

# Gr 5 Unit 8 Applications of Measurement, Computation, and Graphing

Content Area: **Math**  
Course(s):  
Time Period: **Trimester 3**  
Length: **4 Weeks**  
Status: **Published**

## Course Pacing Guide

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In this unit, students apply and extend many skills and concepts they have learned throughout the year to engaging real world concepts. Problems include planning of an athletic center, selecting fish tanks based upon area and volume guidelines, creating a budget for an animal shelter, and calculating how long it would take to earn one million dollars. Students also graph and analyze data from heart rate and pendulum investigations. If time permits, many of the activities in this unit can be extended over several days.

Unit	MP/Trimester	Weeks
Unit 1 Area and Volume	1	3
Unit 2 Whole Number Place Value and Operations	1	4
Unit 3 Fraction Concepts Addition and Subtraction	1	4
Unit 4 Decimal Concepts and Coordinate Grids	2	4
Unit 5 Operations with Fractions	2	4
Unit 6 Investigations in Measurement;Decimal multiplication and Division	2	4
Unit 7 Multiplication of Mixed Numbers;Geometry;Graphs	3	4
<b>Unit 8 Applications of Measurement, Computation, and Graphing</b>	<b>3</b>	<b>4</b>

8.1

Make area conversions to find areas of sports playing surfaces in square feet.

8.2

Apply knowledge of rectangular areas to find areas of nonrectangular shapes.

8.3

Apply length, area and volume concepts to plan a home aquarium.

8.4

Open Response: Use representations to solve a problem about the volume of a rectangular prism.

8.5

Devise a plan for opening and operating an animal shelter for one year.

8.6

Calculate how long it would take to earn a \$1,000,000 at different hourly wages.

8.7

Calculate how long it would take to pay off the National Debt at different pay scales.

8.8

Convert measurement of units and perform operations with multidigit whole

numbers and decimals to solve time and distance problems.

8.9

Collect heart rate data and apply knowledge of multiplication unit conversions to find the number of time the heart beats in different units of time.

8.10

Graph heart rate data and use graphs to analyze data.

8.11

Apply knowledge of coordinate grids and place value to investigate the effect of pendulum length on pendulum swing time.

8.12

Use graphs to investigate the effect of arc size on a pendulum's swing time.

## **Unit Overview**

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### **Theme:**

Application of Measurement, Computation and Graphing

### **Conceptual Lens:**

Refer to page 754 in teacher manual for mathematical content and topics.

### **Students will know:**

Use unit conversions to solve problems.

Find areas of rectangles with mixed number side lengths to solve real- world problems.

Find volumes to solve real world problems.

Multiply and divide

whole numbers and decimals to solve real world problems.

Create graphs.

Use graphs to answer questions.

## Enduring Understandings

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Mathematics is used to solve real world problems by choosing an appropriate mathematical representation.

## Essential Questions

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### ESSENTIAL QUESTIONS

How is math used to solve real world problems?

How can you decide when to use an exact answer and when to use an estimate?

How do place value concepts help us compare, contrast and order numbers?

### GUIDING QUESTIONS

In Unit 8, the students apply previously mastered skills and content to real life situations. Guiding questions will vary based upon each group within each lesson.

## New Jersey Student Learning Standards (No CCS)

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MA.5.NBT.A.4	Use place value understanding to round decimals to any place.
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.NF.B.4a	<p>Interpret the product <math>(a/b) \times q</math> as a parts of a partition of <math>q</math> into <math>b</math> equal parts; equivalently, as the result of a sequence of operations <math>a \times q \div b</math>.</p> <p>For example, use a visual fraction model to show <math>(2/3) \times 4 = 8/3</math>, and create a story context for this equation. Do the same with <math>(2/3) \times (4/5) = 8/15</math>. (In general, <math>(a/b) \times (c/d) = ac/bd</math>.)</p>
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.NF.B.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
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.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.

## **Amistad Integration**

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### [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**

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- 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**

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Lesson 8.1 – Sci/Tech Planning an Athletic Center TM 766-772 Students use knowledge of area to design a 4-acre athletic center for their community.

Lesson 8.4 – ELA A Treasure Hunt. TM 784-791. Students construct a written open response to A Treasure Hunt. Peers review and provide feedback. Revisions and edits are made too open response as necessary.

Lesson 8.5 – Science Spending \$1,000,000 TM 794- 799 Using scientific data on the various weights of zoo animals, students apply and extend their knowledge of decimals.

Lesson 8.7 – Science Estimating Space Travel Time TM 807, MM 319 Students practice computing with large number based upon scientific data regarding Space Travel.

Lesson 8.9 – Physical Education/Science Finding Animal Heart Rates. TM 819, MM 323 Using a variety of data based upon collected exercise data, students will practice creating and interpreting graphs. They make scientific predications about the data.

## Technology Standards

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Digital Resources:

[https://www.mathplayground.com/grade\\_5\\_games.html](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.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.5.A.4	Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.
TECH.8.1.5.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.5.C.CS4	Contribute to project teams to produce original works or solve problems
TECH.8.1.5.F.CS1	Identify and define authentic problems and significant questions for investigation.

## 21st Century Themes/Careers

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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 <sup>®</sup> 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

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### 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.

## **Instructional Strategies & Learning Activities**

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**Refer to the last page of every lesson additional instructional learning activities.**

### **Additional Materials Needed for Advanced Preparation**

Number Cards

6 sided dice

Tape measures

Yardstick

Stopwatch

Poster Paper

Gallon milk container

Map

Scissors

String Pendulum

Encyclopedias

## **Differentiated Instruction**

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See pages in Teacher's Manual p.767, 773, 779, 785, 794, 801, 807, 813, 819, 825, 831, 837 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**

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Assessment Check in

Math Messages

Math Journal Pages, Math boxes, Homelinks

Games:

Exponent Ball

Property Pandemonium

Decimal Domination

Spoon Scramble

## **Summative Assessment**

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Unit 8 Progress Check

Quizzes

## **Benchmark Assessments**

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END OF YEAR BENCHMARK ASSESSMENT

## **Alternate Assessments**

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Progress monitoring by standard on Link it.

## **Resources & Technology**

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

## **BOE Approved Texts**

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

## **Closure**

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- 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.

## **At Risk/504, Gifted and Talented, ELL, Special Education**

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### **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 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

### **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
- Tiered learning
- Focus on effort and practice
- Encourage risk taking

### **English Language Learners**

- Advance Notes
- Extended Time
- Teacher Modeling
- Simplified Written and Verbal Instructions
- E-Dictionaries
- Google Translate

### **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 task.
- Provide visual aids.
- Go over directions orally.
- Shorten assignments to focus on mastery of key concepts.
- Provide a vocabulary list with definitions.

- 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
- 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.

8.1 – Converting among U.S. customary lengths. SRB	8.1 Converting between measurement systems. Activity card 95 and SRB pl. 328	8.1 – Vocabulary activity p. 767	8.1 – Converting ground areas from square feet to acres. MM 298
8.2 Finding areas of rectangles with MM TA3	8.2 Applying the rectangle method to more shapes. MM 301.	8.2 – Use think alouds to understand the word, prefix, p. 773	8.2 – Practicing the rectangle method. Activity Card 96 MM TA3
8.3 – Reviewing length, area and volume activity, p. 779	8.3 – Designing a fish tank. Activity card 97, MJ 285, MM 303-304	8.3 – Using role plays to understand vocabulary, p. 779	8.3 – Solving Measurement problems. Activity Card 98 and MM 305
8.5 – Reviewing estimation strategies activity p. 795	8.5 – Using fractions to adjust spending. Activity Card 99, MJ 290-291.	8.5 – Vocabulary activity p. 795	8.5 – Solving a “Weighty Problem”. MM 310.
8.6 – Representing measures in multiple units activity p. 801.	8.6 – Solving a Water Fountain Problem. MM 314	8.6 – Vocabulary activity p. 801	8.6 – Exploring salaries for different jobs. MM 315
8.7 –Working with large numbers activity p. 807	8.7 – Comparing national debts. Activity Card 100.	8.7 – Role play with money, p. 807	8.7 – Estimating space travel times. MM 318
8.8 – Solving cheetah problems activity p. 813	8.8 – Extending the footprint problem. Activity Card 101, MJ 300-301, MM 320	8.8 – Vocabulary activity p. 813	8.8- Calculating ages in different units. MM 321
8.9 – Applying conversions to solve problems activity p. 819	8.9 – Investigating breathing rates. Activity card 102, MJ 305.	8.9 – Body part vocabulary p. 819	8.9 – Finding Animal Heart Rates. MM 323.
8.10- Making multistep unit conversions. SRB p 328	8.10- Donating Blood. MM 325	8.10 Vocabulary activity p. 825	8.10- Investigating Heart Rate. Activity Card 103,

MJ 305 MM 326-327

8.11- Plotting points with decimal coordinates. MM 329

8.11- Exploring pendulum clocks. MJ 312, MM 330

8.11- Vocabulary activity p. 831

8.11- Using the pendulum length graph. Activity Card 104, MJ 313

8.12 – Reviewing how to interpret graphs. MJ 260-261

8.12 – Researching Pendulums. Activity card 105

8.12 – Vocabulary activity p. 837

8.12- Investigating the effect of Bob Weight. MM 332