

## MA.4.M.1.1

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

### Benchmark of Focus

MA4.M.1.1.: Select and use appropriate tools to measure attributes of objects.

### Benchmark Clarifications

*Clarification 1:* Attributes include length, volume, weight, mass and temperature.

*Clarification 2:* Instruction includes digital measurements and scales that are not linear in appearance.

*Clarification 3:* When recording measurements, use fractions and decimals where appropriate.

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### Related Benchmark/Horizontal Alignment

- MA.4.FR.1.2/1.4
- MA.4.GR.1.2
- MA.4.DP.1.1

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### Vertical Alignment

#### Previous Benchmarks

MA.3.M.1.1

#### Next Benchmarks

MA.5.M.1.1

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### Purpose and Instructional Strategies

The purpose of this benchmark is to select and use tools to measure with precision. This concept builds on work to connect linear measurement to number lines (MA.3.M.1.1).

- Students will measure using the customary units of linear measurement to the nearest  $\frac{1}{8}$  and  $\frac{1}{16}$  of an inch.
- Students will measure volume, weight, mass, and temperature using fractions or decimals where appropriate. As students work with this benchmark, they will begin to see relationships between units. For example, they will see that 10 millimeters is equivalent to one centimeter so one millimeter is  $\frac{1}{10}$  of a centimeter.
- For instruction of linear measurement, spend time showing students equivalent fractions on a number line and how that connects to rulers and tape measures. Students should also gain experience measuring things larger than their piece of paper or their textbook so they can make decisions about what the best tool to measure is.
- 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, one-foot rulers and yardsticks. Students should notice that it takes fewer yard sticks to measure the room than rulers or tiles and explain their reasoning.
- For instruction of liquid volume, give students experiences with real-world measuring cups and graduated cylinders.
- For instruction of mass and weight, give students opportunities to use real-world balances and scales so they understand how they work and how to read measurements.

- For measuring temperature, provide examples of digital and analog thermometers.
- Examples of nonlinear scales include weight scales commonly used in grocery stores and many thermometers.
- Using protractors to measure angles provides the connection between MA.4.GR.2.1 and measurement with nonlinear scales.

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### Common Misconceptions or Errors

- Students who struggle to identify benchmarks on number lines can also struggle to measure units of length, liquid volume, weight, mass and temperature. To assist students with this misconception, during instruction teachers should allow students to measure often and provide feedback. Students can also complete error and reasoning analysis activities to identify this common measurement misconception.

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### Strategies to Support Tiered Instruction

- Instruction includes opportunities to measure often and provide feedback. Use error and reasoning analysis activities to address common measurement difficulties.
- Instruction includes providing students with a variety of objects. Ask students which tool they would use to measure each object. Discussions would include asking which attribute of the object is to be measured.
  - For example, objects could include a banana (where length or weight could be measured), water in a container (where temperature, volume or weight could be measured).

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### Questions to ask students:

- **What tool could I use to measure the length of this pencil to the nearest  $\frac{1}{8}$  inch? What is the length to the nearest  $\frac{1}{8}$  inch?**
  - Sample answer that would indicate understanding: The student will use a ruler and line up the "0" with the end of the pencil and record the  $\frac{1}{8}$  inch.
  - Sample answer that indicates an incomplete understanding or a misconception: The student does not choose a ruler OR The student does not line up the pencil with the "0"; thereby recording an incorrect measurement. OR The student might use the cm side of the ruler rather than the inches side. The student might record to the nearest whole or quarter inch.
  - **What tool could I use to measure the volume of this liquid? What units could we use?**
  - Sample answer that indicates understanding: Graduated cylinder or measuring cup. We could use milliliters, liters, cups, ounces, pint, quarts, gallons.
  - **I need to find the weight of fruits at the grocery store. What tool and units could I use to find the weight?**
  - Sample answer that indicates understanding: A balance or digital scale could help me measure the mass in grams, or the weight in ounces or pounds.
  - **What tool and units could I use to measure the temperature?**
  - Sample answer that indicates understanding: We could use a temperature to measure the temperature in degrees Celsius or Fahrenheit.
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## Instructional Tasks

*Instructional Task 1* Use a thermometer to measure the temperature to the nearest 0.1 degree Fahrenheit at 8:30 a.m., 11:00 a.m., and 1:30 p.m. every day for one week. Record each temperature in a table.

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## Instructional Items

### *Instructional Item 1*

A pencil is shown. Using the ruler provided, what is the length of the pencil to the nearest  $\frac{1}{8}$  inch?



Using the ruler provided, what is the length of the pencil to the nearest  $\frac{1}{8}$  inch?

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## Achievement Level Descriptors

Benchmark		Context	Assessment Limits
MA.4.M.1.1 Select and use appropriate tools to measure attributes of objects. Clarification 1: Attributes include length, volume, weight, mass, and temperature. Clarification 2: Instruction includes digital measurements and scales that are not linear in appearance. Clarification 3: When recording measurements, use fractions and decimals where appropriate.		Mathematical	Allowable units of measurement include: meter, centimeter, millimeter, liter, milliliter, kilogram, gram, milligram, yard, foot, inch, gallon, quart, pint, cup, ton, pound, ounce, Celsius, and Fahrenheit. Items will not require lengths to be measured to the nearest centimeter or half or quarter inch. Items will not require temperatures to be measured to the nearest degree. Items will not require volume of a liquid to be measured to the nearest milliliter or half or quarter cup. Fractional representation is limited to the appropriateness of the tool. Decimals are limited to the hundredths.
ALD 2	ALD 3	ALD 4	ALD 5
N/A	selects appropriate tools to measure attributes of objects.	selects and uses appropriate tools to measure attributes of objects.	measures attributes of objects placed on non-zero starting points.

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## Additional Resources:

[CPALMS Resources](#)

Khan Academy: [Measuring to the Nearest Inch](#)

Khan Academy: [Measuring Lengths in different units](#)

Khan Academy: [Measuring Length to the nearest  \$\frac{1}{4}\$  inch](#)

Khan Academy: [Understanding Volume \(liters\)](#)

Khan Academy: [Measuring Mass](#)

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**Resources/Tasks to Support Your Child at Home:**

- Have your child find objects at home to measure the length. Encourage them to estimate the length first with whichever unit is chosen. Then have them measure the actual length of the object using a ruler, in both centimeters and inches. Have your child compare their estimate to the actual length.
- At the grocery store, have your child use the scales to measure the weight of produce.
- Use various measuring cups at home when cooking so your child can practice measuring liquid volume.