Unit Design

The Shapes We’re In

Grade Level:
Grade 4

Content Areas:
Math
Art
(integrating Language Arts and Social Studies)

Names:
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and

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Standards and Benchmarks

Math: Geometry Standard C

C.4.1 All children at this level must have the opportunity to learn these performance benchmarks:
Analyze the following 2 and 3 dimensional shapes and objects (circles, triangles, squares, rectangles, octagons, hexagons, pentagons, trapezoids, spheres, cubes, prisms, cylinders, cones, rhombus, parallelograms, polygons, and pyramids) by

A) Naming,
B) Comparing, sorting, and classifying according to their attributes,
C) Drawing and constructing physical models to specification,
D) Recognizing the application of geometric shapes and objects in the world,
E) Investigating the following properties:
   a. Number of sides, faces, equal sides, right angles,
   b. Investigate and predict the results of putting together and taking apart shapes.

Horizontal Connections: Art & Design History, Citizenship & Environment Standard B

B.4.4 Know that art is influenced by artist, designer, and cultures.

Concepts: SHAPE

- shape relationships
- shapes in the world around us
- shapes within architectural design
- geometric shapes
- geometric properties
<table>
<thead>
<tr>
<th>Generalizations:</th>
<th>Essential/Guiding Questions:</th>
</tr>
</thead>
</table>
| Cultures use mathematical shapes to develop designs. | E: How do cultures use mathematical shapes to design their architecture?  
G: Why do cultures need to understand shapes?  
What are the shapes different cultures use?  
Why do different cultures have different looking houses?  
How do shapes fit into architecture? |
| All shapes have properties. | E: How do we classify shapes?  
G: When do you need to know the properties of shapes?  
What are some ways we sort shapes?  
What are their different attributes? (What do they look like?)  
What are the differences between 2-D and 3-D? Why is this important?  
What are the properties of shapes? |
| Shapes have relationships to the real world. | E: How do shapes have a relationship to your world?  
G: Where do you see shapes in the world?  
Where do you see shapes in other cultures?  
Why are certain objects certain shapes? (Why is a manhole round?) |
Benchmark: **Math Geometry C.4.1** Analyze the following 2 and 3 dimensional shapes and objects (circles, triangles, squares, rectangles, octagons, hexagons, pentagons, trapezoids, spheres, cubes, prisms, cylinders, cones, rhombus, parallelograms, polygons, and pyramids) by naming, classifying and drawing according to their attributes. Recognizing geometric shapes and objects in the world.

<table>
<thead>
<tr>
<th>Benchmark Proficiency Criteria</th>
<th>Learning Target</th>
<th>Method of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>~ Use tools (ruler, compass) to construct shapes</td>
<td>Skill</td>
<td>Performance Assessment</td>
</tr>
<tr>
<td>~ Use picture/word prompts to name shapes</td>
<td>Knowledge</td>
<td>Selected Response</td>
</tr>
<tr>
<td>~ If given a prompt, students can match shapes to real world objects.</td>
<td>Reasoning</td>
<td>Constructed Response</td>
</tr>
</tbody>
</table>

**K = Knowledge**

**S = Skill**

**R = Reasoning**

**D = Dispositions**

**P = Product**

**CR = Constructed Response**

**SR = Selected Response**

**P = Product**

**PA = Performance Assessment**

**O = Observation**

**PC = Personal Communication**

**PF = Portfolio**
Benchmark: **Art B.4.4** Know that art is influenced by artist, designer, and cultures.

<table>
<thead>
<tr>
<th>Benchmark Proficiency Criteria</th>
<th>Learning Target</th>
<th>Method of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>~ Students can identify art ideas, such as shapes, line, and space within architecture from a variety of cultures.</td>
<td>Reasoning</td>
<td>Performance Assessment/Product</td>
</tr>
<tr>
<td>~ Students demonstrate the ability to identify a variety of geometric shapes.</td>
<td>Knowledge</td>
<td>Selected Response</td>
</tr>
</tbody>
</table>

\[ K = \text{Knowledge} \quad S = \text{Skill} \quad R = \text{Reasoning} \quad D = \text{Dispositions} \]

\[ P = \text{Product} \]

\[ CR = \text{Constructed Response} \quad SR = \text{Selected Response} \quad P = \text{Product} \quad PA = \text{Performance Assessment} \quad O = \text{Observation} \quad PC = \text{Personal Communication} \quad PF = \text{Portfolio} \]
### Instructional/Assessment Planner

#### Baseline Assessment

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td></td>
</tr>
<tr>
<td>Formative Assessment/Instructional Strategies:</td>
<td>Ongoing closing activities to monitor student progress and misconceptions.</td>
</tr>
<tr>
<td>Geometry Journal</td>
<td></td>
</tr>
<tr>
<td>Baseline Activity Sheets. Selected Response,</td>
<td></td>
</tr>
<tr>
<td>Constructed Response.</td>
<td></td>
</tr>
<tr>
<td>Baseline Activity Sheets requiring use of tools.</td>
<td></td>
</tr>
<tr>
<td>Constructed Response, Observational Checklist.</td>
<td></td>
</tr>
<tr>
<td>Formative Assessment/Instructional Strategies:</td>
<td>Lesson 5b. Students retake Baseline Assessment page 2 to show growth.</td>
</tr>
<tr>
<td>Baseline Assessment page 2.</td>
<td></td>
</tr>
<tr>
<td>Formative Assessment/Instructional Strategies:</td>
<td>Lesson 6b. Students visit the Neville Public Museum.</td>
</tr>
<tr>
<td>Scavenger Hunt Worksheet. Constructed Response</td>
<td></td>
</tr>
<tr>
<td>Formative Assessment/Instructional Strategies:</td>
<td>Lesson 9. Identify various architectural patterns within cultures.</td>
</tr>
<tr>
<td>Web “How does Culture Influence Art/Architecture?”</td>
<td></td>
</tr>
</tbody>
</table>

### Performance Assessment

***See attached sheets regarding performance assessment. ***See lesson 5a.
Baseline Assessment

Name:  Aimee, Gretchen, and Karen

Class:  Grade 4

Benchmark # 1:  Math Geometry  C.4.1
Analyze the following 2 and 3 dimensional shapes and objects (circles, triangles, squares, rectangles, octagons, hexagons, pentagons, trapezoids, spheres, cubes, prisms, cylinders, cones, rhombus, parallelograms, polygons, and pyramids) by
Naming, classifying and drawing according to their attributes. Recognizing geometric shapes and objects in the world.

1) Have students follow a series of simple verbal commands (Ex. “Draw a vertical line.”) to practice tool use.
2) Have students do a worksheet of selected shape response given shape images and names.
3) Color-coded picture.

***See lesson Two
Baseline Assessment Part 1 Tools of the Trade
Baseline Assessment Part 2 Name It, Sort It, Draw It

Benchmark # 2:  Art B.4.4
Know that art is influenced by artist, designer, and cultures.

1) Students will complete a worksheet to show they can identify lines and shapes in an architectural picture.

***See lesson Three
Baseline Assessment Part 3  Color-Coded Picture
Baseline Scoring

Benchmark # C.4.1 Geometry Standard
Part 1 Page 1 Tools of the Trade. Use tools to create accurate drawings.

- 9-12 correct = 3 (proficient)
- 5-8 correct = 2 (approaching proficiency)
- 1-4 correct = 1 (not proficient)

Benchmark # C.4.1 Geometry Standard
Part 2 Page 2-3 Name It, Sort It, Draw It

- 9-12 correct = 3 (proficient)
- 5-8 correct = 2 (approaching proficiency)
- 1-4 correct = 1 (not proficient)

Benchmark # C.4.1 Geometry Standard
B.4.4 Art Standard
Part 3 Page 4 Color-Coded Picture

- 22-28 correct = 3 (proficient)
- 14-22 correct = 2 (approaching proficiency)
- 1-14 correct = 1 (not proficient)
**Performance Assessment**

**Goal:** The student demonstrates understanding about the critical component of the unit topic (Use generalizations to guide writing the goal).  
**Students can show how mathematical shapes are used in various cultures’ architecture, primarily in homes.**

**Scenario:** The student is placed in a real-world situation in which the student assumes a role with an authentic audience. (Use G.R.A.S.P.S to guide writing the scenario)

Scenario: You received a special letter in the mail yesterday from the Chamber of Commerce. The letter contained the following statement, “FREE, A NEW HOME.” Everyone in your home was jumping up and down and screaming and yelling until you noticed some smaller print. It said, “You must: (1) Make sure your design has a feature in it which makes it resemble at least one of the listed cultures. (Hispanic, Hmong, Native American, African) (2) In your design, the shapes you used must be identified in some way to help the engineers draw the blueprints. (Identified within the design, write the names, verbalize or list the shapes and give their names.) After thinking about this small print you and your family decided that you were up to the challenge of designing a new home…but you have a lot of work to do!

Role: Student will become the researcher and designer. He/she must know properties of geometry and of various cultures in order to get the house.

Audience: Remember the principal of your school, the mayor of the city, the sheriff and two Packer players will judge your design.

**Evaluation Criteria:** The student meets the criteria for benchmark proficiency by producing evidence of learning.

Product: Draw a house design that incorporates a selected culture and geometric properties.

Criteria: Students use tools to construct their house design. (Geometry C.4.1) Students will match shapes to real world objects within their home design (Geometry C.4.1) Students demonstrate the ability to identify art ideas such as shapes, lines, space and a variety of geometric shapes in their house design. (Art B.4.4)

~See lesson 5 for letter establishing criteria and student teacher checklist.
### Performance Assessment Rubric

<table>
<thead>
<tr>
<th>Benchmark #</th>
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<th>Benchmark #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math C.4.1</td>
<td>Math C.4.1</td>
<td>Art B.4.4</td>
</tr>
<tr>
<td>Art B.4.4</td>
<td>Using Tools</td>
<td>Shapes and Culture</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
<th>Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>The student is able to name most shapes, gives both drawn and written examples, demonstrating a clear understanding. (prompts will be provided)</td>
<td>The student demonstrates control of the tools (ruler, pencil, eraser, compass) completing all the tasks. Most lines are accurate.</td>
<td>The student demonstrates a complete and detailed understanding of a culture’s architecture and its relationship to art ideas (shapes, lines &amp; space).</td>
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<tr>
<td>3</td>
<td>The student is able to name most shapes and is able to give either drawn or written descriptions of each shape. (prompts will be provided)</td>
<td>The student demonstrates control of the tools (ruler, pencil, eraser, compass) for the task, 7 or more times. Student’s lines are accurate most of the times.</td>
<td>The student demonstrates a somewhat complete understanding of a culture’s architecture and its relationship to art ideas (shapes, lines &amp; space).</td>
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<tr>
<td>2</td>
<td>The student is able to name some shapes. Some may have written or drawn examples. (prompts will be provided)</td>
<td>The student demonstrates control of the tools (ruler, pencil, eraser, compass) for the task, 4 or more times. Student’s lines are accurate most of the times.</td>
<td>The student displays a basic understanding of a culture’s architecture and its relationship to art ideas (shapes, lines &amp; space).</td>
</tr>
<tr>
<td>1</td>
<td>The student is able to name only a couple shapes and is unable to give drawn or written examples. (prompts will be provided)</td>
<td>The student cannot demonstrate control of the tools (ruler, pencil, eraser, compass). Student attempts the task and shows some accuracy.</td>
<td>The student displays a limited understanding of a culture’s architecture and its relationship to art ideas (shapes, lines &amp; space).</td>
</tr>
</tbody>
</table>
Informal Performance Assessment Tool:
Student: __________________________
Grade Level: ______________________

<table>
<thead>
<tr>
<th>Standard/Benchmark:</th>
<th>1 minimum</th>
<th>2 basic</th>
<th>3 proficient</th>
<th>4 advanced</th>
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<tbody>
<tr>
<td>Student Demonstrates:</td>
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<td>I observed directly/visually</td>
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<td>The student indicated verbally either individually or in group</td>
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<tr>
<td>Optional written student statement</td>
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<tr>
<td>Additional teacher comments/observations:</td>
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Unit Overview:
• Museum Connection-Scavenger hunt letter and directions
• Lesson 1 – “In the Beginning”

• Lesson 2 – “Do you know the shapes? Can you name them?”

• Lesson 3 – “Can you draw the shapes? Can you find the shapes in a picture?”

• Lesson 4 – “Shapes and Cultures- Can you see the shapes around you?”

*This lesson is where the unit is split to accommodate a focus in the geometry area of math or art.

Art Activity-
• Lesson 5 – “You are a contestant!” Students receive a letter to lead them to a design

• Lesson 6 – “Drafting” Sketch your plan and match the criteria

• Lesson 7 – “Ready, Checked to go and the Final Drawing”

• Lesson 8 – Final Drawing and Observational Benchmark

• Lesson 9- Performance Assessment for the Art Benchmarks
**Unit Title:** The Shapes We’re In  
**Time:** 1 Session  
**Lesson #:** 1

**Key concept/understanding/skill:** Math Standard Geometry C.4.1 Naming, Comparing and classifying shapes.
An introduction to shapes. 1) Shapes are everywhere. 2) Shape definitions and names relate to math, geometry and art. 3) To be comfortable using and communicating with shapes.

**Materials/Resources:** Overhead projector, geometric pattern blocks, PowerPoint with visuals (picture of a sunrise, slide with basic shapes, slide with a simple house picture made from shapes), Geometry poster, Books: *Alphabet City, A Light in the Attic*, Geometry Journal.

**Neville Public Museum Artifact:** Images of M.C. Escher’s work, Alhambra, and Hmong clothing.

**Classroom Setup:** Corner or table for a display of books for children to explore throughout the unit. Geometry Shapes Poster. PowerPoint.

**Instructional Plan:**
- Give children pattern blocks to play with and explore. Give no reason, just let them manipulate the shapes.
- After about 15 minutes have groups discuss. Then have a whole class show and tell of what they created. Pick-up.
- Read aloud. *Alphabet City* by Stephen T. Johnson* There are no words only pictures. Spend a few seconds on each page. Children should pick up on and see a pattern by or around reaching the letter E. Discuss.
- Hand out geometry journal (can be a folder with paper or a book made with construction paper). Ask children, “Where do we see shapes?”

**Learning Strategies:** Use geometry journal to seek student point of view. Work in groups. Self-assessment.

**Assessment Connection:** Life-long learning – Information Processing. Accurately assesses the value of information. Habits of mind-self regulation: Is aware of and uses necessary resources. Observation, Listen to child involvement and monitor interest.

**Teacher notes/reflections:**

*See Bibliography for complete citation.
Unit Title: The Shapes We’re In     Time: 2 Sessions     Lesson #: 2

Key concept/understanding/skill: Introduction to Shapes. What do we know already? Students will demonstrate/practice recognizing geometric shapes to see the connection to the art elements (of our culture and of other cultures around the world), with line and shape.

Materials/Resources: Baseline assessment Pages 1-3. Page 3 can be made into an overhead, put on the board or on student’s desk for them to use if needed. Crayons, pencils, KWLU, shape books, manipulatives, ruler, compass, protractor.

Neville Public Museum Artifact: Tessellations, Tiles.

Classroom Setup: Overhead, KWLU on overhead or poster board, Baseline Assessment packet and tools that are needed to complete the packet.

Instructional Plan:

• Have students close their eyes and think of the clothes, shoes, they have on. Give me a description of any designs on their clothes, using shapes. On tables/desks have pre-cut shapes or pattern blocks. Volunteers take a shape, match to another persons’ clothes and verbally describe. Will lead to a discussion to the reason we need to do some shape activities. We are going to use shapes and their connection to architecture to create our own home design.

• Hold up a few pattern blocks and ask “What is this?” Hold up a triangle. Continue will other basic shapes (Square, Circle, Rectangle) “What are they?” Shapes! Pass out Baseline Assessment and tell them this is so I, as a teacher, know what they already know. It won’t be graded. We will go through it together.

• Baseline Part 1 Page 1. Verbal section. Pass out tools. Students turn to page one of their packet and use tools to fill in the boxes.

• Baseline Part 2 Page 2-3. Page 3 is a word bank and its use is optional. Can be put on an overhead, on the board or students can have their own copy. Explain directions. In the “Name It” box, write the name of the shape you see. In the “Sort It” box, use the directions to classify each shape using A, B, C, and D. There may be more than 1 answer for each shape. In the “Draw It” box, draw it as accurately as possible.

• KWLU on chart paper or overhead. (Do the K, what we KNOW, and the W, what we WANT to learn, part) Hang in literature area to revisit throughout the unit.

• Intro some shape book that the children can read during the unit or independent read time.
• Journal. How well do you think you did on the practice packet? (Baseline Assessment)
• Questions:
  o What is a shape?
  o Is an art shape any different than a math shape?
  o Why should you be able to recognize and describe shapes?

**Learning Strategies:** KWLU, Classifying, Student self-reflection and journaling/sketching.

**Assessment Connection:** Baseline Assessment – all shapes have properties. Use skill and knowledge target. Reasoning skills can apply and be accurate with shapes and concepts.
Look over baseline assessment and circle wrong items. Do not correct. Hand back tomorrow and put in geometry journal folder so the kids can correct as we learn.

**Teacher notes/ reflections:**
Hey!!!! What Do You Know About Geometry?

This packet is designed to spark your interest as we begin to explore geometry. We will be working with the names of shapes, what they look like, and how to draw them. This is your opportunity to share with me what you already know about geometry. Whether you know a lot or a little about this topic, it will not matter!

**Part 1: “Tools of the Trade”**
As a master chef or even a carpenter, the ability to use certain tools is important in order to be successful. Use any of the provided tools to complete the chart, following the verbal directions. Your tools will include a pencil, eraser, ruler, protractor, and compass.

<table>
<thead>
<tr>
<th>(“Draw a straight line”)</th>
<th>(“Draw 2 vertical and horizontal straight lines”)</th>
<th>(“Draw a rectangle”)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(“Draw parallel lines”)</td>
<td>(“Draw intersecting lines”)</td>
<td>(“Draw a square”)</td>
</tr>
<tr>
<td>(“Draw perpendicular lines”)</td>
<td>(“Draw 2 four-sided shapes”)</td>
<td>(“Draw a circle”)</td>
</tr>
</tbody>
</table>

*Bonus*
- (“Draw a pyramid”)
- (“Draw a stop sign”)
- (“Draw a cube”)

You just drew an octagon!

This should look different than a square.
**Part I1: “Name It! Sort It!, Draw It!”**

Now it’s time to be a geometry detective! Just as a detective looks for clues, you will analyze these figures. Fill in the chart as you discover clues about each shape.

<table>
<thead>
<tr>
<th>Name It!</th>
<th>Sort It!</th>
<th>Draw It!</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
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</table>

**Sort It!**

**Directions:** Choose one or more of the following:

- **A** = curved shape
- **B** = straight-lined shape
- **C** = 3D shape
- **D** = has a right angle

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Culture Counts: People, Patterns and Pi
## Word Bank

<table>
<thead>
<tr>
<th>cylinder</th>
<th>trapezoid</th>
</tr>
</thead>
<tbody>
<tr>
<td>square</td>
<td>cone</td>
</tr>
<tr>
<td>circle</td>
<td>octagon</td>
</tr>
<tr>
<td>rectangular prism</td>
<td>cube</td>
</tr>
<tr>
<td>triangle</td>
<td>pentagon</td>
</tr>
<tr>
<td>parallelogram</td>
<td>rectangle</td>
</tr>
</tbody>
</table>
Unit Title: The Shapes We’re In  
Time: 1 Session  
Lesson #: 3

Key concept/understanding/skill: Math/Geometry - Comparing, classifying, and drawing shapes  
Art Concepts – Geometric shapes in architectural design using tools/media


Neville Public Museum Artifact: Alhambra

Classroom Setup: Overhead instructions to look at puzzle on each table. Or have tangram puzzles to play with. Students have 5-10 minutes to “figure out.”

Instructional Plan:
• Intro with shape games or tangrams on table. Questions: What kind of thoughts flow during this puzzle activity? (Look for self talking with shapes, help from friends.) What shape ideas do you need to explore? What shape properties do the students know?
• Demonstration of how to complete the house picture – if completed, have instructor check.
• Use tangram shapes to create a house or building. Trace the outline. This closure activity leads to seeing shapes within architectural design and culture.
• Read The House I Live In: At Home In America. By Isadore Seltzer Time line of different houses in America. What do they look like? What are they made of? Who lives in them? What was going on at the time?
• Put out various books and have students find shapes in a variety of buildings and cultural images.
• Journal  
  o How did you do on page 4 of Baseline Assessment?
  o What are some of the primary shapes you see in architecture?

Learning Strategies: Self-reflection and journaling/sketching.

Assessment Connection: Baseline Assessment – all shapes have properties. Use skill and knowledge target. Reasoning skills can apply and be accurate with shapes and concepts. Students match shapes to the real world. Look over baseline assessment and circle wrong items. Do not correct. Hand back tomorrow and put in geometry journal folder so the kids can correct as we learn.

Teacher notes/Reflections:
Follow the directions to color the shapes:

Blue = Rectangle  Brown = Parallelogram  Green = Octagon  Orange = Square
Grey = Cylinder  Pink = Trapezoid  Yellow = Hexagon  Red = Circle
Purple = Triangle  Black = Pentagon  Tan = Cube  Light Blue = Rectangular Prism
Unit Title: The Shapes We’re In  
Time: 1 Session  
Lesson #: 4a (Math based)

Key concept/understanding/skill: Learning specific shapes. Classifying shapes. All shapes have properties.

Materials/Resources: Individual student bags containing candy of various geometric shapes. Pattern blocks to include: square, triangle, circle, rectangle; pentagon, hexagon, octagon; parallelogram, trapezoid, rhombus; cube, cone, cylinder, rectangular prism, pyramid. Geometry journal, shape books.

Neville Public Museum Artifact:

Classroom Setup: Write on board. How do we classify shapes?

Instructional Plan: Generalization number 2. How do we classify shapes?

• Pass out bag of candy containing various geometric shapes. Use in identifying shapes throughout the lesson.
• Read Aloud. The Shape of Things
• Explore basic, simple shapes including square, triangle, circle, and rectangle. Read Shapes, Circle Song, The Red Ball, and Circle Dogs. (See bibliography.) Shape-sign PowerPoint.
• Explore the Agon Family. Who are they? Who are their family members? Mr. And Mrs. Agon and their children. Pentagon, Hexagon, Octagon, Nonagon.
• Explore 3-D shapes. What is the difference between 2-D and 3-D shapes?
• Games – Shape Hopscotch, build a candy figure using bag distributed earlier, group challenge – sort combined candy according to their properties, etc.


Assessment Connection: 1-on-1 or small groups. Page through Shapes and Things.
Student/Teacher conference. Observational Rubric.

Teacher notes/ reflections:
**Unit Title:** The Shapes We’re In  
**Time:** 1 Session  
**Lesson #:** 4b (Art based)

**Key concept/understanding/skill:** Math – Recognizing the application of geometric shapes and objects in the world. Art – Shapes in the world around us. Shapes within architectural design.

**Materials/Resources:** LCD unit, Internet access, variety of library books with various culture’s architecture and shape motifs, handouts with a variety of cultures motifs, Letter explaining the end project (Creation of building using culture and geometric shapes)

**Neville Public Museum Artifact:** Have pictures of southwest buildings, images of Alhambra, can include motifs in other designs.

**Classroom Setup:** Overhead or power point presentation of various architectural images. Students will need folders with baselines completed.

**Instructional Plan:**
- Students will be introduced to the sketching process
  - Class discussion during viewing of PowerPoint. Emphasis on shapes found in different cultures.
  - Go to Sanford Art Adventures on the Internet. www.sanford-artadventures.com
    - As a group, explore, and be an architect.
  - Students will, as a table, find shapes in various culture hand outs.
  - Closure. As a group, students will share findings with other tables and on overhead will draw a group shape collage to form multicultural image.

**Learning Strategies:** Organizing information and internalizing concept of shape and architecture.

**Assessment Connection:** Performance Assessment – Application of baseline knowledge. Observational Rubric.

**Teacher notes/ reflections:**
**Unit Title:** The Shapes We’re In  
**Time:** 1 Session  
**Lesson #:** 4c (Math based)

**Key concept/understanding/skill:** Where are shapes in the real world? Where are shapes in other cultures?

**Materials/Resources:** PowerPoint. Story books; Anansi the Spider, Matthew Wheelock’s Wall, What Goes Around Comes Around, Alphabet City. For complete citations see references.

**Neville Public Museum Artifact.**

**Classroom Setup:** PowerPoint

**Instructional Plan:** On the board. Where do we see shapes?

- PowerPoint including Building, Signs, and Cultural Artifacts.
- Revisit Alphabet City. Take a nature walk/scavenger hunt. Draw in geometry journal.
- How do artists see shapes? Read Matthew Wheelock’s Wall. How is the wall art?
- Read What Goes Around Comes Around and talk about the cultures around the world. Look at all the shapes in the illustration. Journal about different cultures that you pick up from just looking at the pictures.
- Read Anasi the Spider African culture to tell stories. Shapes represent qualities of the spider.

**Learning Strategies:** Hands on activities. Journaling.sketching.

**Assessment Connection:** Make a spider to represent you. Use geometrical shapes in the body. Complete scavenger worksheet.

**Teacher notes/ reflections:**

***Insert PowerPoint of signs/shapes.
**Geometry Scavenger Hunt**

Find examples of the following geometric shapes within the community.

<table>
<thead>
<tr>
<th>Shape</th>
<th>Example from the Community</th>
<th>Example from the Community</th>
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<tbody>
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<td>pentagon</td>
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Unit Title: The Shapes We’re In       Time: One session       Lesson #: 5a (Art-based)

Key concept/understanding/skill: Cultures use mathematical shapes to develop designs. Shapes have relationships to the world. Various cultures’ art reflects the use of certain shapes to create a unique appearance.

Materials/Resources: Letter with criteria, Overhead, LCD unit, various visual resources available for students to browse through (see book list and website suggestions) shapes to trace, stencils, rulers, compasses, pencils, lots of sketch paper

Neville Public Museum Artifact: Refer back to lesson four images, could have a running image through PowerPoint

Classroom Setup: Folders with each student’s baseline and sketches on tables. Books focusing on various cultures architecture, and websites with architectural styles bookmarked for student use.

Instructional Plan: Students will have letters on tables – Do a student-generated review of previous lessons. Use a simple brainstorming web diagram on overhead leading students from the beginning of shapes to finding them and then to identifying cultural shapes. Establish that students can connect shapes with art designs and also to architecture within this discussion. Put letter up on overhead and review criteria together. Students will then be given a demonstration, walking them through the sketching practice, looking for ideas and also checking their work for the criteria. All students will have some sketches begun. Closure will involve overheads, students coming up and finding shapes in some architectural images.

Learning Strategies: Planning strategies, modeling how to organize information

Assessment Connection: Students are internalizing the criteria for moving to the final activity. Will be involved in the student self-check list

Teacher notes/ reflections:

• See attached letter with criteria and checklist
Congratulations!!!

You have been selected as contestant in the Cultural Home Design Contest being sponsored by the Community. The community diversity committee is looking to have a pilot home project, which will stand as a model to the diverse cultures in the world. The task of creating your design is yours. All you need to draw is the facade or frontal elevation according to the guidelines below:

- Your Design must include a variety of identifiable shapes. These should be geometric shapes. (Remember to list the shapes you use at the bottom of your design).

- Make sure your design has a special cultures' “look”-You may want to do some thumbnail sketches of a specific cultures shape designs from your research before your final design. Your teacher will approve this planning for you.

- Your design should have windows, doors and some interesting decorative elements. The addition of decorative elements should match the culture you are basing your design on.

- You are ready for your final design. Make sure you are accurate with your shapes and use your sketches to make changes in order to avoid lots of erasing on your final. The tools you should use are pencils, rulers, and stencils, erasers and fine point black markers.

Good Luck!!!
Observational Performance Assessment

The concepts: Different cultures have different looking houses and architecture. Shapes are an integral part of designing and geometric shapes have special characteristics.

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<th>Student Self - Check</th>
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<th>Teacher Check</th>
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Unit Title: The Shapes We’re In  Time: 1 Session  Lesson #: 5b (Math-Based)

Key concept/understanding/skill: 3-D shapes. Continue to study shapes.


Neville Public Museum Artifact: Japanese Temari

Classroom Setup: Supplies on central table.

Instructional Plan:
• Teacher model a cube using straws and twist ties. Class brainstorms on the board all the properties of a cube. Rewrite on a note card and attach to 3-D model. Hang from the ceiling for remainder of unit.
• Do a paper Temari when finished constructing model.
• Reassess using baseline Assessment Part 2 Name It, Sort It, Draw It to look for student growth. ***See page 16 in Lesson 2.

Learning Strategies: Constructing models to internalize and store information

Assessment Connection: Look for correct construction of shapes and correct definition of shape’s properties. Baseline Assessment page 2.

Teacher notes/reflections:
Unit Title: The Shapes We’re In  Time: 1 session  Lesson #: 6a (Art based)

Key concept/understanding/skill: Cultures use mathematical shapes to develop designs. Various cultures’ art reflects the use of certain shapes to create a unique appearance. Shapes are an integral part of designing a house and geometric shapes have special characteristics.

Materials/Resources: Letter with criteria, Overhead, LCD unit, various visual resources available for students to browse through (see book list and website suggestions) shapes to trace, stencils, rulers, compasses, pencils, lots of sketch paper

Neville Public Museum Artifact: Refer back to previous lesson for images; could have a running image through PowerPoint

Classroom Setup: Folders with each student’s baseline and sketches on tables. Books focusing on various cultures architecture, and websites with architectural styles bookmarked for student use.

Instructional Plan: Do a student generated review of previous lessons. Begin with a visual group who’s is it? With architecture from 2-4 cultures. Use a simple brainstorming web diagram on overhead leading students from the beginning of shapes to finding them and then to identifying cultural shapes. Establish that students can connect shapes with art designs and also to architecture within this discussion. Students will then be given a very short demonstration, walking them through the sketching practice, looking for ideas and also checking their work for the criteria. Students should have all their sketches complete, have checked their work twice and some students will have the ok to move to the final copy. Closure will be students sharing verbally one problem they experienced and how they solved it.

Learning Strategies: Planning strategies, modeling how to organize information, Individual practice, self-regulation, Pushing individual limits

Assessment Connection: Students are internalizing the criteria for moving to the final activity. Will be involved in the student self-check list and teacher informal assessment

Teacher notes/reflections:
Unit Title: The Shapes We’re In  

Time: 1 Session  

Lesson #: 6b

Key concept/understanding/skill: Math and art are intertwined to reveal aspects about culture. Patterns can be seen in all aspects of a culture.


Neville Public Museum Artifact: All of them

Classroom Setup: N/A

Instructional Plan:

• Intro the trip to the museum. Explain what is expected.
• Go to the museum
• Complete Museum Scavenger Hunt

• In the event that a trip to the museum is impossible use the letter on the following page. This letter will go home with students inviting them to explore the museum with their parents. These students will also do the provided Scavenger Hunt.

• Come together for large group discussion about completed scavenger hunt.

Learning Strategies: Small group and individual exploration, teacher/chaperone directed discussion

Assessment Connection: Completion of scavenger hunt worksheet.

Teacher notes/ reflections:
Culture counts: People Patterns and Pi (p)

This year in art class the students will be working with a lesson that connects cultures, math and art. As a way for students to experience more fully these connections, I would encourage students and their families to find a way to visit the Neville Public Museum this fall and view the exhibit “Culture Counts: People, Patterns and Pi”. This is a hands-on exhibit with many interactive areas. Students will be getting a museum scavenger hunt sheet to complete while at the museum. If you have any questions please contact me at school, 662-7775.

Karen LuMaye
Explore the museum to find the answers to each of the following.

1. **Temari Balls**
The Temari Ball comes from ________________.

What geometric shape is the ball? ________________.

Name 3 geometric shapes that can be found within the Temari Balls.

__________________ ________________ ________________

2. **Tessellations**
While looking at the quilt, rug, and drawings, explain what it means to tessellate.

__________________ ________________ ________________

__________________ ________________ ________________

Draw a tessellating pattern.

3. **Dental Pictograph**
Which culture created the Dental Pictograph? ________________

4. Which exhibit has a spiral pattern? ________________________

5. **Sundial**
The earliest sundial was from ________________.

What does a sundial measure? ________________

__________________ and ________________ are needed to read a sundial.
6. **Flower Cloth**
   The Paj ntaub Flower Cloth is the traditional needlework of which culture?

   Draw the flower cloth shown in the exhibit.

7. **3D Interactive Building Center**
   Use the tiles and the information you learned in class to construct 2 pieces of architecture. Now draw them!
Museum Scavenger Hunt Cont.d

8. Find another exhibit that relates to what we have been learning.
   Draw it                Explain it

   ______________________
   ______________________
   ______________________

9. **Show and Tell!!!!!**
   Can you bring an item from home that relates to your culture and geometric shapes?
Unit Title: The Shapes We’re In  Time: 3 Sessions  Lesson #: 7

Key concept/understanding/skill: Students can accurately use tools to create shapes. Various cultures’ art reflects the use of certain shapes to create a unique appearance. Shapes are an integral part of designing a house and geometric shapes have special characteristics.

Materials/Resources: Overhead, LCD unit, various visual resources available for students to browse through (see book list and website suggestions) shapes to trace, stencils, rulers, compasses, pencils, lots of sketch paper, final white tag board

Neville Public Museum Artifact: refer back to previous lesson for images; could have a running image through PowerPoint

Classroom Setup: Remove some of the resources have more room for variety of tools students now need to access. Folders with each student’s baseline and sketches on tables. Some books focusing on various cultures architecture, and websites with architectural styles bookmarked for student use.

Instructional Plan: Have letter on overhead. Are you ready? Do a group discussion, “What do you need to have ready to start the final drawing”:

- You need a sketch outline of basic design in rough form with an identifiable culture.
- You need to have teacher check-off to get final paper.
- Remember to be accurate.
- Students will then be given a demonstration on how to transfer their sketched plan ideas to the final paper. This will include lightly roughing in to make sure design uses the space well, discussing the importance of using a ruler and keeping their papers clean. Walking them through the sketching practice, looking for ideas and also checking their work for the criteria. Students should have all their sketches complete, have checked their work twice and most students will have the ok to move to the final copy. Closure will be students sharing verbally one problem they experienced and how they solved it.

Learning Strategies: Modeling how to organize information, Individual practice, self-regulation, Students will need to analyze their work for errors and make correct changes, self-assessment and teacher assessment based on observation.

Assessment Connection: Students are continuing to internalize the criteria for moving to the final activity. Students should be developing the ability to identify a culture by the shapes and appearance; Students are working towards mastery for accurate use of the tools.

Teacher notes/ reflections:
Unit Title: The Shapes We’re In  
Time: 2 Sessions  
Lesson #: 8

Key concept/understanding/skill: Students can accurately use tools to create shapes. Students are proficient in identifying how various cultures show mathematical shapes within their architecture.

Materials/Resources: Overhead, LCD unit, various visual resources available for students to browse through (see book list and website suggestions) shapes to trace, stencils, rulers, compasses, pencils, lots of sketch paper, final white tagboard

Neville Public Museum Artifact: Refer back to previous lesson for images; could have a running image through PowerPoint.

Classroom Setup: Remove some of the resources to have more room for variety of tools students now need to access. Folders with each student’s baseline and sketches on tables. Some books focusing on various cultures architecture, and websites with architectural styles bookmarked for student use.

Instructional Plan: Have letter on overhead. “Are you ready to start the final drawing?”

- You need a sketch outline of basic design in rough form with an identifiable culture.
- You need to have teacher check-off to get final paper.
- Remember to be accurate.
- Students will then be given a demonstration on how to transfer their sketched plan ideas to the final paper. This will include lightly roughing in to make sure design uses the space well, discussing the importance of using a ruler and keeping their papers clean. Walking them through the sketching practice, looking for ideas and also checking their work for the criteria. Students should have all their sketches complete, have checked their work twice and most students will have the ok to move to the final copy. Closure will be students sharing verbally one problem they experienced and how they solved it.
- Additional classes will involve individual designing, one on one instructor guidance and the observational performance assessment. All students need to complete the final drawing by the end of the third session. Some students may not go over their pencil lines with black marker.

Learning Strategies: Modeling how to organize information, Individual practice, self-regulation. Students will need to analyze their work for errors and make correct changes, use the before, during and after technique instructors walks group through the process, use of charting/webbing.

Assessment Connection: Students are continuing to internalize the criteria for moving to the final activity. Students should be developing the ability to identify a culture by the shapes and appearance some students will show mastery.

Teacher notes/reflections:
**Unit Title:** The Shapes We’re In  
**Time:** 2 Sessions  
**Lesson #:** 9

**Key concept/understanding/skill:** Students are proficient in identifying how various cultures show mathematical shapes within their architecture. Students can identify how a culture can influence the appearance of its art/architecture.

**Materials/Resources:** Overhead, LCD unit, various visual resources available for students to browse through (see book list and website suggestions) shapes to trace, stencils, rulers, compasses, pencils, lots of sketch paper, final white tag board.

**Neville Public Museum Artifact:** Will have some specific images, which include the Alhambra and tiling images, may also refer back to previous lesson for images; could have a running image through PowerPoint.

**Classroom Setup:** Need both the overhead and PowerPoint to run at the same time. Possible to pull a video resource on eastern cultures in from the school library. Remove some of the resources have more room for variety of tools students now need some books focusing on various cultures architecture, and websites with architectural styles bookmarked for student use. Webbing sheet and written performance packet.

**Instructional Plan:** Teacher will have on the overhead the web sheet for gathering information. The specific standard and benchmark will be reviewed and discussed as needed. As a group discussion the web sheet will be completed by looking at one image:

- Students will then practice the webbing process by looking images in books and individually filling in notes.
- At each table then students will team and share ideas. This may end in one class or two. Need to be flexible so you are confident all students have some comfort in this process.
- Students will then be given an image to look at that they need to do a web on and also write the actual assessment. This also may take two classes but should be complete in one. This assessment needs to be completed totally independently.
- One additional class will need to schedule in to return the assessments and explain the rubrics.

Learning Strategies: Modeling how to organize information, Individual practice, self-regulation, Students will need to analyze their work for errors and make correct changes, use the before, during and after technique instructors walks group through the process, use of charting/webbing.

**Assessment Connection:** Students are continuing to internalize the criteria for moving to the final activity. Students should be developing the ability to identify a culture by the shapes and appearance some students will show mastery.

**Teacher notes/Reflections:**
Standard B – Art & Design History, Citizenship & Environment
Benchmark 4.4 – Know that art is influenced by artist, designer, and cultures

- Shape
- Size
- Added Features
- Why?
- Materials

Culture
How Does Culture Influence Art/Architecture?

<table>
<thead>
<tr>
<th>Four - Advanced</th>
<th>Three - Proficient</th>
<th>Two - Basic</th>
<th>One - Minimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>The student gives a detailed description and examples of how a culture influences art and architecture.</td>
<td>The student clearly explains and/or gives examples of how a culture influences art and architecture.</td>
<td>The student does not clearly make the connection of how a culture influences art and architecture.</td>
<td>The student is unable to explain of give examples of how a culture influences art and architecture.</td>
</tr>
</tbody>
</table>

1. Reflect on the artwork that you are being shown. Also, think about the facts you know about culture and architecture.

2. Look at the picture(s). Explain how these pictures are an example of how a culture influences an artist or designer. Use the rubric as a guide for your answer.
### Individual Record Keeping

<table>
<thead>
<tr>
<th>Name:</th>
<th>Class:</th>
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<td>Art B.4.4</td>
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Standard: Art B.4.4  
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Unit Extensions

- Create mobiles for each family of geometric shapes: simple, agon, 3-D.
- “Cutting Up Mathematics” activity on page 34 in Math for Kids and Other People Too!
- “The Day the Solids Lost Their Shapes” activity on page 41 in Math for Kids and Other People Too!
- “Welcome to Meet the Famous Objects Show” activity on page 48 in Math for Kids and Other People Too! This is a skit about a triangle.
- “The Tri-hexa Flexagon” activity on page 56 in Math for Kids and Other People Too! The activity gives directions for constructing the figure.
- “Discovering the Secret of the Diagonals” activity on page 61 in Math for Kids and Other People Too! Students explore diagonals within geometric figures.
- “Hidden Figures Puzzle” on page 90 in Math for Kids and Other People Too! Students find geometric figures hidden within a larger figure.
- Make and play a “Memory” game where students match shapes to words: simple, agon, 3D, etc.
- Have a geometric shaped lunch or snack!
- Art Project – “Paper Splits” Students take a design/shape cut out of one color and cut it apart into small geometric shapes. They glue the design onto a
separate color of paper, leaving spaces in between each shape, but still forming the larger design.

- “Piezles” Activity #13-16 from *Helping Children Learn Mathematics*. Students solve puzzles using pattern blocks and clues.
- “Is There Such a Thing?” Activity #13-20 from *Helping Children Learn Mathematics*. Students try drawing listed types of triangles to discover if it is possible.
- “Can You Find It?” Activity #13-22 from *Helping Children Learn Mathematics*. Given a large design, students hunt for listed shapes within it.
- Read *The Christmas Cobwebs* by Odds Bodkin
  Discuss tragic events.
  Discuss how spider webs form unique ornament designs through geometric shapes.
  Have students make own Christmas Cobwebs.
- Read *Magda’s Tortillas* by Becky Chabarria-Chairez
  Discuss Spanish vocab.
  Identify Geometry in pictures
- Read *Boys and Girls of the World from One End to the Other* by Nuria Roca
  Students choose a child and compare his/her life to own.
- Read *My Son John* by Jim Aylesworth
  Identify geometry within illustrations.
Students draw selves doing what they enjoy using geometry.  
Try to write a poem that rhymes to go along with it.

• Read **Martin’s Hats** by Joan Blos  
  Design a hat using geometric shapes.

• Read **Anansi the Spider** by Gerold McDermott  
  Discuss African Folklore.  
  Identify geometric figures formed in the spiders body.  
  Make geometric spiders.

• Read **Ninos Mask** by Jeanette Winter  
  Identify geometric shapes and make own mask.

• Read **Look at Shapes** by Ivan Bulloch  
  Make shapes using patterns.  
  Create a design using geometric shape printing.

• Read **Circle Song** by Diana Engel  
  Have children rewrite story using other geometric shapes.

• Read **Why Mosquitos Buzz in People’s Ears**  
  Teach and identify onomatopea.  
  Discuss illustrators use of geometric shapes and sequencing.

• In “Personality Cubes” students fold paper into cube.  
  They then decorate to tell about themselves.

  Compare housing around the world.  Choose a type of house that is interesting to you but is unlike yours.  
  Make a model using geometri figures.  Write about its difference, its geometrical shape and purpose for its shape.

• In “The Teacher’s Helper” April/May 2001 issue
Reproducables for your classroom
Pg 3 “Welcome to Camp Geo” – classifying geometric shapes according to attributes.
Pg 5 “Fun & Games at Camp Geo” – review basic geometry vocabulary with creative version of bingo.
Pg 9 & 11 “More o’s at Camp Geo” – use a square to make & play games. Trominoes, tetraminoes, pentominoes.
Bibliography and Related Resources

Teacher Resources:


Web Sites:
www.nevillepublicmuseum.org – an online exhibit called “Culture Counts”
http://illuminations.nctm.org – geometry lesson plans
www.coolmath4kids.com/geometrystuff.html – fun math related puzzles and geometry stuff
www.learner.org/teacherslab/math/geometry
www.hopepaul.com/kids/kids.htm – geometry shapes and activities
www.gnarlymath.com – solid gold gnarly math lesson examples
www.geom.umn.edu/java – interactive on-line geometry for kids
www.gzkidzone.com/gamesell/p10557.asp – mighty math cosmic geometry
www.math.okstate.edu/~rpsc/dict/Dictionary.html – a visual geometry dictionary for kids
Web Sites Cont.d:
www.hsv.k12.al.us/schools/art/dixon/architecture.htm – a variety of architectural lesson plans for a variety of grade levels

http://jan.ucc.nau.edu/~twp/architecture/federal/ – features the different architectural styles found throughout the United States

http://www.coolhouseplans.com – house designs and plans

http://www.sanford-arterdventures.com – kids have an opportunity to become an architect and design a house with Carmine Chameleon!

Picture Books:


**Picture Books Cont.d:**


Roca, N. (2001). *Boys and girls of the world: From one end to the other.* Barcelona, Spain: Gemser Publications. (Brown County Library-East Branch) (C)

