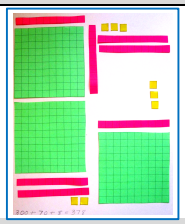
ARTS IMPACT LESSON PLAN

Visual Arts and Math Infused Lesson



Lesson Two: *Place Value: 100s, 10s, and 1s in Composition*

Author: Meredith Essex Grade Level: Second

Enduring Understanding

Shapes symbolizing numbers in a limited color palette can be organized vertically and horizontally to create unified, balanced compositions.

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

Students explore place value using manipulatives to show 3-digit numbers. Non-objective compositions merging math and art are introduced and analyzed by students. Students then cut apart colorful 10x10 square grid papers into 100's, 10's, and 1's. Next, a composition representing a three-digit number is created in collage using a limited color palette for unity and vertical and horizontal alignment for balance.

Learning Targets and Assessment Criteria

Target: Represents numbers using place value manipulatives.
Criteria: Combines 100s flats, 10s rods, and 1s blocks to correctly represent 3-digit numbers.

Target: Makes a composition showing place value.
Criteria: Represents a 3-digit number by arranging place value shapes corresponding with 100s, 10s, and 1s, and records number using expanded notation/form.

Target: Creates balance and unity in composition.
Criteria: Arranges place value shapes vertically and horizontally representing a 3-digit number and uses a limited palette of three colors.

Target: Uses craftsmanship in collage.
Criteria: Cuts on lines; glues securely.

Vocabulary

Arts Infused:
Grid
Horizontal
Shape
Vertical

Math:
100s,10s,1s
Equal to
Expanded notation
Flats, rods, blocks
Greater than
Less than
Place value

Arts:
Balance
Limited palette
Non-objective
Repetition
Unity

Materials

Museum Artworks or Performance:

Seattle, WA
Seattle Art Museum

Tacoma, WA
Children's Museum of Tacoma
Tacoma Art Museum

Materials
Math manipulatives: base 10 sets: flats, rods, and blocks; 1/2" grid transparency; Cardstock: 8.5x11", copy 3-digit numbers from lesson and cut into individual cards; Multiple bright colors copy paper: 8.5x11", several copies in each color of 10x10 cm grid from lesson, at least 4 grids per student; White tag board/card stock: large size (ex. 11x17"); Glue sticks; Recycled magazines: glue mats; Arts Impact sketchbooks; Class Assessment Worksheet

continued

Learning Standards

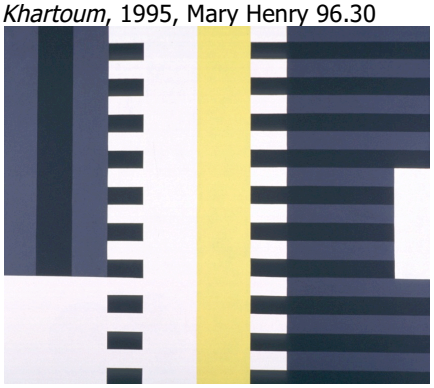
WA Arts State Grade Level Expectations
For the full description of each WA State Arts Grade Level Expectation, see: http://www.k12.wa.us/Arts/Standards
1.1.1 Elements: Line direction
1.1.2 Elements: Shape
1.1.7 Principles of Design: Balance, unity
1.2.1 Skills and Techniques: Collage
2.1.1 Creative Process
2.3.1 Responding Process
4.2.1 Connection between Visual Arts and Math

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: Understand place value in three-digit numbers. Arts: Experiment with creating own artwork.

continued

Connections
Everyday Mathematics
3.1 – Numeration and Place Value
10.8 – Place Value
10.9 – Place Value Tools

Seattle Art Museum images:
Khartoum, 1995, Mary Henry 96.30



Keeper Hill, 2003, Robert Yoder
2003.123

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.NBT.1. Understand that 3-digits of a 3-digit number represent amounts of 100's, 10's and 1's.
2.NBT.3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

CCSS Mathematical Practices
MP 2. Reason abstractly and quantitatively
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: Look for and sketch vertical and horizontal lines seen in interior and exterior spaces.

Lesson Steps

1. Warm-Up: Demonstrate and guide using place value flats, rods, and blocks to represent 3-digit numbers.

☑ Criteria-based teacher checklist: Combines 100s flats, 10s rods, and 1s blocks to correctly represent 3-digit numbers.

2. Introduce concept of non-objective art and guide student analysis of *Khartoum* by Mary Henry and *Keeper Hill* by Robert Yoder from the Seattle Art Museum. Overlay a transparent grid over each image and analyze directional balance of shapes and unity through a limited color palette.

3. Demonstrate selecting 10x10 cm grids (copied on color copy paper) to make shapes for 100s, 10s and 1s that can represent a specific 3-digit number.

4. Distribute a card with a 3-digit number on it to each student. Demonstrate and guide cutting out (and cutting up) 10x10 cm grids to make shapes for 100s, 10s, and 1s for use in a place value composition.

☑ Criteria-based process assessment: Selects a limited palette of three colors.
☑ Criteria-based teacher checklist: Cuts on lines.

5. Demonstrate and guide positioning place value shapes in horizontal and vertical balance. Emphasize balancing shapes by using the whole space of paper while representing a 3-digit number accurately.

☑ Criteria-based peer assessment and teacher checklist: Arranges place value shapes vertically and horizontally representing a 3-digit number and uses a limited palette of three colors.

6. Demonstrate and guide gluing using glue mat or book (recycled magazine) and glue sticks.

☑ Criteria-based teacher checklist: Represents a 3-digit number by arranging place value shapes corresponding with 100s, 10s, and 1s, and records number using expanded notation/form. Glues securely.

7. Guide students in reflection.

☑ Criteria-based group reflection: Analyzes compositions mathematically and artistically.

LESSON STEPS

1. Warm-Up: Demonstrate and guide using place value flats, rods, and blocks to represent 3-digit numbers.

- *If my number is 257, how many 100s flats do I need to show that number? How many 10s rods? How many 1s blocks?*
- *Here is another combination of 100s, 10s, and 1s. Can you tell which number I am showing?*
- *How would I write that number in expanded form or notation? (200 + 50 + 7 = 257)*
- *Now you think of a 3-digit number and group the correct place value flats, rods, and blocks to show that number.*

▯ 3-digit numbers may also be assigned to students for differentiated learning by ability.

☑ Criteria-based teacher checklist: Combines 100s flats, 10s rods, and 1s blocks to correctly represent 3-digit numbers.

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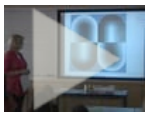
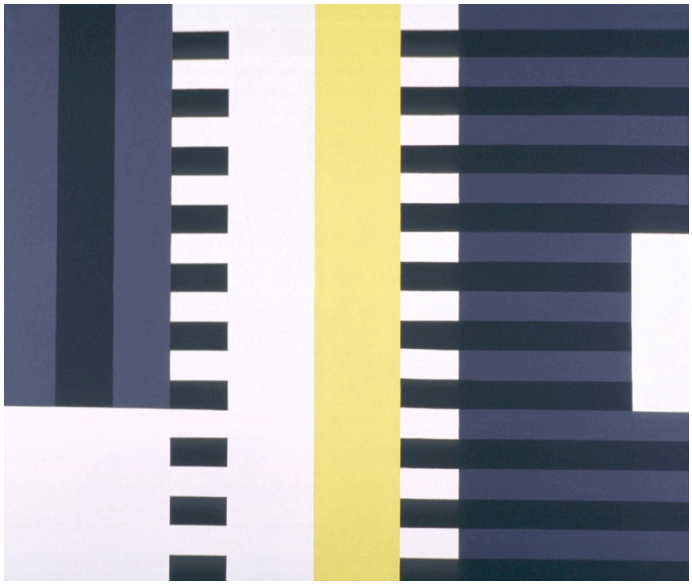
2. Introduce concept of non-objective art and guide student analysis of *Khartoum* by Mary Henry and *Keeper Hill* by Robert Yoder from the Seattle Art Museum. Overlay a transparent grid over each image and analyze directional balance of shapes and unity through a limited color palette.



Responding to Art in the Classroom



▯ 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.

- *What do you notice about these artworks? Artworks that don't represent a thing, but are arrangements of colors, shapes, and lines are considered non-objective.*

- *Non-objective means "no object". Their art is purely about the relationship of shapes and colors. Many non-objective artists use math in their art to organize and give structure to their artistic compositions.*
- *How do you think artists used math in these artworks?*
- *What kinds of shapes do we see? With an imaginary tool, follow the direction of shapes in the compositions. What direction? Horizontal, vertical? Do we see any diagonals? Artists sometimes use shapes arranged vertical and horizontal lines to create balance in composition.*
- *Count the number of colors you see in each work of art. When an artist uses just a few colors, it is called a limited palette (palette means choice of colors). Sometimes artists repeat just a few colors to create a sense of unity: to make every part of the composition feel like it belongs together.*

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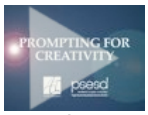
3. Demonstrate selecting 10x10 cm grids (copied on color copy paper) to make shapes for 100s, 10s and 1s that can represent a specific 3-digit number.

- *We are going to combine art and math by using shapes that represent the flats, rods, and blocks we have been working with. We will be arranging these shapes to represent a 3-digit number.*
- *We are working with just three colors for a limited palette, so you can choose up to 3 different grid paper colors.*



Prompting for Creativity

- *My number is 257, so I am choosing two 10x10 (one hundred/flat) grids for 200. They can be the same of different colors of paper (as long as I stick to three colors total).*
- *Now I need another 10x10 (one hundred) grid paper to cut apart for the 10s (rods). How many 10s will I need? (5). How many 1s will I need? (7).*

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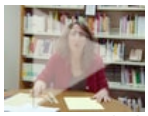
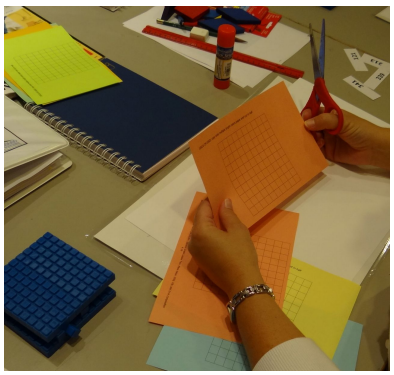
4. Distribute a card with a 3-digit number on it to each student. Demonstrate and guide cutting out (and cutting up) 10x10 cm grids to make shapes for 100s, 10s, and 1s for use in a place value composition.


Cutting Out Grid Shapes

- *Think about your number: You will need one grid paper for each one hundred in your number + an additional grid paper for cutting up 10s and 1s. Remember 3 colors for a limited palette!*
- *With my thumb up, I am slowly cutting around out 100s grids exactly on the line.*
- *Next, I am carefully cutting apart the third 100s grid into 10x10s.*



Students assigned smaller numbers who would like to add a third color paper, can use another student's extra 10s paper strip (in an additional color).

- *Now I am cutting apart one of my 10s into ten 1s.*
- *Carefully cut out your grids now to match your number.*

☑ Criteria-based process assessment: Selects a limited palette of three colors.
☑ Criteria-based teacher checklist: Cuts on lines.

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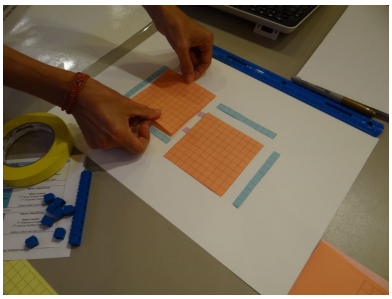
5. Demonstrate and guide positioning place value shapes in horizontal and vertical balance. Emphasize balancing shapes by using the whole space of paper while representing a 3-digit number accurately.



- *Thinking about vertical and horizontal balance, now carefully arrange each shape without overlapping (100s, 10's, and 1's) to show your number.*
- *Arrange your shapes without overlapping or touching as if they are on top of a big imaginary grid where edges of shapes are only horizontal or vertical: just like the art we have looked at. No diagonals!*
- *Think about balance: are your shapes arranged in all parts of your composition?*
- *Talk about your composition with a partner: Check for shapes that are in horizontal and vertical balance that match 3-digit numbers.*

☑ Criteria-based peer assessment and teacher checklist: Arranges place value shapes vertically and horizontally representing a 3-digit number and uses a limited palette of three colors.

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6. Demonstrate and guide gluing using glue mat or book (recycled magazine) and glue sticks.

Craft of Gluing with Glue Stick/O'Glue

- *Once your place value composition and equation has been checked by a partner (and teacher), remove each shape one by one, turn over on glue mat or book, and run glue over the edge of shape, and then glue exactly where it was.*
- *Using craftsmanship, rub shapes down well so they are flat and stay put.*
- *Last, write your number in expanded notation/form as an equation on the bottom left corner (200+30+7=237) and sign your name in the lower right corner on the front.*

☑ Criteria-based teacher checklist: Represents a 3-digit number by arranging place value shapes corresponding with 100s, 10s, and 1s, and records number using expanded notation/form. Glues securely.

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7. Guide students in reflection.

Guiding Reflecting on Student Art

Students can compare their collage with others' to practice ordering compositions from smallest to largest number as part of this lesson also.

- *Practice reading other student's compositions without looking at the notation/equation.*
- *What did you notice about creating vertical and horizontal balance? Notice and describe a composition where the artist has balanced the shapes well on the paper.*

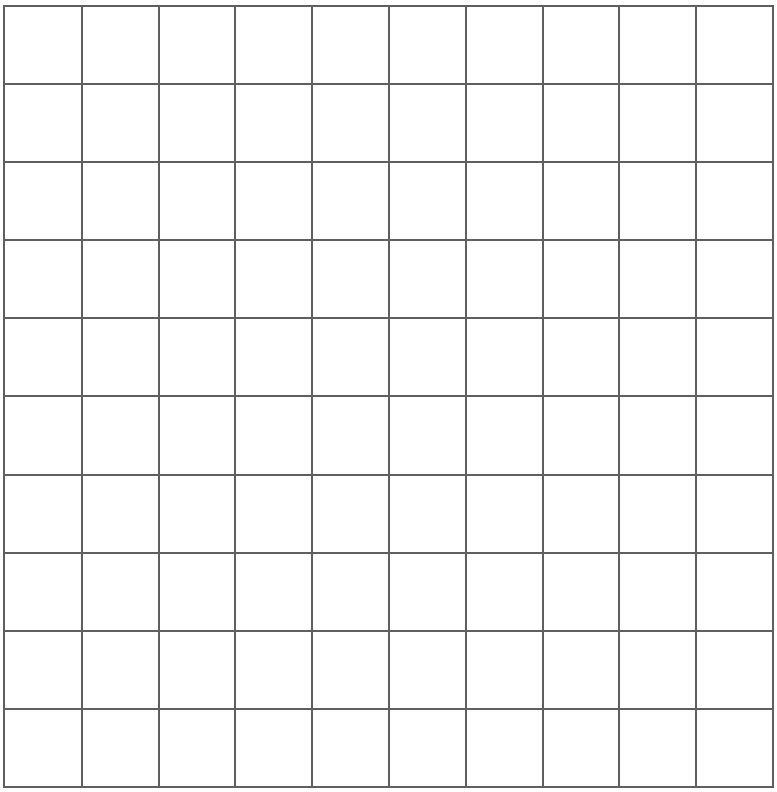
☑ Criteria-based group reflection: Analyzes compositions mathematically and artistically.

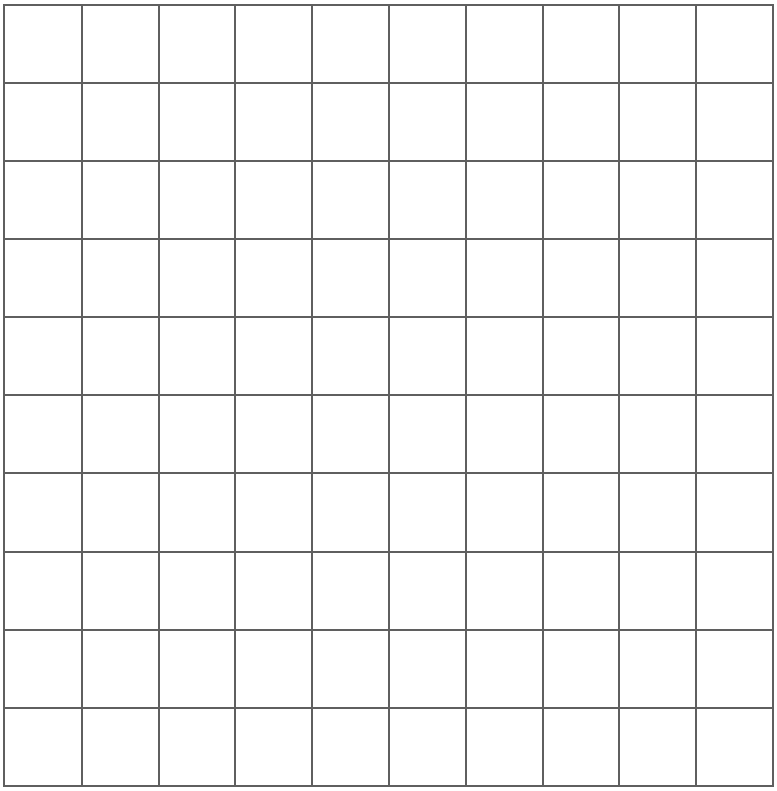
***Everyday Mathematics* Extensions:**
10.10 – Place Value Notation for Ten-thousands

PLACE VALUE NUMBERS FOR STUDENTS: cut into cards or strips

213	**258**	**311**
352	**323**	**127**
137	**144**	**299**
319	**216**	**331**
153	**391**	**112**
234	**177**	**214**
339	**244**	**354**
121	**372**	**132**
295	**139**	**242**
341	**217**	**197**

10X10 CM GRID: copy onto multiple bright colors paper and cut in half





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

STUDENT SELF-ASSESSMENT WORKSHEET

Disciplines	**MATH**		**VISUAL ARTS**			Total
Concept	**Place Value**		**Balance**	**Unity**	**Craftsmanship**	5
Criteria Student Name	Combines 100s flats, 10s rods, and 1s blocks to correctly represent 3-digit numbers	Represents a 3-digit number by arranging place value shapes corresponding with 100s, 10s, and 1s, and records number using expanded notation/form	Arranges place value shapes vertically and horizontally representing a 3-digit number	Uses a limited palette of three colors	Cuts on lines; glues securely	

ARTS IMPACT LESSON PLAN Visual Arts and Math Infusion

Second Grade Lesson Two: *Place Value: 100s, 10s, and 1s in Composition*

CLASS ASSESSMENT WORKSHEET

Disciplines	MATH		VISUAL ARTS			Total
Concept	Place Value		Balance	Unity	Craftsmanship	5
Criteria Student Name	Combines 100s flats, 10s rods, and 1s blocks to correctly represent 3-digit numbers	Represents a 3-digit number by arranging place value shapes corresponding with 100s, 10s, and 1s, and records number using expanded notation/form	Arranges place value shapes vertically and horizontally representing a 3-digit number	Uses a limited palette of three colors	Cuts on lines, glues securely	
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
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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: _____

ARTS IMPACT FAMILY LETTER

VISUAL ARTS AND MATH LESSON: ***Place Value: 100s, 10s, and 1s in Composition***

Dear Family:

Today your child participated in an **Art and Math** lesson. We looked at paintings by two artists that have geometric shapes organized vertically and horizontally. We learned about how art like this is considered non-objective (no object). This art is purely about relationships of shapes and colors. Many non-objective artists use math in their art to organize and give structure to their artistic compositions.

- We explored showing three digit numbers using place value flats, rods, and blocks.
- We each were assigned a 3-digit number. Next, we selected color papers with 100s grids copied on them: Then we cut out, using craftsmanship, 10x10 grid squares representing 100, 10 grid squares in a row representing 10, and single squares representing 1.
- We used a limited color palette of three colors in our collages to unify our compositions. We arranged our cut-out place value shapes in vertical and horizontal alignment to create a sense of balance.
- We checked to make sure our compositions matched the 3-digit number we were assigned, then we glued our collages securely using craftsmanship.

At home, you could explore translating three digit numbers into 100s, 10s, and 1s: you could use dollars, dimes, and pennies. Together, you could search for and draw combinations of shapes showing vertical and horizontal balance. You can also notice how a limited palette is often used to unify signs, printed materials, and web sites.

Enduring Understanding

Shapes symbolizing numbers in a limited color palette can be organized vertically and horizontally to create unified, balanced compositions.