

## Georgia Department of Education Deconstructing Georgia Standards of Excellence Mathematics Standard/Element Using The 5-Step Protocol

<b>Code:</b>	<b>MGSE4.MD.2</b>
<b>Standard and/or Element:</b>	<i>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.</i>

**1. Determine and define vocabulary.** *Identify and underline key terms within the standard(s) and/or element(s). Define each term as it relates to the standard.*

These definitions are for teacher reference only and are not to be memorized by the students. Students should explore these concepts using models and real life examples. Students should understand the concepts involved and be able to recognize and/or demonstrate them with words, models, pictures or numbers.

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language.

- **centimeter(cm)** - a metric unit for measuring length, equal to one hundredth of a meter
- **cup (c)** -
- **customary**- US Standard System
- **foot (ft)**- customary unit for measuring length
- **gallon (gal)** - customary fluid volume unit for measuring liquids
- **gram (g)** - metric unit for measuring mass or weight
- **kilogram (kg)** -metric unit for measuring mass or weight
- **kilometer (km)** - metric unit for measuring distance
- **liquid volume**
- **liter (L)** - metric unit for measuring capacity
- **mass** -the quantity of matter in an object
- **measure** -use of standard units to determine size or quantity in regard to length, breadth, height, area, mass or weight, volume, fluid volume, capacity, temperature and time
- **meter (m)** -base unit of length in the metric system
- **metric** - a decimal system of measurement based on 10
- **mile (mi)** - a customary unit for measuring length
- **milliliter (mL)** - a metric unit for measuring capacity of fluid volume
- **ounce (oz)** - customary unit for measuring weight

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- **pint (pt)** - a customary fluid volume unit for measuring liquids
- **pound (lb)** - a customary unit for measuring weight
- **quart (qt)**- a customary unit for measuring fluid volume or capacity
- **ton (T)** -a customary unit of mass
- **weight** - how heavy something is
- **yard (yd)** - a customary unit of measuring length

**2. Study the standard(s) and/or element(s).** *Identify concepts and skills students will need to know, understand, and be able to do to reach proficiency. Generate key implementation questions related to the standard and/or element(s). Answer each question.*

Students need to be able to fluently add, subtract, multiply, and divide whole numbers.

Students need to be able to fluently add and subtract fractions, mixed numbers, and decimal numbers to the hundredths.

Students need to be able to fluently multiply fractions by a whole number.

Students will need to be able to measure an object with respect to a particular attribute (for example, length, area, capacity, elapsed time, etc.), we may select another object with the same attribute as a unit and determine how many units are needed to 'cover' the object.

Students will need to measure and solve problems using hour, minute, second, pounds, ounces, grams, kilograms, milliliters, liters, centimeters, meters, inches (to halves and fourths), feet, ounces, cups, pints, quarts, and gallons).

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### **3. Scaffold understanding and communicate the language of the standard and/or element(s).**

*Paraphrase the standard) and/or element(s). Create a "script" that details how teachers will describe the standard and/or element(s) to students.*

Students need to be able to understand how measurement relates to real-world scenarios and use the four operations to solve relevant tasks. Examples of these types of word problems include adapting to a schedule, comparing distances, working with recipes, money, and time. Students should use a number line diagram to solve problems. In third grade, students should have learned how to solve problems involving elapsed time, mass and liquid volume. Therefore, students should have a general understanding of these concepts in fourth grade.

In third grade, you should have learned how to solve problems involving elapsed time, and mass and liquid volume. In fourth grade, you will build on this learning by solving problems that include these elements, but have real-world contexts. This standard will help you understand how math is used in your everyday lives. In addition to elapsed time and volumes, you will also solve problems involving distance and money. You have already learned how to add, subtract, multiply and divide. You have also learned about fractions, decimals, and how to convert larger units of measurement into smaller units of measurement. You will apply those skills to solve real-world problems.

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**4. Develop “I can” statements.** *Describe the standard(s) and/or element(s) as statements of intended learning (e.g., “I can use information from what I read to draw conclusions (make inferences)”;* “I can use mathematical vocabulary to describe how I solved a problem,” etc.).

I can add, subtract, multiply and/or divide to solve real-world problems involving distance, elapsed time, liquid volumes, masses, and money.

I can use my understanding of fractions and decimals to solve real-world problems involving distance, elapsed time, volumes, masses, and money.

I can use my knowledge of converting larger units of measurement into smaller units of measurement to solve real-world problems involving distance, elapsed time, liquid volumes, masses, and money.

**5. Establish success criteria by identifying strong and weak work.** *Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions.*

Strong Work	Weak Work
Students are able to solve multi-step problems using a variety of strategies and demonstrating strong reasoning. Students are able to speak to their strategies and explain how their strategies supports their solution.	Common Misconceptions: Student believe that larger units will give larger measures. Students should be given multiple opportunities to measure the same object with different measuring units. For example, have the students measure the length of a room with one-inch tiles, with one-foot rulers, and with yardsticks. Students should notice that it takes fewer yardsticks to measure the room than the number of rulers of tiles needed.