

## **Addition and Subtraction and Number Line: Grade 1**

### **The Work of The Unit**

#### **Overview:**

The focus of this unit is to connect two critical areas of first grade mathematics addition and subtraction and measurement. The unit aims to develop understanding of addition, subtraction within 20, and develop understanding of linear measurement, and measuring length as iterating length units. After in depth student learning focused on each of these areas separately, this unit aims to connect the two. Students will apply previous learning about addition and subtraction to their representation on a number line with the understanding of iterating length units.

#### **Previous Learning Necessary for Success in this Unit:**

Prior to teaching this unit, students will have had instruction in addition and subtraction strategies and experience solving all kindergarten and first grade story problem types.

Students will have conceptual understanding of part, part, whole relationships in addition and subtraction and representing this relationship on a number bond. They represent addition and subtraction with an equation. They have had many opportunities to explore measuring length with a variety of tools both standard and nonstandard. The major focus would have been on iterating.

#### **Coherence linking to major topics within the grade:**

In this unit students will explicitly connect the major work of the grade: addition and subtraction to the measurement of length.

- 1.OA.1
- 1.OA.5
- 1.MD.2

#### **Coherence across grades:**

Previous Kindergarten Learning:

In this unit students use skills learned in kindergarten such as counting and cardinality, describing measureable attributes of objects such as length or weight, understanding addition as putting together and subtraction as taking apart, representing addition and subtraction with objects and drawings and solving word problems.

- K.OA.1
- K.OA.2
- K.CC.4.C
- K.CC.2
- K.MD.1
- K.MD.2

Future Second Grade Learning:

In this unit students will be prepared for future skills to be learned in second grade such as solving problems involving addition and subtraction within 100 and representing them on a number line.

- 2.OA.A.1

- 2.OA.2
- 2.MD.1

**Rigor of the Unit:**

This unit starts off by building conceptual understanding of the number as iterating units of length. Students are given multiple opportunities to use manipulatives for hands on, conceptual understanding of the number line. Students practice procedural skills solving addition and subtraction story problems, learned in prior units. The unit concludes with students applying their number line knowledge to the representation of addition and subtraction on the number line.

**Mathematical Practices:** Mathematical practices are a key part of quality classroom instruction and are embedded within the lessons. Classroom routines established early in the year, and emphasized throughout, allow for mathematical practices to become part of every lesson. However, in this unit, Mathematical Practice 3 is emphasized throughout. Given the work of the unit, students are accessing Mathematical Practice 4 and Mathematical Practice 1 when solving story problems.

**End of Unit Assessment:** Lesson 8 acts as the end of unit assessment. Formative assessment is a large part of this unit, as teachers make in the moment adjustments for intervention and reteaching purposes.

## Lesson 1: Representing Length on a Number Line

### Standard(s):

1MD.2-Express the length of an object as a whole number of length units by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same size length units that span it with no gaps or overlaps.

### Learning Target:

I can create a number line that shows length units.

### Academic Vocabulary:

length unit

### Materials:

Objects to measure  
Paperclips  
Blank number line strips  
(without hash marks or numbers)  
Blank chart to create collaboratively during the close

### Possible

### Misconceptions

## Teacher Plan (Including Student Tasks)

### Whole Group Mini Lesson:

Students gathered at the carpet. Teacher says “We’ve learned how to measure an object. Do you agree?” (Kids respond ‘yes!’)

Teacher introduces learning target and task: “Today we are going to measure classroom objects with paper clips as our length unit *and* we are going to do something new-create a number line that shows length units.”

Teacher asks a volunteer to come and measure a pencil with paper clips on the projector. Student measures. Ask class questions to activate prior knowledge. Possible questions include: Are there any gaps? Did he start at the endpoint? What is the length of the pencil?

Teacher asks “How long is the pencil?” Students respond 8 paper clips.

Teacher brings out a blank number line and states “A number line is a tool that shows length units. Watch as I create a number line.” Teacher pulls the clips from the measured pencil onto a blank line one by one. Once the paperclips are lined up end to end along the blank line showing eight clips, the teacher says “I am going to start labeling my number line now. When you see the pattern, give me a thumbs up”

Teacher starts labeling the end of each paperclip with a line and a number. As students start noticing the counting pattern, teacher stops and asks “I notice some thumbs up? What number should come next? What’s the patterns?” Students

chorally count as teacher continues labeling to 8.

Teacher asks “Does this line show how long the pencil is? How do you know? Share your answer with your partner and justify why (MP3)” Students turn and talk.

Teacher explains today’s task “Your task today is to measure objects in the middle of your table and show the length units on a number line (MP5). If you would like to stay on the carpet before you get started to practice with me, please do. If you are ready, off you go!”

**Independent Work and Small group intervention:** Teacher releases students to work independently and then meets with kids who self-assessed as needing more support. Teacher and students repeat measurement above with a different object. When students feel ready to tackle the task independently, they can leave the carpet.

**Close:**

Teacher asks class to return to the carpet with one of their number lines. Student’s teach their partner the steps they took to measure an object and create a number line. One partner shares to the class how their partner completed the task.

Teacher says “Let’s make a chart about what we learned today.” (Label chart: ‘What did we learn about number lines today?’) Teacher records student responses on the chart. Possible responses include: The number goes after the paperclip, the number line helps us count, the length of the object is the same as the last number I wrote, the number line starts at zero because we didn’t have any paper clips yet, the lines are the same length apart because a paper clip fits between each.

**Instructional Supports:** *(In addition to the questions throughout the lesson, additional supports are listed below.)*

Learning target is posted and referenced throughout the lesson (this will be true for all lessons in the unit)

Small group intervention embedded in the lesson serves as instructional support for struggling learners. If teacher notices students inaccurately self assessing and are in need for reteaching, teacher should pull them in a small group for additional support.

**Assessment**

Teacher observation during student work time. Based on the observations, teachers may need to pull a small group and/or insert more iterating practice for some students.

Teacher will collect student work (number lines) for correct number line creation. Teacher looks for iterating length units and numbers labeled in counting order. This information will inform Lesson Two’s small group intervention.

## Lesson 2: Representing Length on a Number Line

**Standard(s):**

1MD.2-Express the length of an object as a whole number of length units by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same size length units that span it with no gaps or overlaps.

**Learning Target:**

I can create a number line with a length unit.

**Academic Vocabulary:**

length unit

**Materials:**

Objects to measure  
Square tiles  
Blank number line strips (without hash marks or numbers)

**Possible Misconceptions**

### Teacher Plan (Including Student Tasks)

**Whole Group Mini Lesson:** Teacher launches mini lesson by using a non-example. Teacher draws a large snake on the board with a number line underneath. Number line is labeled one, two, three but not in same size length units. Teacher says “I want you to think about what we learned about number lines yesterday. Is this number line accurate? Turn and tell your partner if you think I made my number line accurately and tell them why or why not? (MP3).

Teacher specifically wants students to notice that the units are not the same length and therefore do not accurately show the length of the snake to further develop conceptual understanding of what a number line is.

After discussion, teacher leads a review of Lesson One while reviewing/referencing the poster.

Teacher says “Today our length unit is square tiles. Your task today is to measure objects in the middle of your table and show the length units on a number line (MP5). Off you go!”

**Independent Work and Small group intervention:** Students are released to work.

Based off of student work from Lesson One, teacher pulls small group of identified students to practice measuring and creating number lines with the teacher before independent work.

**Close:**

Teacher asks class to return to the carpet with one of their number lines. Student's teach their partner the steps they took to measure an object and create a number line. One partner shares to the class how their partner completed the task.

Teacher asks "Is there anything to add to our poster? Did you learn anything new today?" Teacher records student responses.

**Instructional Supports:** *(In addition to the questions throughout the lesson, additional supports are listed below.)*

Learning target is posted and referenced throughout the lesson (this will be true for all lessons in the unit)

Small group intervention embedded in the lesson serves as instructional support for struggling learners. If teacher notices students inaccurately self assessing and are in need of reteaching, teacher should pull them in a small group for additional support.

### **Assessment**

Teacher observation during student work time. Based on the observations, teachers may need to pull a small group and/or insert more iterating practice for some students.

**Formative Assessment Exit Task:** Pose the problem "I measured a marker. It was six square tiles long. Show the length of my marker on the number line" Teachers are assessing to see if students are able to accurately show 6 length units on a number line with existing hash marks without measuring.

### Lesson 3: Adding Length on a Number Line

**Standard(s):**

1MD.2-Express the length of an object as a whole number of length units by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same size length units that span it with no gaps or overlaps.

1.OA.5- Relate counting to addition and subtraction.

**Learning Target:**

I can measure two objects, add their lengths together, and show it on a number line.

**Academic Vocabulary:**

**Materials:**  
Objects to measure  
Square Tiles  
Number line strips (with hash marks)  
Student Work  
Page 3 (copied)

**Possible Misconceptions**

Students may show addition of two lengths on the number line as not in counting order.

### Teacher Plan (Including Student Tasks)

**Whole Group Mini-Lesson:** To launch the lesson, teacher revisits tasks similar to Lesson Two's formative assessment, with the class whole group. Teacher has number lines drawn on the board and poses 3 (more or less depending on class need from formative assessment in Lesson Two) problems to the class. Examples may include: I measured my book. It was 9 square tiles long. Show the length of my book on the number line. I measured my lunchbox. It was 12 square tiles long. Show the length of my lunchbox on the number line. Students are called on to come to the board and show the object length on the number line. Representations may vary (some kids may X out length units, some might circle length units, some might color in length units). At this point, different ways of showing length on a number line are all acceptable. After each problem, have students agree/disagree using a thumb up or down and discuss their classmate's work.

Teacher connects launch activity to Lesson Three learning by summarizing, "Wow! So you just practiced showing length on a number line and you didn't even measure the object! Up until now we have been measuring and showing just *one* object on a number line."

Teacher introduces learning target and task "Today, you are going to work with a buddy to add the lengths of two like objects and show it on a number line. Let's see (model picking out items from a table group bin for student use later). I know! I am going to measure this toy car. Our length unit is square tiles again today. Watch as I measure." Teacher models measuring the car. "My car is 6 square tiles long".

Teacher says. "Ok, Would \_\_\_\_\_ come up and be my partner? Is there an object

that is the same as mine in the bin?" (Student pulls out another toy car). "Great! Remember our learning goal is to add the length of two similar objects. We know my car is 6 square tiles long. How should we go about figuring out how long our cars are together? Turn and talk with you partner about how you would attack this problem. Be ready to tell me why you think your strategy would work. (MP3)." Student's turn and talk. Have partner groups share out their strategy and justify its accuracy.

Teacher says "I heard many students say we need to measure my partners car next. Great idea! Let's watch him/her do it"

Student models measuring the car. Student reports length of the second car (3 square tiles). Teacher says "OK, now we know my car is 6 square tiles long and \_\_\_\_\_'s car is 3 square tile's long. Can we figure out how the total length of our two cars now?" Have students call out yes or no and share answers. Kids may use different strategies at this point to determine the answer: counting on, mental math etc...

Once students agree on the length of the two cars put together, give students private think time. Teacher says "So now we know the length of my car, the length of my partners car, and the total length. How would we represent this on a number line? Show me a silent signal when you think you know." Show a number line with one inch iterating lengths already on the line.

After private think time, have a few students share verbally how they would fill in the number line. Address possible misconceptions by modeling inaccurate ways to show the problem on a number line and asking for students to agree/disagree and explain why. For example, coloring in the six units for car one and then coloring in the three units for car two on top, instead of end to end, or writing numbers from 0-6 on the number line and X-ing the space off to show car one's length but then starting over at 1, where the 7 should be, to count car two's length. Lead discussion to have students come to the realization that they are counting-on on the number line and so the numbers continue chronologically to represent the total length.

Teacher models and says, "Now, I get it! We are counting-on *on* the number line. I have to show the six units for car one and write the numbers to match. Then I have to show the three units for car two and keep counting on from the 6, like this: 7, 8, 9, in order to get to the total length of 9 square tiles long."

**Collaborative Work:** Teacher says "Boys and Girls, you are ready! You and your partner are going to work together. Choose two similar items from the bin at your table, each of you measure one item with square tiles. Add their lengths together and show it on the number line." Release students to partner work.

**Recording Sheet:** "We measured 2 \_\_\_\_\_s. Mine is \_\_\_\_ long. My buddy's is \_\_\_\_ long. Together they are \_\_\_\_\_long. "



**Close:** Students come to the carpet with one of their completed recording sheets. Each partner pair reads to the class what they shared and their number line. Students must explain *how* they represented the two lengths and the total length on the number line. This is an opportunity for students to work collaboratively to justify their thinking.

**Instructional Supports:** *(In addition to the questions throughout the lesson, additional supports are listed below.)*

Learning target is posted and referenced throughout the lesson (this will be true for all lessons in the unit)

Differentiation: The length of objects, and therefore length of number line, could vary in difficulty depending on students understanding. Students able to solve addition equations beyond 20 could be using length units to measure and add longer objects.

Intervention: Teacher notes students from formative-assessment in Lesson Two who could not perform task and pull during partner work time to model and re-teach showing the problem on the number line. Partnerships within this group could be released to work but with additional teacher support.

### **Assessment**

Teacher observation during partner work time. Possible look fors: Are students measuring accurately? Do their measurements match their representations on the number line? How do students represent the two objects length on the number line? How do students collaborate on the task?

Teacher will collect student work (number lines) for correct number line representation. This information will inform Lesson Four's small group intervention.

## Lesson 4:

### Standard(s):

1MD.2-Express the length of an object as a whole number of length units by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same size length units that span it with no gaps or overlaps.

1.OA.1-Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions e.g. by using objects, drawings and equations with a symbol for the unknown number to represent the problem.

1.OA.5- Relate counting to addition and subtraction.

### Learning Target:

I can measure two objects, add their lengths together, and *represent* it on a number line.

### Academic Vocabulary:

represent  
**Materials:**  
Square Tiles  
Flower  
Small number line strips  
Student Work  
Page 4 (copied)

### Possible Misconceptions

Students may not spatially transfer square tiles to their representation on a smaller number line

## Teacher Plan (Including Student Tasks)

**Whole Group Mini-Lesson:** Teacher starts by activating prior knowledge and direct instruction around number line. Teacher says “Boys and girls, you know how to solve lots of addition and subtraction stories right? When we had a story problem about 15 cows, did you draw 15 cows to solve?” (students chorally respond no). “No, we used circles to represent the cows. Represent is a fancy word for showing parts of a math problem in precise and accurate ways.” Teacher may write the word represent on the board and discuss its meaning more for clarification.

Teacher continues. “If we were still trying to solve our problem about cows, would we draw the circles that represent the cows as *big* as *real* cows?” (Student chorally respond no) “No, when we represent math stories, we use the space we have to precisely and accurately represent the problem.”

Teacher introduces the learning target and the task. “Class, just like you can represent the cow problem with pictures that aren’t the size or shape of real cows, we can use number lines that aren’t the actual size of our object to represent their length. (show two number lines with hash marks: one with one inch square tile spaces and one to a smaller scale.) Teacher poses the problem, “What is the same and what is different about these two number lines?” Have students share out. Possibly answers may include: one shows bigger length units, one shows smaller length units etc... but the goal is to lead students to the understanding that no matter how big or small the

spaces between the length units are, the spaces between each unit are the same length (iterating).

Teacher directly states, “The space between each unit is the same length! No matter how big the units are, from 1 to 2, and 2 to 3, and 3 to 4, and so on, the space between each unit on a number line is the same length! Repeat after me class, the space between each unit on a number line is the same length (students repeat). Tell your neighbor. Tell the floor. Tell the door. Tell me!”

Teacher continues “Let’s try this together. Here is a sunflower. Let’s measure it with square tiles as our length unit. (Teacher models measuring the flower). This sunflower is 11 square tiles long.

(Teacher shows a smaller representation of a number line on the projector) “Boys and girls, I need to represent the length of my sunflower on this number line. Is each length unit the same size as my square tile?” (Teacher may demonstrate holding a tile to the number line, students respond no). Teacher asks “Could I still **represent** the length of my sunflower on this number line?” Have students turn and talk about if it is possible and share out. Through discussion, come to consensus about how to mark 11 units of length to represent the length of the sunflower. Ask “Does our number line show the length of the flower? 11 units long?” (students respond-yes!)

Teacher poses a practice problem. “We know that the sunflower is 11 units long. Now I have a daisy. Let’s measure it. (model) The daisy is only 4 square tiles long.

“I am going to give you a number line like the one we practiced with together just now. It has lines to mark the lengths. The space between each unit is...(kids chorally respond ‘the same length’) Go back to your desk and show the length of our two flowers altogether. When you’re done, bring it back to the carpet”

Release students to seats briefly.

Students finish task and return to the carpet. Show a few examples, and non examples, of student work on the projector. Multiple representations of this problem on the number line are acceptable as long as the lengths represented are either 11, 4, and 15 or a total of 15 length units. For example, students may X out the 11 square spaces for the sunflower and O the 4 square spaces for the daisy. Students may color the sunflowers length units blue and daisy length units green. Show multiple models and discuss accuracy.

**Collaborative Work:** Teacher says “Boys and Girls, you are ready! You and your partner are going to work together just like you did yesterday. You’ll still need to choose two similar items from the bin at your table, each of you measure one item with square tiles. Add their lengths together. But today, you now know that you can **represent** the length on a number line that looks like this because the space between each unit is the same length. It **represents** the same length of the object! (show

smaller scaled number line matching the one used during whole group time) Release students to partner work.

**Close:** Students come to the carpet. Teacher references poster from Lesson One and Two. Teacher asks “Is there anything to add to our poster? Did you learn anything new today?” Teacher records student responses.

**Instructional Supports:** *(In addition to the questions throughout the lesson, additional supports are listed below.)*

Learning target is posted and referenced throughout the lesson (this will be true for all lessons in the unit)

Differentiation: The length of objects, and therefore length of number line, could vary in difficulty depending on students understanding. Students able to solve addition equations beyond 20 could be using length units to measure and add longer objects.

Intervention: Teacher closely monitors and adjusts learning for students from the small intervention group and student work from Lesson Three. Additionally student who inaccurately represented the flowers during Lesson Four’s whole group problem practice may need intervention. Partnerships within these student subsets could be released to work but with additional teacher support.

### **Assessment**

Teacher observation during partner work time. Possible look fors: Are students measuring accurately? Do their measurements match their representations on the smaller number line? How do students represent the two objects length on the number line? How do students collaborate on the task?

## Lesson 5: Story Problems and Length

### Standard(s):

1MD.2-Express the length of an object as a whole number of length units by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same size length units that span it with no gaps or overlaps.

1.OA.1-Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions e.g. by using objects, drawings and equations with a symbol for the unknown number to represent the problem.

1.OA.5- Relate counting to addition and subtraction.

### Learning Target:

I can represent a story problem on the number line and write an equation to match.

### Academic

#### Vocabulary:

#### Materials:

Math story written on a poster along with a number line below it  
Student Work Page 4 (copied)  
Exit Assessment Task (copied)

### Possible Misconceptions

Students who are accurately representing the lengths of 2 objects after measuring may not apply new knowledge to a more abstract math story problem without concrete measuring.

## Teacher Plan (Including Student Tasks)

**Whole Group Mini-Lesson:** Teacher starts the lesson by reviewing the anchor poster with all the information we have learned throughout this unit. Have students talk with their partner about one or two things on the poster that were new learning to them.

Teacher gets students' attention back and then announces that, "Today we will use everything we have learned about representing length on a number line and apply that learning to math stories!" Teacher continues, "Remember, we have solved all kinds of math stories this year and we have used many different ways to represent the math in these stories. Can you think of ways we've represented our work in solving math stories?" Students may answer: with pictures, equations, number bonds, bar models, tally marks, ten frames, etc.

Teacher continues, "Well, today we are going to use everything we've learned and still do 2 new things. (This is the learning target.) Today we will solve math stories about length and represent our math work and the solution on a number line! We will also write an equation to match the story because we always want to show our math work in more than one way to really help us make sense of the problem."

Teacher says, "Let's try one together first." Teacher reads a problem written on a

poster. This could be an add-to problem , which is a kindergarten problem type because the goal is not to challenge student with the problem just yet, but this could be different depending on the group. For the purpose of explanation the following problem is used:

I measured my 2 pieces of licorice. One is 12 square tiles long. The other piece 5 square tiles long. How long are both of my licorice pieces together?

Teachers asks students, "Is this a combining or a separating story?" Students chorally answer, "Combining!" Ask how they know. Call on a student to explain why it's combining. They might say, "Because you have 2 pieces and you know how long each are but you want to know how long they are when put together."

Ask students to tell their partners how they would solve this problem. They need to tell a strategy, not just the answer, and then tell why they used that strategy. Partners also need to agree on a solution to the problem. Ask for a student to tell how they solved the problem with their partner and what the solution is. Ask others to agree or disagree.

Now tell the class, "Boys and girls, now that we've solved the problem, I'm wondering if someone can show us how you would represent the math story about length on a number line." Call on a student to come up to the poster and mark on the existing number line the 2 lengths (12 and 5, 17 all together). Make sure to call on someone for this first demonstration who will most likely do it accurately.

Ask the class if they agree/disagree. Ask if anyone would have done it differently. Ask what they would have done. (Some may color in the 2 lengths with different colors.

Some may use Xs and Os. Any way of marking the number line is still okay at this point as long as the # lengths are represented accurately.

Ask students if they can whisper an accurate equation to their partners. Call on a student to tell the equation. Ask if others agree or disagree. Ask why. Then when the correct equation has been sufficiently justified, write it on the poster below the number line.

Ask students where they see the parts of the equation (the 12, 5, and 17 from  $12+5=17$ ) on the number line. Teacher could highlight the numbers in the equation and then highlight those parts of the number line with corresponding colors.

Teacher says, "Now you are going to go off and try this on your own for a little bit!

Remember to represent the length units from the math stories on the number lines below each story and also write an equation that matches the story too."

### **Independent Work Time and Teacher Support Time:**

Send students off to work on their own but invite anyone who is unsure about what to do to stay on the carpet to work with the teacher. If students go off to their desks but

then discover that they need help, they are welcome to come back to the carpet. The teacher provides different levels of support to these students based on their needs.

When most students are getting close to finishing, or are finished, stop the group for a mid-way check and to give new directions. At this time, send any students still remaining on the rug back to their desks.

Tell students to share their work with the other students at their table groups. Instruct them to work together to solve any problems that they did not solve the same way. Tell them to come to consensus on a solution for each problem together as a group. They also need to make sure their number line and equation representations show the same parts.

### **Closing:**

Have a student from each table group come up and show how they solved 1 of the problems.

Look at the anchor poster. Ask students if there is any new learning that needs to be added.

Hand out exit task (a new math story that students will have to independently solve and represent on a number line as well as write an equation).

### **Instructional Supports**

Learning target is posted and referenced throughout the lesson (this will be true for all lessons in the unit)

Differentiation: The length of objects in the story problems, and therefore length of number line, could vary in difficulty depending on students understanding. Students able to solve addition equations beyond 20 could solve problems with different lengths. Students who have struggled with previous lessons in this unit could also be given story problems with smaller length unit. HOWEVER... If problems are differentiated, table groups might not be able to work together during collaborative time. Children with the same problems would have to collaborate to agree on their math representations and solutions.

Intervention: Teacher closely monitors and adds support to students who remain on the carpet. Students who are known to struggle based on previous lessons could be directed to stay on the carpet for closer monitoring.

### **Assessment**

Teacher is looking at student work to see if students are accurately solving the problems, accurately representing the solution and operation with an equations, and recording on the number line accurately.

Since the students end their work time collaborating on their work, looking at the exit task, which is completed independently, is especially important.



## Lesson 6: Story Problems and Length

### Standard(s):

1MD.2-Express the length of an object as a whole number of length units by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same size length units that span it with no gaps or overlaps.

1.OA.1-Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions e.g. by using objects, drawings and equations with a symbol for the unknown number to represent the problem.

1.OA.5- Relate counting to addition and subtraction.

### Learning Target:

I can represent a story problem on the number line and write an equation to match.

### Academic Vocabulary:

represent

### Materials:

Chart with a story problem and number line displayed for whole group mini-lesson  
Student Work Page 4 (copied)

### Possible Misconceptions

Students may still have some of the same misconceptions as in earlier lessons. In this particular lesson, they may also be confused when different problem types are introduced.

## Teacher Plan (Including Student Tasks)

### Whole Group Mini-Lesson

The teacher starts by reminding the class about the work they did on the previous day, applying all their learning about the number line, measurement, and addition to math story problems.

Ask the students to talk with their partner about what kind of problems they were solving yesterday. Teacher says, "Think hard about what the stories were about, what you had to do to find a solution." Teacher can also refer students to the anchor poster with the story problem that the class did together yesterday if students need additional support to remember the work from yesterday.

Ask some students to share what they talked about with their partners. Some possible points for discussion might be: We were adding the lengths of 2 things to find the total. We knew 2 length and we had to put them together. All the problems were add-to problem types. We had to represent the length of one things first and then add on the second thing to find how long they were all together.

After some discussion, the teacher says, "Class, today we are going to continue this important work of applying all we have learned to solving story problems. We are also going to continue representing our math work on a number line and with an

equation. However, today we are going to do something different! The type of problems you will be asked to solve will be all kinds of different problems! They will be different from yesterday. They won't be completely new to you though. You have solved similar problems this year, just not with length. Let's do one together first!"

Either on another anchor poster chart or on the same chart as yesterday (with the add-to problem on it) have the following question written along with a number line under the problem.

I have 2 pieces of licorice. One piece is 6 square tiles long. I know that together they measure 15 square tiles long. How long is the other piece?

Teacher reads the problem and asks students to put their thumb up when they have a solution. Tell them to also show on their fingers if they can explain a strategy they used to solve the problem. Have them show as many fingers as the number of different strategies they can think of.

Call on several children to explain their strategy and tell the solution they got. Have children give a signal if they thought of the same strategy (such as shaking their hand). After listening to several strategies and solutions, come to agreement about the answer to the question: How long is the other piece?

Remind students that they have done many, many problems since the beginning of the school year with a 'missing part'. "Boys and girls, sometimes we know the value of one part, and we know the whole, but one part is missing. This is very similar to the missing part stories we've done all year."

Ask a child to come to the chart and represent the math story on the number line. (Call on a child who will most likely represent 6, 9, and 15 accurately since you are making an anchor chart that will be kept up for students to reference.)

Ask children to whisper an equation to their partner and then come to agreement about the correct equation. Ask a child to share the equation. Ask the students if they agree or disagree. If the equation given is incorrect, through discussion among students, see if the correct equation can be determined. Even if the equation given is correct, give some students a chance to justify how they know it's correct.

Write the correct equation on the chart then ask students, "What does the 6 in the equation represent? (The length of one piece of licorice, the piece we knew.) Where do you see that on the number line? What does the 9 represent? (The length of the other piece of licorice. The piece we didn't know.) What does the 15 represent? (The total length of both pieces of licorice together.) Where do you see that on the number line?"

Then ask kid, "What was the question we were trying to answer?" (What is the length of the other piece of licorice, the piece that wasn't 6 square tiles long.) Ask students,

“How long was it?” and they all answer ‘9!’ chorally. Tell the class that you are going to mark that in the equation and on the number line, just to be sure that we have answered the question.

Make a box around the 9 in the equation and circle the section of the number line between 6 and 15. Remind students that sometimes, in a math story problem, you might need to find the missing part for the solution, and sometimes you might need to find the “whole”. Tell them to read each math story carefully to figure out what the question is asking for. Send them off to work independently.

### **Independent Work Time and Teacher Support Time:**

Send students off to work on their own but invite anyone who is unsure about what to do to stay on the carpet to work with the teacher. If students go off to their desks but then discover that they need help, they are welcome to come back to the carpet. The teacher provides different levels of support to these students based on their needs.

When most students are getting close to finishing, or are finished, stop the group for a mid-way check and to give new directions. At this time, send any students still remaining on the rug back to their desks.

Tell students to share their work with the other students at their table groups. Instruct them to work together to solve any problems that they did not solve the same way.

Tell them to come to consensus on a solution for each problem together as a group. They also need to make sure their number line and equation representations include the same numbers..

### **Closing:**

Have a student from each table group come up and show how they solved 1 of the problems.

Look at the anchor poster. Ask students if there is any new learning that needs to be added.

Hand out exit task (a new math story that students will have to independently solve and represent on a number line as well as write an equation).

### **Instructional Supports**

Learning target is posted and referenced throughout the lesson (this will be true for all lessons in the unit)

The anchor questions from today and yesterday are displayed as a support for students. They can be referenced at any time.

Students can get additional teacher support and guidance by staying on the rug to

work and be more closely monitored by the teacher.

Students who have made mistakes will have a chance at their table groups to work through problems together once they have had a chance to work independently.

### **Assessment**

Teacher is looking at student work to see if students are accurately solving the problems, accurately representing the solution and operation with an equation, and recording on the number line accurately.

Since the students end their work time collaborating on their work, looking at the exit task, which is completed independently, is especially important.

## Lesson 7: Story Problems and Length

### Standard(s):

1MD.2-Express the length of an object as a whole number of length units by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same size length units that span it with no gaps or overlaps.

1.OA.1-Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions e.g. by using objects, drawings and equations with a symbol for the unknown number to represent the problem.

1.OA.5- Relate counting to addition and subtraction.

### Learning Target:

I can subtract on a number line.

### Academic Vocabulary:

represent

### Materials:

snap cubes

blank number lines

### Possible Misconceptions

## Teacher Plan (Including Student Tasks)

**Whole Group Mini-Lesson:** Gather students on the carpet. Have students reflect on previous days learning. Review the anchor poster. Ask the question: Can we use a number line to show subtraction? Have students turn and talk, share their reasoning and justify why or why not a number line could be used for subtraction.

Teacher has 3-5 number lines of various lengths drawn on the board. Reinforce prior learning by talking about the number line beginning at 0 and the spaces between each number are the same length. The number lines on the board will be examples for the class to work through together.

Tell the class you have a piece of licorice 12 tiles long. Ask a student to come up and show this on the first number line. The child can show 12 on the number line using the various methods from previous days i.e. by color, X's etc.. Next, tell the class you ate a part of the licorice that was 5 tiles long. Ask "How do we represent this on the number line? Have students talk and justify their answer with a partner (MP3). Invite a student to come show the 5 tile long piece that was eaten. The child might erase or cross out on the numberline. Watch for student to neatly cross off or erase so he/she can precisely state how much licorice is left. Teacher should reinforce the importance of being neat and precise in order to correctly find the answer. The teacher will have to guide the conversation and teach has situations come up, such as, crossing off pieces not together, crossing off at the beginning of the number line, adding to rather than crossing off/erasing etc..

For the next example tell the class you have a piece of licorice 9 tiles long. Have the class tell you how to represent this on the number line. Next, tell them you ate a piece 4 tiles long. Have the students tell you how to show that some was taken away

on the numberline. Model and talk through beginning at the total (9 tiles) and crossing of the parts that were eaten, counting backwards to 5.

Teacher continues with more examples until the class is ready for guided practice.

**Guided Practice:** The teacher tells the class they are going to practice subtracting on the number line together. Have snap cubes and blank number lines on the tables. Students are each building and recording but discussing with their table group is encouraged for shared learning.

Have students return to their desks. Tell them to build a cube train 14 cubes long. Tell them to record 14 cubes on their number line. Teacher is walking around observing student work for correct representation on the number line. Note neatness/accuracy and teacher intervenes with individuals when necessary. Tell the class to take away 6 cubes and represent it on their number line. Teacher continues to observe and support. Teacher asks the students to share their number lines with a partner and explain and justify their answers.(MP3) Teacher poses another whole group problem and follows the same steps again.

### **Partner Work**

Teacher tells students they are going to now give each other practice problems just like they had done whole group. Tell students to have the total be 20 or less. Partner A gives the problem, Partner B solves with cubes and number line and justify their answer to Partner A. Switch roles and take turns to solve multiple practice problems.

### **Close**

Have students bring one of their number line problems to the carpet. Teacher asks for a few partners to come up and share/model their solution and justify (MP3). Ask the class "What new learning about the number line can we add to our anchor poster? Teacher adds student responses.

## **Instructional Supports**

Learning target is posted and referenced throughout the lesson (this will be true for all lessons in the unit)

During partner work, the teacher may pull a small group to work through the problems together for extra support.

## **Assessment**

Teacher observations during guided practice and partner work will assess student understanding. Teacher will collect student work. The teacher will need to address students' misconceptions or errors.

## Lesson 8: Story Problems and Length

### Standard(s):

1MD.2-Express the length of an object as a whole number of length units by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same size length units that span it with no gaps or overlaps.

1.OA.1-Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions e.g. by using objects, drawings and equations with a symbol for the unknown number to represent the problem.

1.OA.5- Relate counting to addition and subtraction.

### Learning Target:

I can represent a story problem on the number line and write an equation to match.

### Academic Vocabulary:

represent

### Materials:

mini-white boards with 3 number lines taped onto it

### Possible Misconceptions

## Teacher Plan (Including Student Tasks)

### Whole Group Mini-lesson

Teacher gathers students together on the carpet. Review yesterday's lesson and class anchor chart. Teacher tells the class that today they are going to get to show all they know about representing story problems on the number line.

Teacher passes out mini-white boards with 3 number lines taped to it. Teacher poses 3 addition or subtraction problems one at a time. Students solve each of the problems independently on their whiteboards. Next, have partners share their number lines and equations and justify their answers. Ask partners to agree or disagree with their partners and explain why (MP3). Have students share out whole group to explain which strategies they used to solve the addition and subtraction problems, how they recorded on the number line and what equation they wrote.

Once the class has discussed solutions, tell them they are going to solve story problems independently at their desks. Tell them to use the anchor chart as a reminder of all of the class number line learning and to be ready to explain and justify their answers to a partner. Remind students to be neat (to help with accuracy and precision) and to think about how they will explain their strategies/answers using math language.

Independent Work Time and Teacher Support Time: Pass out the student work page. As students are working the teacher circulates through the classroom intervening

one-on-one with students that are struggling. If the teacher finds a few students with the same struggle, a small group could be pulled to work together.

**Close**

Students return to the carpet to share their strategies, number lines and equations.

Students explain and justify with partners(MP3). When partners have finished teacher asks one student per problem to come to the board to share their solution whole group. Class discusses solutions and agree or disagree with a thumbs up or down.

**Instructional Supports**

Learning target is posted and referenced throughout the lesson (this will be true for all lessons in the unit)

Based on observations, teacher pulls a small group of students to solve a story problem together for extra support.

**Assessment**

Teacher observation will determine if there are students that still need extra support. The student work page acts as the summative assessment for this unit.