Unit 3: Understanding Volume, Coordinate Geometry and Classifying Figures

Content Area: **Mathematics**
Course(s):
Time Period: **Generic Time Period**
Length: **8 weeks**
Status: **Published**

Standards

	For example, given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.
TECH.8.1.5	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.5.C	Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
TECH.8.1.5.E	Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.5.F	Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.2.5	All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
TECH.8.2.5.E	Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.
LA.5.L.5.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
MA.5.5.G	Geometry
LA.5.W.5.10	Write routinely over extended time frames (time for research, reflection, metacognition/self-correction and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
MA.5.5.MD.A	Convert like measurement units within a given measurement system.
MA.5.5.MD.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
MA.5.5.MD.B	Represent and interpret data.
MA.5.5.G.A	Graph points on the coordinate plane to solve real-world and mathematical problems.
LA.5.RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
MA.5.5.OA.B	Analyze patterns and relationships.
MA.5.5.MD.B.2	Make a line plot to display a data set of measurements in fractions of a unit (1/2,

	1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.
CAEP.9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.
MA.5.5.G.A.1	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).
MA.5.5.OA.B.3	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.
MA.5.5.MD.C	Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.
MA.5.5.G.A.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
MA.5.5.G.B	Classify two-dimensional figures into categories based on their properties.
MA.5.5.MD.C.5b	Apply the formulas $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.
MA.5.5.MD.C.3	Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
MA.5.5.MD.C.5c	Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.
MA.5.5.G.B.3	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
MA.5.5.MD.C.3a	A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume.
LA.5.RI.5.3	Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
MA.5.5.MD.C.3b	A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.
MA.5.5.G.B.4	Classify two-dimensional figures in a hierarchy based on properties.
MA.5.5.MD.C.4	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.
MA.5.5.MD.C.5	Relate volume to the operations of multiplication and addition and solve real

	world and mathematical problems involving volume.
MA.5.5.MD.C.5a	Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
LA.5.W.5.4	Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
LA.5.L.5.2	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
CAEP.9.2.8.B.1	Research careers within the 16 Career Clusters ® and determine attributes of career success.

Learning Objectives

Unit Focus:

- Understand concepts of volume
- Graph points on the coordinate plane to solve real-world and mathematical problems
- Analyze patterns and relationships
- Classify two dimensional figures into categories based on their properties
- Represent and interpret data
- Perform operations with multi-digit whole numbers and with decimals to hundredths
- Apply and extend previous understanding of multiplication and division

Critical Area:

Developing understanding of volume.

Chapter Nine:

Lesson Learning Objectives:

9.1: Make and use line plots with fractions to solve problems.

9.2: Graph and name points on a coordinate grid using ordered pairs.

9.3: Collect and graph data on a coordinate grid.

9.4: Analyze and display data in a line graph.

9.5: Use two rules to generate a numerical pattern and identify the relationship between the corresponding terms in the pattern.

9.6: Solve problems using the strategy solve a simpler problem.

9.7: Graph the relationship between two numerical patterns on a coordinate grid.

Chapter Ten:

Lesson Learning Objectives:

10.1: Compare, contrast, and convert customary units of length.

10.2: Compare, contrast, and convert customary units of capacity.

10.3: Compare, contrast, and convert customary units of weight.

10.4: Convert measurement units to solve multi-step problems.

10.5: Compare, contrast, and convert metric units.

10.6: Solve problems about customary and metric conversions using the strategy make a table.

10.7: Convert units of time to solve elapsed time problems.

Chapter Eleven:

Lesson Learning Objectives:

11.1: Identify and classify polygons.

11.2: Classify and draw triangles using their properties.

11.3: Classify and compare quadrilaterals using their properties.

11.4: Identify, describe, and classify three-dimensional figures.

11.5: Understand unit cubes and how they can be used to build a solid figure.

11.6: Count unit cubes that fill a solid figure to find volume.

11.7: Estimate the volume of a rectangular prism.

11.8: Find the volume of a rectangular prism.

11.9: Use a formula to find the volume of a rectangular prism.

11.10: Use the strategy make a table to compare volumes.

11.11: Find the volume of combined rectangular prisms.

Essential Questions

Chapter Nine:

Chapter Essential Question:

How can you use line plots, coordinate grids, and patterns to help you graph and interpret data?

Lesson Essential Questions:

9.1: How can a line plot help you find an average with data given in fractions?

9.2: How can you identify and plot points on a coordinate grid?

9.3: How can you use a coordinate grid to display data collected in an experiment?

9.4: How can you use a line graph to display and analyze real-world data?

9.5: How can you identify a relationship between two numerical patterns?

9.6: How can you use the strategy solve a simpler problem to help you solve a problem with patterns?

9.7: How can you write and graph ordered pairs on a coordinate grid using two numerical patterns?

Chapter Ten:

Chapter Essential Question:

What strategies can you use to compare and convert measurements?

Lesson Essential Questions:

10.1: How can you compare and convert customary units of length?

10.2: How can you compare and convert customary units of capacity?

10.3: How can you compare and convert customary units of weight?

10.4: How can you solve multi step problems that include measurement conversions?

10.5: How can you compare and convert metric units?

10.6: How can you use the strategy make a table to help solve problems about customary and metric conversions?

10.7: How can you solve elapsed time problems by converting units of time?

Chapter Eleven:

Chapter Essential Question:

How do unit cubes help you build solid figures and understand the volume of a rectangular prism?

Lesson Essential Questions:

11.1: How can you identify and classify polygons?

11.2: How can tyou classify triangles?

11.3: How can you classify and compare quadrilaterals?

11.4: How can you identify, describe, and classify three-dimensional figures?

11.5: What is a unit cube and how can you use it to build a solid figure?

11.6: How can you use unit cubes to find the volume of a rectangular prism?

11.7: How can you use an everyday object to estimate the volume of a rectangular prism?

11.8: How can you find the volume of a rectangular prism?

11.9: How can you use a formula to find the volume of a rectangular prism?

11.10: How can you use the strategy make a table to compare different rectangular prisms with the same volume?

11.11: How can you find the volume of rectangular prisms that are combined?

Materials

Go Math Digital Resources:

iStudent Edition

eTeacher Edition

Personal Math Trainer

Math on the Spot Video

Real World Video

Animated Math Models

iTools

HMH Mega Math

iPad

Computer

Go Math Print Resources:

Student Edition

Practice and Homework (in the Student Edition)

Reteach (in the Chapter Resources)

Enrich (in the Chapter Resources)

Grab-and-Go Centers Kit

Achieve the Core:

http://achievethecore.org/page/2853/go-math-k-5-guidance-documents

Activities

Geometry and Measurement

Unit Project: Space Architecture

Chapter Nine: Algebra: Patterns and Graphing

Vocabulary Game: Going to the Moon

Lesson 1: Line Plots

Lesson 2: Ordered Pairs

Lesson 3: Investigate-Graph Data

Lesson 4: Line Graphs

Mid-Chapter Checkpoint

Lesson 5: Numerical Patterns

Lesson 6: Problem Solving-Find a Rule

Lesson 7: Graph and Analyze Relationships

Chapter Ten: Convert Units of Measure

Vocabulary Game: Bingo

Lesson 1: Customary Length

Lesson 2: Customary Capacity

Lesson 3: Weight

Lesson 4: Multi-step Measurement Problems

Mid-Chapter Checkpoint

Lesson 5: Metric Measures

Lesson 6: Problem Solving-Customary and Metric Conversions

Lesson 7: Elapsed Time

Chapter Eleven: Geometry and Volume

Vocabulary Game: Picture It

Lesson 1: Polygons

Lesson 2: Triangles

Lesson 3: Quadrilaterals

Lesson 4: Three-Dimensional Figures

Mid-Chapter Checkpoint

Lesson 5: Investigate-Unit Cubes and Solid Figures

Lesson 6: Investigate-Understand Volume

Lesson 7: Investigate-Estimate Volume

Lesson 8: Volume of Rectangular Prisms

Lesson 9: Algebra-Apply Volume Formulas

Lesson 10: Problem Solving-Compare Volumes

Lesson 11: Find Volume of Composed Figures

Other Activities:

5.G.A.1 Battle Ship Using Grid Paper

5.G.A.2 Meerkat Coordinate Plane Task

5.OA.B.3 Sidewalk Patterns

5.G.B.3 Always, Sometimes, Never

5.G.B.4 What is a Trapezoid? (Part 2)

5.MD.B.2 5.NF.A.1 Fractions on a Line Plot

5.NBT.B.7, 5.NF.B.3 What is 23 divided by 5?

5.NF.B.7c Salad Dressing

5.MD.C.5 Breaking Apart Composite Solids

5.MD.C.5a using Volume to Understand the Associative Property of Multiplication

5.MD.C.5b Cari's Aquarium

5.MD.C Box of Clay

Assessment

MAP Assessment

Diagnostic:

Show What You Know

Digital Personal Math Trainer

Formative:

Lesson Quick Check

Mid-Chapter Checkpoint

Digital Personal Math Trainer

- Assessment Animation
- Assessment Video

Summative:

Chapter Review/Test

Chapter Test

Performance Assessment Task

Digital Personal Math Trainer

Fact Fluency

Go Math Resources for Fact Fluency

- Fluency Standard Lessons (Student Edition)
- Fluency Builder (Teacher Edition)
- Strategies and Practice for Skills and Facts Fluency-Intermediate G3-6
- HMH Mega Math
- Personal Math Trainer: Standards Quizzes
- Animated Math Models

Other Resources for Fact Fluency

- Mad Minutes
- Rocket Math

MA.5.5.NBT.B.5	Fluently multiply multi-digit whole numbers using the standard algorithm.

Accomodations and Modifications

Materials and Resources that provide opportunities to accommodate and modify include:

Personal Math Trainer (adaptive assessment and intervention system)

Interactive Student Edition

Leveled Quizzes, Tests, and Performance Tasks

Grab & Go Differentiated Centers

Intensive Intervention Resource

Strategic Intervention Resource

Reteach Activities

RTI Tiered Resources and Activities

Math on the Spot Videos

Others/Notes

Standards for Mathematical Practice

MP.1 Make sense of problems and perserve in solving them.

MP.2 Reason abstractly and quantitavely.

MP.3 Construct viable arguments and critique the reasoning of others.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

MP.6 Attend to precision.

MP.7 Look for and make use of structure.

MP.8 Look for and express regularity in repeated reasoning.