



San Diego Unified School District

Instructional Module to Enhance the Teaching of

HARCOURT

Math

California Edition

Grade 1

Module 10 - Revised

Measurement

– WORK IN PROGRESS –

San Diego City Schools
Instruction and Curriculum Division
MATHEMATICS CURRICULUM MAPS – GRADE 1

MODULE 10 – MEASUREMENT

Modules represent individual units of study that lead to essential learnings.

THREADS THROUGHOUT THE YEAR:

The threads represent ongoing learning opportunities in which students should be actively engaged throughout all units of inquiry during the entire school year. These items should not be isolated to any one particular unit of inquiry.

Students will be provided opportunities to:

- Develop understanding of numbers and the number system and use their understanding to solve problems and recognize reasonable results.
- Use mathematical reasoning to solve problems.
- Develop understanding of and fluency in basic computation and procedural skills.
- Use equations and to express generalizations of patterns and relationships.*
- Communicate their mathematical thinking by using words, numbers, symbols, graphs and charts., and describe different representations
- Express generalizations of patterns and relationships.
- Make connections among mathematical ideas and between other disciplines.
- Develop and use strategies, skills, and concepts to solve problems.
- Use appropriate tools, including technology as vehicles to learn mathematical concepts.

These are essential learnings that represent bigger ideas/concepts:

- Students understand that objects have properties, such as length, weight and capacity.
- Students understand that measurement involves the comparison of an attribute of one object with another object with the same attribute.
 - Students make reasonable estimations for length, weight, and capacity of an object.
- Students estimate, compare and order the measurement of length with units of length, weight with units of weight, and capacity with units of capacity (standare and non-standard).
- Students understand how measurement tools work so that they can be used correctly and meaningfully.

These are essential questions that learners ask themselves in order to achieve the essential learnings:

- How can I compare** and order the length, weight, capacity of different objects?
- How do I select appropriate tools/units/attributes for measurement?***
- How can I measure with consistency?***
- On what benchmarks am I basing my measurement estimates?
- How do I know when my measurement estimates are reasonable?

**Previously presented in kindergarten

Resources: Van de Walle, Chapter 19, pp 316 – 324, 327 -328

Harcourt Math – Grade 1

**Module 10: Measurement
10 Days**

Key Mathematical Concepts:

- Compare lengths; identify longer, shorter
- Estimate and measure length using non-standard units
- Estimate and measure length to the nearest inch, to the nearest centimeter
- Compare weights; identify heavier, lighter
- Estimate and measure weight
- Estimate and measure capacity
- Solve problems using reasoning skills

<p>Chapter 23: Length <u>DAY</u></p> <p>1 23.1 Compare Length</p> <p>2 23.2 Use Nonstandard Units</p> <p>3 23.3 Use Inches to Measure Length</p> <p>4 23.4 Use Centimeters to Measure Length</p> <p>5 23.5 Problem Solving: Make Reasonable Estimates</p>	<p>Chapter 24: Weight and Capacity <u>DAY</u></p> <p>6 24.1 Use a Balance</p> <p>7 24.2 Estimate and Measure</p> <p>8 24.3 Compare Capacities</p> <p>9 24.4 Problem Solving: Choose the Measuring Tool</p> <p>10 Assessment</p>
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<p><u>Day 1</u> Unit 5 Lesson 23.1</p>	<p><u>Day 2</u> Unit 5 Lesson 23.2</p>	<p><u>Day 3</u> Unit 5 Lesson 23.3</p>	<p><u>Day 4</u> Unit 5 Lesson 23.4</p>	<p><u>Day 5</u> Unit 5 Lesson 23.5</p>
<p><u>Day 6</u> Unit 5 Lesson 24.1</p>	<p><u>Day 7</u> Unit 5 Lesson 24.2</p>	<p><u>Day 8</u> Unit 5 Lesson 24.3</p>	<p><u>Day 9</u> Unit 5 Lesson 24.4</p>	<p><u>Day 10</u> Unit 5 Assessment</p>

DAY 1:
Measurement
Chapter 23: Length
LESSON 23.1 TE P. 327A

Math Background: This lesson introduces length measurement to children by having them place items in order from shortest to longest. Children also learn to measure length in units by linking connecting cubes. As children measure using connecting cubes, they are learning about measurement using a nonstandard unit. This will make it easier to introduce the inch and the centimeter as units of measurement in upcoming lessons.

LESSON FOCUS:	Compare Lengths
CALIFORNIA STANDARD:	Measurements and Geometry 1.1: Compare the length, weight, and volume of two or more objects by using direct comparison or a nonstandard unit
PURPOSE OF LESSON:	To understand length as a linear unit.
ROUTINE	Suggestion: Daily Routine: TE P. 327A Or Quick Review: TE P. 327
LAUNCH:	In the following two activities, students explore length comparisons. You may choose one for all the students to explore or introduce both activities and ask half of the class to work on one, while the other half works on the other, and switch halfway through your explore time. Introduce Activities: “Sorting by Length” and “Find 5 Things” Sorting by Length: <ul style="list-style-type: none"> • Create sorting-by-length stations at which students sort objects as longer, shorter, or nearly the same as a specified object. For example, the reference object may be a Crayola marking pen. • Other items in the station may include different sized crayons, pencils, paper clips, craft sticks, strings, strips of paper, etc. • Children sort these items into 3 groups, items shorter than the marking pen, longer than the marking pen, and about the same as the marking pen. • You may challenge students with the task of putting items in order from shortest to longest. Find 5 Things: <ul style="list-style-type: none"> • Give pairs of students one of the following: a strip of tagboard, a stick, a length of rope or some other such object. • Ask students to search for 5 items in the room that are longer than their object. (Tomorrow they will search for items that are shorter). • They can draw pictures or write the names of the items they find.
	<i>For each station (group of 3 to 4), classroom objects with an obvious length dimension, such as crayons, pencils, paper clips, craft sticks, strings, strips of paper, etc.</i>
	<i>For each pair, a reference object such as a strip of tagboard, a stick, a length of rope etc.</i>
EXPLORE:	Students work in small groups or in pairs comparing lengths.
PRACTICE:	As time allows, TE and Workbook Pp.

<i>TE and Workbook</i> <i>Pp. 327-328</i>	327-328
SUMMARIZE:	<p><i>Revisit with students the lesson's objective by connecting the following discussion to the purpose of the lesson.</i></p> <p>Discuss:</p> <ul style="list-style-type: none"> • Ask students to share their explore work. • Ask: What strategy did you use to figure out which items were shorter? Longer? • Did anyone use a different strategy?
HOMEWORK:	<p>Suggestion: <u>Family Involvement Activities</u> P. FA101 And/Or <i>"I Spy Something Longer/ Shorter"</i></p> <ol style="list-style-type: none"> 1. Find someone at home to play with. 2. Choose an item such as a butter knife, a candle, a ribbon, etc. 3. Player 1 finds another object in the room and says "I Spy something longer than the knife." 4. Player 2 tries to guess what it could be. Player 1 can give clues like, "It is longer than what you guessed. It is shorter than that guess. That's not it, but it's about that same length." 5. Players switch roles.

Below are the directions for "I Spy" if you would like to photocopy them on the back of P. FA101

Directions for "I Spy Something Longer/Shorter"

1. Find someone at home to play with
2. Choose an item such as a butter knife, a candle, a ribbon, etc.
3. Player 1 finds another object in the room and says "I Spy something longer than the knife."
4. Player 2 tries to guess what it could be. Player 1 can give clues like, "It is longer than what you guessed. It is shorter than that guess. That's not it but it's about that same length."
5. Players switch roles.

DAY 2
Measurement
Chapter 23: Length
LESSON 23.2 TE P. 329A

LESSON FOCUS:	Use Nonstandard Units
CALIFORNIA STANDARD:	Measurements and Geometry 1.1: Compare the length, weight, and volume of two or more objects by using direct comparison or a nonstandard unit
PURPOSE OF LESSON:	To estimate and measure length; using nonstandard units
ROUTINE:	Suggestion: "I Spy Something Longer/Shorter" : See Day 1 Homework Suggestion Or Daily Routine : TE P. 329A Or Problem of the Day : TE P. 329A Continue questioning: <ul style="list-style-type: none"> • How did you think about the problem to come up with that answer? • Did anyone think about it another way? • Do you agree or disagree with this response? • What was your strategy? • Explain how you got your answer.
LAUNCH: For each pair, a reference object such as a strip of tagboard, a stick, a length of rope etc., paper, connecting cubes, paper clips For each student :form for measurement (optional)	Introduce Activity: Find 5 Things - Guess and Measure: <ul style="list-style-type: none"> • This activity is continued from yesterday but with an extension for using nonstandard measurement. • Before introducing the activity, explain that one way to measure the length of an object is by counting how many "units" long the object is. • We can use almost anything as a "unit of measurement." Today we will be using a cube as one "unit of measurement" and a paperclip as another "unit of measurement." • Before you begin modeling how to use the unit of measurement, have students estimate how many cubes long a particular object is. (Estimation is very important for students to develop the measuring process. Students should make estimates before actually measuring any object, whether they are using standard or non standard measurement) • Model how to use cubes and paper clips to measure objects. (Emphasize the importance of placing the units used -cubes, paper clips- directly next to each other without having any space in-between. <ul style="list-style-type: none"> – Give pairs of students a strip of tagboard, a stick, a length of rope or some other such object. Today, ask students to search for 5 things in the room that are shorter than their object. They can draw pictures or write

	<p>the names of the things they find.</p> <ul style="list-style-type: none"> - Next, Partner A writes "Measure with cubes" at the top of her paper. - Partner B writes "Measure with paper clips" at the top of his paper. - Ask students to write the words "Guess _____" and "Measured _____" next to each item on their paper. - Have them estimate how many cubes or paper clips long they think each item might be. - Write down the guess before measuring. - Then measure each item and record the answer. (As estimating distances is quite difficult for young students, ask questions that lead them to using measurements of objects they have taken to help estimate the length of other objects. For example, you might ask, "If the crayon was 4 cubes long, do you think the marker is going to have less than 4 cubes or more than 4 cubes?" At the same time reinforce that estimates aren't supposed to be perfect or "right.")
EXPLORE:	Students work in pairs comparing lengths, estimating and measuring using connecting cubes and paper clips.
PRACTICE: TE and Workbook Pp. 329-330	As time allows, TE and Workbook Pp. 329-330
SUMMARIZE:	<p><i>Revisit with students the lesson's objective by connecting the following discussion to the purpose of the lesson.</i></p> <p>Discuss:</p> <ul style="list-style-type: none"> • Ask students to share their explore work. • Ask. "Did you and your partner get the same or different measurements for the items you found?" • "If you were measuring the same thing, why were your numbers different?" (We were using different units to measure.) • "Were your numbers larger or smaller than your partner's? Why do you think so?" (Paper clips are longer than cubes so you don't use as many to measure the same object.) • How did knowing the length of one object help you to estimate the length of another object?
HOMEWORK:	<p>Suggestion:</p> <ul style="list-style-type: none"> • At home, take out one fork, one knife, and one spoon. • Put them in order from shortest to longest. • Measure the shortest item using pennies as your "unit of measurement." • Estimate how many pennies long the other two objects will be. Then measure each with pennies.

DAY 3
Measurement
Chapter 23: Length
LESSON 23.3 TE P. 331A

LESSON FOCUS:	Use Inches to Measure Length
CALIFORNIA STANDARD:	Mathematical Reasoning 1.2: Use tools, such as manipulatives or sketches, to model problems
PURPOSE OF LESSON:	To understand "inch" as a unit of linear measurement.
ROUTINE:	<p>Suggestion: <i>"I Spy Something Longer/Shorter"</i>: See Day 1 Homework Or <i>Quick Review</i>: TE P.331 Or <i>Problem of the Day</i>: TE P. 331A</p> <p>Continue questioning:</p> <ul style="list-style-type: none"> • How did you think about the problem to come up with that answer? • Did anyone think about it another way? • Do you agree or disagree with this response?
<p>LAUNCH: <i>For each student, 10 1-Inch squares (p. TR100 teacher's Resource Book or inch square tiles), Workbook pp.331-332, scissors, pencil, marker, glue bottle, paintbrush.</i></p>	<p>Introduce Activity: <i>Using an Inch Unit</i></p> <ul style="list-style-type: none"> • Make 4 copies of the 1-Inch grid paper on p. TR100 in Teacher's Resource Book. • Cut the grids into columns so that each student has one column of 10 one-inch squares. • Instruct students to color the squares and cut them out. • Explain that they will use these inch squares as their "unit of measurement." • Students use their inch squares instead of a standard ruler to measure the items on Workbook Pp. 331-332. • You may want to point out the importance of lining up the squares end to end to get an accurate measurement. <p>Note: If you prefer, color tiles are 1" squares and can be used in the place of grid paper.</p>
EXPLORE:	<p>Students work independently estimating first and then measuring the lengths of objects in the classroom using 1-inch squares.</p> <ul style="list-style-type: none"> • On a sheet of paper, students name or draw the item (or make copies of worksheet provided in Module from the previous day) • Students write an estimated length • Students measure with 1" squares and record length in inches

PRACTICE:	Students continue using 1-inch squares to measure other items in the classroom
SUMMARIZE:	<p><i>Revisit with students the lesson's objective by connecting the following discussion to the purpose of the lesson.</i></p> <p>Discuss and Write:</p> <ul style="list-style-type: none">• Draw a curved line on the overhead.• Ask, "How can I measure this line using inches as my unit of measurement?"• Ask for volunteers to demonstrate strategies.• Next ask students to draw a similar curved line in their math journals and measure it using an appropriate strategy.• Why must "inch" squares all be the same length?
HOMEWORK:	<p>Suggestion: At home, take out one fork, one knife, and one spoon. Put them in order from shortest to longest. Measure the shortest item using pennies as your "unit of measurement." Estimate how many pennies long the other two objects will be. Then measure each with pennies.</p>

DAY 4
Measurement
Chapter 23: Length
LESSON 23.4 TE P. 333A

LESSON FOCUS:	Use Centimeters to Measure Length
CALIFORNIA STANDARD:	Mathematical Reasoning 1.2: Use tools, such as manipulatives or sketches, to model problems
PURPOSE OF LESSON:	To understand “centimeter” as a unit of linear measurement.
ROUTINE: <i>For each small group, a variety of manipulatives students have been using as units of measurement (connecting cubes, paper clips, pennies, 1-inch squares)</i>	Suggestion: “Guess, Measure, Draw”: Provide each table group with a variety of manipulatives they have been using as “units of measurement” (connecting cubes, paper clips, pennies, 1-inch squares). Choose an item for each group to measure (a book, desk, etc). <ul style="list-style-type: none"> • Ask students to: <ol style="list-style-type: none"> 1. Decide which unit of measurement they want to use 2. Guess the measurement and record their guess on paper 3. Measure the item 4. Draw the item and record the actual measurement • You may ask students to work together as a group using the same unit of measurement, or you may ask each student in the group to use a different unit of measurement. The latter leads to a discussion about what happens when you measure the same object using different units. • <i>Does the length change, why or why not?</i> • <i>Why do we seem to have different answers?</i>
LAUNCH: <i>For each student, 17 1-Centimeter squares (p. TR99 teacher’s Resource Book), Workbook pp.333-334, scissors, index card, glue, one inch square tile</i>	Introduce Activity: Using a Centimeter Unit <ul style="list-style-type: none"> • Make 1 copy of the 1-Centimeter grid paper on p. TR99 in Teacher’s Resource Book. • Cut the grids into rows so that each student has one row of 17 one-centimeter squares. • Instruct students to color the squares and cut them out. • Explain that they will use a centimeter square as their “unit of measurement.” Pass out color tiles or inch tiles used yesterday. Ask: How does a centimeter unit compare to the inch unit that was used yesterday? Is it longer? Shorter? • Ask students to use the centimeter squares to measure 1 or 2 items in their desk. • Next, provide students with an index card. Ask them to glue their centimeter squares along the top edge of the index card lining them up end to end. • Explain to students that they have just created a centimeter ruler. • Ask for ideas on how to use this as a measuring tool.

	<ul style="list-style-type: none"> Students use these centimeter rulers to measure the items on Workbook Pp. 333-334.
EXPLORE:	<p>Students work independently estimating and measuring the lengths of objects in the classroom using the 1-centimeter rulers they have made.</p> <ul style="list-style-type: none"> On a sheet of paper, students name or draw the item. Students write an estimated length <p>Students measure with 1" squares and record length in inches</p>
PRACTICE:	As time allows, students use 1-centimeter rulers to measure other items in the classroom or Workbook P. 334
SUMMARIZE:	<p><i>Revisit with students the lesson's objective by connecting the following discussion to the purpose of the lesson.</i></p> <p>Discuss and Write: Hold up some cylindrical shape such as a can or jar.</p> <ul style="list-style-type: none"> Ask, "How many centimeters do you think it is around the center of this can?" "How can I measure it?" Ask for volunteers to demonstrate strategies. Next ask students to draw a circle in their math journals and measure it using an appropriate strategy. If some students got different measurements for the same object that was measured, ask them to speculate as to how this might have happened.
HOMEWORK:	<p>Suggestion: Take home yesterday's one-inch squares in a baggie. Use them to create an inch ruler by gluing them to the edge of another piece of paper. Use this inch ruler to measure 5 things at home.</p>

DAY 5
Measurement
Chapter 23: Length
LESSON 23.5 TE P. 335A

LESSON FOCUS:	Problem Solving: Make Reasonable Estimates
CALIFORNIA STANDARD:	Measurements and Geometry 1.1: Compare the length, weight, and volume of two or more objects by using direct comparison or a nonstandard unit
PURPOSE OF LESSON:	To understand length as a unit of linear measure.
ROUTINE: <i>Centimeter rulers made by students yesterday</i>	Suggestion: "Guess, Measure, Draw": (From Day 4) Or Reading Support TE P. 335A Or Quick Review TE P.335
LAUNCH: <i>For each small group, items to measure such as lengths of string, pipe cleaner, lines drawn on paper (straight, curved, and zigzagged) And various units of measurement such as pennies, cubes, inch and centimeter squares, etc.</i>	Introduce Activity - Choose One: Alternative Teaching Strategy TE P. 336A Or Advanced Learners TE P.336A Either one of these activities work well for a range of ability levels by simply lengthening or shortening the item you ask students to estimate and measure. Another way to scaffold these measuring activities is to provide some students with a larger unit of measurement such as large paper clips as opposed to small paper clips.
EXPLORE:	Students work in small groups estimating and measuring lengths.
PRACTICE: <i>TE and Workbook Pp.335-336</i>	As time allows, Workbook Pp. 335-336
SUMMARIZE: Overhead, paper clips	<i>Revisit with students the lesson's objective by connecting the following discussion to the purpose of the lesson.</i> Discuss: Draw a straight line on the overhead. <ul style="list-style-type: none"> • Place a paper clip on the overhead, not next to the line • Ask students to estimate how many paper clips long the line is. Record a few estimates on the board. • Place one paper clip next to the line. Ask if anyone would like to change their previous estimate now that they see the paper clip next to the line. • Ask why or why not. • As you start placing more paper clips on the line offer students another opportunity to change their estimate when you are about halfway. (It is an opportunity for you to assess if they are using this new information in their estimate.)

	<ul style="list-style-type: none">• Continue to ask why they do or do not want to change their estimate.• After measuring a straight line, try doing the same thing with a curved and zigzagged line.
HOMEWORK:	Suggestion: Practice 23.5 (See bottom margin TE P. 335)

