JOHANNA GROENE

TESSELLATIONS

3rd Grade | Mixed Media
# UWM Lesson Plan Template
*(adapted from PSOA Art Education Area)*

<table>
<thead>
<tr>
<th>Name:</th>
<th>Johanna Groene</th>
<th>Email:</th>
<th><a href="mailto:jgroene@uwm.edu">jgroene@uwm.edu</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Title:</td>
<td>Tessellations</td>
<td># of Sessions</td>
<td>3 1.5 hours each</td>
</tr>
<tr>
<td>Level/Grade/Age</td>
<td>3rd grade</td>
<td>3rd grade Summer School</td>
<td></td>
</tr>
</tbody>
</table>

## BIG IDEA
*(Describe how the big idea is important to this age group in relation to student assets and the content area):*

Exploring problem solving, and creative thinking while working with geometric shapes. Approaching mathematics in a new, student centered, inquiry-based learning with arts integration.

## OBJECTIVES AND NATIONAL STANDARDS:

**Form & Structure** *(i.e., how does the lesson allow students to analyze and demonstrate art making approaches using art elements and principles of design to convey meaning?)*

Students must manipulate common animal stencils to create and unending repeated pattern. The act created opportunities for special relations.

**Learning Objectives**

After this lesson, students will be able to:

- define and identify tessellations
- discriminate between a pattern and tessellation
- find tessellations in the real world

- CCSS.ELA-LITERACY.RI.2.1

Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.

- CCSS.ELA-LITERACY.RI.2.2

Identify the main topic of a multi paragraph text as well as the focus of specific paragraphs within the text.
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.

Objective:
Recognize and explore the properties of tessellations.
- Identify and examine symmetry in geometric figures.
- Describe, and classify polygons, examine the role of mathematics in society and nature

Form and Structure
The students need to find where the pattern fits perfectly within itself to create a repeating pattern (Iterations)

Context (i.e., how does the lesson allow students to relate art to personal, social, cultural and/or historical perspectives?)
Being curious with space and proportion, rotating shapes to solve problems. Allowing students

Personal Perspective (i.e., how does the lesson provide opportunities to students for personal choices with content, methods, or styles?)
Each student will be able to choose their own tessellation shape, color schemes, and placement of fist iteration. Each choice will personalize their art in allowing for individual styles and abilities.

UWM Lesson Plan Template
(adapted from PSOA Art Education Area)

ACADEMIC LANGUAGE TO BE INTRODUCED THROUGHOUT LESSON:

| Academic language to be used: | Polygon, Symmetry, Tessellation, iterations, patterns, geometric shapes, Maurits Cornelis Escher |
| Where academic language will be practiced (i.e. through writing and art making): | Verbally in context, written |

LANGUAGE FUNCTION USED THROUGHOUT LESSON:

| Type of language function: | Written, reflective writing, oral discussion. |
| Emphasis of language function (describe the main purpose of using this language function for your lesson): | Expressing and Supporting Opinions • Comparing • Contrasting • Summarizing |
| Where language function will be practiced (i.e., through writing and art making): | Oral and written language |

UNIT or LESSON OVERVIEW:
Each lesson will start out with a math journal-

**Day 1**

1. Math Journal question: What do you know about patterns?

2. After sharing what students think they know about patterns, look around the room for patterns (number lines, colored tiles)

After students share their thoughts, talk about What Tessellations are. Regular/ Non-regular.

Tell students they are going on a 'pattern hunt.' They will walk around the classroom (or even into the hallways) and look for one thing: patterns. After about five minutes, have students return to their seats.

- What patterns did you notice?
- How did you know they were patterns?

Show examples (same shapes, equal sides) in nature

Honeycombs
Seashells
Patterns

Ask student what they notice? (Color is used along with shape to create repeating pattern, nature has naturally occurring patterns, etc.)

3. Explain “Tessellation” an arrangement of shapes closely fitted together, especially of polygons in a repeated pattern without gaps or overlapping. Have them write it down, have them explain what it means to them. “elbow partner”

Give out regular tessellation coloring sheet.
Pass out supplies

Paper will be handed out first and then pencils
Pass out oil pastels and begin filling in designs

Give assistance to any students who may need assistance

**Day 2**
- What is a tessellation? Draw an example (after 2 minutes of productive struggle show previous day’s examples in nature)

Repeat the previous day’s lesson on how to spell Tessellation, what it is, regular/irregular?

Show examples of regular polygon tessellations. Hand out two lizards and have student manipulate all the ways a lizard can fit inside itself.

After student have attempted a few different ways- ask what they noticed.

Model tracing lizard shapes, have students watch and offer suggestions as to where the lizard goes next. Also offer tracing tip (hold still while using hand.)

Have them use their 3d model and trace and model after teacher.
Day 3
Continue completing tessellation – Look at artist’s pictures
Remind about use of color as a pattern (show examples from yesterday)

Hand out tessellation shapes (lizard,
Students will sketch out and plan their patterns with pencil and begin to color.
Show students examples of how coloring also makes a pattern (3-4 colors, how do they know where to put the colors?)
Trace and color tessellation picture.

Day 4
Introduce
Maurits Cornelis Escher history, who he was, introduce video, say that people talk about a man born in the early 1900s, followed Suprematism geometric movement.

https://youtu.be/Kcc56fRtrKU

finish tessellation coloring, reminding about patterns.
Talk about artist, what do they notice? (same as yesterday) Finish tessellation art.
| ADAPTATIONS: | Give “clues” if child has demonstrated productive struggle. (NCTM)  
Have smaller pieces of paper so child can make few iterations. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RELEVANT THEORIES:</td>
<td>Vygotsky socio-cognitive language, Suprematism movement early 1900s</td>
</tr>
</tbody>
</table>
| ASSESSMENTS: | Initial (formal/informal):  
Watch if students attempt to manipulate the shapes  
Progressive/Formative (formal/informal):  
Students complete at least 80% of tessellation shape without assistance  
Final/Summative (formal/informal):  
Students create original tessellations with an oral story to share with class. |
Exploring problem solving, and creative thinking while working with geometric shapes. Approaching mathematics in a new, student centered, inquiry-based learning with arts integration.

OBJECTIVES AND NATIONAL STANDARDS:

Form & Structure (i.e., how does the lesson allow students to analyze and demonstrate art making approaches using art elements and principles of design to convey meaning?)

Students must manipulate common animal stencils to create and unending repeated pattern. The act created opportunities for special relations.

Learning Objectives

After this lesson, students will be able to:

- define and identify tangram
- manipulate tangram using problem solving techniques
- create their own shapes and create unique story

- CCSS.ELA-LITERACY.RI.2.1

Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.

- CCSS.ELA-LITERACY.RI.2.2

Identify the main topic of a multi paragraph text as well as the focus of specific paragraphs within the text.

- CCSS.MATH.CONTENT.2.G.A.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.
Objective:
Recognize and explore the properties of tangrams.
- Identify and examine symmetry in geometric figures.
- Describe, and classify polygons, examine the role of mathematics in society and nature

Form and Structure
The students need to find where the pattern fits perfectly within itself to create a repeating pattern (Iterations)

Context (i.e., how does the lesson allow students to relate art to personal, social, cultural and/or historical perspectives?)
Being curious with space and proportion, rotating shapes to solve problems. Allowing students

Personal Perspective (i.e., how does the lesson provide opportunities to students for personal choices with content, methods, or styles?)
Each student will be able to choose their own tessellation shape, color schemes, and placement of first iteration. Each choice will personalize their art in allowing for individual styles and abilities.

UWM Lesson Plan Template (adapted from PSOA Art Education Area)

ACADEMIC LANGUAGE TO BE INTRODUCED THROUGHOUT LESSON:
| Academic language to be used: | Polygon, Symmetry, Tangram, iterations, patterns, geometric shapes, |
| Where academic language will be practiced (i.e. through writing and art making): | Verbally in context, written |

LANGUAGE FUNCTION USED THROUGHOUT LESSON:
| Type of language function: | Written, reflective writing, oral discussion. |
| Emphasis of language function (describe the main purpose of using this language function for your lesson): | Expressing and Supporting Opinions • Comparing • Contrasting • Summarizing |
| Where language function will be practiced (i.e., through writing and art making): | Oral and written language |

UNIT or LESSON OVERVIEW:
Each lesson will start out with a math journal-

**Day 1**
- What do I know about shapes?
  After sharing students gather on the floor.

  Talk about history of tangrams:
  [https://www.youtube.com/watch?v=Q4LsgzL9DaE](https://www.youtube.com/watch?v=Q4LsgzL9DaE)  
  debrief video

  - First attempts will be done in whole group on floor with teacher and students. The plastic tangrams are worked, teacher models how to flip tangram shapes. There are seven pieces in a tangram, which makes a square.

- For third grade, teacher is prepared to give a few “clues”. (i.e. \( \frac{1}{2} \) of the square is made of the two largest triangles

- Offer tangram bags and have each student practice creating squares, model making the square on the document camera. Slowly as each student can go at their own rate.

**Day 2**
- What are some words I know for shapes?
  (triangles, circles, polygon)

**Day 3**
Math journal- What is a tangram? Draw a picture. Share

- Have students recreate the tangram square.
- Introduce making a shape challenge (Christmas in July shapes)
- Model making a Holiday Tree using cutout tangrams.
- Pass out print out tangrams along with an envelope with their names on them.
- Have students cut out shapes. Give them a tree shape outline, have them attempt making the shape.
- Once frustration is about to have students shut down, offer major clues in the tree’s construction (start with two large triangles.)
- Those finished early can play with their tangrams and make up their own shapes
Third grade summer school enjoying “Christmas / Holidays in July” with tangrams

Day 4
Kazimir Malevich introduce artist
Show video: https://www.youtube.com/watch?v=xyCLVaxX0zI
Boy with oil

Discuss the video, what did they notice with his paintings? (shapes that make a story, shapes that used as just shapes).

Tell students they are going to make a story with their tangram shapes. Show students the example and tell them a quick story about the apple that fell from a tree and grew into the giant apple and became friends with the giant peach.”

Hand out oil crayons, envelope of tangram shapes scissors, glue sticks.

Have students invent a shape with their pieces (not an apple), then create a background for their shape, recreate on paper, then glue shape in place.

Have them be ready to share a quick oral story with their picture.

UNIT or LESSON DETAIL (provide for each lesson session):

UWM Lesson Plan Template (adapted from PSOA Art Education Area)

<table>
<thead>
<tr>
<th>ADAPTATIONS:</th>
<th>Give “clues” if child has demonstrated productive struggle. (NCTM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RELEVANT THEORIES:</td>
<td>Vygotsky socio-cognitive language, Suprematism movement early 1900s</td>
</tr>
</tbody>
</table>
| ASSESSMENTS: | Initial (formal/informal):
Watch if students attempt to manipulate the shapes |
| Progressive/Formative (formal/informal):
Students complete at least 80% of tangram shape without assistance |
<table>
<thead>
<tr>
<th>Final/Summative (formal/informal):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students create original tangram art with an oral story to share with class.</td>
</tr>
</tbody>
</table>
UWM Lesson Plan Template
(adapted from PSOA Art Education Area)

<table>
<thead>
<tr>
<th>Name:</th>
<th>Johanna Groene</th>
<th>Email:</th>
<th><a href="mailto:jgroene@uwm.edu">jgroene@uwm.edu</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson</td>
<td>Base Ten With Art</td>
<td># of Sessions</td>
<td>3, 1.5 hour each</td>
</tr>
<tr>
<td>Title:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level/Grade/Age</td>
<td>3rd grade</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**BIG IDEA**
(Describe how the big idea is important to this age group in relation to student assets and the content area):

Exploring problem solving, and creative thinking while working with geometric shapes. Approaching mathematics in a new, student centered, inquiry-based learning with arts integration.

**OBJECTIVES AND NATIONAL STANDARDS:**

Form & Structure (i.e., how does the lesson allow students to analyze and demonstrate art making approaches using art elements and principles of design to convey meaning?)

Students must manipulate common animal stencils to create and unending repeated pattern. The act created opportunities for special relations.

**Learning Objectives**

After this lesson, students will be able to:

- define and identify place value
- understand and utilize color in an expressive, meaningful way (can articulate)
- CCSS.ELA-LITERACY.RI.2.1

Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.

- CCSS.ELA-LITERACY.RI.2.2

Identify the main topic of a multi paragraph text as well as the focus of specific paragraphs within the text.

**Objective:**

Recognize and explore the properties of base ten.

- Describe, and classify polygons, examine the role of mathematics in society and nature
Form and Structure

The students need to find where the pattern fits perfectly within itself to create a repeating pattern (Iterations)

Context (i.e., how does the lesson allow students to relate art to personal, social, cultural and/or historical perspectives?)

Being curious with space and proportion, rotating shapes to solve problems. Allowing students

Personal Perspective (i.e., how does the lesson provide opportunities to students for personal choices with content, methods, or styles?)

Each student will be able to choose their own tessellation shape, color schemes, and placement of first iteration. Each choice will personalize their art in allowing for individual styles and abilities.

UWM Lesson Plan Template (adapted from PSOA Art Education Area)

<table>
<thead>
<tr>
<th>ACADEMIC LANGUAGE TO BE INTRODUCED THROUGHOUT LESSON:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic language to be used:</td>
<td>Polygon, base ten, place value, iterations, patterns, geometric shapes,</td>
</tr>
<tr>
<td>Where academic language will be practiced (i.e. through writing and art making):</td>
<td>Verbally in context, written, expressive through art.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LANGUAGE FUNCTION USED THROUGHOUT LESSON:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of language function:</td>
<td>Written, reflective writing, oral discussion.</td>
</tr>
<tr>
<td>Emphasis of language function (describe the main purpose of using this language function for your lesson):</td>
<td>Expressing and Supporting Opinions • Comparing • Contrasting • Summarizing</td>
</tr>
<tr>
<td>Where language function will be practiced (i.e., through writing and art making):</td>
<td>Oral and written language</td>
</tr>
</tbody>
</table>

UNIT or LESSON OVERVIEW:

The teacher will prepare a space in the gallery for the students to work. Tables and chairs will be arranged so that it is accessible for all of the individuals. All of the supplies will be at the end of one of the tables and ready to distribute.

2. Introduction to art

Day 1:

Math Journal Question:
What do you already know about what shape?
What place is the underlined in this number: _539_?
Go over expectations of using base ten blocks while teacher is talking (it’s a tool, not a toy).

Show Base 10 Blocks

Review places. Show the ones cube, ask a student what it represents “One cube of the “Ones Group”. Ask student to locate one cube in their table’s basket.

Show ten rods. Ask how many cubes are in a rod. “Ten”. Have them count, while placing 10 single cubes on top of the rod so the students see that there are 10- or “One group of ten”

Show Hundred flat- ask students to place ten rods on top of flat. Ask how many groups of ten in a flat “ten”, have students count by ten (10,20,30,40,50,60,70,80,90,100) “How many cubes of one? “100”)

Practice having students making numbers, 243, 325, 201 with base 10 blocks.

Show the thousands cube, have students build a cube of the same size. Have the students count by hundreds “100,200,300,400,500,600,700,800,900,1000”

Day 2:
Make art with base 10 blocks.

Have students gather on floor, teacher models making a number to review yesterday. Has students produce a number, have other students identify the number.

After having them return to their seats, use document camera to produce the art piece below.
Ask students what they notice that I did differently? (layered blocks) Ask students to guess the number that teacher made.

Point out a few pieces that teacher used (ones, hundreds)
When students realized that the medium sized squares are not base ten blocks, ask how they could figure out how many cubes it is? (have them place cubes of one on top pf square) (12 per medium squares 136 total)

Have students use base ten blocks to create base ten art, have elbow partner

Day 3:
- The teacher will show the example of Wassily Kandinsky “Several Circles”.

I think this number is ____ because

_________________________
_________________________
_________________________
_________________________
_________________________
_________________________

P.O. Box 413, ArtsECO Art & Design Department, University of Wisconsin-Milwaukee, Milwaukee WI 53201-0413
c. Ask the student what they notice?

The teacher will tell the students to think about the colors and patterns that they will use that could describe them (things they like, their personality, etc.).

Talk about Wassily Kandinsky “Several Circles”, show video
https://www.youtube.com/watch?v=YuFNL0tPmDo

Talk about the video- who was he? What did he do that made him different? How do they think he make his art? Talk about water color (what do they know about it?)

Teacher demonstrates how to use watercolor pens using doc camera. Show student how it’s using water to paint with color pigments. Show two beginner techniques: wet on wet techniques, wet on dry technique.

Have students use circle patterns large, medium, small, extra small.
And draw/ color with watercolor pens
Establish use rules (on paper, not on people)

Have newspaper on each table prior. Each student gets a paper towels.

Hand out circle templates in baggie to each student. Ask them to experiment and start by tracing circles, then adding more circles on top of each other.

Then have them use watercolor pens when circles are finished
| **ADAPTATIONS:** | Have student trace only a few iterations with smaller piece of paper.  
**Extension:** Assign a number value (base ten) for each circle size and ask what number they had created. |
| **RELEVANT THEORIES:** | Moore color theory, Vygotsky socio-cognitive language, Suprematism movement early 1900s |
| **ASSESSMENTS:** | Initial (formal/informal):  
Student is able to manipulate various circles, turn around, flip to create the concentric circles pattern  
Progressive/Formative (formal/informal):  
Able to make the connection between place values and Kandinsky paintings  
Final/Summative (formal/informal):  
Student successfully completes the pattern 80% correctly. |