Unit 4: Domain: Geometry and Fractions of Shapes

Content Area: **Mathematics**
Course(s): **Mathematics**
Time Period: **Marking Period 4**
Length: **4-5 Weeks**
Status: **Published**

Unit Overview

In the Geometry and Fractions Unit, learners will identify, sort and classify plane and solid figures. They will build shapes and make new ones out of exsisting shapes. Building upon the concept of congruent equal shares and lines of symmetry, fractions will be explored to 1/2, 1/4, and 1/3 of a whole plane figure. Fractions will also be introduced as a part of a whole.

Standards

MA.1.G.A	Reason with shapes and their attributes.
MA.1.G.A.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.
MA.1.G.A.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.
MA.1.G.A.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.

Essential Questions

- How can attributes be used to classify objects?
- How can visual tools be used to answer questions?
- How can spatial relationships be described by careful use of geometric language?
- How do geometric relationships help to solve problems and/or make sense of phenomena?
- How can we best represent and verify geometric relationships?

Application of Knowledge and Skills...

Students will know that...

- attributes relating to surfaces, sides, and corners define specific plane figures (circle, triangle, rectangle, square, rhombus, hexagon, and trapezoid) and solid figures (sphere, cone, cylinder, cube, and rectangular prism).
- congruent shapes are the same size and shape.
- different groups of plane figures can be combined to compose the same new plane figure.
- equal parts of a plane figure are fractions of the figure.
- many everyday objects closely approximate standard geometric solids.
- one out of many in a whole is a fraction of the whole.
- the appearance of a plane figure may change if it is flipped, slid, or turned.
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- the flat surface of a solid figure is a plane figure.

Students will be skilled at...

- Combining plane shapes to make different pictures.
- Determining whether a shape is divided into equal or unequal parts.
- Identifying and naming 1/2, 1/4, and 1/3 of a plane figure.
- Identifying defining and non-defining attributes of shapes.
- Identifying properties of plane shapes.
- Identifying, sorting and classifying plane and solid shapes
- Making organized lists to solve problems.
- Solving a problem by drawing a picture

Assessments

- Benchmark Tests
- End of the Year Test
- Identify Patterns: Using plane figures, make a pattern. Extend an existing pattern.
- Placement Test: used to test prior knowledge
- Solid and Plane Figure Hunt: Hunt for solid figures or plane figures in the classroom given their name or their attributes.
- Sort by Color, Size and Shape: Identify what belongs in a given group.
- Task Cards: used as a reinforcement of a topic
- Topic Math Projects
- Topic Quick Checks: can be given after each section in the topic to check for understanding
- Topic Tests: given after each topic

Activities

Problem of the Day: sets the stage for what students will be learning that day

Math Stations: reinforces topics taught each day

Station activities- Each section has center activities to reinforce skill (leveled)

- Clip and Cover- Students answer questions and try to cover four spaces in a row on a gameboard to win.
- Display the Digits- Students answer the problem and display the tile that represents the answer.
- Quick Questions- Toss number cubes and answer questions.
- Team Work- Students in turn explain the steps in a multi-step process.
- Think Together- Students choose and discuss answers to problems.
- Tic Tac Toe- Students use algebra to compute solutions to problems.
- Toss and Talk- Students toss number cubes and explain how to solve resulting problems

Interactive Learning: integrates technology into the lesson

Topic Opener Projects: sets the stage for what students will be learning in the unit

Interactive Math Stories: gives the students an initial look into the new unit

Practice Work: leveled worksheets/activities

Ticket to Leave: way to assess at the end of a lesson

Other Activities: (Vocabulary shown in bold type.)

- Identify and sort the following solid figures by their **flat and curved surfaces: sphere, cone, cylinder, cube, rectangular prism, pyramid.**
- Classify solid figures by the number of flat surfaces and **corners** they have.
- Identify the following plane figures that are found by tracing a flat surface of a solid figure: **circle, triangle, rectangle,** and **square.**
- Identity and sort plane figures (circle, rectangle, square and triangle) recognizing the square as a special rectangle.
- Classify the following plane figures by the number of **straight sides** and corners they have: square, triangle, **hexagon, rhombus,** and **trapezoid.**
- Use attributes and logical reasoning to identify the appropriate plane figure and discount the

inappropriate figure.
- Use different combinations of plane figures to compose the same new plane figure.
- Identify **equal parts** and **unequal parts** of a **whole** (congruent pieces and incongruent pieces).
- Identify, describe and name **halves** as one of two equal parts (**1/2, one half**) of a plane figure.
- Identify, describe and name **fourths** or **quarters** as one of four equal parts (**1/4, one fourth**) of a plane figure.
- Identify, describe and name **thirds** as one of three equal parts (**1/3, one third**) of a plane figure.

Activities to Differentiate Instruction

General strategies for modification of this curriculum for students with special needs, ELL, and gifted learners:

- **General strategies:**
  - preferential seating
  - manipulatives
  - modified workbook pages
  - practice or enrich homework pages
- **Center activities** - There are leveled center activities for each section. There is a separate activity for "Intervention", and then "On-Level" and "Advanced" are in spiral book.
- **Leveled practice pages** - There are three leveled (Reteaching, Practice, and Enrichment) sheets that can be used for practice or homework.
- **Math Concept Readers:** These readers allow the student to read the story at different levels- above level, on level, and below level. (also available on line with audio) Complete the Think and Respond and Write Math questions at the conclusion of each book.
- **Assessment**- Using Quick Check Review can determine differentiated instruction levels using sample answers and using the rubric at the Close/ Assess and Differentiate section in the teacher edition.

Content specific modification for students with special needs, ELL, and gifted learners:

- **Topic 15:**
  - **Below level students:**
    - Some children will have difficulty remembering the names of all the figures, as well as the attributes. They will benefit from repeated modeling of the information. For instance, when drawing a rectangle on the board, remark, "I am going to draw a rectangle with 4 sides and 4 corners." Making comments that reinforce the names and properties of geometric figures as you present the material will help children understand and retain the information.
    - These children will also benefit from a variety of activities that strengthen their grasp of the names and properties of geometric figures. These activities can range from hands-on drill and practice, to art projects, discussions, and games.
  - **Students with special needs:**
    - Some of the ideas, such as attributes of shapes and solids, are fairly abstract for young children. These concepts will be especially difficult for children with special needs. These children will need to be exposed to these ideas in many different ways in order to grasp the concepts behind them.
    - Children with special needs will benefit from tactile exploration of shapes and solids. Guided play with cut-outs or pattern blocks, artwork illustrating given concepts, and

other hands-on experiences will help children understand important geometric ideas.

- **ELL**
  - Geometry is a challenging topic because there are a number of terms key to understanding the material. Use concrete and visual aids to reinforce the vocabulary words.
  - **Emerging:** Display model or drawings of the figures included in this topic. Call on a child to come p and identify a figure such as a triangle. Then reinforce its properties with questions such as, "Point to its corners; how many are there?"
  - **Expanding:** Have children identify examples of plane shapes and solid figures in the classroom and describe their properties.
  - **Bridging:** Encourage children to extend their language skills by having them compare and contrast different geometric figures.

- **Advanced/Gifted:**
  - Children who quickly learn to identify geometric figures and their properties will be able to notice less obvious examples in their environment. Bring in illustrations of architecture, famous art, plants, and other topics. Encourage children to detect and discuss examples of geometric figures, congruence, and symmetry.

- **Topic 16:**
  - **Below level students:**
    - Below level performers may have had limited experience in distinguishing among different sizes and shapes. In addition, their counting skills may be limited.
    - When you work with these children, ask questions to focus their attention on how parts of a shape are alike or different.
  - **Students with special needs:**
    - Children with visual impairments often respond well to tactile experiences. Try to incorporate items that can be help and manipulated.
    - Sort-term activities that capture attention are helpful for children with short attention spans.

  - **ELL**
    - By folding and cutting paper, you can demonstrate to English language learners how to make equal parts. Children can grasp the concept through visual clus. They can talk about the process on different levels, depending upon their language proficiency.
    - **Emerging:** Fold and cut paper to show equal parts. Place one part on top of another to demonstrate that they are equal. Say with children, "equal parts."
    - **Expanding:** Show two more equal parts of a paper shape. Ask if the parts are equal or not equal. Repeat with another paper shape and two parts that re not equal.
    - **Bridging:** Show two equal parts cut from a paper shape. Ask children to explain in their own words how they know these are equal parts.

  - **Advanced/Gifted:**
    - Children who are able to readily identify equal parts can be encouraged to verbalize elements such as size, position, and direction as they describe the parts.
    - These children may enjoy the challenge of describing how a shape might be halved or quartered in multiple ways.

Integrated/Cross-Disciplinary Instruction

Language Arts and Reading: listening to trade books and reading leveled math concept readers; students will discuss questions at the back of the book

Topic 15: Art: Children choose pictures from magazines, glue pictures on construction paper and cut it into three or four different shapes; students will put them back together (page 466)

Topic 16: Music: Children make up a song for remembering fractions of a whole; illustrate each verse (page 512)

Resources

Envision Math Grade 1 Teacher's Guide and Student book

Envision Math Practice Workbook

Topics: Topic 15 - Geometry; Topic 16 - Fractions of Shapes

Envision Math Teacher's Resource Book: masters for enrichment, problem-solving, reteaching activities

Manipulatives: pattern blocks, solid figures, math stories, plane shape cards, building materials

Envision Online: student text; teacher's guide; enrichment, reteach, problem-solving and practice worksheets; animated glossary; math practice animations; visual learning animations; on-line intervention and enrichment (www.pearsonrealize.com)

Read Aloud Books: A Fair Bear Share, Leaping Lizards, 100 Days of Cool, Spunky Monkeys on Parade, Super Sand Castle Saturday

Songs: "My Hat, It Has Three Corners", "Hokey Pokey"

Poems: "The Shape of Things" by Meish Goldish

I Spy books

Envision Leveled Math Concept Readers

Investigations: Survey Questions and Secret Rules

Investigations: Mathematical Thinking at Grade 1

Math songs

21st Century Skills

CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP8.1	Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.