Topic C
Non-Standard and Standard Length Units

1.OA.1, 1.MD.2

Focus Standard: 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. (See Glossary, Table 1.)

1.MD.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. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.

Instructional Days: 3

Coherence -Links from: GK–M3 Comparison of Length, Weight, Capacity, and Numbers to 10
-Links to: G2–M2 Addition and Subtraction of Length Units
G2–M7 Problem Solving with Length, Money, and Data

Topic C gives students a chance to explore the usefulness of measuring with similar units. The topic opens with Lesson 7, where students measure the same objects from Topic B using two different non-standard length units simultaneously, such as toothpicks and small paper clips (1.MD.2). They then use small paper clips and large paper clips, two non-standard units that happen to be the same object but at different lengths. Each time they measure one object using both units and receive inconsistent measurement results. Students then begin to ask the question, “Why do we measure with same-sized length units?” As they explore why it is so important to use the same-sized length unit, they realize that doing so yields consistent measurement results.

In Lesson 8, students explore what happens when they use a different unit of measurement from that of their classmates. As students measure the same objects with different non-standard length units, they realize that in order to have discussions about the lengths of objects together, they must measure with the same units. Students answer the question, “If Bailey uses paper clips and Maya uses toothpicks, and they both measure things in our classroom, will they be able to compare their measurements?” With this new understanding of consistent measurement, Lesson 9 closes the topic, with students solving compare with difference unknown
problems using centimeters. Students explore and solve problems such as, “How much longer is the pencil than the marker?” \((1.OA.1)\). Revisiting the centimeter here helps students recognize the value of having a consistent way to communicate about various measurements.

### A Teaching Sequence Towards Mastery of Non-Standard and Standard Length Units

**Objective 1:** Measure the same objects from Topic B with different non-standard units simultaneously to see the need to measure with a consistent unit.  
(Lesson 7)

**Objective 2:** Understand the need to use the same units when comparing measurements with others.  
(Lesson 8)

**Objective 3:** Answer compare with difference unknown problems about lengths of two different objects measured in centimeters.  
(Lesson 9)
Lesson 7

Objective: Measure the same objects from Topic B with different non-standard units simultaneously to see the need to measure with a consistent unit.

Suggested Lesson Structure

- Fluency Practice (18 minutes)
- Application Problem (5 minutes)
- Concept Development (27 minutes)
- Student Debrief (10 minutes)
- Total Time (60 minutes)

Fluency Practice (18 minutes)

- Beep Counting 1.NBT.1 (2 minutes)
- Addition Strategies Review 1.OA.6 (6 minutes)
- Sprint: Addition Within 20 1.OA.6 (10 minutes)

Beep Counting (2 minutes)

Note: This fluency activity strengthens students’ ability to understand number relationships and recognize counting patterns. If students are proficient with beep counting by ones, consider beep counting by tens (1.NBT.5), or challenge students with practicing Grade 2 standards of counting by twos or fives (2.NBT.2).

Say a series of three or more numbers but replace one of the numbers with the word beep (e.g., 15, 16, beep). When signaled, students say the number that was replaced by the word beep in the sequence. Scaffold number sequences, beginning with easy sequences and moving to more complex ones. Be sure to include forward and backward number sequences and to change the sequential placement of the beep.

Suggested sequence: 15, 16, beep; 25, 26, beep; 35, 36, beep; 12, 11, beep; 22, 21, beep; 32, 31, beep; 8, beep, 10; 18, beep, 20; 38, beep, 40; beep, 9, 8; beep, 19, 18; beep, 29, 28; etc.
Addition Strategies Review (6 minutes)

Materials: (T) Hide Zero cards

Note: This review fluency helps strengthen students’ understanding of the make ten and add the ones addition strategies, as well as their ability to recognize appropriate strategies based on the number of tens and ones in both addends.

Divide students into partners. Lay out your Hide Zero cards so they are easy to access. Show 9 and 6 with your cards.

T: Partner A, show me 9 on your Magic Counting Sticks. Partner B, show me 6.
If I want to solve 9 + 6, how can I make a ten?

S: Take one from the 6 and add 1 to 9.

T: Yes. Show me! (Exchange the 9 and 6 cards for 10 and 5 as students adjust their fingers.) We changed 9 + 6 into an easier problem. Say our new addition sentence with the solution.

S: 10 + 5 = 15.

T: (Put the Hide Zero cards together to show 15.) Say it the Say Ten way.

S: Ten 5.

T: (Show 13 with Hide Zero cards.) Partner A, show the ones. Partner B, show the tens. (Break apart the Hide Zero cards as students hold up their fingers.) If we want to add 2, should we make a ten to help us?

S: No. We already have a ten!

T: Should we add 2 to our 3 or our 10?

S: Our 3.

T: Yes! Partner A, show me 3 + 2. (Exchange the 3 card for a 5 card.) What is the answer?

S: 5.

T: So, Partner B, what is 13 + 2?

S: 15.

T: Say it the Say Ten way.

S: Ten 5.

Sprint: Addition Within 20 (10 minutes)

Materials: (S) Addition Within 20 Sprint

Note: This Sprint addresses the Grade 1 standard of adding and subtracting within 20.
Application Problem (5 minutes)

When Corey measures his new pencil, he uses 19 centimeter cubes. After he sharpens it, he needs 4 fewer centimeter cubes. How long is Corey’s pencil after he sharpens it? Use centimeter cubes to solve the problem. Write a number sentence and a statement to answer the question.

Note: As students build measurements with centimeter cubes, they continue to connect their experiences of addition and subtraction with concrete problem situations. As students work, encourage them to talk through the problem sentence by sentence, placing the centimeter cubes in front of them to build the story.

During the Debrief, connect the students’ concrete experience with the problem type or computation.

Concept Development (27 minutes)

Materials: (T) Chart paper, 3 new pencils of different color (e.g., red, blue, yellow) from the same brand and size, mixed set of large and small paper clips (S) Bag of 20 large paper clips and 20 small paper clips

Note: Model for students how to measure objects that are longer or shorter than a whole unit. Also, discuss how best to choose the number of units when estimating.

Gather students in the meeting area with their materials.

T: For the past few days, we have been measuring with centimeter cubes. Today, let’s measure with paper clips. What did we learn about the rules of measuring? (Write the rules on chart paper as students respond. Model how to measure objects that are longer or shorter than a whole unit. Discuss how best to choose the number of units when estimating.)

S: Line up the endpoints. Don’t leave any gaps. Don’t overlap what you are measuring with.

T: Let’s see how long this red pencil is by using paper clips as our length unit. (Measure with a mix of both paper clips, e.g., 3 large and 1 small.) How many paper clips long is the red pencil?

S: 4 paper clips long.

T: (Keep the red pencil measurement displayed.) This blue pencil is the same length. Let’s measure it using paper clips as the length unit. (Measure with a different combination of paper clips, e.g., 1 large and 4 small.) How many paper clips long is the blue pencil?
Lesson 7

Measure the same objects from Topic B with different non-standard units simultaneously to see the need to measure with a consistent unit.

Date: 7/30/13

Prerequisite Skills

S: 5 paper clips long.

T: According to these measurements, the blue pencil is longer than the red. Is this correct?

S: Yes. → But, it looks like the pencils are the same length!

T: Let’s compare the pencils directly. (Pick up the pencils from their places and stand them up from the floor. Leave the paper clip measurements where they are.) Are they the same length?

S: Yes!

T: (Put the pencils back so they are aligned with their paper clips.)

T: Hmm. Let me measure again. This yellow pencil is also the same length as the others. (Measure with a different combination of paper clips, e.g., 4 large paperclips.) Oh boy, this time, it’s less than 4 paper clips long! Why do I keep getting different measurements when the pencils are the same size?

T: I’m using the length unit of a paperclip. (Refer to the chart with measuring rules.) I’m aligning my endpoints, making sure there are no gaps or overlaps. I should be getting the same length measurement each time since the pencils are the same length.

S: The paper clips are different sizes! → Some paper clips are long and others are short! → It’s not an accurate measurement because the paper clips have to be the same size, just like our centimeter cubes were the same size, a centimeter. → We should only use the smaller paper clips. → Or, we should only use the bigger paper clips. But, we can’t mix them.

T: It sounds to me like we have a new rule for proper measuring! (Add to the chart: Length units must be the same length.) Just like you said, we need to make a decision: either use just the small paper clips or...

S: Just the big paper clips!

T: Great. And what should we make sure we don’t do?

S: Mix them up because they are different sizes.

T: (Ask a student volunteer to come up and use small paper clips to measure the red pencil. Measure the blue pencil with small paper clips as the student measures the red pencil.) How many paper clips long is the blue pencil? How many paper clips long is the red pencil?

S: They are both about 6 small paper clips long!

T: Thank you for solving my measurement problem! You’re ready to go and measure with paper clips on your Problem Set. Before you go, let’s read all of our rules for measuring.

While distributing a bag of varying paper clips to each student, remind the class of the new rule, to make sure they use the same length paper clips as they measure. (Note: It will be helpful to students to have the chart hanging in the classroom for future reference.)
Problem Set  (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first.

Note: Circulate to ensure that students use the correct size of paper clip for each set of questions. The last two items in the chart are found in the classroom, not in the Problem Set.

Student Debrief  (10 minutes)

Lesson Objective: Measure the same objects from Topic B with different non-standard units simultaneously to see the need to measure with a consistent unit.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion.

- What is a new rule we must remember when we are measuring? (Length units must be the same size.)
- Compare your first chart to your partner’s. Explain why you have the same measurements.
- Even though we measured the same objects, why are your measurements different on your first chart from your second chart?
- A student said she used new pencil-top erasers from a pack to measure how long her pencil is. All the erasers are the same size. Her partner said she couldn’t use these erasers to measure properly because they are all different colors. Who is correct?
- Look at your Application Problem. What measurement rules did you have to keep in mind? Did you add more cubes or take cubes away to solve this problem? What number sentence matches the problem?
Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students’ understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.
**Lesson 7 Sprint**

**Lesson 7:**

*Write the missing number.*

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<th>16</th>
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<tr>
<td>15</td>
<td>12 + 7 =</td>
<td>30</td>
<td>7 + 8 = ☐ + 9</td>
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</tbody>
</table>

**Number correct: ☀**

*Measure the same objects from Topic B with different non-standard units simultaneously to see the need to measure with a consistent unit.*

**Date:** 7/30/13

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**Lesson 7 Sprint**

Name ___________________________ Date ____________

*Write the missing number.*

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<td>15</td>
<td>13 + 6 = ☐</td>
<td>30</td>
<td>6 + 7 = ☐ + 9</td>
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</table>

Measure the same objects from Topic B with different non-standard units simultaneously to see the need to measure with a consistent unit.
Lesson 7:

Measure the length of each object with your LARGE paper clips. Fill in the chart with your measurement.

<table>
<thead>
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<th>Name of Object</th>
<th>Number of Large Paper Clips</th>
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<tbody>
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<td>Bottle</td>
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<td>Caterpillar</td>
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<td>Key</td>
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<td>Pen</td>
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<td>Sticker</td>
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<tr>
<td>Paper</td>
<td></td>
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<tr>
<td>Reading book</td>
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Measure the length of each object with your **SMALL** paper clips. Fill in the chart with your measurement.

<table>
<thead>
<tr>
<th>Name of Object</th>
<th>Number of Small Paper Clips</th>
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<tbody>
<tr>
<td>Bottle</td>
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<td>Caterpillar</td>
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Name ______________________ Date _____________________

Measure the length of each object with your **small** and **large** paper clips. Fill in the chart with your measurements.

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<thead>
<tr>
<th>Name of Object</th>
<th>Number of Large Paper Clips</th>
<th>Number of Small Paper Clips</th>
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<td>Vase and Flowers</td>
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Measure the same objects from Topic B with different non-standard units simultaneously to see the need to measure with a consistent unit.
Cut the strip of paper clips. Measure the length of each object with your large paper clips to the right. Then, measure the length with your small paper clips on the back. Fill in the chart on the back of the page with your measurements.
### Lesson 7 Homework

<table>
<thead>
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<th>Name of Object</th>
<th>Length in Large Paper Clips</th>
<th>Length in Small Paper Clips</th>
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<td>Eraser</td>
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<td>Crayon</td>
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<td>Glue</td>
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</tbody>
</table>

Now find objects around your home to measure. Record the objects you find on the chart.

<table>
<thead>
<tr>
<th>Name of Object</th>
<th>Length in Large Paper Clips</th>
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Lesson 8

Objective: Understand the need to use the same units when comparing measurements with others.

Suggested Lesson Structure

- Fluency Practice (10 minutes)
- Application Problem (5 minutes)
- Concept Development (35 minutes)
- Student Debrief (10 minutes)
- Total Time (60 minutes)

Fluency Practice (10 minutes)

- Speed Writing 1.OA.5 (3 minutes)
- Race and Roll Addition 1.OA.6 (4 minutes)
- Cold Call: Addition and Subtraction Within 20 1.OA.6 (3 minutes)

Speed Writing (3 minutes)

Materials: (S) Personal white boards, timer

Note: Throughout the first two modules, students have been practicing counting by ones, twos, fives, and tens, as well as Say Ten counting.

Reviewing these counting patterns prepares students for Module 4 by strengthening their understanding of place value and their ability to add and subtract. Many students are familiar with skip-counting, and though skip-counting by twos, fives, and tens is not a Grade 1 standard, the teacher can incorporate these counting patterns if appropriate.

Choose a counting pattern with which students need more practice. Students count on their boards by the chosen pattern for a minute. Tell them to erase their boards but remember how high they counted. Then, give them another minute to try to count even higher.
Lesson 8
Understand the need to use the same units when comparing measurements with others.

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Race and Roll Addition (4 minutes)

Materials: (S) 1 die per set of partners

Note: This fluency activity reviews the grade level standard of adding within 20.

All students start at 0. Partners take turns rolling a die, then saying a number sentence adding the number rolled to the total. (For example, Partner A rolls 6 and says, “0 + 6 = 6.” Partner B rolls 3 and says, “6 + 3 = 9.”) They continue rapidly rolling and saying number sentences until they get to 20, without going over. Partners stand when they reach 20. (For example, if partners are at 18 and roll 2, they take turns rolling until one of them rolls 2 or both of them roll 1. Then, they both stand.)

Cold Call: Addition and Subtraction Within 20 (3 minutes)

Note: This review fluency addresses Grade 1’s standard and practices including units when adding length.

For directions on how to play Cold Call, refer to G1–M3–Lesson 6.

T: 4 centimeters + 2 centimeters is? (Pause to provide thinking time.) Students with pets?
S: (Only students with pets answer.) 6 centimeters.

T: 14 centimeters + 2 centimeters is? (Pause to provide thinking time.) Students with no pets?
S: (Only students with no pets answer.) 16 centimeters.

Continue playing, practicing addition and subtraction within 20. As always, scaffold instruction by beginning with easy problems and slowly increasing the complexity.

Application Problem (5 minutes)

Each crayon is 9 centimeter cubes long. The paintbrush is the same length as 2 crayons. How many centimeter cubes long is the paintbrush? Use centimeter cubes to solve the problem. Write a number sentence and a statement to answer the question.

Note: Students continue to use concrete materials to consider problem situations. Continue to encourage students to build each part of the story, using the cubes to think through what they know and to identify what they do not yet know. During the Debrief, students can demonstrate their strategies for solving the problem. The example above right shows several ways in which students may solve this Application Problem. Some students may simply align the cubes and solve without drawing.
Concept Development (35 minutes)

Materials: (T) Measuring Rules chart (from G1–M3–Lesson7) (S) 1 brown bag of 2 new crayons, 10 linking cubes, and 10 centimeter cubes per pair

Gather the students in the meeting area in a semi-circle.

T: We have measured with many different tools so far. Who can name the different tools we have used to measure?


Review the rules for measuring properly using the chart created in the previous days’ lesson.

T: (Distribute a brown bag with materials listed above to each pair of students.) You and your partner are going to measure the new crayons with the materials in your bag. Don’t forget about the rules for proper measuring!

T: How many cubes long was your new crayon? (Note: Do not tell students which cubes to use.)

S: Mine was 9 cubes long. → Mine was 3 cubes long.

T: That’s interesting. These crayons are brand new, they came from the same box which means they should be the same size. (Match up the crayons.) And they are! Why are we getting different measurements?

Ask students if they measured properly by going over each rule, repeating the last rule twice to ensure that no one mixed the cubes to measure.

T: Why do we have different measurements? Talk with your partner.

S: We were measuring with different cubes. We didn’t mix them up, but I measured with smaller cubes, the centimeter cubes. My partner measured with bigger cubes, the linking cubes. → We didn’t do anything wrong. We measured correctly. It’s just that our answers are different because we used different size cubes from each other.

T: Great thinking! Even though you measured properly, it sounds like we need to add a rule for sharing and communicating about our measurements. When someone says, “My crayon is 3 cubes long,” and another person says, “No! It’s 9 cubes long,” this can become a frustrating conversation because they are both right! So, how can we help these two students?

S: They have to say, “My crayon is 3 linking cubes long,” or, “My crayon is 9 centimeter cubes long.” → We have to say what type of tool we used to measure!

T: Yes! We need to be precise when we communicate about which length unit we used to measure. Let’s practice measuring more items and communicating their measurements precisely on your Problem Set.
Give each student, or pair of students, one set of the following measuring tools:

- 20 small paper clips
- 20 large paper clips
- 20 toothpicks
- 20 centimeter cubes

Ask students to measure the classroom objects with their assigned measuring tools. Remind students to write the word *about* if their measurement is not exactly a certain length unit long. Circulate and ask students about their measurements, encouraging them to use the length unit label as they share. (Note: The use of the word *about* was first introduced in G1–M3–Lesson 4. Remind students that if they are going to use this word the appropriate way to use it is, “My pretzel rod is about 18 centimeter cubes long.”)

**Problem Set (10 minutes)**

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first.

For the Problem Set and Homework, each student gets one of the following: bag of 20 small paper clips, bag of 20 large paper clips, bag of 20 toothpicks, bag of 20 centimeter cubes. Be sure to have each student take the bag home to complete the homework assignment.

**Student Debrief (10 minutes)**

**Lesson Objective:** Understand the need to use the same units when comparing measurements with others.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner who used the same length unit before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion.

- Compare your measurements to your partner’s (a student who used a different tool). How are your answers different?
- Why do we need a label, or a length unit, along with a number when we are writing our measurements? Why can’t we use the number only?
- How can it be true that when Student A says the glue stick is X paper clips long and Student B says it is Y centimeter cubes long, they are both correct?
Lesson 8: Understand the need to use the same units when comparing measurements with others.

Date: 7/30/13

- Student A says she used 9 centimeter cubes to measure the crayon. Student B says she used 3 small paper clips to measure the crayon. Why do you think she needed so many more centimeter cubes to measure the crayon compared to using the small paper clips?
- Pick three objects from your sheet. Name your items in order from shortest to longest. Name your items in order from longest to shortest.
- Would the order change if you were using a different measuring tool to measure length? Why or why not?
- Display an example of the Problem Set for Lesson 7. Look at the caterpillar on each page. How do our measurements on each page relate to today’s lesson?
- Look at your Application Problem. How much longer is the paintbrush compared to one crayon? Why is it important that you included the label centimeters or centimeter cubes after the number in your statement?

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students’ understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.
Lesson 8 Problem Set

Name ____________________________ Date __________________

Circle the length unit you used to measure. Use the same length unit for all objects.

- Small Paperclips
- Large Paperclips
- Toothpicks
- Centimeter Cubes

Measure each object listed in the chart and record the measurement. Add the names of other objects in the room and record their measurements.

<table>
<thead>
<tr>
<th>Classroom Object</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glue Stick</td>
<td></td>
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<tr>
<td>Dry Erase Marker</td>
<td></td>
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<tr>
<td>Unsharpened Pencil</td>
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<tr>
<td>Personal White Board</td>
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Lesson 8 Exit Ticket

Name ________________________________ Date ____________________

Circle the length unit you used to measure. Use the same length unit for all objects.

- Small Paperclips
- Large Paperclips
- Toothpicks
- Centimeter Cubes

Choose two objects in your desk. Fill in the chart and record the measurement.

<table>
<thead>
<tr>
<th>Classroom Object</th>
<th>Measurement</th>
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<tr>
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Common Core Mathematics Curriculum

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Lesson 8 Homework

Circle the length unit you used to measure. Use the same length unit for all objects.

| Small Paperclips | Large Paperclips |
| Toothpicks       | Centimeter Cubes |

Measure each object listed in the chart and record the measurement.
Add the names of other objects in your house and record their measurements.

<table>
<thead>
<tr>
<th>Home Object</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fork</td>
<td></td>
</tr>
<tr>
<td>Picture Frame</td>
<td></td>
</tr>
<tr>
<td>Pan</td>
<td></td>
</tr>
<tr>
<td>Shoe</td>
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</tbody>
</table>
Lesson 8: Understand the need to use the same units when comparing measurements with others.

Date: 7/30/13

<table>
<thead>
<tr>
<th>Home Object</th>
<th>Measurement</th>
</tr>
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<tbody>
<tr>
<td>Stuffed Animal</td>
<td></td>
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</table>

Did you remember to add the name of the length unit after the number?  Yes  No

Pick 3 items. List your items from longest to shortest:

1. ______________________

2. ______________________

3. ______________________
Lesson 9

Objective: Answer compare with difference unknown problems about lengths of two different objects measured in centimeters.

Suggested Lesson Structure

- Fluency Practice (18 minutes)
- Application Problem (5 minutes)
- Concept Development (27 minutes)
- Student Debrief (10 minutes)
- Total Time (60 minutes)

Fluency Practice (18 minutes)

- Race and Roll Addition 1.OA.6 (5 minutes)
- Sprint: Addition Within 20 1.OA.6 (10 minutes)
- Number Sentence Swap 1.OA.4 (3 minutes)

Race and Roll Addition (5 minutes)

Materials: (S) 1 die per set of partners

Note: This fluency activity reviews the grade level standard of adding within 20.

All students start at 0. Partners take turns rolling a die, then saying a number sentence adding the number rolled to the total. (For example, Partner A rolls 6 and says, “0 + 6 = 6.” Partner B rolls 3 and says, “6 + 3 = 9.”) They continue rapidly rolling and saying number sentences until they get to 20, without going over. Partners stand when they reach 20. (For example, if partners are at 18 and roll 5, they take turns rolling until one of them rolls 2 or both of them roll 1. Then, they both stand.)

Sprint: Addition Within 20 (10 minutes)

Materials: (S) Addition Within 20 Sprint

Note: This Sprint addresses the Grade 1 standard of adding and subtracting within 20. It is the same Sprint from two days prior, so students will likely do better today. Along with celebrating improvement between Sides A and B, celebrate improvement from the last time this Sprint was given.

A NOTE ON STANDARDS ALIGNMENT:

In this lesson, students compare centimeter cubes as a concrete form of compare with difference unknown problem types. This bridges towards the Grade 2 standard of measuring to determine how much longer one object is than another (2.MD.4), although the lesson specifically focuses on comparing the concrete cubes rather than the more abstract numerical representations of the measurements.

NOTES ON MULTIPLE MEANS FOR ENGAGEMENT:

While some students thrive during Sprints, others may not enjoy having to complete a task being timed. Cultivate healthy personal best competition during Sprints so that students focus on their improvement.
Lesson 9: Answer compare with difference unknown problems about lengths of two different objects.

Date: 7/30/13

Number Sentence Swap (3 minutes)
Say a subtraction sentence aloud, saying “the mystery number” for the unknown answer (e.g., “5 – 3 = the mystery number”). Call on a student to rephrase the sentence as an addition sentence (e.g., “3 + the mystery number = 5”). Pause to provide thinking time. Students solve for the mystery number on your signal.
Suggested sequence: 5 – 3, 15 – 3, 6 – 4, 6 – 4, 16 – 4, etc.

Application Problem (5 minutes)
Corey buys a super-cool, extra-long crayon that is 14 centimeters long. His regular crayon is 9 centimeters long. Use centimeter cubes to decide how much longer Corey’s new crayon is than his regular crayon.
Write a statement to answer the question.
Write a number sentence to show what you did.

Note: This problem continues to provide students with opportunities to concretely build various lengths with centimeter cubes. As students work towards solving compare with difference unknown problem types, experiences with concrete objects like centimeter cubes can strengthen understanding. Students will be exploring the comparison of centimeter cubes during today’s lesson. As students work, notice how they are solving and use your analysis during the Concept Development.

Concept Development (27 minutes)
Materials: (T) 2 different color centimeter cubes (e.g., blue and yellow), dry erase marker, popsicle stick, crayon, glue stick, small paper clip, unsharpened pencil, new colored pencil, measurement chart from G1–M3–Lesson 6 (S) Bag with 20 blue and 20 yellow centimeter cubes, bag with classroom materials from G1–M3–Lesson 4, new colored pencil

Note: Adjust the Concept Development as necessary based on your observations of student successes and challenges during G1–M3–Lesson 6, as well as during the most recent Application Problems. Today’s Concept Development is an opportunity to continue supporting student understanding of the compare with difference unknown problem types within the concrete context of comparing lengths of centimeter cubes. As addressed in the Note on Standards Alignment, the focus of the lesson should be on comparing the cubes themselves rather than the Grade 2 standard of comparing the measurements alone.

Gather students in the meeting area in a semi-circle formation.

T: (Post the measurement chart from G1–M3–Lesson 6.) The teacher next door and I were playing a game. Whoever finds the longer object on our desk would win, but the object could not be longer than a new pencil. For each extra centimeter in length, the person with the longer object would get a point.
Lesson 9: Answer compare with difference unknown problems about lengths of two different objects.

T: He found a popsicle stick, and I found a dry erase marker, just like the ones on our chart (point to the chart). My dry erase marker measured 12 centimeters and his popsicle stick measured 15 centimeters. He said he gets 15 points, but I don’t think that’s right. Let’s lay the centimeter cubes down and compare them to see how many points he will get in our game.

T: I’ve got 12 centimeter cubes here in my hand. (Lay the two objects in the middle. Point to the chart.) The dry erase marker is 12 centimeters long. Will I have enough cubes to measure my dry erase marker?

S: Yes! It is 12 centimeters long, and you have 12 centimeter cubes.

T: (Lay down blue centimeter cubes next to the dry erase marker. Point to the popsicle stick measurement of 15 centimeters on the chart.) Will these same 12 cubes be enough to measure the popsicle stick?

S: No! There are only 12 centimeter cubes. The popsicle stick is 15 centimeters long.

T: (Lay down 12 blue centimeter cubes next to the popsicle stick.) The teacher next door says he gets 15 points because it took 15 more centimeter cubes to measure the popsicle stick! Look at the marker and the centimeter cubes we laid down. Is he right? Does he need 15 more cubes? Talk with a partner, how many more cubes does he need? (Have partners share their thinking with the class.)

T: Now, let’s try the other teacher’s idea. (Add 15 more cubes, this time using yellow cubes.) Wow, this is too long! It’s much longer than the difference between what he already has and what he needs. What should I do?

S: Take away all of the extra cubes until it lines up with the end of the popsicle stick.

T: (Three yellow cubes are left.) So, if I had 12 cubes and he had 15 cubes, how many more cubes did the teacher need compared to me?

S: 3 more cubes.

T: How much longer is the teacher’s popsicle stick compared to my marker?

S: 3 centimeters.

T: How much shorter is my marker compared to the teacher’s popsicle stick?

S: 3 centimeters.

T: So, for that round, the teacher got three points because his stick was 3 centimeters longer than my marker. He tried to get 15 points for that one, but I’m glad we figured out that he only gets 3 points.

Repeat the process by having students work with their centimeter cubes, measuring using the following contexts. Model as much as appropriate.

- Measure a new colored pencil and an unsharpened pencil as in the game between the two teachers.
- One student measures and compares the lengths of a crayon and a glue stick to see which item is shorter and by how much.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Reading word problems aloud facilitates problem solving for those students who have difficulty reading the text they are presented with. Make sure students with reading difficulties are not held back by the reading when they are able to solve the math problems.
Lesson 9: Answer compare with difference unknown problems about lengths of two different objects.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first.

Note: For the Problem Set, students will use actual centimeter cubes to solve the problems.

Student Debrief (10 minutes)

Lesson Objective: Answer compare with difference unknown problems about lengths of two different objects.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion.

- Look at Problems 3 and 4 on the first page. What do you notice about the answers? Explain to your partner why this is so.
- Look at Problem 4 on the second page. Can you think of a number sentence that can help you check your answer?
- What strategy helped you when you tried to find the difference between two objects? (Counting on.)
- Look at today’s Application Problem. How does it apply to today’s lesson?
Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students’ understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.
## Lesson 9 Sprint

**Name ____________________________  Date ____________________________**

*Write the missing number.*

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<td>16</td>
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<td>8</td>
<td>5 + 13 = ☐</td>
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<td>8 + ☐ = 17</td>
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<td>12</td>
<td>13 + 4 = ☐</td>
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<td>☐ + 7 = 16</td>
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<td>13</td>
<td>3 + 14 = ☐</td>
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<td>☐ + 7 = 15</td>
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<td>14</td>
<td>17 + 2 = ☐</td>
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<td>9 + 5 = 10 + ☐</td>
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<td>15</td>
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<td>7 + 8 = ☐ + 9</td>
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**Lesson 9: Answer compare with difference unknown problems about lengths of two different objects.**

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<td>5 + 13 = ☐</td>
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<td>13 + 4 = ☐</td>
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<td>4 + 14 = ☐</td>
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<td>14</td>
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<td>13 + 6 = ☐</td>
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</table>
Lesson 9: Answer compare with difference unknown problems about lengths of two different objects.

Date: 7/30/13

Name ___________________________________________ Date ______________________

1. Look at the picture below. How much longer is Guitar A than Guitar B?

Guitar A is ______ unit(s) longer than Guitar B.

2. Measure each object with centimeter cubes.

The blue pen is ____________________________.

The yellow pen is ____________________________.

3. How much longer is the yellow pen than the blue pen?

The yellow pen is ____ centimeters longer than the blue pen.

4. How much shorter is the blue pen than the yellow pen?

The blue pen is ____ centimeters shorter than the yellow pen.
Use your centimeter cubes to model each problem. Then, draw a picture of your model.

5. Austin wants to make a paper clip train that is 13 paper clips long. If his train is already 9 paper clips long, how many more paper clips does he need?

6. Kea’s doll is 12 centimeters long, and Megan’s doll is 8 centimeters long. How much shorter is Megan’s doll than Kea’s doll?

7. Kim cuts a piece of ribbon for her mom that is 14 centimeters long. Her mom says the ribbon is 8 centimeters too long. How long should the ribbon be?

8. The tail of Lee’s dog is 15 centimeters long. If the tail of Kit’s dog is 9 centimeters long, how much longer is Lee’s dog’s tail than the tail of Kit’s dog?
Use your centimeter cubes to model each problem. Then, draw a picture of your model.

1. Mona’s hair grew 7 centimeters. Claire’s hair grew 15 centimeters. How much less did Mona’s hair grow than Claire’s hair?
Lesson 9: Answer compare with difference unknown problems about lengths of two different objects.

Date: 7/30/13

1. Look at the picture below. How much shorter is Trophy A than Trophy B?

![Trophy A and Trophy B](image)

Trophy A is ____ units shorter than Trophy B.

2. Measure each object with centimeter cubes.

![Red Shovel](image)

The red shovel is ____ centimeters.

![Green Shovel](image)

The green shovel is ____ centimeters.

How much longer is the green shovel than the red shovel?

The green shovel is ____ centimeters longer than the red shovel.
Use your centimeter cubes to model each problem. Then, draw a picture of your model.

3. Susan grew 15 centimeters and Tyler grew 11 centimeters. How much more did Susan grow than Tyler?

4. Bob’s straw is 13 centimeters. If Tom’s straw is 6 centimeters, how much shorter is Tom’s straw than Bob’s straw?

5. A purple card is 8 toothpicks long. A red card is 12 toothpicks long. How much longer is the red card than the purple card?

6. Carlos’ bean plant grew to be 9 centimeters high. Dallas’ bean plant grew to be 14 centimeters high. How much higher is Dallas’ plant than Carlos’ plant?