08. Applications of Measurement, Computation, and Graphing

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **5 weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

In Grade 5, instructional time should focus on three critical areas:

1. Developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions)
2. Extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing an understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations
3. Developing an understanding of volume

In this unit, students will understand that the purpose of developing number sense, mathematical skills, and mathematical practices is to extend and gather knowledge in real-world, complex contexts.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Students will understand that:

- The significance of conversions in real-life contexts

- Appropriate calculations are needed to solve problems related to areas, volumes, monetary amounts, and measurement units.

- The connection between shapes like rectangles and rectangular prisms

- Formulas are needed to calculate areas and volumes

- Importance of estimation and approximation

Essential Questions:

- How do conversions and area calculations relate to solving real-world problems?
- Why is understanding the rectangle method important in finding the area of various shapes, and how is it applied?
- In what ways can volume formulas be applied practically to determine the base area and volume of objects?
- How do estimation and approximation through multiplication, division, and powers of 10 help in solving complex problems?

- What are the strategies and procedures used to convert measurement units and solve problems involving multi-digit numbers and decimals?
- Why are time conversions important, and how are they utilized in problem-solving?

STUDENT LEARNING TARGETS

Refer to the 'Declarative Knowledge' and 'Procedural Knowledge sections.

Declarative Knowledge

Students will know:

- Conversions in two dimensions (inches squared to feet squared, meters squared to centimeters squared, etc.) call for area models and an added step of multiplication or division.

- The rectangle method is used to compute the area for right triangles.

- The height of a fixed volume of a space will change directly as the width of a space changes.

- Strategies for computing with very large numbers extend from previously developed understandings.

- Graphs illustrate how one variable affects another.

- Pendulums provide a useful context for the study of patterns and relationships due to their "regular" swing time; the time is takes for one complete swing increases as the length of the pendulum increases; the size of the pendulum's arc does not significantly affect the swing time.

Procedural Knowledge

Students will be able to:

- Make conversions and calculate areas

- Find areas of rectangles as a step in the rectangle method of finding area.

- Calculate the base area and volume of real-world objects.

- Make sense of representations of rectangular prisms and apply a volume formula to solve volume problems.

- Round money amounts to the nearest whole dollar and multiply whole numbers to compute approximate total costs.

- Determine what calculations and conversions are required to solve a problem and accurately multiply and divide to complete intermediate steps.

- Use multiplication, division, and powers of 10 to estimate components of a real-world problem.

- Convert measurement units and multiply and divide multi-digit numbers and decimals to solve a problem.

- Complete time conversions and use the conversions to solve a problem.

- Multiply whole numbers and decimals to calculate cardiac output.

- Mentally divide a decimal by 10 and graph data on a coordinate grid.

- Graph data on a coordinate grid and interpret coordinate values in context.

CONTENT AREA STANDARDS

MA.5.NBT.A.2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
MA.5.NBT.A.4	Use place value understanding to round decimals to any place.
MA.5.NBT.B.5	Fluently multiply multi-digit whole numbers using the standard algorithm.
MA.5.NBT.B.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
MA.5.NBT.B.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
MA.5.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
MA.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.MD.C.5	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
MA.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.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.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.

INTERDISCIPLINARY CONNECTIONS

Math and Science Integration:

- Students will explore the concept of volume and its application in real-world objects like containers, comparing their volumes to understand capacity in science experiments.

Math and Economics:

- Students will round money amounts and estimate costs for budgeting scenarios. They will use multiplication and division to calculate expenses or savings in financial planning.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

	An individual's financial traits and habits affect his/her finances.
PFL.9.1.5.FP.1	Illustrate the impact of financial traits on financial decisions.
PFL.9.1.5.FP.2	Identify the elements of being a good steward of money.
PFL.9.1.5.FP.3	Analyze how spending choices and decision-making can result in positive or negative consequences.
PFL.9.1.5.FP.4	Explain the role of spending money and how it affects wellbeing and happiness (e.g., "happy money," experiences over things, donating to causes, anticipation, etc.).
PFL.9.1.5.PB	Planning and Budgeting
	There are specific steps associated with creating a budget.
PFL.9.1.5.PB.1	Develop a personal budget and explain how it reflects spending, saving, and charitable contributions.
	Saving money can impact an individual's ability to address emergencies and accomplish their short-and long-term goals.
PFL.9.1.5.PB.2	Describe choices consumers have with money (e.g., save, spend, donate).
CS.K-12.2.d	Evaluate and select technological tools that can be used to collaborate on a project.
CS.K-12.7.a	Select, organize, and interpret large data sets from multiple sources to support a claim.
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
TECH.K-12.P.4	Demonstrate creativity and innovation.
TECH.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.

TECH.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.

EVIDENCE OF LEARNING

Refer to the 'Formative, Summative, and Benchmark Assessments' sections.

Alternate Assessments

- Portfolios

- Verbal Assessment (instead of written)

- Multiple choice

- Modified Rubrics

- Performance Based Assessments

Formative Assessments

- Journal Pages
- Homelinks
- Math Boxes
- Observations
- Classwork
- Homework Assignments
- Do Now Questions
- Exit Tickets
- Self Assessment Questions

Summative Assessments

- Check Points
- Unit 8 Assessment
- End of Year Assessment
- Graded Assignments
- Project-based assessments

Benchmark Assessments

- IXL Screener / Diagnostic Snapshot BOY
- Trimester 1 Benchmark Assessment
- IXL Diagnostic Snapshot MOY
- Trimester 2 Benchmark Assessment
- IXL Diagnostic Snapshot EOY
- Trimester 3 Benchmark Assessment

RESOURCES (Instructional, Supplemental, Intervention Materials)

Core Instructional Materials:

- Everyday Math Unit 8 Resources (Math Masters, Student Journal Volume 2 / ConnectED)
- Calendar Math

Supplemental Materials:

- Illustrative Math Tasks
- IXL
- Games
    - Exponent Ball (Lesson 8-1): Multiplying and dividing decimals by powers of 10
    - Property Pandemonium (Lesson 8-3): Drawing, naming, and classifying quadrilaterals
    - Decimal Domination (Lesson 8-7): Multiplying decimals
    - Spoon Scramble (Lesson 8-10): Multiplying fractions and multiplying and dividing by powers of 10
- Manipulatives
    - Number card sets 1-4, 2-9, 0-9, 2-20
    - 6-sided dice
    - Counters
    - Rulers
    - Yardsticks
    - Tape measures
    - Stopwatch

Intervention Materials:

- Number Worlds
- Touch Math Now

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.