Geometry Shapes and Patterns
Janine Vis
First Grade
Math
10 days
**Thematic Statement:**
Geometry skills are important for students as they learn to discern the God-given beauty of patterns and relationships in math and the world around them. Geometry allows students to discover mathematical concepts both visually and kinesthetically, while providing opportunities for students to build practical skills related to building and organization. It is also important for students to practice communication of mathematical concepts and reasoning, which they will be able to do as they work with their classmates, sorting and differentiating between different plane and solid shapes.

**Outline/Table of Contents:**
1. Preassessment  
   a. Basic knowledge and review of shapes  
   b. Review of describing shapes
2. Lesson 1: Exploring Plane Shapes  
   a. Identifying, classifying, and describing plane shapes (rectangles, squares, trapezoids, triangles, circles, half-circles, and quarter-circles)
3. Lesson 2: Making same and different shapes  
   a. Folding and cutting paper to combine and split shapes  
   b. Introduce symmetry
4. Lesson 3: Exploring Solid Shapes  
   a. Identifying, classifying, and sorting solid shapes (cubes, right rectangular prisms, right circular cones, right circular cylinders, spheres, and pyramids)
5. Lesson 4: Making Pictures with Plane Shapes  
   a. Combining and separating plane shapes
   a. Combining solid shapes to build models
7. Lesson 6: Seeing Shapes Around Us  
   a. Identifying plane and solid shapes in real life
8. Lesson 7: Making Patterns with Plane Shapes  
   a. Using plane shapes to identify, extend, and create patterns
9. Lesson 8: Making Patterns with Solid Shapes  
   a. Using solid shapes to identify, extend, and create patterns
10. Possible Extension for Reinforcement or Review  
    a. This is just an extra resource that provides ideas for centers that allow students to practice many of the unit’s concepts

**Unit Goals:**
1. Students will be able to identify, classify, and describe both plane and solid shapes (track to demonstrate student learning—aligned with ICC Standard 1.G.1)
2. Students will be find relationships between plane and solid shapes
3. Students will use plane and solid shapes to make new shapes by combining or decomposing the shapes (track to demonstrate student learning—aligned with ICC Standard 1.G.2)
4. Students will be able to identify plane and solid shapes in the world around them
5. Students will be able to communicate effectively about the plane and solid shapes they encounter, comparing and contrasting the shapes
6. Students will be able to make patterns with both solid and plane shapes
Lesson 1 - - H. Van Brummelen, Walking With God in the Classroom

Grade Level: First Grade  
Time: Lesson 1 (2 days)
Curriculum Area: Math  
Unit topic: Geometry Shapes and Patterns

Curriculum standards tied to this lesson:
ICC 1.G.1) Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g. color, orientation, overall size); build and draw shapes to possess defining attributes.

Intended learning outcomes (to know, to do, to create, to value) aka Goals & Objectives:
Students will identify the plane shapes rectangles, squares, trapezoids, triangles, circles, half-circles, and quarter-circles despite their color, orientation, and size. Students will be able to discuss and sort plane shapes using color, size, and the number of sides and corners.

Assessment strategies: How will you assess attainment of the intended learning outcomes?

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Materials/preparation: Large cut-out shapes, cut-out examples and nonexamples of shapes, bulletin board labels for each of the shapes, attribute blocks, shape labels for the sorting game or bingo sheets for the bingo shape game (Appendix A), Student Book A p. 98, 100-101, Workbook A 94-98, note cards

Curriculum text: Math In Focus 1A

Introduction:

#1-Setting the stage:
Engaging, motivating, experiencing, connecting with prior knowledge, reflecting, conjecturing posing problems

Hangman Game
- Have a shape in mind
- First, a student can ask if there is a side or a corner
- Then another student can ask for a letter (like in regular hangman)
- Then another student can ask for a side or corner and so on
- As the students guess sides and corners, the teacher draws the sides and corners; as the students guess letters, the teacher writes the letters in the blanks like in regular hangman
Guided Learning Steps:

**#2-Disclosing:** Acquiring knowledge/skills, conceptualizing, developing, understanding, integrating

**Identifying Plane Shapes**
- Go to Student Book A p. 98
- Hold up a cut-out shape and have the students name it. Turn the shape to show what it looks like different ways
  - Turning the shape will be especially helpful to help students understand that a “diamond” and a square are the same thing, as well as the different looks of the other shapes
- Use a magnet to put the shape on the board and trace it with your finger and instruct the students to do the same in their book.
  - Some of the shapes are not in the book (i.e. the trapezoid, half-circle, and quarter-circle) You can either decide not to teach these shapes, or have the students draw the shapes in a notebook and trace them, provide a picture of the shapes for the students to trace, or have them trace the shapes imaginarily in the air
- Show some other examples and nonexamples of the shape to help students understand what the shape is.
  - Emphasize that the color, orientation, and size of a shape do not change the shape
- Ask the class to tell you the name of the shape again
- Put the shape up on a math bulletin board.
- Repeat for each shape.

**Comparing Shapes Based on Sides and Corners**
- Hand out attribute blocks to students or groups of students
- Hold up one of the shapes, have the students identify it, and point to the sides, running your finger along the sides and having the students do the same.
- Have students count the number of sides for that shape and other shapes
- Hold up one of the shapes, have the students identify it, and point to the corners, touching them and showing the children how the sides meet at the corners
- Have the students do the same
- Ask the students to count the number of corners for that shape and other shapes
  - Have students notice that the square and rectangle have the same number of corners and sides as each other—the difference between a square and a rectangle is that a square has all equal sides, while a rectangle can have two sides that are longer (a square is a special kind of rectangle)

**#3-Practicing, reinforcing:** Modeling, giving instructions, checking for understanding, guided practice, independent practice, applying, posing and solving problems

**Identifying Plane Shapes**
- Have the students name the shapes on the bulletin board. When they name the shape correctly, put up a label next to the shape
- Play follow-the-leader, walking in a shape, then have the students identify the shape
- Have students do Workbook A p. 94-96 (practicing identifying shapes)

**Comparing Shapes Based on Sides and Corners**
- Ask the students to identify the number of sides and corners on the shapes on the bulletin board. When they identify it correctly, put up a label, making a chart similar to the one on p. 95 in the Teacher’s Edition 1A
- Play follow-the-leader again, this time asking how many corners and sides the shape had

**Sorting shapes**
• Go to Student Book A p. 100-101
• Ask how the shapes at the bottom of p. 100 are alike (they are all red—they have the same color)
• Ask how the shapes are different (they are different shapes/they have a different number or corners/sides)
• Continue the questions for p. 101

#4-Transcending: Summing up, responding, creating, Performing, committing, evaluating, Closure
Two Options:
1) Sorting Game
• Have different areas in the room for each of the shapes learned (circle, square, rectangle, triangle)
• Tell students that they get to be one of the shapes we learned about today
• Tape a shape to the back of each student so that they do not know what the shape is
• Write on the board a list of questions the students are allowed to ask the other students:
  o How many sides do I have?
  o How many corners do I have?
  o Are all of my sides the same length?
  o Are some of my sides longer than the others?
• Observe the students as they play this game
  o Do they know what shapes they are?
  o What makes them confused?
2) Bingo Shape Game
• Have bingo sheets made with different shapes of different colors and sizes
• Say to students “This shape is (color), (size), has (number of sides), and (number of corners)—if the shape is a square, rectangle, or trapezoid, explain the difference by describing the lengths of the sides.
• Watch the students to make sure that they place bingo chips on the correct spaces

Review/Class Discussion
• Review the names of the shapes—especially those that were confusing for the students
  o Use the attribute shapes and refer to the bulletin board to help the visual and kinesthetic learners
• Ask the students which shapes are their favorite and why
  o As the teacher, you can model this
    ▪ Share that you like a shape because of the number of sides it has
    ▪ Share that you like a shape because it reminds you of something (e.g. a circle reminds you of CDs or cookies)—this will tie in really well to Lesson 5—Seeing Shapes All Around Us

Modifications: How will you change the lesson to meet the needs of individual students?

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Who will require lesson modifications?
- For ELLs, some of the vocabulary may be difficult. It might be helpful to practice saying the words with the students and to make vocabulary cards with a picture of the shape drawn on one side and the name written on the other side.
- Since the lesson is active, children with emotional disorders or children who act out may become disruptive. It could help these students to pair them with a buddy who will help keep them focused, or to walk near the students who are being disruptive and ask them about their learning.

Personal notes/reminders/homework:
- Possible homework assignment—Workbook A p. 97-98

Post-lesson reflections:

Lesson 2
In Lesson 2, students make same and different shapes, using paper folding and cutting to make shapes and compare them. In this lesson, students also get a brief introduction to symmetry.

Lesson 3 - - H. Van Brummelen, Walking With God in the Classroom
Grade Level: First Grade
Time: Lesson 3 (1 day)
Curriculum Area: Math
Unit topic: Geometry Shapes and Patterns

Curriculum standards tied to this lesson:
ICC 1.G.2) Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.

Intended learning outcomes (to know, to do, to create, to value) aka Goals & Objectives: Students will be able to identify, classify, and sort solid shapes (rectangular prism, cone, cylinder, cube, pyramid, sphere).

Assessment strategies: How will you assess attainment of the intended learning outcomes?

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Materials/preparation: Sets of geometric solids, picture or bulletin board model of each of the
solid shapes, name labels for each of the shapes, 3 “stack” labels, 3 “roll” labels, and 4 “slide” labels, Student Book A pp. 110-112, note cards or labeled geometric solids

**Curriculum text:** Math in Focus 1A

**Introduction:**

**#1-Setting the stage:**

*Engaging, motivating, experiencing, connecting with prior knowledge, reflecting, conjecturing, posing problems*

- Hand out geometric solids to students or groups of students
- Have students build structures out of the solids—just spending some time with the shapes to begin to discover characteristics such as rolling, sliding, stacking, vertices, numbers of edges, and numbers of faces
- After the students have built their own structures, allow them to walk around the classroom and look at the structures that the other students made.
- Clean up the geometric solids

**Guided Learning Steps:**

**#2-Disclosing:** *Acquiring knowledge/skills, conceptualizing, developing, understanding, integrating*

- Have students turn to p. 110-111 in the Student Book A
- Explain that the three days before, you talked about *plane* shapes, but now you are going to talk about *solid* shapes
- Hold up one of the solid shapes—have the students find the solid shape in their books
- Turn the shape different ways so that students can see the different sides of the shape
- Ask: What plane shape does this solid shape remind you of?—connect each solid shape to plane shapes
  - Rectangular prism—rectangles (and possibly squares)
  - Cube—squares
  - Sphere—circle
  - Cone—triangle and circle
  - Cylinder—circle and rectangle
  - Pyramid—triangles (and square if it is a square pyramid)
- Tell the students the name of each shape

**#3-Practicing, reinforcing:** *Modeling, giving instructions, checking for understanding, guided practice, independent practice, applying, posing and solving problems*

- Go to p. 112 in the Student Book A
  - Have the students name the solid shapes and then answer the question “Which of these shapes are not cubes?”
  - Remind them that a cube has a square on every side
- Hold up pictures or small models of the solid shapes the students learned and have them identify them one by one
- As the students identify the shapes, put them on the math bulletin board and put a label next to them, like you did for the plane shapes in lesson 1
- Now hand out the geometric solids again and tell the students that, as the class, they get to discover some other properties of solids
  - First demonstrate stacking
    - Say “I can stack the cubes”
    - Ask “What else can I stack?” and try whatever they suggest, allowing them to do it as well
    - When you as a class discover which solid shapes stack, put up a “stack” sign
next to the solid shape on the bulletin board to help the students remember the properties of each of the solid shapes

- Do the same thing for rolling and sliding
  - Watch out for students who get confused with the difference between rolling and sliding—possibly use a patterned ball for the sphere and a patterned block for the cube so that the students can see that the sphere moves all around its surface while the cube does not

**#4-Transcending:** Summing up, responding, creating, Performing, committing, evaluating, Closure

- Hold up some everyday life examples of the solid shapes you learned in class (dice, box, tin can, soccer ball, ice cream cone, etc.)
- Ask the student what solid shape each is
- Ask the students why each shape cannot be one of the other shapes (e.g. why can the box not be a cone?)
  - Try to encourage students to reason using properties such as stacking, rolling, and sliding

**Modifications:** How will you change the lesson to meet the needs of individual students?

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Who will require lesson modifications?

- For some students, remembering the names of the solid shapes may be quite difficult, so making vocabulary cards with a picture of the shape on one side and the name on the other side may be helpful
- If it is possible, even better than just vocabulary cards would be providing the students with actual solid shapes that have their names written on them, so that the students can feel, see, and say the name of the shape at the same time
- If students have trouble with motor skills, it might be helpful to pair them with another student to help them with sliding, rolling, and stacking the solid shapes

**Personal notes/reminders/homework:**

- Have students bring 2 solid shapes to school the next day for show and tell
- Remind the students that they need to be able to tell everyone the name of the solid shapes they bring

**Post-lesson reflections:**
Lesson 4 - - H. Van Brummelen, *Walking With God in the Classroom*

**Grade Level:** First Grade  
**Time:** Lesson 4 (1 day)  
**Curriculum Area:** Math  
**Unit topic:** Geometry Shapes and Patterns

**Curriculum standards tied to this lesson:**
ICC 1.G.2) Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.

**Intended learning outcomes (to know, to do, to create, to value) aka Goals & Objectives:**
Students will be able to combine pieces of plane shapes to make familiar plane shapes and combine and separate plane shapes to make composite shapes.

**Assessment strategies:** How will you assess attainment of the intended learning outcomes?

| _x_ Observation | ___ Rubric | ___ Peer Assessment |
| ____ Work samples/portfolio | ___ Presentation or performance | ___ Self-assessment |
| ___ Anecdotal notes | _x_ Learning log/journal | ___ Focused questions |
| ___ Interview/Conference | ___ Other (explain): |

**Materials/preparation:** 3 blank papers for each student—to draw shape pictures, to make shape pictures, and to make shape puzzles; Smartboard presentation; Student Book A p. 119; 2 sets of shapes for students to cut out and make pictures out of and cut out and make puzzles out of (Appendix B); Workbook A p. 105-106, 109; tangrams

**Curriculum text:** Math in Focus 1A

**Introduction:**

**#1-Setting the stage:**

*Engaging, motivating, experiencing, connecting with prior knowledge, reflecting, conjecturing posing problems*

- First review what we learned yesterday:
  - Sit in a circle and have each student show their two solid shapes that they brought for show and tell
  - Have each student say the name of their shapes and one of the properties (if they need help, direct them to the math bulletin board)
- Remind students of the plane shapes that they learned about a few days before and point to the bulletin board to refresh their memory.
- Have students draw a picture using only up to 6 of the plane shapes (triangles, rectangles, squares, circles, trapezoids, half-circles, and quarter-circles) that must be connected
- Have the students cut out their picture and then flip it over so that the lines are hidden.
  - Depending on the class, it could be more exciting to assign one shape to different groups of students so that some students are making pictures out of only triangles, and other students are making pictures out of only circles (this might make it easier for the second students who have to draw lines to show how the first students
- Have students share their drawing with a partner who has to try draw lines in to show the shapes that the first student used to make the picture.

**Guided Learning Steps:**

**#2-Disclosing:** Acquiring knowledge/skills, conceptualizing, developing, understanding, integrating

- On the Smartboard, have 2 identical slides with some attribute shapes of different colors available along the bottom of the screen (e.g. 2 small triangles, a square, 2 rectangles, 2 circles, and a trapezoid).
- Select one of the shapes and have the students name the shape and its color (e.g. blue rectangle)
- With student input, move the shape somewhere to the middle of the screen, modeling how to move and turn shapes on the Smartboard
- Select another shape and have the students describe this shape’s name and color
- Again with student input, move this shape to the middle of the screen, adding it to the picture
- Continue this until all the shapes have been used
- Ask the students what the picture reminds them of—does it look like a plant, a house, a car, something else?
- With the next Smartboard slide, do the activity again, but this time have a student come up and move the shape each time, helping them with the Smartboard when they need assistance
- Ask the students:
  - What does the picture remind you of this time?
  - How is it similar to the last picture?
  - How is it different from the last picture we made?
- Discuss how two different pictures can be made using the same set of shapes
- Next, on the Smartboard, have 2 half-circles, 2 triangles, and 2 rectangles (like on Student Book A p. 119)
- Have students volunteer to try put two of the shapes together to make one shape
  - Make a circle out of the 2 half-circles
  - Make a triangle or a rectangle out of the 2 triangles
  - Make a square out of the 2 rectangles

**#3-Practicing, reinforcing:** Modeling, giving instructions, checking for understanding, guided practice, independent practice, applying, posing and solving problems

- Hand out a page with a set of shapes like those available on the first 2 Smartboard slides to each student (Appendix B)
- Tell the students to make a picture using the shapes, but they do not have to use all of the shapes
- When students finish the picture, have them write 2 sentences on the back that say, “I made a picture of a __________. My picture has ___ squares, ___ rectangles, ___ circles, ___ triangles, and ___ trapezoids.”
- Tell the students share their picture with a partner, sharing
  - What the picture is of
  - The sentence on the back
- Tell the students to hand in their finished picture
- Next give students the same sheet and have them cut out the shapes again
- This time, have them cut four of the shapes into 2 pieces—making a sort of puzzle
• Have them trade the pieces with a neighbor, each doing each other’s puzzle, like we did on the Smartboard (slide 3) where we put two pieces together to make one plane shape
• Have them glue the puzzles together on a sheet of paper and write the name of the shape next to the puzzle pieces.
• When students finish, have them do Workbook A p. 109

#4-Transcending: Summing up, responding, creating, Performing, committing, evaluating, Closure
• Have students journal about building pictures, shapes, and structures using the following prompts:
  o What was the best picture that you saw someone make?
  o Was there a shape you used often?
  o Was there a shape you hardly ever used?
  o What was the most difficult part about what we learned today?
  o What was the most fun thing you did today?
  o Was anything confusing today?

Modifications: How will you change the lesson to meet the needs of individual students?

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Who will require lesson modifications?
• Some students may struggle with using the Smartboard. For these students, it might help to have them use a tennis ball or their knuckle to move the shapes on the Smartboard
• Some students may struggle with cutting out the shapes and gluing them on another paper neatly. For such students, it may be helpful to cut out the shapes ahead of time or have a buddy or an educational assistant (EA) to help with the cutting and gluing
• If a student struggles with using the paper objects, it may be helpful for him or her to use actual plastic attribute blocks when possible
• If a student struggles with writing, it may be helpful for a teacher or an EA to act as a scribe for the student, or to decrease the journal requirement for the student
• If some students find the lesson easy, a set of tangram games and puzzles could be available as an extension for the lesson

Personal notes/reminders/homework:
• Possible homework—Workbook A p. 105-106

Post-lesson reflections

Lesson 5
In lesson 5, students make models with solid shapes and count the number of each solid shape in the models that they make. For homework, have students bring something from home that is in one of the shapes they have been learning about (circle, square, rectangle, trapezoid, circle).

**Lesson 6 - H. Van Brummelen, *Walking With God in the Classroom***

**Grade Level:** First Grade

**Curriculum Area:** Math

**Time:** Lesson 6 (1 day)

**Unit topic:** Geometry Shapes and Patterns

**Curriculum standards tied to this lesson:**

ICC 1.G.1) Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.

**Intended learning outcomes (to know, to do, to create, to value) aka Goals & Objectives:**

Students will be able to recognize plane and solid shapes in everyday life.

**Assessment strategies:** How will you assess attainment of the intended learning outcomes?

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**Materials/preparation:** A copy of *The Greedy Triangle* by Marilyn Burns, checklists and clipboards for each student, a camera for the teacher

**Curriculum text:** Math in Focus 1A

**Introduction:**

**#1-Setting the stage:**

*Engaging, motivating, experiencing, connecting with prior knowledge, reflecting, conjecturing posing problems*

- Ask the students
  - Do you see shapes anywhere?
  - Do you see shapes at home, on the playground, in the classroom?
- Read *The Greedy Triangle* to the students
- Ask the students
  - When the triangle was a triangle, where could he be found?
    - Holding up roofs
    - Triangle instrument
    - Sails
    - Pie slices and sandwich halves
    - In the space between someone’s arm and body when they put their hand on their hip
  - Where were other shapes found?
- Square/quadrilateral—bases, baseball diamond, TV and computer screen, picture and window frames, book pages
- First base
- Parts of a soccer ball
- Honeycomb
- Floor tiles

Guided Learning Steps:

**#2-Disclosing:** Acquiring knowledge/skills, conceptualizing, developing, understanding, integrating

- Have show and tell time where the students share their objects from home that they brought
  - Have the students tell the class what the object is, and what shape it represents
  - Encourage the students to tell the class how many corners and sides the object has
- Remind students of the solid shapes they brought two days before and show the students some of them again to refresh their memory

**#3-Practicing, reinforcing:** Modeling, giving instructions, checking for understanding, guided practice, independent practice, applying, posing and solving problems

- Take the class on a field trip or a scavenger hunt either outside or in the school (depending on the class size, weather, and practicality)
- Explain to the class that today we are going on a mission to find the shapes we have learned about in real life
  - Trapezoid
  - Square
  - Circle
  - Rectangle
  - Triangle
  - Sphere
  - Rectangular prism
  - Cone
  - Cube
  - Cylinder
- Give each student a checklist (see Appendix C) on a clipboard on which they can record when the class finds a shape, and they can draw the plane or solid shape that the class found
- Go on a walk, and when one of the students sees a shape, he or she can raise her hand and tell the teacher.
- The class must stop and look at the object the student found
- If the object is one of the shapes that the class learned, they can check off the shape on their checklist and draw a picture of the object that they found
- If the teacher wants to, he or she can bring along a camera and take pictures of the objects. Later, the teacher can make a class shape book for the students to look at during extra time to reinforce their knowledge of plane and solid shapes
- As the students search for the shapes, take note of which shapes they notice easily, and which shapes they don’t notice as quickly
  - Some shapes, such as trapezoids, cones, and cylinders may be more difficult to find. As a teacher, it may be helpful to plan to walk past places where these objects can be found (e.g. an ice cream stand for ice cream cones, or bridge trusses or a purse for a trapezoid)
#4-Transcending: Summing up, responding, creating, Performing, committing, evaluating, Closure

- Come back into the classroom and discuss with the class
  - Where can we find shapes?
  - Are some shapes easier to find than others?
  - What shapes did we find the most often?
  - Which shapes were the most difficult to find?
  - Were there any objects that we saw that looked like both solid shapes and plane shapes?
  - In your opinion, what was the most surprising shape that we found today? Why?

Modifications: How will you change the lesson to meet the needs of individual students?

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Other: parent participation

Who will require lesson modifications?
- For students who struggle to understand the geometry that we have been learning so far, they could easily be ignored in this lesson. For that reason, it would be especially helpful to invite parents to come join the field trip or have an older buddy class come along and help the students find the shapes.
- Buddies or partners will also be especially helpful for students with attention deficit hyperactivity disorders or emotional impairments in order to help students who may tend to wander off or get frustrated easily.

Personal notes/reminders/homework:
- If students did not finish their drawings of the shapes found on the field trip, have them finish those at home.

Post-lesson reflections:

Lesson 7 - - H. Van Brummelen, *Walking With God in the Classroom*

Grade Level: First Grade

Time: Lesson 7 (1 day)

Curriculum Area: Math

Unit topic: Geometry Shapes and Patterns

Curriculum standards tied to this lesson:
ICC 1.G.1) Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.

Intended learning outcomes (to know, to do, to create, to value) aka Goals & Objectives:
Students will be able to recognize, build on, and create patterns using plane shapes.
**Assessment strategies:** How will you assess attainment of the intended learning outcomes?

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**Materials/preparation:** Pattern Smartboard presentation, attribute blocks, Workbook A p. 117-122, unifix cubes

**Curriculum text:** Math in Focus 1A

**Introduction:**

**#1-Setting the stage:**

*Engaging, motivating, experiencing, connecting with prior knowledge, reflecting, conjecturing posing problems*

- Ask and remind the students of all that we have learned so far in this unit
  - The names of plane shapes
  - Some properties of plane shapes (look at the bulletin board)
  - Cut and folded paper to make shapes that look alike and different
  - The names of solid shapes
  - Some properties of solid shapes (look at the bulletin board)
  - Made pictures and puzzles with plane shapes
  - Made models with solid shapes
  - Found shapes in the world
- Tell students that today we get to learn about something new: making repeating patterns with shapes (show first slide with “patterns” written on it, and some question marks in the background)
- Ask students:
  - Does anyone know what a pattern is?
  - Have you ever seen a pattern anywhere?
- Show students a simple repeating pattern (slide 2)
  - Tell the students to help you name the shapes out loud (circle, triangle, circle, triangle, circle, triangle)
  - Ask the students “does anyone know what comes next?”
  - If a student thinks he or she knows, have him or her drag the next shape to the pattern (Have circles and triangles available as infinite clones along the bottom of the Smartboard screen.)
  - Ask the class
    - Is the student right?
    - Why?
  - Have another student add the next shape in the pattern and ask the same questions
  - Tell students that the repeating shapes follow a pattern
- Show the students a non-example (slide 3)
  - Mix up the order of the shapes, possibly adding another shape in the mix so that
there is no pattern
  o Tell students that it is not a pattern because the order of the shapes does not repeat

Guided Learning Steps:

#2-Disclosing: Acquiring knowledge/skills, conceptualizing, developing, understanding, integrating

- Do the same thing with several patterns (slides 4-8)
  - Patterns with the size changing (slide 4)
  - Patterns with the orientation changing (slide 5)
  - Patterns with the color changing (slide 6)
  - Patterns with more than one of the shape, size, orientation, and color changing (slides 7-8)
    - ABABAB, AABBAABBAABB, AABAAABAAB, ABCDABCDABCD patterns, etc.
- Remind the students that the color, size, and orientation of a shape does not change the shape
- Watch the students as they work
  - Which patterns are the most difficult?
  - Which students are going to need extra practice?
  - Which students are going to need an extra challenge?

#3-Practicing, reinforcing: Modeling, giving instructions, checking for understanding, guided practice, independent practice, applying, posing and solving problems

- Instruct students to turn to Workbook A p. 117-120 and do 3 of the pages
  - Have all students do p. 117
  - Have students who are beginning to understand do p. 118, while more advanced students do p. 120
  - Have all students do p. 119—they can work with a partner on this page
- When students finish, have them do Workbook A p. 121-122 independently
  - Have them explain their pattern to a friend
  - Have them compare their pattern with a friend’s pattern
- For auditory learners, encourage students to describe the pattern aloud
- For kinesthetic learners, encourage students to use attribute blocks to model the patterns that they see on the work pages
- When students finish with their worksheets, have unifix cubes and attribute blocks available in an activity area, where the students can work together to make patterns

#4-Transcending: Summing up, responding, creating, Performing, committing, evaluating, Closure

- Ask the students what we learned about today (repeating patterns)
- Ask the students what a repeating pattern is
- Show students an example and nonexample of a repeating pattern on the Smartboard (slide 9)
  - Ask the students if they see a pattern in the first set of shapes
  - Ask the students if they see a pattern in the second set of shapes
  - For the repeating pattern, have the students tell the teacher what comes next, so that the teacher can continue the pattern with shapes from the bottom that are infinite clones
- Ask the students what the best part about repeating patterns was
- Ask the students what the most difficult part about repeating patterns was
- If the students understand patterns well, tell them “You did a fantastic job with patterns today. Do you think there is anything else we can make patterns out of?”
Have the students make repeating patterns out of objects in the classroom (e.g. white board markers and erasers)

Ask students if they could be part of a repeating pattern (possibly girl, boy, girl, boy)

Depending on how much time is left, have students use items from their desks (such as pencils, erasers, and crayons) to make repeating patterns (this leads in well to Lesson 8: Making Patterns with Solid Shapes)

**Modifications:** How will you change the lesson to meet the needs of individual students?

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**Who will require lesson modifications?**

- Some students may struggle with using the Smartboard. For these students, it might help to have them use a tennis ball or their knuckle to move the shapes on the Smartboard.
- If students struggle to understand what a pattern is, it may be helpful to focus on just one attribute changing, such as color. Using unifix cubes, create a pattern with 2 colors and have the student extend the pattern. Continue to scaffold the student by creating patterns that are more difficult for the student. Have the student create his or her own pattern. After the student completes repeating patterns using the unifix cubes, move on to other objects such as attribute blocks, and change attributes such as shape, size, and orientation.
- Like it says earlier in the lesson, when students work on pages in the workbook, they can do either p. 118 or 120 depending on their level of understanding of repeating patterns.
- If the repeating patterns are very easy for some of the students in the activity area, walk over and start a more complex repeating pattern for them to finish (e.g. using an ABCCDDED pattern with several attributes changing).

**Personal notes/reminders/homework:**

- Have students finish at least one pattern from Workbook A p. 121-122 if they did not finish in class

**Post-lesson reflections:**

**Lesson 8**

In Lesson 8, students recognize, build on, and create patterns using solid shapes. It would be very similar to Lesson 7, but with solid shapes rather than plane shapes.

**Possible Extension for Reinforcement or Review**

Centers
1) Plane shapes: attribute shapes with which students can make designs or pictures
   a. Ask the students about the shapes that they make—“What did you make the head out of?” “How many sides does the final shape have?”
   b. Have students fill out Workbook A p. 110 for this center
   c. Make patterns with the shapes (after Lesson 7)

2) Solid shapes: attribute blocks—or even objects that the students bring from home (boxes, toilet paper rolls, balls, etc.)—with which students can make structures, stacking, sliding, and rolling the shapes
   a. Ask questions about the structures—“Why did you put the (name of solid shape) like that?” “How could you rearrange it?”
   b. Introduce and encourage the students to talk about the edges, points, and faces as well as stacking, rolling, and sliding
   c. Have students make the structures from and fill out Workbook A p. 111-112 for this center
   d. Make patterns with the shapes (after lesson 8)

3) Color by shape
   a. Students color a picture of a scarecrow, coloring each shape a different color (See Appendix D)
   b. source: http://www.makinglearningfun.com/themepages/ScarecrowColorbyShape.htm

4) Matching—Vocabulary practice
   a. Have students match plane and solid shapes with their names—use Workbook A p. 93 and 101
   b. Have students match corresponding plane and solid shapes

5) Telephone pictionary/naming
   a. Students sit in a circle and play a game of telephone, communicating a different way each time:
      i. Whisper the name of a shape into your neighbor’s ear
      ii. Draw the shape that was whispered into your ear, or pick the shape from a basket of attribute shapes or geometric solids
      iii. Write the name of the shape on the piece of paper that you receive from your neighbor
      iv. Is the name the same as what the original person told to their neighbor?
   b. This center helps students practice the correspondence between shapes and shape names

6) Build solid shapes
   a. Have toothpicks or straws and clay or marshmallows for the students to build edge
Assessment

Preassessment:

- **Plane Shapes**
  - Students should already be able to identify plane shapes, so for the first day do some practice with identifying shapes in the real world
  - As an introduction to the unit, ask students to bring from home 2 objects in a shape that they know
  - Do show and tell with the objects, having the students describe their objects and their shapes
  - When a student shares, ask how their objects are alike or different from another’s (e.g. bigger, smaller, different color, more sides, more corners)

- **Solid shapes**
  - Have students sit in a circle with geometric solids available in a pile in the middle
  - Ask them to find (with a partner if there are not enough solids) different solids and get them from the middle of the circle (cubes, right rectangular prisms, right circular cones, right circular cylinders, spheres, and pyramids)
  - Allow the students to build structures with their solids
  - Discuss with the students how some of the solids stack, based on their structures
  - Have students share with the class which solid is their favorite and why (encourage them to discuss different properties—perhaps model it by saying “I like the sphere the best because it has no edges, and it rolls.”)

- As the teacher, make notes on what the students know, what is developing, and what they need to learn (The students should not be expected to know the answers to the questions at this point—the preassessment is simply to find out where the students are at)

Formative

- **Student worksheets**
  - Look at the student worksheets and be observant of any themes
  - Are there any shapes that the students are struggling with?
  - Are the students struggling to identify what a side or a corner is?
  - Are students struggling with certain properties of plane and solid shapes?
  - Which patterns are the most difficult?

- **Discussion**
  - During class discussions, be mindful of what is confusing for the students.
  - Are the students struggling with a particular idea?
  - Take notes during discussions if something comes up that needs to be re-taught or reinforced

- **Activities**
  - As students do activities, walk around and listen to their discussion with their partners
  - Ask questions about the main concepts of the geometry unit
  - Again, be mindful of what concepts are causing the students to struggle
  - Take notes as needed to remind yourself which concepts to emphasize for the students

- **Journal**
  - Read the students’ journals to find out what is causing the students to struggle
  - Use this information when deciding what to emphasize when reviewing content from the days before
Post-Assessment

- A final assessment test can be found in Appendix E

Sources:

- Math In Focus Teacher’s Edition 1A
- http://www.makinglearningfun.com/themepages/ScarecrowColorbyShape.htm
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<tr>
<th>□ Trapezoid</th>
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<td>□ Rectangular prism</td>
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Name ____________________  

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For more creative learning ideas check out www.makinglearningfun.com
Geometry Shapes and Patterns Unit Test

1) Match the following shapes with their names:

- Rectangular Prism
- Circle
- Cone
- Rectangle
- Trapezoid
- Cylinder
- Triangle
2) Label the sides and corners on the following shape:

![Diagram of a square]

3) How many sides does the shape have? _______

4) How many corners does the shape have? _______

5) This shape is folded on the dotted line to make 2 new shapes.

   a. The 2 new shapes are a __________________ and a __________________.
   b. How are the shapes different?
   c. How are the shapes alike?

6) Circle the shape or shapes that roll.

   ![Possible shapes for rolling: cube, cylinder, triangle, sphere]

7) Circle the shapes that stack.

   ![Possible shapes for stacking: cube, cylinder, triangle, sphere]
8) How many of each shape can you find in the picture?
   a. Squares ______
   b. Circles ______
   c. Triangles ______
   d. Rectangles ______
   e. Trapezoids ______
   f. Half-circles ______
   g. Quarter-circles ______

9) Draw or write the name of a real-life example of
   a. A cone

   b. A circle

   c. A square

   d. A cylinder

   e. A triangle
10) Extend the following repeating pattern:

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11) Circle the missing solid shape in this repeating pattern.

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12) Draw your own repeating pattern of shapes. Make sure the pattern repeats at least once.

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13) What was your favorite thing that you learned about geometry shapes and patterns?

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