

**Math: Grade 2, Lesson 13, Addition, Subtraction, and Length**

**Lesson Focus:** Students will focus on practicing addition in order to solve problems involving measurement.

**Practice Focus:** Students will use models and write equations to solve unknown addend problems with lengths.

**Objective:** Add to solve length problems, using drawings and equations.

**Key Vocabulary:** addition, addend, sum, total, equation

**TN Standards:** 2.MD.B.5

**Teacher Materials:**

- Whiteboard
- Dry Erase Markers and Erasers
- Student Practice Packet

**Student Materials:**

- Paper
- Pencil

Teacher Do	Student Do
<p><u>Opening(1 min)</u></p> <p><b>Hello! Welcome to Tennessee’s At Home Learning Series for math! Today’s lesson is for all our 2nd graders out there, though all children are welcome to tune in. This lesson is the in thirteenth in our series.</b></p> <p><b>My name is ____ and I’m a ____ grade teacher in Tennessee schools! I’m so excited to be your teacher for this lesson! Welcome to my virtual classroom!</b></p> <p><b>If you didn’t see our previous lesson, you can find it on the TN Department of Education’s website at <a href="http://www.tn.gov/education">www.tn.gov/education</a>. You can still tune in to today’s lesson if you haven’t see any of our others. But, it might be more fun if you first go back and watch our other lessons since we’ll be talking about things we learned previously.</b></p> <p><b>Today we will be learning about adding and subtracting to solve measurement problems in mathematics! Before we get started, to participate fully in our lesson today, you will need:</b></p> <ul style="list-style-type: none"><li>• Paper</li><li>• Pencil</li><li>• The student packet for Math, Grade 2, Lesson 13 which can be found at <a href="http://www.tn.gov/education">www.tn.gov/education</a></li></ul> <p><b>Ok, let’s begin!</b></p>	<p>Students get materials ready for the lesson.</p>

Intro (4 minutes)

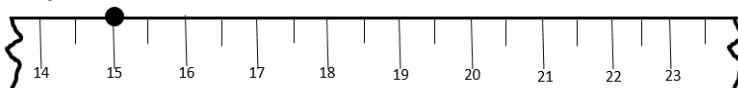
We have been solving measurement problems with models during our last couple of visits. I'm so excited to continue our work!

Read this problem with me.

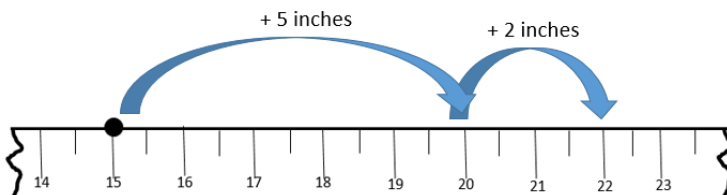
A plant was 15 inches tall. It grew and is now 22 inches tall. How many inches did the plant grow?

Grab your pencil and paper and draw this model with me. We will draw a long rectangle first. Then place 10 dashes across the top as evenly spaced as you can, but don't spend a lot of time trying to get them perfect! This is just a way to help us organize our thinking. [Model and pause.]

Let's graph 15, because we are beginning our model when the plant was 15 inches tall.



Let's move 5 spaces at once. We know how to count by 5s! We need to move 2 more inches because  $5 + 2 = 7$ . Do this with me. [Pause.]



Please write the equation for this model. [Pause.]

I am going to write  $15 + 7 = 22$ . The plant grew 7 inches, so it is 22 inches tall now.

Students read the problem with the teacher.

Students draw model.

Students graph 15.

Students model 2 moves, +5 and +2.

Students write the equation.

Teacher Model (8 minutes)

Objective 1: Use a measurement model to find a missing addend.

We must a measurement model to solve a plant problem. We are going to look at a different type of plant problem now.

Read along with me.

Elena buys a plant that is 34 centimeters tall. The plant grows and it is now 51 centimeters tall. How many centimeters did the plant grow?

Objective 1: Use a measurement model to find a missing addend.

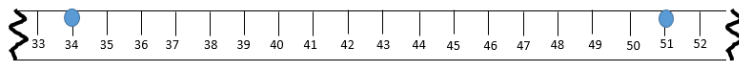
Students read along with the teacher.

How tall was the plant at the beginning? [Pause.]

Good reading! So we know the starting point. The plant started at 34 centimeters.

How tall was the plant at the end? [Pause.]

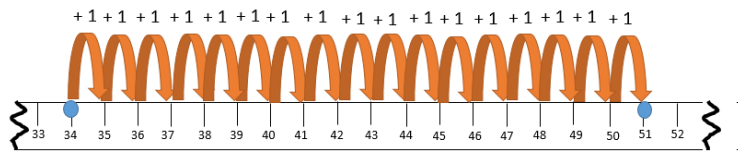
Wow! You are doing a great job of going back to the text! The plant ended up being 51 centimeters tall. But the text only tells us that the plant grew. We don't know how much. Let's go to our model. We will graph 34, the starting point, and 51, the ending point.



Now we can use the model to figure out the how many centimeters the plant grew.

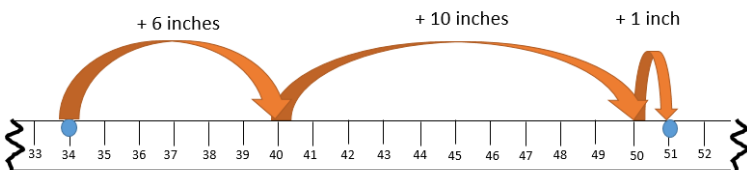
We could count every single move. Count the moves with me, starting at 34. [Count and point.]

35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51.



Whew! That took a long time!!

Let's count the moves in a quicker way! I am going to move on the ruler so that I can count by 2s, 5s, or 10s to save time. Below, I moved 6 to get to 40. Then I moved 10 to get to 50. After that, I only needed to move one more space to end up at 51 centimeters.



How can we figure out the total move? [Pause.]

Good idea! We can add all of the moves!


$$6 + 10 + 1 = 17$$

The text says that the plant started at 34 centimeters.

The plant grew to 51 centimeters.

Students count with the teacher.

Students say that we could add up all of the moves.

<p>Objective 2: Use a measurement model to write a missing addend equation.</p> <p><b>I am going to write the first equation, before we figured out the growth. Write this first equation with me on your paper.</b></p> $34 + ? = 51$ <p><b>The 34</b> [Point to the equation and the model.] <b>is the starting point.</b></p> <p><b>We also knew the ending point of 51 inches.</b> [Point to 51 in the equation and the model.]</p> <p><b>We didn't know how much the plant grew, so we showed that missing amount in the equation with the "?".</b> [Point.]</p> <p><b>Let's rewrite the equation now that know the missing amount, or the missing addend. The equation would look like this:</b></p> $34 + \underline{\quad} = 51$ $34 + \underline{17} = 51$	<p>Objective 2: Use a measurement model to write a missing addend equation.</p> <p>Students write the equation with the missing addend.</p> <p>Students rewrite the equation, substituting in the addend.</p>
<p><u>Guided Practice</u> (12 minutes)</p> <p><b>Wasn't the second model fun? We got to figure out our own way to move on the number line. And we found the missing number, or addend!</b></p> <p><b>Let's try some more!!!</b></p> <p>I Do</p> <p><b>A noodle is 29 centimeters. David eats all but 13 centimeters of it. How long is the part that David eats?</b></p> <p><b>Draw a model with me. You are going to need to draw a long rectangle. Add 20 dashes across the top like this.</b> [Model.]</p> <p><b>Try to place the lines evenly, but don't worry too much about getting them exactly spaced.</b> [Model.]</p>  <p><b>We are going to start labeling at 12 and continue to 31, counting by 1s.</b> [Model.]</p> <p><b>Let's start by writing an equation with a "?". Write this equation with me:</b></p> $13 + \underline{\quad} = 29$ <p><b>We have 13 centimeters of a noodle.</b> [Point.]</p> <p><b>The total length of the noodle is 29 centimeters.</b> [Point.]</p>	<p>Students draw the model.</p> <p>Students write the equation.</p>

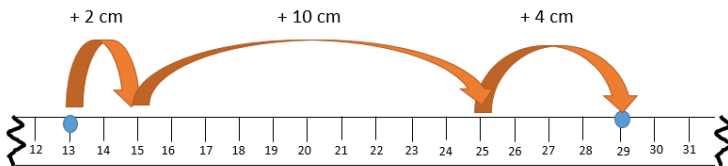
We don't know how much David ate. [Point.]

If we add the 13 centimeters to the part that David ate, we have 29 centimeters of noodle.

Now we are going to represent this information on the model. Graph the 13 and 29 centimeters.



The space in between is the part that was eaten. Let's use our counting strategies to move spaces. Move with me by drawing arrows.



I moved 2 centimeters to get to 15, because it is easy for me to count by 5s and 10s. Then I moved 10 spaces to get to 25. That left a move of 4 spaces to get to 29 centimeters. How can we figure out the total number of spaces we moved? [Pause.]

You are working so hard! That's right... we can add, or sum, all of the moves. Do this with me. Think, " $2 + 10 = 12$ .  $12 + 4 = 16$ ."

How many centimeters did we move? [Pause.]

Correct! We moved 16 centimeters.

Let's add the missing addend to our equation. [Model.]

$$13 + \underline{\quad} = 29$$

$$13 + \underline{16} = 29$$

We are on a roll!!! Let's practice another one!

We Do

Read this problem with me.

Brigit is making a hair bow. She has 18 inches of ribbon and ties on some more ribbon. Now, she has 32 inches of ribbon. How much ribbon did she add?

Let's think. What do we know about the ribbon? How much ribbon did Brigit start with? [Pause.]

Good reading! She started with 18 inches of ribbon. How much ribbon did she add? [Pause.]

Students graph 13 and 29.

Students move spaces by drawing arrows.

We can add the moves/spaces together.

We moved 16 centimeters.

Students add the missing addend to the equation.

Students read the problem with the teacher.

Students respond that she begins with 18 inches of ribbon.

Students say that they don't know how much ribbon was added.

Oh. We don't know that do we? The text tells us that she ties on some more ribbon, but not how much. Hmm... do we know anything else? [Pause.]

Exactly! We know that Brigit has 32 inches of ribbon in the end. Doesn't that sound like a problem that we can use a measurement model to solve? [Pause.]

I agree. Let's set up the equation first. Write this with me.

18 inches + some more ribbon = 32 inches

$$18 + \underline{\quad?} = 32$$

Now we can figure out the missing number, or addend, with a model. Set up your model with me.

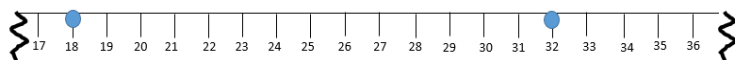
We will need to draw a long rectangle. You do this on your paper as I am modeling it here.



Please place 20 hash marks across the top, as evenly spaced as you can. Don't get too stressed about the spacing.

What numbers can we graph? [Pause.]

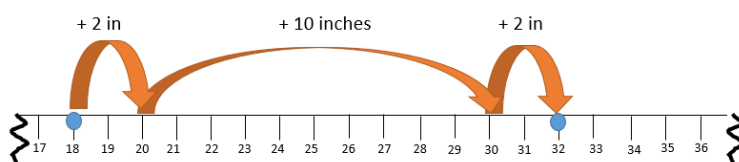
Right! We are sure about 18 and 32 inches, so we will graph those together.



We have the parts of the story and the parts of the equation that we know. [Connect the 18 on the model to the 18 in the story and in the equation. Then connect the 32 in the model to the story and the equation.]

$$18 + \underline{\quad?} = 32$$

We can use the model to find the missing ribbon length which is the missing addend. [Point to the missing addend in the equation and in the model.]



The text also tells us that she has 32 inches of ribbon after she adds the two pieces together.

Students write the equation.

Students set up the model.

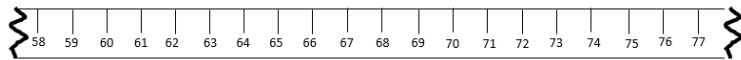
Students draw model.

Students graph 18 and 32 inches.

Students model with teacher.

<p>Let's move 2 spaces to get to 20 inches. Then we can move 10 spaces to get to 30. Now, we move 2 inches to end at 32 inches.</p> <p>How can we figure out the missing addend? [Pause.]</p> <p>Oh! That's right! Earlier, we added the spaces to find the total move.</p> <p>Would you do that right now? [Pause.]</p> <p>What was the missing addend? [Pause.]</p> <p>Excellent! You said that the missing ribbon length is 14 inches.</p> $2 + 10 + 2 = 14$ <p>We have found the missing piece, or addend, to our equation. Add this to your equation.</p> $18 + \underline{\quad? \quad} = 32$ $18 + 14 = 32$ <p>You Do</p> <p>We just helped Brigit figure out her missing piece of ribbon. Now we are going to help Kelsey figure out how much she has grown this year!</p> <p>Read this problem on your own. [Pause.]</p> <p>Now read along with me.</p> <p>Kelsey is 59 inches tall. She has grown and is now 73 inches tall. How many inches did Kelsey grow?</p> <p>On your own, show the problem with an equation. Use a question mark for any missing information. [Pause, then model.]</p> <p>I am writing <math>59 + ? = 73</math>.</p> <p>Compare your equation with mine. [Pause.]</p> <p>Kelsey started at 59 inches and then grew some. She is now 73 inches tall. We don't know how much she grew, so we use a "?" in the equation to stand for the missing addend.</p> <p>Let's draw the model to help us solve. Under your equation, draw a long rectangle like before. Add 20 dash marks at the top of the rectangle to make a ruler. Begin numbering the ruler at 58 and continue through to 77, counting by 1s.</p>	<p>Students respond that you add.</p> <p>Students add.</p> <p>Students say that the missing ribbon is 14 inches.</p> <p>Students add the 14 inches to their equation.</p> <p>Students read the text.</p> <p>Students write "<math>59 + ? = 73</math>."</p> <p>Compare equation with teacher.</p>
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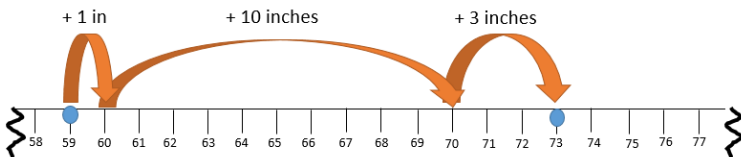
**Complete your model and then compare to mine. [Pause, then model.]**



**Use your model to determine Kelsey's growth. Use arrows to show your moves. Then determine your total moves. [Pause.]**

**How much did Kelsey grow? [Pause.]**

**Wow! You are working so hard. That's right... Kelsey grew 14 inches. Let's compare our models. [Pause and share model.]**



**We have found the missing length, or addend. Now we can fill in the "?" in our equation. Do this with me.**

$$59 + ? = 73.$$

$$59 + \underline{14} = 74$$

**Additional Problems (if Needed):**

**Read this problem on your own. [Pause.]**

**Now read along with me.**

**#1. Steve and Ronna caught two fish the measured 24 inches long together. If Steve's fish was 14 inches long, how long was Ronna's fish?**

**On your own, show the problem with an equation. Use a question mark for any missing information. [Pause, then model.]**

**I am writing  $14 + ? = 24$ .**

**Compare your equation with mine. [Pause.]**

**Let's draw the model to help us solve. Under your equation, draw a long rectangle like before. Add 20 dash marks at the top of the rectangle to make a ruler. Begin numbering the ruler at 10 and continue through to 29, counting by 1s.**

Students create model.

Students compare to teacher's model.

Students complete model finding the missing addend.

Students say that Kelsey grew 14 inches.

Compare models.

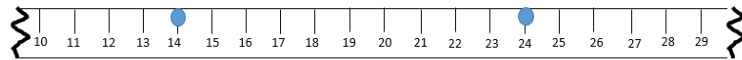
Students fill in the missing addend in the original equation.

Students read problem.

Students write the equation with the missing addend and compare to the teacher's equation.

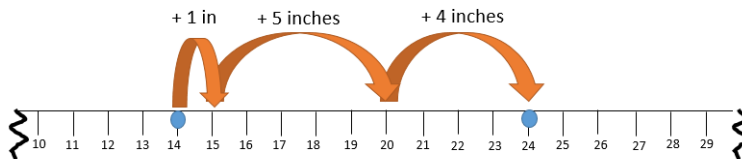
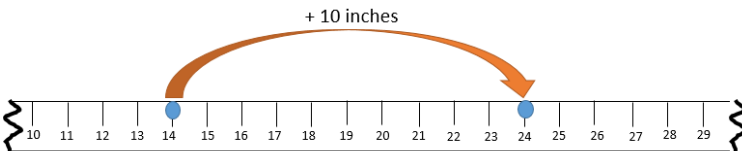


**Complete your model and then compare to mine. [Pause, then model.]**



**Complete the model on your own and re-write the equation with the missing addend. Then we will compare models.**

**Here are two ways that you could have moved on your ruler to get to 24 inches.**



**Both models tell you that Ronna's fish was 10 inches long. The first model shows a jump of 10 inches.**

**The second model shows  $1 + 5 + 4 = 10$**

**We can rewrite the original equation.**

$$14 + ? = 24$$

$$14 + \underline{10} = 24$$

**Read this problem on your own. [Pause.]**

**Now read along with me.**

**#2. Nathan ran 75 meters over the weekend. He ran 59 meters on Sunday. How far did he run on Saturday?**

**On your own, show the problem with an equation. Use a question mark for any missing information. [Pause, then model.]**

**Compare your equation with mine. [Pause.]**

**I am writing the equation:  $? + 59 = 75$ .**

**Let's draw the model to help us solve. Under your equation, draw a long rectangle like before. Add 20 dash marks at the top of the rectangle to make a ruler. Begin numbering the ruler at 58 and continue through to 77, counting by 1s.**

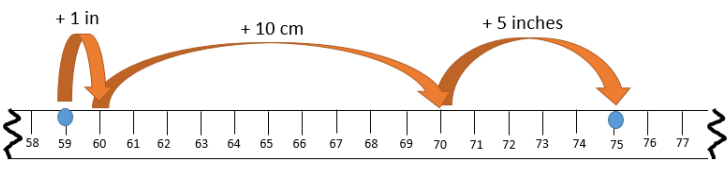
Students draw the model and compare.

Students finish the model, determining that Ronna's fish was 10 inches long.

Students have already rewritten the equation. They compare.

Students read problem.

Students write the equation with the missing addend and compare to the teacher's equation.

<p><b>Complete your model and then rewrite your equation. We will compare in a minute. [Pause, compare.]</b></p>  <p><b>Did you re-write your equation like this?</b>  <math>? + 59 = 75</math>  <math>\underline{16} + 59 = 75</math></p> <p><b>Excellent work! He ran 59 meters on Sunday. His total was 75 meters. The distance between 59 meters and 75 meters is 16 meters. Nathan ran 16 meters on Saturday.</b></p>	<p>Students draw the model and compare.</p> <p>Students have already rewritten the equation. They compare.</p>
<p><u>Independent Practice</u> (3 minutes)</p> <p><b>Great work, boys and girls! Today, we reviewed writing equations with missing addends and using models to solve the problem. I hope you're seeing some connections between models, equations, and word problems with measurement! You sure did a great job!</b></p> <p><b>After the video, you will have some problems to practice on your own. You can find the student practice for this lesson posted on our website, <a href="http://www.tn.gov/education">www.tn.gov/education</a>. [Teacher shows student practice page under document camera or camera zooms in on student practice page.]</b></p> <p><b>Have fun and do your best!</b></p>	
<p><u>Closing</u> (1 min)</p> <p><b>Friends, I enjoyed finding missing addends with you! Thank you for inviting me into your home. I look forward to seeing you in our next lesson in Tennessee's At Home Learning Series! Bye!</b></p>	

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