, does it seem still or active? Why? Where do we see lines or shapes pointing in diagonal directions (in all parts of the picture)?*
- *In our compositions, we are going to be adding lines in all directions, especially diagonals, to create a sense of movement and excitement.*

Criteria-based teacher checklist: Orients lines in vertical, horizontal, and diagonal directions.

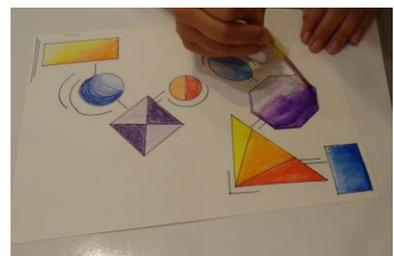
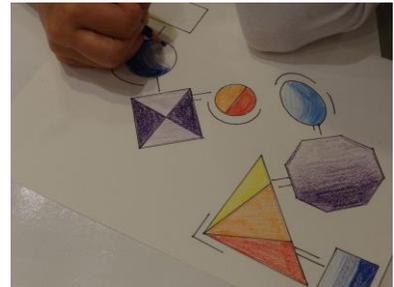
2. Demonstrate and guide using rulers and pens to add lines oriented in different directions. Emphasize diagonals creating a sense of movement. Introduce circle templates (various caps and lids) and demonstrate dividing circle, square, and rectangle shapes into equal parts.

- *Add lines in all directions, especially diagonal ones, to create movement in composition.*
- *Add some circles using these caps and lids for templates, and some lines radiating from them... I see wheels starting to spin and turn!*
- *Using some more math, use a ruler to divide some shapes into equal parts just like we have seen in the art.*
- *Can I divide a circle in half—into equal parts? How? Can I divide a square into quarters? How? Can I divide a rectangle into three equal parts? How?*
- *Draw vertical and horizontal lines or diagonal lines to divide a square into 4. Use a line to divide a circle in half. Use lines to divide a square or rectangle into thirds.*

Criteria-based teacher checklist: Uses a ruler to divide circles into halves and squares/rectangles into quarters and thirds.

3. Demonstrate and guide refining composition by adding details in pen and watercolor pencil to selected shapes.

- *Add lines to show patterns or interesting details: notice the flag, ladder, and cloud shapes in the art we have looked at.*
- *Watercolor pencil goes on the paper just like pencil, but when we add a bit of water it acts like paint and becomes brighter.*
- *In a few shapes you want to especially stand out (not necessarily all) add color. You can use different colors to make the equal parts of some of your shapes stand out or combine more than one color in one shape.*
- *When you are done adding color to refine your composition, you will receive a little brush. Dip it in water and dab off any extra water, and then gently and carefully add water inside of your colored shapes.*



Have student add color using watercolor pencils first, then when this step is complete, collect pencils, and bring brush, paper towel, and a small container of water to students.

Criteria-based teacher checklist: Adds details with line and emphasizes shapes with color using watercolor pencil techniques.

4. Guide criteria-based peer assessment and group reflection.

- *Switch artwork with a partner. Find a triangle, square, rectangle, and an irregular pentagon and hexagon.*
- *Find places where your partner divided shapes into halves, quarters, and thirds.*
- *Notice places where your partner created a sense of movement through direction of lines and shapes and share your ideas with the class*

Criteria-based student peer-assessment and group reflection: Reflects on use of shapes and fractions in art. Analyzes how direction of line and shape creates movement in composition.

ARTS IMPACT LESSON PLAN Visual Arts and Math Infusion

Primary Grade Lesson Three: *Geometric Shapes in Action*

▣ Teachers may choose to use or adapt the following self-assessment tool.

STUDENT SELF-ASSESSMENT WORKSHEET

Disciplines	VISUAL ARTS AND MATH	VISUAL ARTS	VISUAL ARTS AND MATH	VISUAL ARTS	Total 4
Concept	Shapes	Line Direction	Fractions	Composition	
Criteria	Uses a ruler to draw quadrilaterals, triangles and irregular pentagons and hexagons.	Orients shapes and lines in vertical, horizontal and diagonal directions.	Uses a ruler to divide circles into halves, and squares/rectangles into quarters and thirds.	Adds details with line and emphasizes shapes with color using watercolor pencil techniques.	
Student Name					

ARTS IMPACT LESSON PLAN Visual Arts and Math Infusion

Primary Grade Lesson Three: *Geometric Shapes in Action*

CLASS ASSESSMENT WORKSHEET

Disciplines	VISUAL ARTS AND MATH	VISUAL ARTS	VISUAL ARTS AND MATH	VISUAL ARTS	Total 4
Concept	Shapes	Line Direction	Fractions	Composition	
Criteria	Uses a ruler to draw quadrilaterals, triangles and irregular pentagons and hexagons.	Orients shapes and lines in vertical, horizontal and diagonal directions.	Uses a ruler to divide circles into halves, and squares/rectangles into quarters and thirds.	Adds details with line and emphasizes shapes with color using watercolor pencil techniques.	
Student Name					
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					
Total					
Percentage					

What was effective in the lesson? Why?

What do I want to consider for the next time I teach this lesson?

What were the strongest connections between visual arts and math?

Teacher: _____ Date: _____

VISUAL ARTS AND MATH LESSON: *Geometric Shapes in Action*

Dear Family:

Today your child participated in a two-part **Arts and Math** lesson. We looked at two artworks with many precisely drawn mathematical shapes in them. We identified the name of and described the geometric shapes we saw. We also noticed that shapes were created using tools for precision.

- We identified names and attributes of different shapes using pattern blocks.
- We then drew triangles, quadrilaterals and irregular pentagons and hexagons on tag board using a ruler.
- We carefully cut these shapes out, then used them as templates to draw shapes using pen on watercolor paper.
- We focused on using a variety of directions of line and shape—especially diagonal—to create movement in our composition.
- We divided our some of our composition shapes into halves, quarters, and thirds.
- We refined our compositions by adding line details in pen and adding areas of color within shapes using watercolor pencil and brush.

At home, you could encourage your child to practice using a ruler to draw all kinds of geometric shapes. Together, you could go on shape searches and draw or make paper collages combining the different kinds of shapes you have seen.

Enduring Understanding

Geometric shapes have specific attributes and can be partitioned into parts. Combining and orienting shapes and lines in different directions can create movement in composition.