Grade Level	2	**Content Area**	Mathematics
Course Title (grades 9-12 Only)	NA		
Expected Prior Knowledge *The knowledge/skills mastered earlier in the year foundational to the mastery of the required Standard in the current sample.*	Students enter second grade familiar with a ruler and how to use it. Students also have background knowledge regarding directly comparing two objects with a measurable attribute in common and describe the difference. Students understand that measuring involves using the same-size length units that span over an object with no gaps or overlaps. They are also able to determine accurate and inaccurate ways to measure.		
Alignment to Program of Instruction *Briefly outline methods of instruction found in this sequence of lessons that align to the Program of Instruction described in A.3.*	Students continue to develop a strong mathematical foundation through hands-on learning opportunities and the application of concepts learned. The concepts taught and practiced are done so based on individualized instruction and personalized attention so students demonstrate mastery. Students engage in cross-curricular opportunities at the Caepe School. Here, students in math class measure leaves of plants they have planted and nurtured in science. They also access and utilize their nature journals from science.		
Standard Number and Description *List the Number* and full description for the Required Standard or Science Performance Objective listed in section A.6.*	**2.MD.2** Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.		
Materials/Resources Needed	Lesson 1: rulers, leaf, other items from outside, nature journals Lesson 2: rulers, meter/yard sticks, Measurement Data Sheet 1 Lesson 3: rulers, meter/yard sticks, bead, Measurement Data Sheet 2, variety of items for measurement stations (i.e. text book, 6 foot long string, folder, pencil, white board, rug, eraser from pencil, shoe, dime, teacher (for height) etc.) Summative Assessment: rulers		

* ***Standard Number****: For English Language Arts (Reading and Writing), use Grade, Strand, Standard (e.g., 3.RI.2). For K-8 Math, use Grade, Domain, Standard (e.g., 6.EE.7). For HS Math, use Conceptual Category-Domain, Standard (e.g., A-REI.6). For Science, use Grade, Strand, Concept, PO (e.g., 4.1.3.1).*

Lesson (add as needed)	Instructional Strategies The teacher will:	Student Activities The students will:
1	**Review:** Assign students to pairs. Give to each pair a ruler. Ask them to examine their ruler and share with their partner what they know or notice about it. After they have had the opportunity to share with their partners, ask students to volunteer to tell the class what they know or noticed. Write comments on the board. Answer may include the following: There are lines on the ruler. You can use the lines to measure. One side shows one way to measure, and the other side shows another way to measure. One side shows centimeters (metric units), and the other side shows inches (customary units). Centimeters are shorter than inches. Inches are longer than centimeters. **Demonstration:** Show students some items that you will measure. First, show students a leaf and measure it from end to end. Measure using centimeters and then inches and write the measures on the board, labeling both measures. Note that if a measure is not a whole number but near a whole number, you may say "it is about…." For example, you may record the measure of the leaf as 8 cm (metric units) or about 3 inches (customary units). Ask students to compare the two measures and say what they notice. Remind students that we can abbreviate centimeters with cm. Repeat with another item or two. For example, you may measure and record measurements for items like a stick, a flower stem, a flower petal, etc. **Interaction**: Instruct students to be sure they have their nature journal, a pencil for each student, a crayon for each student, and a ruler for each pair. Tell them to write these sentences in their nature journals. 1. A leaf from my cucumber plant is _____ cm or _____ inches long. 2. I made a leaf rubbing, and the leaf is _____ cm or _____ inches long. 3. I found a stick that is _____ cm or _____ inches long. 4. I found a flower, and its stem is _____ cm or _____ inches long. 5. I found a/an _____, and it is _____ cm or _____ inches long. Inform students that we will start in the class garden and will move on to the landscaped area or the wash adjacent to the parking lot. Partners	**Review:** Examine rulers. Share with partners, and share with the class **Demonstration**: Consider measurements. Students may say that there are more centimeters than inches in this measurement. **Interaction**: Write the sentences in science journals. Work with partners to find items and to measure. Although working with partners to measure, each student should write measurements in their own journals.

	should work together to measure and record measurements in both metric and customary units in their journals. For the last item, encourage to find something unusual to measure and to be very careful. (Do not try to measure an unfamiliar bug, a snake, or anything else that could be dangerous.) **Wrap Up**: Go back to the classroom and share measurements. Be sure to show leaf rubbings to the class.	**Wrap Up**: Share measurements and show leaf rubbings. Note again that centimeters are smaller than inches. **Independent Practice**: Complete a paper with pictures of leaf rubbings. Measure each in centimeters and inches.
2	**Review**: Discuss Independent Practice and clarify anything if necessary. Ask how centimeters and inches compare to each other. **Demonstration:** Explain that today we will measure again. We will start by measuring the length of one of the walls of the classroom. Call on a team of volunteers to measure, and ask the audience to watch to be sure we are doing it correctly. Record the measurement in both centimeters and inches. Ask the class if it seemed easy and accurate. Ask students if they can think of an easier way or more accurate way to measure something like a wall that much longer than a ruler. Be sure to have rulers out and meter/yard sticks visible. If students do not mention using something larger than a ruler or a larger unit of measure, hold up a meter/yard stick and ask if anyone has ever used one of these to measure. Walk around with the meter/yard stick so students can see it up close. Point out that there are lines showing centimeters and inches, but there are other measures, as well. Write on the board the following: 100 centimeter = 1 meter 12 inches = 1 foot 3 feet = 1 yard 1 meter is pretty close to 1 yard. Ask students if they think it would be easier to measure the wall with the yard/meter stick and to measure in yards or meters. Call on a team of volunteers to measure, and ask the audience to watch to be sure we are doing it correctly. Record the measurement in both meters (metric) and yards (customary). Ask the class if it seemed easy and accurate. **Interaction**: Assign students to pairs. Hand out to each pair a yard/meter stick and to each student a Measurement Data Sheet 1. Preview the sheet before going out to the playground to measure. Encourage students to find something unusual or interesting to measure for number 5. 1. The slide is about _____ meters or _____ yards long.	**Review:** Discuss Impendent Practice. Explain we can use a ruler to measure in both centimeters and inches. Centimeters are smaller than inches, and inches are larger than centimeters. **Demonstration:** Volunteer to measure the wall or watch the measurement process. Provide feedback regarding the ease and accuracy of the measurement. Comments may include that it is difficult to keep track of all the centimeters or inches or that it may not be very accurate to use small units when measuring something so big. Respond. Measure again using a meter/yard stick. Notice that it is easier to keep track of meters and yards when measuring something much longer than a ruler. **Interaction:** Work with partners to measure. Although working with partners to measure, each student should write measurements in their own journals.

	2. The hopscotch squares are about _____ meters or _____ yards long. 3. The distance between the swing posts is about _____ meters or _____ yards long. 4. The length of the picnic table is about _____ meters or _____ yards long. 5. I found a/an _____, and it is about _____ meters or _____ yards long. **Wrap Up**: Go back to the classroom and share measurements. Be sure to highlight different items students found for number 5. Answer any clarifying questions.	**Wrap Up**: Share measurements and highlight different items found for number 5. Note again that meters and inches are pretty close in size. **Independent Practice**: Find three items to measure at home. It could be inside or outside the home. Write them down and record their measure in both meters and yards. Measure accurately and be sure to label.
3	**Review:** Discuss Independent Practice and clarify anything if necessary. Ask how meters and yards compare to each other. **Introduction:** Call on a team of volunteers to measure a few different items, while the audience observes to be sure measuring is done accurately. One item should be small, like a bead. One should be large, like the length of the white board, and one should be medium, like the width of the chair seat. Have plenty of rulers and meter/yard sticks available for students to use. Ask the students who are measuring to choose their measuring tool and instruct them to record on the board their measurement, choosing the best unit of measure. After teams measure, discuss with students why certain measurement tools and units of measure are more appropriate when measuring different items. **Interaction**: Assign students to groups. Hand out to each student Measurement Data Sheet 2. Instruct students that groups will visit measurement stations in turn. At each station, they must measure the items, choosing the best measurement tool and units of measure. They must measure accurately and record measurements with correct labels. **Wrap Up**: Ask students to share their data. Discuss any differing opinions regarding best units of measure, allowing students to defend their choices. Note that sometimes one might choose one unit of measure, while someone else might choose a different one. That is fine, but we should take into account the unit(s) of measure that make the most sense to our brains and allow for the most accuracy.	**Review:** Discuss Independent Practice. Note that meters and yards are pretty close to the same length, but not exactly. Centimeters and inches are smaller than meters and yards. **Introduction:** Respond to questions. Recognize that it is good to measure something small like a bead with a ruler and use centimeters for the unit of measure, because a cm is relatively small. It is good to measure something long like a white board with a meter/yard stick and use meters or yards for the unit of measure, because a meter or yard is relatively large. It is good to measure a medium-size object like a chair seat with a ruler and use inches or feet for the unit of measure, because inches and feet are medium compared to other units of measure we have been using. It makes sense to our brains to do that. **Interaction:** Groups visit each station, exploring items to be measured, choosing the best measurement tool for each, measuring accurately using the best units of measure, and recording measurements with correct labels. **Wrap Up:** Share data, discussing any differing opinions regarding best units of measure. Students should defend their choices, recognizing that other choices may also be good. Note again that centimeters and inches are smaller than meters and yards.

Summative Assessment Items:

Use a ruler to measure the following objects in centimeters and inches. Measure using the nearest whole number.

1. This pencil measures about _____ centimeters long.
2. This pencil measures about _____ inches long.

3. This bookmark measures about _____ centimeters wide.
4. This bookmark measures about _____ inches wide.

The leaf pictured in this rubbing is about the size of my hand.

5. To measure it, it is better to use a _____.
   A. meter/yard stick
   B. ruler
6. The better unit of measure for this leaf is _____.
   A. inches
   B. meters

Marlo must measure the width of the playground.

7. To measure it, it is better to use a _____.
   A. meter/yard stick
   B. ruler
8. The better unit of measure for the width of the playground is _____.
   A. centimeters
   B. yards

9. Imagine you must measure the height from the floor to ceiling in our classroom. Would you use MORE meter/yard sticks or rulers to find the height?
10. Explain your answer to number 9.

Answer Key: Each correct answer is awarded 1 point, and no partial credit is available. A score of 8/10 demonstrates mastery.

1. 10 cm
2. 4 inches
3. 15 cm
4. 6 inches
5. B
6. A
7. A
8. B
9. I would use more rulers.
10. Rulers are smaller (shorter) than meter/yard sticks. OR Meter/yard sticks are bigger (longer) than rulers.