Unit 8: Solving Problems Involving Measurement and Data

Unit #:	APSDO-00017494	Duration:	21.0 Day(s)	Date(s)	

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Grade(s)
4

Subject(s)
Mathematics

Unit Focus

In this unit, students will understand relative sizes of measurement units within customary and metric systems. They will convert measurement units within a single system, and record measurement equivalents in a table. Students will learn perimeter and area formulas in order to solve real world mathematical problems. They will use all four operations to solve word problems involving units of measure. Primary instructional materials for this unit include On Core and Everyday Mathematics.

Stage 1: Desired Results - Key Understandings

Standard(s)

Common Core
Mathematics: 4

- Know relative sizes of measurement units within one system of units including km, m, cm; 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. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet

Transfer

T1 (T31) Represent, summarize, and interpret data to clarify and solve problems or to make informed decisions.
T2 (T32) Apply appropriate formulas to determine the unknown.
T3 (T50) Based on an understanding of any problem, initiate a plan, execute it and evaluate the reasonableness of the solution.
T4 (T53) Articulate how mathematical concepts relate to one another in the context of a problem or in the theoretical sense.
T5 (T51) Examine alternate methods to accurately and efficiently solve problems.
T6 (T52) Use appropriate tools strategically to deepen understanding of mathematical concepts.

Meaning

and inches listing the number pairs (1, 12), (2, 24), (3, 36), ... *CCSS.MATH.CONTENT.4.MD.A.1*

- 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. *CCSS.MATH.CONTENT.4.MD.A.2*
- Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor. *CCSS.MATH.CONTENT.4.MD.A.3*
- 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. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection. *CCSS.MATH.CONTENT.4.MD.B.4*

Understanding(s)

U1 (U302) Measurements of the same physical property can be converted.
U2 (U303) Measurements with the same unit can be compared and combined.
U3 (U305) Sets of measurements may display patterns.
U4 (U304) Measurements can be used to categorize objects and recognize patterns that describe the world.
U5 (U502) Effective problem solvers identify and apply an appropriate model, tool, or strategy.
U6 (U503) Effective problem solvers try multiple strategies when struggling.
U7 (U512) Mathematicians use diagrams, symbols, and terms to describe problems or situations
U8 (U550) Attention to detail, such as specifying units of measure and labeling, leads to clarity in expressing mathematical information.

Essential Question(s)

Q1 (Q302) How do I compare/combine measurements of objects?
Q2 (Q304) What patterns do I see in this data set? Could this be random behavior? (Gr 6-12)
Q3 (Q308) Have I accurately applied the appropriate measurement formula?
Q4 (Q506) If my answer isn't correct or doesn't make sense, how can I fix it? How can I avoid this error the next time?
Q5 (Q500) What is a reasonable estimate?
Q6 (Q512) What information is needed and how do I use it to solve a problem?
Q7 (Q552) Does my solution make sense?

Acquisition of Knowledge and Skill

Knowledge

Skill(s)

S1

Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit (km, m, cm; lb, oz.; l, ml; hr, min, sec.)

S2

Record measurement equivalents in table

S3

Use four operations to solve word problems involving the following:

		a.distances b.intervals of time c.masses of objects d.money e.simple fractions or decimals f.conversion of measurements from larger units to smaller units **S4** Apply the area and perimeter formulas for rectangles in real world and mathematical problems **S5** Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8) **S6** Solve problems involving addition and subtraction of fractions by using information presented in line plots