Gr 5 Unit 1 Area and Volume

Content Area: **Math**
Course(s):
Time Period: **Trimester 1**
Length: **3 weeks**
Status: **Published**

Course Pacing Guide

In this unit, students build in their prior work with area and explore ways to find the area of rectangles with fractional side lengths. Students also learn about volume as an attribute of solid figures. Using improvised units, they explore volume and build toward using cubic units and volume formulas.

Unit

Unit 1 Area and Volume

Unit 2 Whole Number Place Value and Operations

Unit 3 Fraction Concepts Addition and Subtraction

Unit 4 Decimal Concepts and Coordinate Grids

Unit 5 Operations with Fractions

Unit 6 Investigations in Measurement;Decimal multiplication and Division

Unit 7 Multiplication of Mixed Numbers;Geometry;Graphs

Unit 8 Applications of Measurement, Computation, and Graphing

Unit 1

1.1 (1 day)

Students explore the student reference book. They read about and practice using grouping symbols.

1.2 (1 day)

Review area concepts and explore strategies for finding the area of rectangles.

1.3 (2 day)

Students make sense of two different answers to an area problem. Discuss and compare some solutions and review work.

1.4 (1 day)

Find areas of rectangles with fraction side lengths

1.5 (1 day)

Students explore the concept of volume as they informally compare volumes of three dimensional objects.

1.6 (1 day)

Use nonstandard units to measure volumes of rectangular prisms. Discuss packing units without gaps or overlaps to obtain an accurate volume measurement.

1.7 (1 day)

Discuss benefits of using unit cubes to measure volume. Measure volume by counting the number of cubes it takes to fill a rectangular prism.

1.8 (1 day)

Relate volume to multiplication and addition by iterating layers to find the volumes of prisms.

1.9 (1 day)

Explain and apply two different formulas for finding the volume of a rectangular prism.

1.10 (1 day)

Explore units of volume and convert between them.

1.11 (1 day)

Find volumes of figures composed of rectangular prisms and solve real world problems involving volume.

1.12 (1 day)
Play a game to practice finding volumes of rectangular prisms and write number models for the volumes.

1.13 (2 day)

Day 1: Administer Unit 1 Assesmsment

Day 2: Administer Unit 1 Open Response Assessment

Unit Overview

Evaluate expressions with grouping symbols

Write expressions to model situations.

Find the area of a rectangle with one fractional side length.

Identify objects with volume. Use cubes to find volume.

Use formulas to find volume.

Find the volume of a figure made of rectangular prisms.

Enduring Understandings

Volume is a measure of how much space a solid figure encloses and is measured in cubic units.

I can find the volume of a rectangular prism with this formula: V=l x w x h.

Measurements can be used to describe, compare, and make sense of phenomena.

Essential Questions

Essential Questions:

What is volume?

How can I find the volume of a rectangular prism?

How can measurements be used to solve problems?

How do formulas help us make sense of problem solving in our daily life?

Guiding Questions:

What is volume and how does it relate to the attribute of an individual figure?

What tools and units of measurement can be reasonably used to determine length, area and volume?

How can area, perimeter, and volume help us to solve problems in everyday life?

Why is area measured in square units?

Why is volume measured in cubic units?

How are area and volume related?

New Jersey Student Learning Standards (No CCS)

MA.5.NF.B.4b	Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
MA.5.MD.A	Convert like measurement units within a given measurement system.
MA.5.MD.C	Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.
MA.5.MD.C.3	Recognize volume as an attribute of solid figures and understand concepts of volume

	measurement.
MA.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.
MA.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.MD.C.4	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.
MA.5.MD.C.5	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

Amistad Integration

Amistad Integration Document

The Girl With a Mind for Math: The Story of Raye Montague by Julia Finley Mosca

SOC.5-8.1.3.1	Compare and contrast differing interpretations of current and historical events.
SOC.5-8.1.3.2	Assess the credibility of sources by identifying bias and prejudice in documents, media, and computer-generated information.

Holocaust/Genocide Education

- Teach district mandated diversity lessons
- Incorporate Responsive Classroom Program into classroom community

SOC.5-8.1.1.1	Construct timelines of the events occurring during major eras including comparative events in world history for the different civilizations.
SOC.5-8.1.1.2	Explain how major events are related to one another in time.

Interdisciplinary Connections

1.1 Literature Solving Problems using the Student Reference Book. TM 17, MJ 2-3.
Students use nonfiction books to compare glossary, index and table of contents to Student Reference Book.

1.3– Art
Quilt Area Open Response Activity. TM 26-35.
In this open response activity, students plan and design a quilt based on mathematical equations.

1.1 – 1.13 – ELA

Teacher models and reviews key vocabulary terms.

Essential content specific vocabulary can be found in the introductory material on the first page of every lesson.

LA.5.CCSS.ELA-Literacy.CCRA.R.4	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone. Key Ideas and Details

Technology Standards

Digital Resources:

https://www.mathplayground.com/grade_5_games.html

https://www.khanacademy.org/math/cc-fifth-grade-math/5th-volume

http://newtech.coe.uh.edu/

TECH.8.1.5.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.5.E.1	Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
TECH.8.1.5.E.CS1	Plan strategies to guide inquiry.
TECH.8.1.5.F	Critical thinking, problem solving, and decision making: 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.E	Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.

21st Century Themes/Careers

Through the integration and interdisciplinary connections in each unit, students will develop the understanding that math relates to the individual and global society.

Activity cards and enrichment activities provide a variety of options for developing computational strategies.

The following site provides access to real life collaborative math projects.

http://mathwire.com/problemsolving/probs58.html

CAEP.9.2.8.B.1	Research careers within the 16 Career Clusters ® and determine attributes of career success.
CAEP.9.2.8.B.4	Evaluate how traditional and nontraditional careers have evolved regionally, nationally,

and globally.

Financial Literacy Integration

Making a Difference

Essential Question: How can sharing with others improve our community and the lives of people throughout the world?

Objective: Create colorful, persuasive posters that entice others to support a charity of each student's choice.

http://www.scholastic.com/browse/article.jsp?id=3758472

9.1.8.A.1 Explain the meaning and purposes of taxes and tax deductions and why fees for various benefits (e.g., medical benefits) are taken out of pay.

9.1.8.A.2 Relate how career choices, education choices, skills, entrepreneurship, and economic conditions affect income. 9.1.8.A.3 Differentiate among ways that workers can improve earning power through the acquisition of new knowledge and skills.

9.1.8.A.4 Relate earning power to quality of life across cultures.

9.1.8.A.5 Relate how the demand for certain skills determines an individual's earning power.

9.1.8.A.6 Explain how income affects spending decisions.

9.1.8.B.1 Distinguish among cash, check, credit card, and debit card.

9.1.8.B.2 Construct a simple personal savings and spending plan based on various sources of income.

9.1.8.B.3 Justify the concept of "paying yourself first" as a financial savings strategy.

9.1.8.B.4 Relate the concept of deferred gratification to [investment,] meeting financial goals, and building wealth.

9.1.8.B.5 Explain the effect of the economy on personal income, individual and family security, and consumer decisions.

9.1.8.B.6 Evaluate the relationship of cultural traditions and historical influences on financial practice.

9.1.8.B.9 Determine the most appropriate use of various financial products and services (e.g., ATM, debit cards, credit cards, check books).

9.1.8.B.10 Justify safeguarding personal information when using credit cards, banking electronically, or filing forms.

9.1.8.D.5 Explain the economic principle of supply and demand.

9.1.8.E.1 Explain what it means to be a responsible consumer and the factors to consider when making consumer decisions. 9.1.8.E.2 Identify personal information that should not be disclosed to others and the

possible consequences of doing or not doing so.

9.1.8.E.3 Compare and contrast product facts versus advertising claims.

9.1.8.E.4 Prioritize personal wants and needs when making purchases.

9.1.8.E.6 Compare the value of goods or services from different sellers when purchasing large quantities and small quantities.

9.1.8.E.8 Recognize the techniques and effects of deceptive advertising.

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.
CAEP.9.2.8.B.7	Evaluate the impact of online activities and social media on employer decisions.

Instructional Strategies & Learning Activities

Unit 1 Volume and Area TM Pages 14-90 See page 4 for a detailed list of materials for Unit 1

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*** Additional Materials Needed for Advanced Preparation**

 Multiplication and division fact tables.

 Class Data Pad

 Solid Objects and packing materials.

 Pennies

 Quilt or picture of quilt

 Nonfiction book.

 Full and empty containers.

Differentiated Instruction

See pages inTeacher's Manual p. 15, 21, 27, 37, 43, 49, 55, 61, 67, 73, 79, 85 for Readiness Activities, Enrichment and Extra Practice

- Use data from Tech-Exit Tickets, Exit Slips, and Progress Monitoring to group students for each skill
- Student "may-do" activities
- sentence and discussion stems
- visual anchor charts for previous, current, and next lessons

Formative Assessments

Journal Pages, Math Boxes, Home Links

EDM4 Games:

Name that Number

Baseball Multiplication

Buzz

Prism Pile Up

Summative Assessment

Beginning of the Year Assessment (Found in Math Assessment Handbook)

Unit 1 Checking Progress

Quizzes

Benchmark Assessments

Beginning of the year assessment -benchmark test for assessing 5th grade skills.

Alternate Assessments

Progress Monitoring By Standard on Link-It

Resources & Technology

https://www.ixl.com/math/grade-5

BOE Approved Texts

McGraw Hill Education - Everyday Math Manual - Volumes 1 and 2

Closure

- Gallery Walk - On chart paper, small groups of students write and draw what they learned. After the completed works are attached to the classroom walls, others students affix post-its to the posters to extend on the ideas, add questions.
- Low-Stakes Quizzes - Give a short quiz using technologies like Kahoot or a Google form.
- Have students write down three quiz questions (to ask at the beginning of the next class).
- Question Stems - Have students write questions about the lesson on cards, using question stems framed around Bloom's Taxonomy. Have students exchange cards and answer the question they have acquired.
- Kids answer the following prompts: "What takeaways from the lesson will be important to know three years from now? Why?
- Have students dramatize a real-life application of a skill.
- Ask a question. Give students ten seconds to confer with peers before you call on a random student to answer. Repeat.
- Have kids orally describe a concept, procedure, or skill in terms so simple that a child in first grade would get it.
- Direct kids to raise their hands if they can answer your questions. Classmates agree (thumbs up) or disagree (thumbs down) with the response.
- Have kids create a cheat sheet of information that would be useful for a quiz on the day's topic.
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At Risk/ 504, Gifted and Talented, ELL, Special Education

Struggling Learners/504

- behavior management support
- Have student restate information
- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- Have student restate

Gifted and Talented Students (Challenge Activities)

- Offer the Most Difficult First
- Pretest for Volunteers
- Offer choice
- Speak to Student Interests
- Allow G/T students to work together

English Language Learners

- Advance Notes
- Extended Time
- Teacher Modeling
- Simplified Written and Verbal Instructions
- E-Dictionaires

Special Education Students

- Give directions in small steps and in as few words as possible.
- Number and sequence the steps in a task.
- Have student repeat the directions for a

information • Lab and math sheets with highlighted instructions • Graph paper to assist in organizing or lining up math problems • Use of manipulatives • No penalty for spelling errors or sloppy handwriting • Follow a routine/schedule • each time management skills • Verbal and visual cues regarding directions and staying on task • Adjusted assignment timelines • Visual daily schedule • Immediate feedback • Work-in-progress check • Pace long-term projects	• Tiered learning • Focus on effort and practice • Encourage risk taking	• Google Translate	task. • Provide visual aids. • Go over directions orally. • Shorten assignments to focus on mastery of key concepts. • Provide a vocabulary list with definitions. • Permit as much time as needed to finish tests. • Allow tests to be taken in a room with few distractions (e.g., the library). • Have test materials read to the student, and allow oral responses. • Divide tests into small sections of similar questions or problems.
1.1 – Exploring the Student Reference Book – page 15 Page p. 15	1.1 – Writing a Reference Book	1.1 – Number Line Activity p. 15	1.1 Activity Card 1: Student Reference Book p. 15
1.2 – Reviewing Equal Groups Activity p. 21	1.2 – Find the Area of Figures with Fractional Side Lengths MM 8	1.2 – Area activity p. 21	1.2 – Finding the Area of Rectangles – Activity Card 2 – MM p. TA3
1. 4 – Tiling squares with fractional side lengths activity p. 37	1.4 – Showing Area Unit Conversions – Activity Card 3 SRB	1.4 – Vocabulary Activity p. 37	1.4 – Finding Areas of Rectangle Activity MM 14
1.5 - Identifying Measureable Attributes – Group Activity p. 43	1.5 – Creating Prisms – Volume Challenge – Activity Card 4	1.5 – Vocabulary Activity p. 43	1.5 – Detecting Volume by Touch – Activity Card 5
1.6 – Measuring with nonstandard units. MM 17.	1.6 – Building and Measuring the Volume of a Polyhedron–Activity Card 6	1.6 – Vocabulary Activity p. 49	1.6 – Estimating Volume in Nonstandard Units – Activity Card 7.
1.7 – Layer Prism Problems MM 22	1.7 – Exploring Penticubes Activity Card 8 MM 23	1.7 – Vocabulary Activity p. 55	1.7 – Creating prism patterns MM TA3

1.8 – Layering Down Layers p. 61	1.8 – Finding the Volume of a Stick-On Note MM 26	1.8 – Using Visual Aids p. 61	1.8 – Rolling for Prisms Activity Card 9 – MM 27
1.9 – Reviewing an Area Formula p. 67	1.9 – Finding dimensions for given volume Activity Card 10.	1.9 - Vocabulary Activity p. 67	1.9 – Using volume formulas MM 29
1.10 – Converting Linear Measurements MM 31	1.10 – Packing Cubes in a Box – MM 32	1.10 –Math Message Activity p. 73	1.10 – Estimating the volume of a classroom. Activity Card 11.
1.11 – Using cubes to find volume activity p. 79	1.11 – Estimating Volume of a Classroom Object Activity Card 12	1.11-Math Message Activity p. 79	1.11 – Adding to find volume. Activity card 13.
1.12 Choosing volume strategies p. 85	1.12 – Creating Prism pile up cards. Activity Card 14.	1.12–Math Message Disc. p. 85	1.12 – Solving Volume Problems MM 37