Unit 4: Domain: Measurement and Data

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

Unit Overview

In this unit, students will solve problems involving measurement and conversion of measurement from a larger unit to a smaller unit using both customary and metric units. Students will also represent and interpret data, specifically using a line plot that will allow students to add and subtract fractions. Students will apply and calculate the area and perimeter for rectangles.

Standards

MA.4.MD.A.1	Know relative sizes of measurement units within one system of units including km, m, cm, mm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table.
MA.4.MD.A.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
MA.4.MD.A.3	Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
MA.4.MD.B.4	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

Essential Questions

- How can using the appropriate standard units and tools help you with measurements?
- When would it be appropriate to use a line plot to display information?

Application of Knowledge and Skills...

Students will know that...

- Numbers can be approximated by numbers that are close. Numerical calculations can be approximated by replacing numbers with other numbers that are close and easy to compute with mentally. Some measurements can be approximated using known referents as the unit in the measurement process
- Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways. For some relationships, mathematical expressions and equations can be used to describe how members of one set are related to members of a second set
- Some attributes of objects are measurable and can be quantified using unit amounts
- Some questions can be answered by collecting and analyzing data, and the question to be answered determines the data that need to be collected and how best to collect the data. Data can be represented visually using tables, charts, and graphs. The type of data determines the best choice of visual representation

Students will be skilled at...

- Comparing several different units of time and freely converting from one unit of time to another
- Constructing line plots using given data and using the line plot to answer questions about the data set
- Converting between customary units
- Converting between metric units
- Estimating and measuring length by choosing the most appropriate unit of length
- Estimating and measuring length to the nearest centimeter, and choose the most appropriate metric unit for measuring length
- Estimating fluently and measuring with units of weight
- Estimating fluently with customary capacity units (cups, pints, quarts, and gallons). They will compare the relative sizes of capacity measurements
- Estimating fluently with milliliters and liters. They will measure capacity using these metric units
- Making line plots to organize their data and drawing conclusions
- Measuring with units of mass- grams and kilograms
- Solving real-world problems that involve money and giving change by counting
- Using diagrams to show data and analyze how the quantities are related to solve real-world measurement problems
- Using the formulas for the perimeter and area of rectangles to solve real-world problems

Assessments

- Basic Facts Timed Tests
- Benchmark Tests
- End of Year Test (administered after completing program)
- Placement Test (administered prior to beginning program)
- Task Cards
- Topic Math Projects
- Topic Quick Checks
- Topic Tests

Activities

Problem of the Day-Present a daily problem that serves as a review from the previous day's lesson.

Vocabulary- Have students create a chart for each new vocabulary word that includes the word's meaning and an example or use vocabulary cards as flash card game

Station activities- Each section has center activities to reinforce skill (leveled) - please see Domain 1 unit for individual directions for each station activity

- **Display the Digits**
- **Toss and Talk**
- **Clip and Cover**
- **Think Together**
- **Teamwork**
- **Display the Digits**
- **Quick Questions**

STEM - Certain sections have Going Digital integrating technology and the use of calculators

Interactive Learning - Problem-Based Interactive learning activities at the beginning of each topic

Projects - There is a math project for each topic (See Cross-Disciplinary Instruction for projects and page numbers)

Practice work - Communicator practice can be done using Independent work and problem- solving practice problems in each section.

- Play SCOOT for certain sections or review for topic tests
- Task cards and use answer sheets for assessment

Ticket to Leave - Quick Checks on each sections

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 14**
  - **Below level students:**
    - To help students see the relationship between the various units of time, have them determine the number of times they breathe or the number of jumping jacks they can do in one minute. Have them describe activities in terms of taking more or less than one minute, one hour, or one day to complete.
  - **Students with special needs:**
    - Students with special needs will benefit greatly from hands-on experiences with measuring capacity, weight, and mass. Bring in a variety of containers and items and allow students to pour water, sand, rice, or other materials into the containers and weigh items on a balance scale. This will help them get a better sense of the relative size of each unit of measure.
    - Remind students of the difference between weight and mass. The terms cannot be used interchangeably.
  - **ELL**
    - Because students are asked to recall and relate a number of different units of measure in this topic, try to always hold up a reference object when talking about a specific unit of capacity, weight, or mass. Have students frequently repeat the names of the various units.
    - **Emerging:** Bring in items of various capacities. Have students choose the most appropriate unit to measure the capacity of each object.
    - **Expanding:** Bring in items of various capacities. Have students group the items into the following three categories: less than 1 cup, about 1 cup, more than 1 cup. Repeat with pint, quart, and gallon.
    - **Bridging:** List various customary units of capacity on the board. For each one, have the students list items that would be measure in each of these units.
  - **Advanced/Gifted:**
    - If students show proficiency converting between units of time, have them convert into fractional units of time. For example, 1 hour is 1/24 of a day and 1 year is 1/10 of a decade.

- **Topic 15**
  - **Below level students:**
    - Below level students may have difficulty linking area and perimeter to familiar concepts. Discuss how these terms would relate to students' desks. Point out that the shape of the desk is a rectangle. Then have students find the length and width of their desks. The area and perimeter of a rectangle can be found using the same concept (i.e. attributes of length and width).
  - **Students with special needs:**
    - Discuss with students the need for standard units. Have students measure the length of their desks using their hands. Students should find different measurements. Point out that a standard unit is needed for measuring.
  - **ELL**
    - Students may have difficulty explaining the difference between area and perimeter.
    - **Emerging:** Have students draw a rectangle that is 2 units wide and 3 units long on grid paper. Have them trace the outer edge in blue crayon. Tell students the blue is the perimeter and the red is the area.
    - **Expanding:** Write perimeter and area on the board. Have students think of words or small phrases that describe each, such as outside edge for perimeter or covering for area.
    - **Bridging:** Have pairs of students think of situations that would require finding area or perimeter, such as drawing a border around a picture. Then have them decide if they need area or perimeter to solve.
  - **Advanced/Gifted:**
    - Students who have strong number sense may enjoy finding the area of their hand print. Have students trace their hand on grid paper and count the number of squares.
    - Provide students with different dimensions of rectangles. Have students compare the perimeter and area of each rectangle.

Integrated/Cross-Disciplinary Instruction

Reading and Writing: The Math Concept Readers allow the student to read the story at different levels- above level, on level, and below level. Complete the Think and Respond and Write Math questions at the conclusion of each book.

Topic 14: Social Studies: Movies-pretending to open a new movie theatre - pg 361E

Topic 15: Social Studies: States - tracing a state outline onto grid paper to approximate the area and perimeter - pg 379E

Resources

Topics Categories in book form:

Topic 14: Measurement Units and Conversions

Topic 15: Solving Measurement and Data Problems

Master Enrichment pages

Master Reteaching pages

Master Practice pages

Student Edition workbook

On line Resources available at www.pearsonrealize.com

- Teacher Edition (TE) Textbook
- Student Edition (SE) Textbook
- Tests on line
- Concepts videos
- Math Tools

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.