# ARTS IMPACT LESSON PLAN

Visual Arts and Math Infused Lesson

Lesson Two: Translucent Collage: Comparing Fractions

Author: Meredith Essex Grade Level: Fourth

Enduring Understanding

Fractional parts can be combined to create a balanced whole in composition.

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

Students make a fraction model showing 1/2, 1/4, and 1/8 on grid paper. Artworks composed of

fractions combined to make a balanced whole are analyzed. Students begin a translucent collage by

selecting vellum for a background whole, then fold and cut the vellum in different colors to create a

1/2, 1/4, and 1/8 of that whole. Fractional parts are combined and layered in compositions to show

understanding of how they combine to make a whole. Students identify smaller, greater, and equal

fractions in their collage and write an equation matching their collage using common denominators.

Learning Targets and Assessment Criteria

Target: Compares fractions with different denominators.

Criteria: Measures/counts and draws or folds a fraction model showing 1/2, 1/4, and 1/8 of the

same whole.

Target: Makes a balanced translucent collage.

Criteria: Layers and arranges vellum shapes to show 1/2, 1/4, and 1/8 (3/8s optional) of the

same whole.

Target: Compares fractions in collage.

Criteria: Describes each part using <, >, and =; writes an equation representing collage.

Target: Uses craftsmanship in translucent collage.

Criteria: Cuts fractional shapes smoothly and glues or tapes securely.

Vocabulary Materials Learning Standards

Arts Infused:

Fraction

Horizontal

Vertical

Math:

Denominator

Eighth

Half

Quarter

Arts:

Background

Collage

Composition

Craftsmanship

Crease

Depth

Nonobjective

Proportion

Space

Translucent

Vellum

Museum Artworks or Performance:

Seattle, WA

Seattle Art Museum

Tacoma, WA

Tacoma Art Museum

Materials

Rulers; Drawing pencils: 2H; 1” grid paper:

9x12”; 1” grid transparency; Transparency

film markers; Vellum: 8.5x11”, broad range

of colors, 2 sheets per student; Scissors;

O’glue by Itoya and/or double-sided tape;

Recycled magazines: glue mats; Arts Impact

sketchbooks; Class Assessment Worksheet

Connections

Everyday Mathematics

7.4 – Pattern Block Fractions

7.5 – Fraction Addition and Subtraction

7.6 – Many Names for Fractions

7.7 – Equivalent Fractions

continued

WA Arts State Grade Level Expectations

For the full description of each WA State Arts Grade Level

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Seattle Art Museum images:

Orange on Red, 1956, Mark Rothko,

2002.68

Counterpoint, 1990, Weldon Butler, 92.32

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/

4.NF.2. Compare two fractions with different numerators

and different denominators, e.g., by creating common

denominators or numerators, or by comparing to a

benchmark fraction such as 1/2. Recognize that

comparisons are valid only when the two fractions refer to

the same whole. Record the results of comparisons with

symbols >, =, or <, and justify the conclusions.

CCSS Mathematical Practices

MP 2. Reason abstractly and quantitatively.

MP 4. Model with mathematics.

MP 6. Attend to precision.

MP 7. Look for and make use of structure.

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Pre-Teach

Sketchbook Activity: Draw objects or elements in the environment that are

shapes divided into fractions (buildings, rugs, book covers). Notice and compare

the different ways that shapes are divided into parts.

Lesson Steps

1. Warm-Up: Guide students in drawing or folding a 4x8 unit rectangle on grid

paper and dividing it into 1/2, 1/4, and 1/8 part of a whole.

þ Criteria-based teacher checklist: Measures/counts and draws a fraction model

showing 1/2, 1/4, and 1/8 of the same whole.

2. Introduce and guide art and math analysis of Orange on Red by Mark Rothko

and/orCounterpoint by Weldon Butler from the Seattle Art Museum collection.

Introduce idea of fractions or parts arranged to create balance in compositions.

3. Demonstrate and guide folding and cutting papers into 1/2, 1/4, and 1/8

fractions that extend edge to edge across the composition to make a

translucent collage.

þ Criteria-based teacher checklist: Cuts fractional shapes smoothly.

4. Demonstrate and guide arranging and comparing fractions in composition.

Focus on layering shapes to show 1/8, 1/4, 3/8, and 1/2.

þ Criteria-based teacher checklist and peer assessment: Layers and arranges

vellum shapes to show 1/2s, 1/4s, and 1/8s (3/8s optional) of the same whole.

Describes each part using <, >, and =; writes an equation representing collage.

5. Demonstrate and guide gluing or taping using craftsmanship.

þ Criteria-based teacher checklist: Glues/tapes securely.

6. Guide criteria-based self assessment for craftsmanship and math

understandings.

þ Criteria-based self-assessment: Glues/tapes securely and writes an equation

representing collage.

ICON KEY:

3 = Indicates note or reminder for teacher

þ = Embedded assessment points in the lesson

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7. Guide criteria-based group reflection. Display by taping on windows so that

light can come through compositions.

þ Criteria-based group reflection: Interprets compositions mathematically

and artistically.

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LESSON STEPS\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Warm-Up: Guide students in drawing or folding a 4x8 unit rectangle on grid paper and

dividing into 1/2, 1/4, and 1/8s parts of a whole.

• Count and dot the corners (vertices) of a horizontal 4x8 unit

rectangle. Draw lines using a ruler to connect the corners.

• Count squares and then use a ruler to draw a vertical line to

divide the rectangle in half.

• Draw another vertical line dividing 1/2 in half again, making

1/4s of the whole.

• Draw another vertical line dividing 1/4 into 1/8s.

• Which is the smallest fraction?

þ Criteria-based teacher checklist: Measures/counts and draws a fraction model showing 1/2, 1/4, and

1/8 of the same whole.

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2. Introduce and guide art and math analysis of Orange on Red by Mark Rothko

and/orCounterpoint by Weldon Butler from the Seattle Art Museum collection.

Introduce idea of fractions or parts arranged to create balance in compositions.

3 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 in the beginning of

the lesson.

• Where do you see fractions or parts in these works of art? Many artists create nonobjective (no

object) compositions that focus on dividing space into parts in ways that feel balanced and

pleasing to our eyes. Let’s see what happens when I cover up part of one. What changes?

• Do you think the artists used math tools (ruler, grids) to make this art? Why?

• Without actually measuring, just looking, how many parts or fractions do you see in

Counterpoint by Weldon Butler?

• Think about the relationship of each part. Do any sections look equal? What is the smallest

part? Let’s layer a clear transparency over this artwork and see what we can figure out.

• How many times do you think we repeat the smallest fraction/rectangle horizontally within the

whole painting? (5 times approximately) Now we have a common denominator. Let’s call that

1/5. Using 5 as that common denominator and looking closely at the other two parts, what

fractions might they represent? (2/5 and 2/5). What does 1/5 + 2/5 + 2/5 equal?

(5/5 as one whole)

3 A piece of transparency film can be laid over the artwork projected with a document camera and

lines drawn in pen to show fractions.

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Responding to Art in

the Classroom

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3. Demonstrate and guide folding and cutting papers into 1/2, 1/4, and 1/8 fractions that

extend edge to edge across the composition to make a translucent collage.

• We are creating a collage, which is a work of art composed of layered papers. The paper we

are using is a translucent (that lets some light through it) paper called vellum. Our papers will

orient vertically with our fractions in horizontal bands (like Butler and Rothko’s work).

• Select one vellum color—(preferably the darkest or brightest

one) for the background. The background represents the whole;

we will not be cutting it up into fractions.

• Choose another color that you feel will work well with your

background color. Orient it horizontally and fold it in half. Line

up the edges carefully and crease. Vellum is a stiff paper, so

crease very thoroughly. Just like the artists we studied, we want

to show mathematical precision and craftsmanship in our art.

• Open and flatten vellum on both sides of the fold. Top of thumb

pointing up, open the scissors all the way and slowly cut exactly

on the crease. Both these papers should be exactly the same

size when cut since they are halves. Keep one half and share

the other.

• Choose a third color (half sheet) and repeat the process: Orient

it vertically and fold into half to make quarters of the whole.

Both these papers should be exactly the same size when cut.

Keep one quarter and share the other.

• Choose a fourth color (quarter sheet) and repeat the process.

Orient it vertically and fold in half to make long skinny strips that

are eighths of the whole.

3 As soon as students fold and cut vellum into halves and quarters, the

extra papers go into a communal pile for other students to use so that

paper is used economically.

þ Criteria-based teacher checklist: Cuts fractional shapes smoothly.

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4. Demonstrate and guide arranging and comparing fractions in composition. Focus on

layering shapes to show 1/8s, 1/4s, 3/8s, and 1/2s.

• Arrange all of your shapes (half, quarter, and eighth) so that

they reach across (in stripes) the width of your paper when your

paper is vertical. Think about what feels balanced to your eyes.

All fraction strips touch the edges of the paper.

• We are showing how fractions create a whole in our artistic

compositions. Make sure when you overlap and arrange your

shapes that each stripe of color represents a very specific fraction with a

denominator of 2, 4, or 8 that you can name.

Folding and Cutting Congruent

Shapes / Fractions, Cutting

through Multiple Layers

Prompting for Creativity

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• You might be covering up part of a half with an eighth—what is that part of the half that would

still be showing? (3/8) Once we display this art on a window and let the light through, we can

also see how smaller fractions add up to larger ones. Make sure all of your edges align with

your background paper.

• Once you have arranged your composition, write the fractions

expressing each color as you “read” your composition from top

to bottom (1/8, 1/4, 1/4, 3/8). Now using the common

denominator of 8, read and write your composition as an

equation: 1/8+2/8+2/8+3/8=8.

• Share your composition and the equation that goes with it with

a partner. Describe which fraction is the largest and smallest

and which, if any, are equal. Check for accuracy.

þ Criteria-based teacher checklist and peer assessment: Layers and arranges vellum shapes to show

1/2, 1/4, and 1/8 (3/8 optional) of the same whole. Describes each part using <, >, and =; writes an

equation representing collage.

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5. Demonstrate and guide gluing or taping using craftsmanship.

• Now that your composition is arranged and the fractions you are showing have

been clearly identified and checked, layer and glue or tape (with double sided

tape) all of your parts together using craftsmanship.

• This glue is called “O” glue: it has a sponge tip. With a glue book or paper underneath, run it

along just the perimeter of your first layer. Position edges to edges and rub along the perimeter

so that the bond is smooth and secure. You can also use small pieces of double sided tape

carefully slipped under each corner of each shape.

• Run the glue right along the edge of the next pieces of vellum as you layer. Make sure that a

glue paper or mat is underneath.

• Check to see that every shape is secure.

þ Criteria-based teacher checklist: Glues/tapes securely.

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6. Guide criteria-based self assessment for craftsmanship and math understandings.

• Check for craftsmanship. Are all of your edges securely glued and rubbed down? Are all of your

edges lined up so that fractions are easy to see?

• Check to make sure your math matches your composition!

þ Criteria-based self-assessment: Glues/tapes securely and writes an equation representing collage.

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Craft of Gluing with

Glue Stick / O’Glue

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7. Guide criteria-based group reflection. Display by taping on windows so that light can

come through compositions.

• Look at all of our work as a group. Let’s play a little game: choose a composition

and name the fractions you see, then check to see whether your math matches

the artist’s math.

• Notice a composition that feels especially balanced or effective and share what

artistic choices you feel the artist made that created that effect.

• Notice the new colors that are created through layering translucent colors.

• How does the translucency (with light coming through) change how we see the fractions? What

does the translucency tell us about parts of our composition forming a whole?

þ Criteria-based group reflection: Interprets composition mathematically and artistically.

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Everyday Mathematics Extensions:

7.11−Probability, Fractions and Spinners

7.12−A Cube Drop Experiment

Unit 9−Fractions, Decimals and Percents

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Guiding Reflecting on

Student Art

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ARTS IMPACT LESSON PLAN Visual Arts and Math Infusion

Fourth Grade Lesson Two: Translucent Collage: Comparing Fractions

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

STUDENT SELF-ASSESSMENT WORKSHEET

Disciplines VISUAL ARTS AND MATH VISUAL ARTS Total

Concept Fractions/Space Craftsmanship 5

Criteria

Student Name

Measures/counts and

draws or folds a

fraction model

showing 1/2, 1/4s,

and 1/8s of the

same whole

Layers and arranges

vellum shapes to

show 1/2, 1/4s, and

1/8s (3/8s optional)

of the same whole

Describes each part

using <, >, and =;

writes an equation

representing collage

Cuts

fractional

shapes

smoothly.

Glues or

tapes

securely

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ARTS IMPACT LESSON PLAN Visual Arts and Math Infusion

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CLASS ASSESSMENT WORKSHEET

Disciplines VISUAL ARTS AND MATH VISUAL ARTS Total

Concept Fractions/Space Craftsmanship 5

Criteria

Student Name

Measures/counts and

draws or folds a

fraction model

showing 1/2, 1/4s,

and 1/8s of the

same whole

Layers and arranges

vellum shapes to

show 1/2, 1/4s, and

1/8s (3/8s optional)

of the same whole

Describes each part

using <, >, and =;

writes an equation

representing collage

Cuts

fractional

shapes

smoothly.

Glues or

tapes

securely

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Total

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:

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