MA.4.M.1.2

Overarching Standard: *MA4.M.1 Measure the length of objects and solve problems involving measurement.*

Benchmark of Focus

MA.4.M.1.2.: Convert within a single system of measurement using the units: yards, feet, inches, kilometers, meters, centimeters, millimeters; pounds, ounces; kilograms, grams; gallons, quarts, pints, cups; liter, milliliter; and hours, minutes, seconds

Example: If a ribbon is 11 yards 2 feet in length, how long is the ribbon in feet?

Example: A gallon contains 16 cups. How many cups are in $3\frac{1}{2}$ gallons?

Benchmark Clarifications

Clarification 1: Instruction includes the understanding of how to convert from smaller to larger units or from larger to smaller units.

Clarification 2: Within the benchmark, the expectation is not to convert from grams to kilograms, meters to kilometers or milliliters to liters.

Clarification 3: Problems involving fractions are limited to denominators of 2, 3, 4, 5, 6, 8, 10, 12, 16 and 100.

Related Benchmark/Horizontal Alignment
- MA.4.M.1.1

Vertical Alignment

Previous Benchmarks	Next Benchmarks
MA.3.M.1.1	MA.5.M.1.1

Purpose and Instructional Strategies

The purpose of this benchmark is for students to see the relationships between the units they use for measurement. Students should begin to generalize that the smaller the unit is, the more precise measurement they will get, but will also need more of the unit to measure (MTR.5.1). Work in this benchmark builds from Grade 3 foundations of using customary measurements (MA.3.M.1.1).

- For instruction, students need to use measuring devices in class to develop a sense of the attributes being measured to have a better understanding of the relationships between units.
- The number of units relates to the size of the unit. Students need to develop an understanding that there are 12 inches in 1 foot and 3 feet in 1 yard. Allow students to use rulers or a yardstick to discover these relationships among units of measurements. Using 12-inch rulers and yardsticks, students will see that three of the 12-inch rulers are the same length as a yardstick, so 3 feet is equivalent to one yard. A similar strategy can be used with rulers marked with centimeters and a meter stick to discover the relationships between centimeters and meters.
- To help students to visualize the size of units, they should be given multiple opportunities to measure the same object with different measuring tools. 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 yard sticks to measure the room than rulers or tiles and explain their reasoning.

- During instruction, have students record measurement relationships in a two-column table or t-chart.
- Students are not expected to memorize conversions. Students should be provided conversion tools (e.g., charts) during instruction

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Common Misconceptions or Errors

- Students can assume that converting from smaller units to larger units (e.g., ounces to pounds), that multiplication is used, and when converting from larger units to smaller units (e.g., pounds to ounces), that division is used. To assist students with this misconception, expect them to estimate reasonable solutions.

Strategies to Support Tiered Instruction

- Instruction includes demonstrating which operation to use when converting from smaller units to larger units (e.g., ounces to pounds) and when converting from larger units to smaller units (e.g., pounds to ounces). Instruction also includes estimating reasonable solutions. The teacher models a think aloud and record the relationships on a two- column chart.
  - For example, "If a ribbon is 11 yards 2 feet in length, how long is the ribbon in feet?"
    - "I know that for every 1 yard, there are 3 feet. So, I can multiply the number of yards by 3 to convert to feet. I also know that for every 3 feet, there is one yard. I can divide the number of feet by 3 to convert to yards. Therefore 2 yards convert to 6 feet and 6 feet converts to 2 yards. To find out how many feet there are in 11 yards, 2 feet, I have to multiply the number of yards by 3. $11 \ yards \times 3 = 33 \ feet$. Next, I have to add the extra 2 feet. So, 11 yards, 2 feet converts to 35 feet."

	× 3	
Yards		**Feet**
1		3
2		6
11 yds 2ft		33 ft + 2 ft = 35 ft
	÷ 3	

- Instruction includes using a bar model or tape diagram to show the relationship between the units. The teacher models a think aloud.
  - For example, "If a ribbon is 11 yards 2 feet in length, how long is the ribbon in feet?"

▪ "I know that for every 1 yard, there are 3 feet. So, I can multiply the number of yards by 3 to convert to feet. I also know that for every 3 feet, there is one yard. I can divide the number of feet by 3 to convert to yards. Therefore 2 yards convert to 6 feet and 6 feet converts to 2 yards. To find out how many feet there are in 11 yards, 2 feet, I have to multiply the number of yards by 3. 11 × 3 = 33. Next, I have to add the extra 2 feet. So, 11 yards, 2 feet converts to 35 feet."

1 yard = 3 feet
3 feet = 1 yard

2 yard = 6 feet
6 feet = 2 yards

11 yards, 2 feet = 35 feet
35 feet = 11 yards, 2feet

Questions to ask students:

- Ask students how they know if their answer will be a greater or less number when they convert their units. Example: If you are finding out how many ounces are in 7 pounds, will your answer be greater than 7 or less than 7?

    - Sample answer that indicates understanding: *I know that my answer will be greater because it takes more of the smaller unit to make 1 of the larger unit.*

    - Sample answer that indicates an incomplete understanding or a misconception: *The answer is going to be small because my unit is smaller.*

- Ask students what operation they would use to change a larger unit to a smaller unit.

    - Sample answer that indicates understanding: I would use multiplication because we will be changing a few larger units to many smaller units.

    - Sample answer that indicates an incomplete understanding or misconception: I would divide because that will give me a smaller unit.

- Ask students how they know if they should multiply or divide when converting units.

    - Sample answer that indicates understanding: If we are converting a smaller unit to a larger unit, we should divide. If we convert a larger unit to a smaller unit, we should multiply.

- Ask students why converting metric units is easier than converting customary units.

    - Sample answer that indicates understanding: metric units increase or decrease by powers of 10, customary units have harder numbers to convert like 3 feet in a yard or 12 inches in a foot.

Instructional Tasks

Instructional Task 1 Calculate how many minutes there are in 1 week.

Instructional Items

Instructional Item 1

There are 3 paperclip chains. Chain A is 50 inches long, Chain B is $4\frac{1}{4}$ feet long. Chain C is 1 yard long. Order the chains from the longest length to the shortest length.

    a. Chain A, Chain B, Chain C
    b. Chain B, Chain C, Chain A
    c. Chain C, Chain B, Chain A
    d. Chain B, Chain A, Chain C

Achievement Level Descriptors

Benchmark	Context	Assessment Limits
MA.4.M.1.2 Convert within a single system of measurement using the units: yards, feet, inches; kilometers, meters, centimeters, millimeters; pounds, ounces; kilograms, grams; gallons, quarts, pints, cups; liter, milliliter; and hours, minutes, seconds. Example: If a ribbon is 11 yards 2 feet in length, how long is the ribbon in feet? Example: A gallon contains 16 cups. How many cups are in $3\frac{1}{2}$ gallons? Clarification 1: Instruction includes the understanding of how to convert from smaller to larger units or from larger to smaller units. Clarification 2: Within the benchmark, the expectation is not to convert from grams to kilograms, meters to kilometers or milliliters to liters. Clarification 3: Problems involving fractions are limited to denominators of 2, 3, 4, 5, 6, 8, 10, 12, 16 and 100.	Both	Items will only include one conversion and will be limited to a maximum of two procedural steps.

ALD 2	ALD 3	ALD 4	ALD 5
converts within a single system of measurement using hours, minutes, seconds.	converts within a single system of measurement using the units kilometers, meters, centimeters, millimeters; kilograms, grams; liters, milliliters; and hours, minutes, seconds; limited to whole number measurements.	converts within a single system of measurement using the units yards, feet, inches; kilometers, meters, centimeters, millimeters; pounds, ounces; kilograms, grams; gallons, quarts, pints, cups; liters, milliliters; and hours, minutes, seconds.	solves conversion word problems within a single system of measurement using the units yards, feet, inches; kilometers, meters, centimeters, millimeters; pounds, ounces; kilograms, grams; gallons, quarts, pints, cups; liters, milliliters; and hours, minutes, seconds.

Additional Resources:

[CPALMS Resources](#)

[Video: Converting Metric Distance](#)

[Video: Converting CM to M](#)

[Video: Converting Units: US Volume](#)

[Video: Converting minutes to hours](#)

Resources/Tasks to Support Your Child at Home:

In the kitchen, use measuring cups that have multiple units listed on them. Have your child practice measuring and comparing the different units.