Course Title: Mathematics	Full Year	Required

Course Description:

The big ideas in grade 2 include: extending understanding of the base-ten number system, building fluency with addition and subtraction, using standard units of measure, and describing and analyzing shapes.

The mathematical work for grade 2 is partitioned into 9 units:

1. Adding, Subtracting, and Working with Data
2. Adding and Subtracting within 100
3. Measuring Length
4. Addition and Subtraction on the Number Line
5. Numbers to 1,000
6. Geometry, Time, and Money
7. Adding and Subtracting within 1,000
8. Equal Groups
9. Putting it All Together

In these materials, particularly in units that focus on addition and subtraction, teachers will find terms that refer to problem types, such as Add To, Take From, Put Together or Take Apart, Compare, Result Unknown, and so on. These problem types are based on common addition and subtraction situations, as outlined in Table 1 of the Mathematics Glossary section of the Common Core State Standards.

Additional Course Information:

The big ideas in Grade 2 include:
- Representing and solving problems involving addition and subtraction
- Adding and subtracting within 20
- Understanding place value
- Using place value understanding and properties of operations to add and subtract
- Measuring and estimating lengths in standard units
- Relating addition and subtraction to length

Required fluency in grade 2 includes:
- Single-digit sums and differences (sums from memory by end of Grade 2)
- Add/subtract within 100

Core Resources:
Illustrative Mathematics

Instructional Routines and Math Language Routines

Glossary - Student-friendly

Required Materials

IM en Español:

Developing a Mathematical Community

Are there any attachments at the course level that teachers will need?

Scope and Sequence This document should be reviewed at the start of the year and each unit for information on language routines, expectations, and possible misconceptions.

Pacing Guide and Dependency Diagrams K-5

Unit 3: Measuring Length	Duration: 19-20 days

Unit Overview - FOCUS:
Unit Learning Goals
    ● Students measure and estimate lengths in standard units and solve measurement story problems within 100.
 	
This unit introduces students to standard units of lengths in the metric and customary systems. In grade 1, students expressed the lengths of objects in terms of a whole number of copies of a shorter object laid without gaps or overlaps. The length of the shorter object serves as the unit of measurement.
 	
Here, students learn about standard units of length: centimeters, meters, inches, and feet. They examine how different measuring tools represent length units, learn how to use the tools, and gain experience in measuring and estimating the lengths of objects. Along the way, students notice that the length of the same object can be described with different measurements and relate this to differences in the size of the unit used to measure.
 	
Throughout the unit, students solve one- and two-step story problems involving addition and subtraction of lengths. To make sense of and solve these problems, they use previously learned strategies for adding and subtracting within 100, including strategies based on place value.
 	
To close the unit, students learn that line plots can be used to represent numerical data. They create and interpret line plots that show measurement data and use them to answer questions about the data.
 	
Students relate the structure of a line plot to the tools they used to measure lengths. This prepares students for the work in the next unit, where they interpret numbers on the number line as lengths from 0. The number line is an essential representation that will be used in future grades and throughout students' mathematical experiences.
	Topic Titles:
	● **Section A: Metric Measurement**
	    ○ Measure length in centimeters and meters.
	    ○ Represent and solve one-step story problems within 100.
	● **Section B: Customary Measurement**
	    ○ Measure length in feet and inches.
	    ○ Represent and solve one- and two-step story problems within 100.
	● **Section C: Line Plots**
	    ○ Represent numerical data on a line plot.

Coherence: How does this unit build on and connect to prior knowledge and learning?

In grade 1, students learned how to measure using non-standard units of length laying multiple copies of a shorter object end to end without gaps or overlap. They developed precision as they made sure that there were no gaps or overlap in the units used to measure. The length of the shorter object served as the unit of measurement. They learned the conventions of length measurement and represented their measurements with a number and the name of the length unit. They understand that the length measurement of an object is the number of same-size length units that span it without gaps or overlaps. They explored using different manipulatives such as connecting cubes, paper clips, and base-ten cubes as length units and realized that the larger the manipulative used to measure the less units the length of the object would be. Also, they develop the idea that the number of units for the same length would not change when measured by different people. This unit is the first time students learn about standard units of length.

In grade 1, students solve problems in various contexts, including measurement. They solve Compare, Difference Unknown, Bigger Unknown, Smaller Unknown, Take From, Start Unknown story problems about lengths. They solved story problem types with unknowns in all positions. Earlier in grade 2, students revisited solving these various types of story problems with whole numbers within 100. They used tape diagrams to represent the problem and find the unknown in all positions. In grade one, students used the part-part-whole relationship to represent and solve problems. In grade one students learned the meaning of the equal sign and had experience deciding if each statement was True or False (example, 6+4 = 3+7 is true and 11-4=10-7 is false).

In a previous unit, students created and interpreted two representations of categorical data, bar graphs and picture graphs.

Essential Questions:	Enduring Understanding:
1. What is important to know when measuring length? 2. What are some strategies to solve story problems involving measurement units of length? 3. How can line plots be used to show measurements and give us information?	● **In order to accurately measure length, we need to understand important measurement concepts.** The length of an object is measurable. We can measure length using standard and non-standard units of measure. We can choose the best measurement tool strategically based on the size of an object. The length of any object can be used as a measurement unit for length (i.e. paperclip), but a standardized unit such as an inch or centimeter is always the same length. The length of two objects can be compared by subtracting to find the differences. ● **We can use what we know about addition and subtraction in order to solve story problems related to measurements.** Measurement in the same unit like inches can be added or subtracted in the same way as adding and subtracting whole numbers. ● **Data can be represented visually using line plots and graphs.** We can collect numerical data by measuring and creating a line plot to display this information. A line plot can be used as a visual representation of the relative length of objects. The numbers on the

	number line represent lengths and each "x" above a number represents an object of that length.	
What Students Will Know: This should be based on the competencies.	**What students will do: This should be based on the competencies.**	**Unit Specific Vocabulary:**
		Topic Vocabulary:
		Attributes
• When measuring the same object using different length units it leads to different measurements.	• Measure lengths of objects using centimeters.	Accuracy
	• Measure length using tools such as ruler, measuring tape, and meter sticks.	Precise
• When measuring an object with the same length unit everyone will get the same measurement	• Find the value of expressions with two-digit numbers mentally.	**Academic vocabulary**
	• Compare the lengths of objects.	
• A single base-ten block is a centimeter cube because each edge of the cube is 1 centimeter long.	• Estimate a reasonable length of an object in centimeters.	Measurement
	• Measure the length of objects using meters.	Length
• A centimeter is represented by the length between two tick-marks on a ruler and that each number on the centimeter ruler represents the distance in centimeters from zero.	• Choose an appropriate unit of measure (either centimeters or meters) for measuring an object.	Length units
		Centimeter, "cm"
		Tick mark
	• Measure the length of an object twice, using length units of different lengths for the two measurements and describe how the two measurements relate to the size of the unit chosen.	Metric
		Physical length units
• What the numbers and tick marks on a ruler represent		Ruler
		Estimate
• A meter is a larger unit of metric length than a centimeter	• Use diagrams to represent situations and determine if they will add or subject when they make sense of measurement story problems.	Reasonable
		Meter
• Benchmarks to know about how long each of the following units are: centimeter, meter		Meter stick
		Inch
	• Use inch tiles, rulers, and yardsticks to measure the length of objects and the sides of geometric shapes in inches, feet and yards	Metric System
• We can measure length using standard and non-standard units of measure.		US Customary System
		Foot
• We can choose the best measurement tool and unit strategically based on the size of an object.	• Determine which tool and unit of measurement is best used to measure an object	Tape measure
		Yardstick
		Tape diagram
• The length of two objects can be compared by subtracting to find the differences.	• Compare measurements for the same object in inches and feet and generalize that more units are needed to measure the same length if you	Take From
		Line Plot
• Measurements in the same unit like		Tick Marks

inches can be added or subtracted in the same way as adding and subtracting whole numbers.
- The inch is a length unit in the U.S. customary system.
- A benchmark to remember the length of an inch, foot, and yard
- The length of a 12-inch ruler is the length of 1 foot.
- If they line up the edge of an object with zero on their tools, they can easily read the measurement from the tool without counting each length unit.
- A line plot is a way to show how many of each measurement using an x for each measurement.
- Each x on the line plot represents one measurement.
- The numbers on the number line represent lengths and each "x" above a number represents an object of that length
- A line plot is used to represent and interpret numerical data.

use a smaller length unit.
- Determine the measurement of an object with a measuring tool when the endpoint does not line up with 0.
- Solve Take From problems involving length.
- Solve one-step story problems about length within 100.
- Interpret and solve two-step problems involving length.
- Collect numerical data by measuring and create a line plot to display their measurements.
- Interpret a line plot.
- Choose an appropriate starting and ending number based on the data when creating a line plot.
- Represent numerical data in a line plot.
- Use data presented in a table to determine the longest and shortest length when they create a line plot
- Ask and answer questions using a line plot.

Entry Level Assessment and Connection to Unit:

Section A Pre-Unit Practice Problems
Section B Pre-Unit Practice Problems
Section C Pre-Unit Practice Problems

Unit Materials, Resources and Technology:
- **Illustrative Mathematics**
- **Instructional Routines and Math Language Routines**
- **Glossary** - **Student-friendly**
- **Required Materials**
- **IM en Español**
- **Pacing Guide and Dependency Diagrams K-5**

Opportunities for Interdisciplinary Connections:

This unit has multiple opportunities for interdisciplinary connections as it connects to many science concepts. Within science, look for opportunities in which students can use their measuring skills to identify lengths of objects. Students can utilize their knowledge of line plots to represent, organize, and interpret their data sets.

Any links, attachments and resources:	Planning Ideas:
Instructional Routines Document	Components of a Typical IM Lesson
Family Support Materials	What To Know About IM When Planning
	Where to Find the Mathematical Practices in the Units
	Assessing the Mathematical Practices

Topic # 1 (Section A)	Topic Name: Section A - Metric Measurement	Duration: Recommended: 7 days (7 lessons)

Topic Description:

This section introduces two metric units: centimeter and meter. Students use base-ten blocks, which have lengths of 1 centimeter and 10 centimeters, to measure objects in the classroom and to create their own centimeter ruler. Students iterate the 1-centimeter unit Just as they had done with non-standard units in grade 1.

Students relate the side length of a centimeter cube to the distance between tick marks on their ruler. They see that each tick mark notes the distance in centimeters from the 0 mark, and that the length units accumulate as they move along the ruler and away from 0.

Students then compare the ruler they created to a standard centimeter ruler. They learn the importance of placing the end of an object at 0 and discuss how the numbers on the ruler represent lengths from 0.

Students also learn about a longer unit in the metric system, meter, and use it to estimate lengths. They have opportunities to choose measurement tools and to do so strategically (MP5), by considering the lengths of objects being measured. Students also measure the length of longer objects in both centimeters and meters, which prompts them to relate the size of the unit to the measurement.

To close the section, students apply their knowledge of measurement to compare the lengths of objects and solve Compare story problems involving lengths within 100, measured in metric units.

Section Learning Goals
- Measure length in centimeters and meters.
- Represent and solve one-step story problems within 100.

Competencies Addressed: **Understanding and Applying Number Systems** **2.NS.2** I can count, read, and write whole numbers. (2.NBT.A.2-3) **2.NS.4**. I can use my understanding of place value and properties of operations to add. (2.NBT.B.5-9) **2.NS.5**. I can use my understanding of place value to subtract. (2.NBT.B.5, 7-9) **Operations and Algebraic Thinking** **2.OA.1** I can add within 20. (2.OA.B.2) **2.OA.2** I can subtract within 20. (2.OA.B.2) **2.OA.3** I can represent and solve problems involving addition and subtraction.(2.OA.A.1, 2.MD.B.5-6) **Measurement and Data Investigations** **2.MD.1** I can measure and estimate lengths by selecting and using appropriate tools. (2.MD.A.1-4)	**Essential Question and Enduring Understanding Addressed in this Topic:** **Essential Question** 1. What is important to know when measuring length? **Enduring Understanding** ● **In order to accurately measure length, we need to understand important measurement concepts.** The length of an object is measurable. We can measure length using standard and non-standard units of measure. We can choose the best measurement tool strategically based on the size of an object. The length of any object can be used as a measurement unit for length (i.e., paperclip), but a standardized unit such as an inch or centimeter is always the same length. The length of two objects can be compared by subtracting to find the differences.
In this Topic, students will know: ● When measuring the same object using different length units it leads to different measurements. ● When measuring an object with the same length unit everyone will get the same measurement ● A single base-ten block is a centimeter cube because each edge of the cube is 1 centimeter long. ● A centimeter is represented by the length between two tick-marks on a ruler and that each number on the centimeter ruler represents the distance in centimeters from zero. ● What the numbers and tick marks on a ruler represent ● A meter is a larger unit of metric length than a centimeter ● Benchmarks to know about how long a centimeter is and about how long a meter is	**Topic Vocabulary:** Attributes Accuracy Precise **Academic vocabulary** Measurement Length Length units Centimeter, "cm" Tick mark Metric Physical length units Ruler

• We can measure length using standard and non-standard units of measure. • We can choose the best measurement tool and unit strategically based on the size of an object.	Estimate Reasonable Meter Meter stick Difference Unknown Bigger Unknown Smaller Unknown

In this Topic, students will be able to:

- Measure lengths of objects using centimeters.
- Measure length using tools such as ruler, measuring tape, and meter sticks.
- Find the value of expressions with two-digit numbers mentally.
- Compare the lengths of objects.
- Estimate a reasonable length of an object in centimeters.
- Measure the length of objects using meters.
- Choose an appropriate unit of measure (either centimeters or meters) for measuring an object.
- Measure the length of an object twice, using length units of different lengths for the two measurements and describe how the two measurements relate to the size of the unit chosen.
- Use diagrams to represent situations and determine if they will add or subject when they make sense of measurement story problems.
- Use inch tiles, rulers, and yardsticks to measure the length objects and the sides of geometric shapes in inches, feet and yards
- Determine which tool and unit of measurement is best used to measure an object
- Compare measurements for the same object in inches and feet and generalize that more units are needed to measure the same length if you use a smaller length unit.
- Determine the measurement of an object with a measuring tool when the endpoint does not line up with 0.
- Solve Take From problems involving length.
- Solve one-step story problems about length within 100.
- Interpret and solve two-step problems involving length.

Plan for Student Reflection:

[Student Journal Prompts and Reflection Practices](#)

Plan for Teacher Reflection:

Lesson 1: In grade 1, students measured by iterating same-size length units. How did students demonstrate their understanding and skill with measurement in this lesson? What can you do in future lessons to build on these strengths?

Lesson 2:
What evidence have students given that shows they understand that a centimeter is a length unit? What language do they use to describe how they measure a length in centimeters?

Lesson 3: In future lessons, students will learn how to represent whole numbers as lengths from 0 on a number line. How does their work today representing length units on a ruler help lay the foundation for the more abstract work with the number line? How can you continue to reinforce how measuring tools represent length units in upcoming lessons to prepare for student work with

number lines?

Lesson 4: Reflect on how you can reinforce the work done in today's lesson outside of math class. When can you ask students questions involving the estimation work done today? Are there opportunities at other times during the day to ask students to estimate the lengths of objects?

Lesson 5: Reflect on who participated in math class today. What assumptions are you making about those who did not participate? How can you leverage each of your students' ideas to support them in being seen and heard in tomorrow's math class?

Lesson 6: What representations have been most helpful for the students as they solve story problems? What do you notice in their work from today's lesson that you might leverage in a future lesson?

Lesson 7: Who got to do math today in class and how do you know? Identify the norms or routines that allowed those students to engage in mathematics. How can you adjust these norms and routines so all students do math tomorrow?

Utilize additional strategies for Teacher Reflection:
- Reviewing formative assessments
- Developing scaffolds
- Collaborative scoring
- PLCs
- Planning for small groups

Topic 1 Task Development

Each Topic has its own Task that serves as a roadmap for instruction during the unit. The task follows the Learning Cycle Model that drives teaching and learning in Naugatuck Public Schools.

Task Title: Topic 1 - Metric Measurement	Grade Level and Unit: Grade 2, Unit 3
Description of Task: Students interpret story problems about length measurements whose solution requires addition and subtraction within 100. In each activity, students solve Compare problems in situations where the language of the problem may direct students to use an incorrect operation. Throughout the lesson, they are encouraged to make sense of and use tape diagrams to visualize the measurement contexts and make sense of the lengths and their relationships (MP1, MP2).	**Purpose of Task:** The purpose of this task is for students to solve Compare story problems within 100 involving length.
Background of Students/Learning Progression: In previous lessons, students measured lengths and determined how much longer one object is than another using centimeters. They have also developed strategies for adding and subtracting numbers within 100. This lesson combines these skills. Students interpret story problems about length measurements whose solution requires addition and subtraction within 100. In each activity, students solve Compare problems in situations where the language of the problem may direct students to use an incorrect operation. Throughout the lesson, they are encouraged to make sense of and use tape diagrams to visualize the measurement contexts and make sense of the lengths and their relationships (MP1, MP2).	**Ensure all competencies are addressed in the task:** ☐ Yes, all competencies are addressed ☐ No - Task needs modification
Getting Started: In the lessons that make up Topic 1 - Section A of Unit 3, students will: ● Measure length in centimeters and meters.	

- Represent and solve one-step story problems within 100.

Lesson 1 (Warm Up)
- Lesson 1 Slides
- Teacher Presentation Materials

The purpose of this activity is to invite students to share what they know about measuring. Students measured the length of objects in grade 1 using non-standard units such as paper clips and tiles and may also have experience measuring length outside of school. This activity allows teachers to hear the language students use to talk about measurement and what attributes of objects they attend to in order to measure.

"What do you know about measuring?"

"What does it mean to measure?" (To find out how long something is.)
"We are going to continue thinking about what we know and learn more about measuring in our upcoming activities."

Section A

IM Lesson	Lesson 1: Standard Units of Measure	Lesson 2: Measure in Centimeters	Lesson 3: Create and Use a Ruler	Lesson 4: Measure and Estimate in Centimeters	Lesson 5: Measure in Meters	Lesson 6: Compare Reptile Lengths in Story Problems	Lesson 7: Center Day 1 (optional)
Learning Cycle Model	Making Meaning	Making Meaning	Investigate	Investigate	Investigate	Create/Produce	Additional Learning
Naugatuck Math Competency	2.MD.1	2.MD.1	2.MD.1 2.OA.3 2.NS.4, 2.NS.5	2.MD.1	2.MD.1 2.NS.2	2.OA.3 2.NS.4, 2.NS.5 2.OA.1, 2.OA.2	2.MD.1 2.NS.4, 2.NS.5 2.OA.3

Math Practice Standards	MP6	MP5, MP6	MP2	MP2, MP3, MP6	MP5	MP1, MP2	MP7
Lesson Purpose	The purpose of this lesson is for students to measure by iterating same-size length units and identify the need for standard units of measurement.	The purpose of this lesson is for students to measure in centimeters.	The purpose of this lesson is for students to use a ruler to measure and compare lengths in centimeters.	The purpose of this lesson is for students to estimate and measure lengths in centimeters. Students use a ruler for the first time.	The purpose of this lesson is for students to learn that the meter is a larger unit of metric length measurement.	The purpose of this lesson is for students to solve Compare story problems within 100 involving length.	The purpose of this lesson is for students to practice estimating and measuring length as well as telling and solving math stories.
Vocabulary Focus	Measurement, attributes, length, length units	Centimeter, "cm", physical length units, Metric System	Ruler, accuracy,	Estimate, reasonable	Meter, meter stick,	Difference Unknown, Bigger Unknown, Smaller Unknown	

Lesson Materials/ Resources	Lesson 1 Slides Teacher Presentation Materials Student Pages **Activity 1:** ● Give each group of 2 a 40-cm length of **string** or ribbon, five 10-cm length straws for half of the groups, ten 5-cm length **straws** for the other half of the groups. **Activity 2:** ● Gather a connecting cube to display in the activity synthesis. ● Give each group centimeter cubes.	Lesson 2 Slides Teacher Presentation Materials Student Pages **Warm-up:** ● Students need access to base-ten blocks **Activity 1:** ● Give centimeter cubes and 10-centimeter tools to each group. ● Give each student a copy of the bearded dragon. **Activity 2:** ● Give each student a Reptile Length sheet and access to base-ten blocks.	Lesson 3 Slides Teacher Presentation Materials Student Pages **Activity 1:** ● Give each student the Centimeter Ruler Template and access to centimeter cubes and 10-centimeter tools. **Activity 2:** ● Give each group access to base-ten blocks.	Lesson 4 Slides Teacher Presentation Materials Student Pages **Activity 1:** ● Each group of 2 needs access to several objects between 5–30 cm long and at least one object between 50–90 cm long. **Activity 2:** ● Materials from Activity 1 ● Give students centimeter rulers and access to base-ten blocks.	Lesson 5 Slides Teacher Presentation Materials Student Pages **Activity 1:** ● Tape strips of these lengths on the floor. Label each strip. ● Tape A, gila monster: 58 cm ● Tape B, baby alligator: 72 cm ● Tape C, baby cobra: 44 cm ● Tape D, komodo dragon: 180 cm ● Tape E, adult alligator: 3 meters and 36 cm ● Tape F, adult cobra: 1 meter and 90 cm ● Tape G, ribbon snake: 2 meters and	Lesson 6 Slides Teacher Presentation Materials Student Pages **Activity 1:** ● Give students access to base-ten blocks. **Activity 2:** ● Give students access to base-ten blocks.	Lesson 7 Slides Teacher Presentation Materials Student Pages **Activity 1:** ● Gather objects of various lengths (pencils, markers, books, glue, scissors, shoe, tape dispenser, etc). ● Give students access to centimeter rulers and meter sticks. ● Give each student Estimate and Measure Stage 2 Recording Sheet **Activity 2:** ● Centers - see below

				82 cm ● Give students access to centimeter rulers and base-ten blocks **Activity 2:** ● Give each group a meter stick and a ruler.		
	Cool-down: Measure a Rectangle	Cool-down: Measure with Centimeters	Cool-down: Use a Ruler	Cool-down: The Pencil	Cool-down: Measure in Meters	Cool-down: Kiran and Han Compare Pets	
Assessment	Formative Assessment Strategies: observation, questioning, student discourse : Monitoring Sheet See Section A Checkpoint Assessment, Section A Checkpoint Teacher's Guide						
						Section A Practice Problems

| Centers Materials | Target Numbers (1–5), Stage 5: Subtract Two-digit Numbers (Addressing)

Five in a Row: Addition and Subtraction (1–2), Stage 6: Add within 100 with Composing (Supporting) | Target Numbers (1–5), Stage 5: Subtract Two-digit Numbers (Addressing)

Five in a Row: Addition and Subtraction (1–2), Stage 6: Add within 100 with Composing (Supporting) | Target Numbers (1–5), Stage 5: Subtract Two-digit Numbers (Addressing)

Five in a Row: Addition and Subtraction (1–2), Stage 6: Add within 100 with Composing (Supporting) | Estimate and Measure (1–4), Stage 1: Choose Your Unit (Addressing)

Five in a Row: Addition and Subtraction (1–2), Stage 6: Add within 100 with Composing (Supporting) | Estimate and Measure (1–4), Stage 1: Choose Your Unit (Addressing)

Five in a Row: Addition and Subtraction (1–2), Stage 6: Add within 100 with Composing (Supporting) | Estimate and Measure (1–4), Stage 1: Choose Your Unit (Addressing)

Five in a Row: Addition and Subtraction (1–2), Stage 6: Add within 100 with Composing (Supporting) | Estimate and Measure (1–4), Stage 2

Math Stories, Stage 5 |
|---|---|---|---|---|---|---|---|

Making Meaning:

In Lesson 1, students use these measuring skills to measure the length of objects by iterating with straws and centimeter cubes. In the first activity, students use different length units when measuring the same objects and see that this leads to different measurements. In the second activity, all students use the same length unit (centimeter cubes) and see they all find the same measurement. In the lesson synthesis, students are introduced to the centimeter as the length of a centimeter cube. Students will use the centimeter as a length unit in future lessons.

In Lesson 2, students measure in centimeters and consider more efficient ways to measure. Students use tools (base-ten blocks) that have lengths of 1 centimeter and 10 centimeters to measure the length of objects. In the warm-up and Activity 1, students begin a transition from describing their measurements of length based on the number of objects they use to describing the number of standard length units (centimeters) the objects represent. In Activity 2, students choose to measure with centimeter cubes or 10-centimeter tools (base-ten block "tens") and explain their choices (MP5).

Lesson 1: Standard Units of Measure
- The purpose of this lesson is for students to measure by iterating same-size length units and identify the need for standard units of measurement.
- Lesson 1 Slides

- [Teacher Presentation Materials](#)

Lesson 2: [Measure in Centimeters](#)
- The purpose of this lesson is for students to measure in centimeters.
- [Lesson 2 Slides](#)
- [Teacher Presentation Materials](#)

Investigation:
In Lesson 3 (Activity 1 and 2), students create a ruler with centimeter units. Students begin their ruler at 0 and measure and label each centimeter up to 25 centimeters. It is important to include 0 on the ruler as this helps build the foundation for making sense of the number line in later lessons. Just as they will on the number line, students label each tick mark—not the space between the tick marks. They notice that the length between successive tick marks on their ruler is 1 centimeter and each tick mark represents a length in centimeters from zero, allowing them to use the ruler to measure without counting cubes (MP2).

In Lesson 4, students build on their experiences with centimeters to estimate lengths in centimeters and measure lengths with a centimeter ruler. In Activity 1, students estimate the length of objects in the classroom. Objects have been suggested, but they can be changed based on what is available in the classroom. Most of the objects students use to estimate and measure length for the purposes of this lesson should be 5–30 cm long. At least one object should be between 50–90 cm long to give students the opportunity to estimate longer objects and an opportunity to experience the need to iterate a ruler to find a longer measurement in anticipation of future lessons. In Activity 2, students measure the actual length of the objects.

In Lesson 5, students measure longer lengths and identify the need for a more appropriate length unit and tool for these measurements. Students use meter sticks to measure strips of tape on the floor, which represent the measurements of a variety of reptiles. Students recognize that a meter stick makes measuring longer lengths easier.

Lesson 3: [Create and Use a Ruler](#)
- The purpose of this lesson is for students to use a ruler to measure and compare lengths in centimeters.
- [Lesson 3 Slides](#)
- [Teacher Presentation Materials](#)

Lesson 4: [Measure and Estimate in Centimeters](#)

- The purpose of this lesson is for students to estimate and measure lengths in centimeters. Students use a ruler for the first time.
- Lesson 4 Slides
- Teacher Presentation Materials

Lesson 5: Measure in Meters
- The purpose of this lesson is for students to learn that the meter is a larger unit of metric length measurement.
- Lesson 5 Slides
- Teacher Presentation Materials
-

Create and Produce:

In Lesson 6, students interpret story problems about length measurements whose solution requires addition and subtraction within 100. In each activity, students solve Compare problems in situations where the language of the problem may direct students to use an incorrect operation. Throughout the lesson, they are encouraged to make sense of and use tape diagrams to visualize the measurement contexts and make sense of the lengths and their relationships (MP1, MP2).

Lesson 6: Compare Reptile Lengths in Story Problems
- The purpose of this lesson is for students to solve Compare story problems within 100 involving length.
- Lesson 6 Slides
- Teacher Presentation Materials

Communicate and Present:
Lesson 3 (Activity 1 and 2):
In this task students created and measured with their own rulers. They will present what they learned about creating a ruler and using it to measure with their classmates.
MLR8 Discussion Supports:
If needed, invite students to repeat their reasoning using mathematical language: "Can you say that again, using the phrase I could show them the length from __ to __?"
"How can you use the ruler to show someone how long 10 centimeters is?" (It's the length from 0 to 10.)
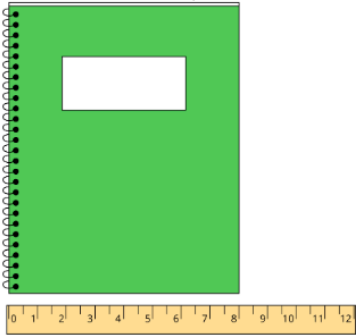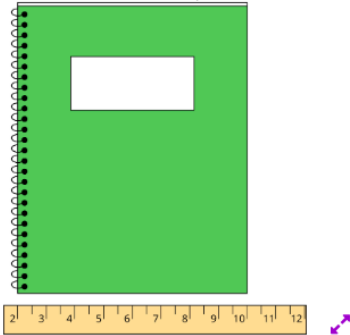"What other lengths could you use your ruler to show?" (Answers vary between 0 and 25 centimeters)

Reflection:
Lesson 3:
"Today, we created a ruler so we didn't have to line up centimeter cubes or 10-centimeter tools to measure. We learned what the numbers and tick-marks on a ruler represent."

"How is measuring with a ruler the same as measuring with centimeter cubes or a 10-centimeter tool? How is it different?" (They both measure in centimeters. The ruler just uses a line and tick-marks to show centimeter lengths and the

"How did you decide how long the rectangle is?"
"Where do you see this on the ruler?"

Share measurements for each rectangle.
Discuss any differences in measurement.
"How was the number 0 helpful when you measured each rectangle?" (It showed us where to put the tool. If you start with 0 then the length is the closest number to the end of the rectangle.)
Invite previously identified students to share how they found the difference between the shortest and longest rectangles.
"How can we use our ruler to prove that the longest rectangle is 10 cm longer than the shortest rectangle?"

other tools use the edges of the blocks. The ruler is easier to carry around and use to measure longer lengths. You don't have to count on the ruler if you line up what you are measuring with 0.)

"How did you use a ruler to find how many more centimeters longer one line was than another?" (You can measure from the end of the shorter line to the end of the longer line. You could find the length of both lines on the ruler and count up from the shorter line. You could find both lengths and subtract the smaller length from the larger length).

Additional Learning

In Lesson 7, Activity 1, students learn stage 2 of the Estimate and Measure center, which was first introduced in grade 1. Students estimate and measure the length of objects and find the difference between their estimate and the actual measurement. In the second activity, students choose to continue working on Estimate and Measure or a previously introduced center focused on solving story problems.

Lesson 7: Center Day 1 (optional)
- The purpose of this lesson is for students to practice estimating and measuring length as well as telling and solving math stories.
- Lesson 7 Slides
- Teacher Presentation Material

Notes: Follow the lessons in numerical order	Complete File with Resources and Task:

Topic # 2 (Section B)	Topic Name: Section B - Customary Measurement	Duration: Recommended 6 days (6 lessons)

Topic Description:

In this section, students apply measurement concepts and skills from earlier to measure and estimate lengths in two customary units: inches and feet.

As in the previous section, students make choices about the tool to use based on the length of the object being measured (MP5) and measure the length of the same object in both feet and inches. They begin to generalize that when they use a longer length unit, fewer of those units are needed to span the full length of the object. This understanding is a foundation for their work with fractions in grade 3 and beyond.

To solidify their understanding of measurement concepts, students also solve one- and two-step story problems involving addition and subtraction of lengths within 100, expressed in customary units. Some problems involve measurements using a "torn tape" where the 0 cannot be used as a starting point.

Jada and Han used an inch ruler to measure the short side of a notebook.

Han says it is 8 inches.   *Jada says it is 8 inches.*

How did Han and Jada get the same measurement?

Section Learning Goals:
- Measure length in feet and inches.
- Represent and solve one- and two-step story problems within 100.

Competencies Addressed:	Essential Question and Enduring Understanding Addressed in this Topic:

Understanding and Applying Number Systems
2.NS.4 I can use my understanding of place value and properties of operations to add. (2.NBT.B.5-9)
2.NS.5 I can use my understanding of place value to subtract. (2.NBT.B.5, 7-9)

Operations and Algebraic Thinking
2.OA.1 I can add within 20. (2.OA.B.2)
2.OA.2 I can subtract within 20. (2.OA.B.2)
2.OA.3 I can represent and solve problems involving addition and subtraction.(2.OA.A.1, 2.MD.B.5-6)

Measurement and Data Investigations
2.MD.1 I can measure and estimate lengths by selecting and using appropriate tools. (2.MD.A.1-4)

Essential Question
1. What is important to know when measuring length?

2. What are some strategies to solve story problems involving measurement units of length?

Enduring Understanding
- **In order to accurately measure length, we need to understand important measurement concepts.** The length of an object is measurable. We can measure length using standard and non-standard units of measure. We can choose the best measurement tool strategically based on the size of an object. The length of any object can be used as a measurement unit for length (i.e., paperclip), but a standardized unit such as an inch or centimeter is always the same length. The length of two objects can be compared by subtracting to find the differences.

- **We can use what we know about addition and subtraction in order to solve story problems related to measurements.** Measurement in the same unit like inches can be added or subtracted in the same way as adding and subtracting whole numbers.

In this Topic, students will know:

Topic Vocabulary:

- The inch is a length unit in the U.S. customary system.
- A benchmark to remember the length of an inch
- The length of a 12-inch ruler is the length of 1 foot.
- If they line up the edge of an object with zero on their tools, they can easily read the measurement from the tool without counting each length unit.

Academic vocabulary
Inch
Metric System
US Customary System
Foot
Tape measure
Yardstick
Tape diagram
Take From

In this Topic, students will be able to:
- Use inch tiles, rulers, and yardsticks to measure the length of objects and the sides of geometric shapes in inches, feet and yards
- Determine which tool and unit of measurement is best used to measure an object
- Compare measurements for the same object in inches and feet and generalize that more units are needed to measure the same length if you use a smaller length unit.
- Determine the measurement of an object with a measuring tool when the endpoint does not line up with 0.
- Solve Take From problems involving length.
- Solve one-step story problems about length within 100.
- Interpret and solve two-step problems involving length.

Plan for Student Reflection:

[Student Journal Prompts and Reflection Practices](#)

Plan for Teacher Reflection:
Lesson 8: In Activity 2, students estimated the length of objects in inches. Did their previous work measuring and estimating with centimeters make working with a new length unit easier? How have you seen students making progress toward making more accurate estimates?
Lesson 9: In Activity 1, students measured the same length of tape in both inches and feet. What evidence did you see of students' understanding that the different measurements for each line relate to the size of the unit used to measure?
Lesson 10: What connections did students make between the different methods shared? What questions did you ask to help make the connections more visible?
Lesson 11: In previous lessons, students used tape diagrams to represent Compare problems. How did you see students use the structure of

|	
	part-part-whole tape diagrams to make sense of Take From problems? What connections did you hear students make between the tape diagrams and the measurement context? **Lesson 12:** Reflect on how comfortable your students are asking questions of you and of each other. What can you do to encourage students to ask questions? **Lesson 13:** As students worked in their centers today, whose ideas were heard, valued, and accepted? How can you use what you learned today about your students to inform how you will use centers in the future? **Utilize additional strategies for Teacher Reflection:** ● Reviewing formative assessments ● Developing scaffolds ● Collaborative scoring ● PLCs ● Planning for small groups

Topic 2 Task Development

Each Topic has its own Task that serves as a roadmap for instruction during the unit. The task follows the [Learning Cycle Model](#) that drives teaching and learning in Naugatuck Public Schools.

Task Title: Topic 2 - Customary Measurement	Grade Level and Unit: Grade 2, Unit 3
Description of Task: Friendship Bracelets and Gifts (Lesson 12 Activity 2) Students will represent and solve two-step story problems involving measurement. Students use representations to make sense of problems, support their calculations, and explain their thinking. The story problems are presented in parts, and students are encouraged to represent each part in a way that makes sense to them. Students may use base-ten blocks, base-ten diagrams, tape diagrams, and equations to show and display their thinking. Then, students will compare different ways they represented and solved the task.	**Purpose of Task:** Students will interpret the story problem and show their understanding of each part of the problem by creating a representation that makes sense to them. Students will be combining what they have learned about measurement and solving story problems.
Background of Students/Learning Progression: In previous lessons, students represented and solved one- and two-step story problems in a way that made sense to them. They have used tape diagrams to represent comparisons and part-part-whole relationships. In this task students will have the opportunity to make sense of the problem and make a representation to show their understanding of each part of the problem involving length units.	**Ensure all competencies are addressed in the task:** ▢ Yes, all competencies are addressed ▢ No - Task needs modification

Getting Started:
In the lessons that make up Topic 2 - Section B of Unit 3, students will:
- Measure length in feet and inches.
- Represent and solve one- and two-step story problems within 100.

Lesson 8 : [What is an Inch?](#) (WARM UP)
- The purpose of this lesson is for students to learn that an inch is a standard length unit in the U.S. customary system and use it to measure length.
- [Lesson 8 Slides](#)
- [Teacher Presentation Materials](#)

The purpose of this warm-up is to elicit the idea that there is a unit of measure that is longer than a centimeter but is still small—an inch. This will be

useful when students are introduced to customary units beginning with the inch tile and the inch ruler. While students may notice and wonder many things about these images, the difference in the length between tick marks on the rulers (the length-unit) is an important discussion point.
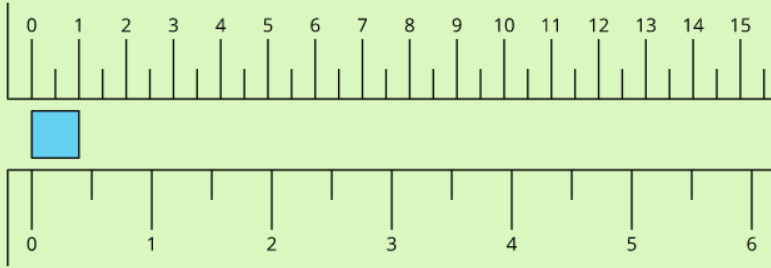
"How are these images the same? How are they different?" (They both look like rulers. They both start with 0 and count up. One of the rulers lines up with the square from 0–1, but the other ruler does not show the same length unit.)

"We have learned that there are different length units we can use to measure. We have measured with standard units from the metric system like centimeters and meters. In the next activity, we will learn more about a new standard unit that is longer than a centimeter, but much shorter than a meter."

Section B

IM Lesson	Lesson 8: What is an Inch?	Lesson 9: From Feet to Inches	Lesson 10: Measure with a Torn Tape	Lesson 11: Saree Silk Stories: Necklaces and Bracelets	Lesson 12: Saree Silk Stories: Friendship Bracelets	Lesson 13: Center Day 2 (Optional)
Learning Cycle Model	Making Meaning	Making Meaning	Investigation	Investigation	Create/Produce	Additional Learning
Naugatuck Math Competency	2.MD.1	2.MD.1	2.OA.1, 2.OA.2 2.OA.3	2.OA.3 2.NS.4, 2.NS.5	2.OA.3 2.NS.4, 2.NS.5	2.MD.1 2.NS.4, 2.NS.5 2.OA.1, 2.OA.2
Math Practice Standards	MP3, MP6	MP3, MP4, MP5, MP7	MP7, MP8	MP1, MP2	MP1, MP2, MP3, MP7	MP7
Lesson Purpose	The purpose of this lesson is for students to learn that an inch is a standard length unit in the U.S. customary system and use it to measure length.	The purpose of this lesson is for students to learn about a larger unit of customary measurement—the foot.	The purpose of this lesson is for students to measure objects without lining up the end with the 0 mark.	The purpose of this lesson is for students to solve Take From story problems within 100 in the context of length.	The purpose of this lesson is for students to represent and solve one- and two-step story problems.	The purpose of this lesson is for students to practice estimating and measuring lengths and adding and subtracting within 100.
Vocabulary Focus	Inch, Metric System, US Customary System	Foot, tape measure, yardstick		Tape diagram, "take from"		

Lesson Materials/ Resources	Lesson 8 Slides	Lesson 9 Slides	Lesson 10 Slides	Lesson 11 Slides	Lesson 12 Slides	Lesson 13 Slides
	Teacher Presentation Materials	Teacher Presentation Materials	Teacher Presentation Materials	Teacher Presentation Materials	Teacher Presentation Materials	Teacher Presentation Materials
	Student Pages	Student Pages	Student Pages	Student Pages	Student Pages	Student Pages
	Activity 1: - Each group of 4 needs access to several objects between 1–11 inches long (markers, colored pencils, 11 connecting cubes, books, or any other object with a length shorter than 12 inches.) - Give students access to inch tiles and 12-inch rulers. **Activity 2:** - Give students access to inch tiles and 12-inch rulers.	**Activity 1:** - Tape strips of these lengths on the floor. Label each strip with the letter and fish name. It may be helpful to make multiple sets of these lines to keep the groups small - Strip A, largemouth bass: 2 feet - Strip B, spiny dogfish shark: 4 feet - Strip C, catfish: 3 feet - Strip D, koi: 2 feet and 6 inches - Give each student an inch ruler and access to inch tiles. **Activity 2:** - Each group of 4 needs a	**Activity 1:** Each group of 2 needs access to several objects between 2–10 inches long (markers, colored pencils, paperclips, or other objects or images used in previous activities.)	**Activity 1:** - Give students access to base-ten blocks **Activity 2:** - Give students access to base-ten blocks	**Activity 1:** - Give students access to base-ten blocks **Activity 2:** - Give students access to base-ten blocks	**Activity 1:** - Give each group the Target Measurement Stage 1 Recording Sheet and access to centimeter and inch rulers. **Activity 2:** - Give each group a set of Number Puzzles Digit Cards and the Number Puzzles Addition Stage 4 Gameboard.

		measuring tape (or retractable tape measure) that labels the length of each foot. ● Give students access to inch ruler and inch tiles				
	Cool-down: Measure a Rectangle	Cool-down: Measure in Inches and Feet	Cool-down: Torn Tape	Cool-down: More Saree Ribbon	Cool-down: Sharing Saree Silk Ribbon	
Assessment	**Formative Assessment Strategies: observation, questioning, student discourse : Monitoring Sheet** **See Section B Checkpoint Assessment, Section B Checkpoint Teacher's Guide**					
						Section B Practice Problems
Centers Materials	Capture Squares (1–3), Stage 4: Subtract within 20 (Supporting) Math Stories (K–2), Stage 5: Tape Diagrams (Supporting)	Capture Squares (1–3), Stage 4: Subtract within 20 (Supporting) Math Stories (K–2), Stage 5: Tape Diagrams (Supporting)	Capture Squares (1–3), Stage 4: Subtract within 20 (Supporting) Math Stories (K–2), Stage 5: Tape Diagrams (Supporting)	Capture Squares (1–3), Stage 4: Subtract within 20 (Supporting) Math Stories (K–2), Stage 5: Tape Diagrams (Supporting)	Capture Squares (1–3), Stage 4: Subtract within 20 (Supporting) Math Stories (K–2), Stage 5: Tape Diagrams (Supporting)	Number Puzzles, Stage 4 Estimate and Measure, Stage 2 Target Measurements, Stage 1

Making Meaning

In previous lessons, students learned the importance of using standard length units to measure and compare lengths. They learned about length units from the metric system and measured the length of objects in centimeters and meters with different tools, including rulers and meter sticks. In Lesson 8, students learn that an inch is a standard unit of measure in the U.S. customary system. They use inch tiles or rulers to measure the length of classroom objects and the sides of geometric shapes in inches (MP2, MP5). Students use their tools and their measurements of classroom objects to develop a benchmark for the length of an inch, which will support them with estimating in later lessons.

In Lesson 9, students use the length of a 12-inch ruler to develop an understanding of the length of 1 foot. They use a ruler as a benchmark for estimating the length of a foot. Throughout the lesson, students make decisions about which tools and which length units to use when measuring (MP5). They compare measurements for the same object in inches and feet and generalize that more units are needed to measure the same length if you use a smaller length unit. This concept is a foundation for future work with measurement and their work with unit fractions in later grades.

Lesson 8 : What is an Inch?
- The purpose of this lesson is for students to learn that an inch is a standard length unit in the U.S. customary system and use it to measure length.
- Lesson 8 Slides
- Teacher Presentation Materials

Lesson 9: From Feet to Inches
- The purpose of this lesson is for students to learn about a larger unit of customary measurement—the foot. Students measure in inches and feet, compare their measurements, and generalize about the relationship between the size of a length unit and the number of units needed to measure the length of an object.
- Lesson 9 Slides
- Teacher Presentation Materials

Investigation:

In Lesson 10, students extend their experiences with measurement to include situations when they can not use a tool to measure from 0. They know from prior experience that simply moving an object in space does not change its length (conservation of length). However, this understanding is challenged when students see an object that is not lined up with 0 on a measuring tool. Throughout the lesson, students are encouraged to make sense of and use equations that represent the measuring problems in each task (MP2). This understanding will support learning in future units with representing addition and subtraction on the number line.

In Lesson 11, students solve Take From problems involving length measured in inches. They use the context of length to make sense of tape diagrams that represent the part-part-whole relationships between the quantities in each story (MP2). They also continue to practice adding and subtracting within 100 with and without decomposing a ten.

In Lesson 13, Activity 1, students learn a new center, Target Measurements. In this center, students practice estimating and measuring length in inches and centimeters. In Activity 2, students can choose to continue working on Target Measurements, or choose between a previously introduced center and a new stage of the Number Puzzles center, In this stage, called Within 100 with Composing, students work with sums and differences within 100 with composing and decomposing a ten.

Lesson 10: Measure with a Torn Tape
- The purpose of this lesson is for students to measure objects without lining up the end with the 0 mark.

- Lesson 10 Slides
- Teacher Presentation Materials

Lesson 11: Saree Silk Stories: Necklaces and Bracelets
- The purpose of this lesson is for students to solve Take From story problems within 100 in the context of length.
- Lesson 11 Slides
- Teacher Presentation Materials

Create and Produce:

In previous lessons, students represented and solved one- and two-step story problems in a way that made sense to them. They have used tape diagrams to represent comparisons and part-part-whole relationships. Since students are familiar with centimeters and inches, the stories in Lesson 12 include both. In the first activity, students hear the story read multiple times and make sense of the story without considering the question or necessary calculations. Then they work independently to solve, representing the story in whatever way is helpful to them. In the second activity, students work with a partner to read and interpret the stories and solve independently.

Activity 2: The purpose of this activity is for students to represent and solve two-step story problems. The story problems are presented in parts, and students are encouraged to represent each part in a way that makes sense to them. In the synthesis, students compare different ways they represent and solve the problem.

"Read each problem with your partner and solve it on your own. Show your thinking using diagrams, equations, or words."

Students may represent and solve the first part of each problem accurately, but see the second part as a problem with two unknowns. Consider asking:

"What new information does the second part of the problem give you? What do you need to figure out? What do you already know?"
"What happened in the first part of the story? What did you figure out? How could you use that in the second part of the problem?"

Lesson 12: Saree Silk Stories: Friendship Bracelets
- The purpose of this lesson is for students to represent and solve one- and two-step story problems. Students use representations to make sense of problems, support their calculations, and explain their thinking.
- Lesson 12 Slides
- Teacher Presentation Materials

Communicate and Present: | **Reflection:**

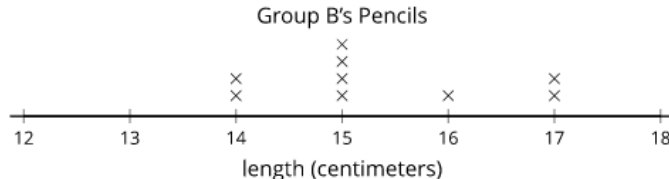| Lesson 12 Activity 2

Invite students to share their diagrams and equations for each part of the problem.
"How did _____ represent the problem? How does each representation show the story problem?" | "Today you solved different kinds of story problems that had two parts."

"How did you represent your thinking and keep track of your calculations? How did you keep up with the lengths you knew and what you needed to find out?" (I used diagrams to make sense of the story. I drew base-ten diagrams to help me solve. I put a circle around my answer so I could use it for the next problem.)
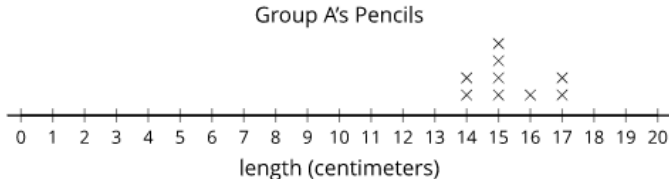
"What ideas for solving story problems have you learned from others?"

Share and record responses. |

Additional Learning:

Lesson 13: Center Day 2 (Optional)
- The purpose of this lesson is for students to practice estimating and measuring lengths and adding and subtracting within 100.
- Lesson 13 Slides
- Teacher Presentation Materials

| **Notes:**
Follow the lessons in order | **Complete File with Resources and Task:** |

Topic # 3 (Section C)	Topic Name: Section C - Line Plots	Duration: Recommended 6 days (5 lessons) 1 additional day for End of Unit Assessment

Topic Description:

In this section, students apply their understanding of measurement and data to create and interpret line plots. Students learn that the horizontal scale is marked off in whole-number length units, the same ones used to collect the data.

They recognize that the numbers on the number line represent lengths and each "x" above a number represents an object of that length. They label line plots with titles and the measurement unit used. Throughout the section, students connect the features of the line plot to the tools they use to measure.

Group A's Pencils

length (centimeters)

Group B's Pencils

length (centimeters)

Section Learning Goals
- Represent numerical data on a line plot.

Competencies Addressed: **Understanding and Applying Number Systems**	Essential Question and Enduring Understanding Addressed in this Topic:

2.NS.4 I can use my understanding of place value and properties of operations to add. (2.NBT.B.5-9) **2.NS.5** I can use my understanding of place value to subtract. (2.NBT.B.5, 7-9) **Operations and Algebraic Thinking** **2.OA.1** I can add within 20. (2.OA.B.2) **2.OA.2** . I can subtract within 20. (2.OA.B.2) **2.OA.3** I can represent and solve problems involving addition and subtraction.(2.OA.A.1, 2.MD.B.5-6) **Measurement and Data Investigations** **2.MD.1** I can measure and estimate lengths by selecting and using appropriate tools. (2.MD.A.1-4) **2.MD.4** I can represent and interpret data. (2.MD.D.9-10)	**Essential Question** 1. How can line plots be used to show measurements and give us information? **Enduring Understanding** ● **Data can be represented visually using line plots and graphs.** We can collect numerical data by measuring and creating a line plot to display this information. A line plot can be used as a visual representation of the relative length of objects. The numbers on the number line represent lengths and each "x" above a number represents an object of that length.
In this Topic, students will know: ● A line plot is a way to show how many of each measurement using an x for each measurement. ● Each x on the line plot represents one measurement. ● The numbers on the number line represent lengths and each "x" above a number represents an object of that length ● A line plot is used to represent and interpret numerical data.	**Topic Vocabulary:** **Academic vocabulary** Line Plot Tick Marks
In this Topic, students will be able to: ● Collect numerical data by measuring and create a line plot to display their measurements. ● Interpret a line plot. ● Choose an appropriate starting and ending number based on the data when creating a line plot. ● Represent numerical data in a line plot. ● Use data presented in a table to determine the longest and shortest length when they create a line plot	**Plan for Student Reflection:** [Student Journal Prompts and Reflection Practices](#) **Plan for Teacher Reflection:** **Lesson 14:** In a future lesson, students will create their own line plots. What do students need to

|	
● Ask and answer questions using a line plot.	understand in order to be successful? How did this lesson prepare them to create their own line plots? **Lesson 15:** What did you say, do, or ask to support students in creating a line plot based on an understanding of the representation, rather than following a procedure? **Lesson 16:** In another unit, students are introduced to the number line. They learn how to represent numbers and equations on the number line. How will their work with line plots support that learning? **Lesson 17:** How have centers helped deepen student understanding of the important mathematical ideas of this unit? Are there centers from this unit that students would continue to benefit from if extended into the next unit? **Lesson 18:** In what ways did you see students working together to make sense of problems and persevere in solving them? How were they able to engage in aspects of mathematical modeling as they created their yardsticks and revised their work? **Utilize additional strategies for Teacher Reflection:** ● Reviewing formative assessments ● Developing scaffolds ● Collaborative scoring ● PLCs ● Planning for small groups

Topic 3 Task Development

Each Topic has its own Task that serves as a roadmap for instruction during the unit. The task follows the [Learning Cycle Model](#) that drives teaching and learning in Naugatuck Public Schools.

Task Title: Topic 3 - Line Plots	Grade Level and Unit: Grade 2, Unit 3
Description of Task: In this task, students make their own yardstick using only a 3-by-5 inch index card as a tool. They use addition and subtraction to make lengths between 1 and 36 inches and mark them on a 3-foot-long strip of butcher paper. They then use their yardstick to measure a common object, the height of their chairs in inches. Students use their yardstick to measure the lengths of their hands and forearms. They write equations using the measurements and explain what the equations mean in the context of the situation (MP2). OPTIONAL - After generating data, students can create a line plot using their measurements and share their line plot with the class.	**Purpose of Task:** The purpose of this task is for students to apply their understanding of addition, subtraction, and measurement to build their own yardstick. Students attend to precision as they mark each inch on their yardstick. When students make their own unit markings, they discover that unequal placement will lead to errors in measurement. The task emphasizes that an inch, or any standard length unit, must be the same size and that there must not be gaps or overlaps between length units. After they create their yardsticks, they compare their yardsticks directly across groups and by measuring the same object. They get a chance to revise their yardsticks based on their observations, an important part of mathematical modeling.
Background of Students/Learning Progression: In previous lessons, students made their own centimeter ruler and used different measuring tools such as rulers, measuring tapes, and yardsticks to measure objects.	**Ensure all competencies are addressed in the task:** ☐ Yes, all competencies are addressed ☐ No - Task needs modification

Getting Started:
In the lessons that make up Topic 3 - Section C of Unit 3, students will:
- Represent numerical data on a line plot.

Lesson 14: [What is a Line Plot?](#) (WARM UP)
- The purpose of this lesson is for students to learn about the ways a line plot can be used to represent data collected from measuring objects.
- [Lesson 14 Slides](#)
- [Teacher Presentation Materials](#)

In a previous unit, students created and interpreted two representations of categorical data, bar graphs and picture graphs. In a previous lesson, students measured length using metric and customary units.

The purpose of this warm-up is to have students consider a new type of data representation, the line plot. While students may notice and wonder many things about the two data representations, describing the differences between the data represented in a bar graph (categorical) and the data represented in a line plot (numerical) should be the focus. This warm-up will provide a foundation for discussions about the features of a line plot and an understanding of how data is represented in this type of graph.

What do you notice? What do you wonder?

Glove Sizes

Hand Spans of Teachers
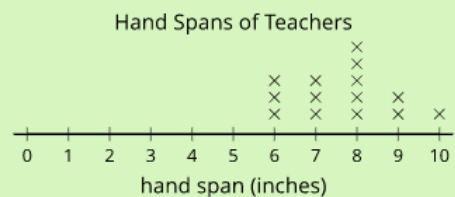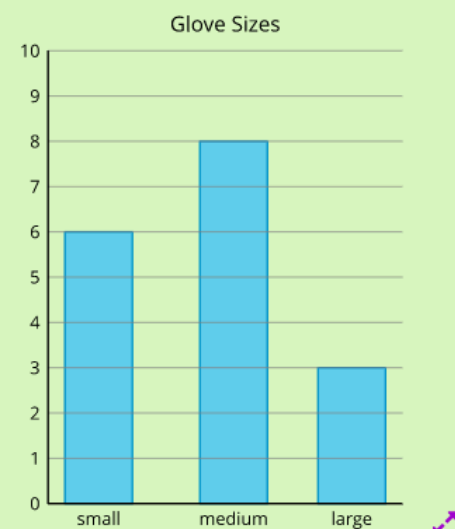
"What are these two graphs about? How do you know?" (One graph is about the size of gloves. The other graph is about hand spans. I can tell from the title and labels on the graphs.)
As needed, clarify the meaning of hand span.
"Today we are going to learn a new way to display data that is collected by measuring the lengths of objects. You are going to get a chance to measure your own hand spans and create a class data display."

Section C

IM Lesson	Lesson 14: What is a Line Plot?	Lesson 15: Create Line Plots	Lesson 16: Interpret Measurement Data	Lesson 17: Center Day 3 (Optional)	Lesson 18: Make a Yard Stick (Optional)
Learning Cycle Model	Making Meaning	Investigation	Investigation	Investigation	Create/Produce
Naugatuck Math Competency	2.MD.1 2.MD.4	2.MD.1 2.MD.4 2.NS.4, 2.NS.5	2.MD.4 2.NS.4, 2.NS.5	2.MD.1 2.MD.4 2.NS.4, 2.NS.5 2.OA.1, 2.OA.2	2.OA.1, 2.OA.2, 2.OA.3 2.MD.1, 2.MD.4
Math Practice Standards	MP6	MP6, MP7	MP3, MP7		MP1, MP7
Lesson Purpose	The purpose of this lesson is for students to learn about the ways a line plot can be used to represent data collected from measuring objects.	The purpose of this lesson is for students to create line plots to represent numerical data.	The purpose of this lesson is for students to create and interpret a line plot.	The purpose of this lesson is for students to practice adding, subtracting, and measuring length to create line plots.	The purpose of this lesson is for students to apply their understanding of addition, subtraction, and measurement to build their own yardstick.
Vocabulary Focus	Line plot	Data Line plot Accurate			
Lesson Materials/ Resources	Lesson 14 Slides Teacher Presentation Materials Student Pages Activity 1: ● Create a blank line plot with a scale from 0 to 10 for students to place their measurements on.	Lesson 15 Slides Teacher Presentation Materials Student Pages Activity 1: ● Give each group a set of 10–12 pencils of various lengths. ● Give each student a centimeter ruler. ● Give each student a	Lesson 16 Slides Teacher Presentation Materials Student Pages Activity 1: ● Give each student a copy of the Plant Line Plot Template.	Lesson 17 Slides Teacher Presentation Materials Student Pages Activity 1: ● Gather collections of objects of various lengths (pencils, crayons, math tools, or other classroom	Lesson 18 Slides Teacher Presentation Materials Student Pages Activity 1: ● Cut the chart paper into strips. ● Each group of 2 needs a strip of paper that is at least 36 inches long and

	● Give students 12-inch rulers. ● Give each student a sticky note that is the same size. **Activity 2:** Class line plot from Activity 1 Cool-down: Hand Spans	copy of the pencil Line Plot Template Cool-down: Hand Spans of Mai's Group	 Cool-down: Diego's Art Project	materials that have varying lengths). ● Give each group rulers and a Creating Line Plots Stage 1 Recording Sheet. **Activity 2:** Centers - see below	about 3 inches wide to make their yardstick. ● Give each group a strip of paper and an index card. **Activity 2:** ● Create a blank line plot with a scale that includes lengths longer, shorter, and equal to the height of student desks. ● Give each student a sticky note. **Activity 3:** ● Student yardsticks from activity 1.
Assessment		**Formative Assessment Strategies: observation, questioning, student discourse : Monitoring Sheet** See Section C Checkpoint Assessment, Section C Checkpoint Teacher's Guide End of Unit 3 Assessment, End of Unit 3 Assessment Teacher Guide		
				Section C Practice Problems
Centers Materials	Number Puzzles: Addition and Subtraction (1–4), Stage 4: Within 100 with Composing (Addressing) Target Measurements (2–5), Stage 1: Inches and Centimeters (Addressing)	Number Puzzles: Addition and Subtraction (1–4), Stage 4: Within 100 with Composing (Addressing) Target Measurements (2–5), Stage 1: Inches	Number Puzzles: Addition and Subtraction (1–4), Stage 4: Within 100 with Composing (Addressing) Target Measurements (2–5), Stage 1: Inches and Centimeters (Addressing)	Estimate and Measure, Stage 2 Number Puzzles, Stages 2–4 Target Measurements, Stage 1	

		and Centimeters (Addressing)			

Making Meaning

In Lesson 14, a line plot is defined as a way to show how many of each measurement using an x for each measurement. Students collect numerical data by measuring their hand spans and create a class line plot to display their measurements. Through the lesson activities, students learn that each x on the line plot represents one measurement. They learn that the scale of the line plot shows the length units used to measure and resembles the way length units are labeled on a ruler. Students notice that the length units on the scale of the line plot are not exactly the same length as the length units used to measure (inches), but that labels can help others know what length unit was used (MP2, MP6). Students will gain experience working with line plots throughout the rest of the section. Save the class line plot you create for reference in future lessons.

Lesson 14: What is a Line Plot?
- The purpose of this lesson is for students to learn about the ways a line plot can be used to represent data collected from measuring objects.
- Lesson 14 Slides
- Teacher Presentation Materials

Investigation:
In Lesson 15, students measure the lengths of pencils in centimeters and represent the data on their own in a line plot. In Activity 2, students make sense of line plots that do not start at 0. They choose an appropriate starting and ending number based on the data (MP6). In the lesson synthesis, students interpret the data presented in a line plot with a scale that does not start at 0.

In Lesson 16, students continue to consider what numbers to use to label the tick marks as they create line plots. Students will use data presented in a table to determine the longest and shortest length and then create a line plot and interpret the data to answer questions. When working with measurements with larger numbers, students learn to set up their number line to start with the shortest length. Students also answer questions that require calculations.

In Lesson 17, Activity 1, students learn stage 1 of the Creating Line Plots center. In this stage, called Inches and Centimeters, students measure up to 8 objects to the nearest centimeter or inch. They work with a partner to create a line plot to represent their measurement data. Then, they ask

their partner 2 questions that can be answered based on their line plot. In Activity 2, students choose to continue working on Creating Line Plots, or choose between two previously introduced centers focused on estimation and measurement or a center focused on addition and subtraction.

Lesson 15: Create Line Plots
- The purpose of this lesson is for students to create line plots to represent numerical data.
- Lesson 15 Slides
- Teacher Presentation Materials

Lesson 16: Interpret Measurement Data
- The purpose of this lesson is for students to create and interpret a line plot.
- Lesson 16 Slides
- Teacher Presentation Materials

Lesson 17: Center Day 3 (Optional)
- The purpose of this lesson is for students to practice adding, subtracting, and measuring length to create line plots.
- Lesson 17 Slides
- Teacher Presentation Materials

Create and Produce:

Lesson 18, provides students with an opportunity to apply precursor skills of mathematical modeling. In previous lessons, students made their own centimeter ruler and used different measuring tools such as rulers, measuring tapes, and yardsticks to measure objects.

In this lesson, students make their own yardstick using only a 3-by-5 inch index card as a tool. They use addition and subtraction to make lengths between 1 and 36 inches and mark them on a 3-foot-long strip of butcher paper. They then use their yardstick to measure a common object, the height of their chairs in inches.

In an optional activity, students use their yardstick to measure the lengths of their hands and forearms. They write equations using the measurements and explain what the equations mean in the context of the situation (MP2).

OPTIONAL - After generating data, students can create a line plot using their measurements and share their line plot with the class.

"Today you will use an index card to make a yardstick. The long side of the card measures 5 inches and the short side measures 3 inches."
"What numbers can you mark on the yardstick using the cards?"

Lesson 18: Make a Yard Stick(Optional)
- The purpose of this lesson is for students to apply their understanding of addition, subtraction, and measurement to build their own yardstick.
- Lesson 18 Slides
- Teacher Presentation Materials

Communicate and Present: Students can share their yard sticks with their classmates and their optional line plots that they created after generating data. "Now discuss your method with another group." Invite students to share their methods. Consider asking: "Which numbers did you mark first?" "Which numbers were easy to find?" "Which numbers were harder to find?" "Did you run into any problems? How did you solve them?"	**Reflection:** "Today we made a measuring tool and used it to measure some objects around us. What are some important things we learned about how measuring tools are made?" (The units have to be equally spaced—every inch is the same length as every other inch. There are no gaps or overlaps between the length units. It is important to know where the zero is placed.)
Notes: **Follow the lessons in order**	**Complete File with Resources and Task:**