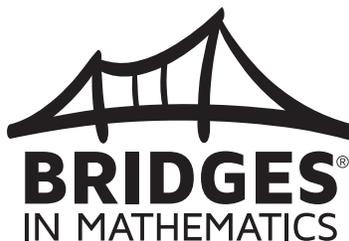




Teachers Guide

GRADE 2 – UNIT 7 – MODULE 1

Preview



Module 1

Army Ants: Length in Metric Units

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Teacher Masters

Pages renumber with each module.

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Unit 7 Pre-Assessment	T2
Work Place Guide 7A Race to the Cookie Jar	T6
Work Place Instructions 7A Race to the Cookie Jar	T7
Army Ants	T8
Work Place Guide 7B	
Estimate & Measure Centimeters.....	T13
Work Place Instructions 7B	
Estimate & Measure Centimeters.....	T14
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Army Ant Raids.....	T17
Work Place Guide 7C Ant Paths	T18
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Student Book Pages

Page numbers correspond to those in the consumable books.

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Estimate & Measure Centimeters.....	91

Home Connections Pages

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Module 1

Army Ants: Length in Metric Units

Overview

Unit 7 takes students into the exciting world of ants through readings, problem solving, and writing. Module 1 sets the stage when students learn that the average length of a worker army ant is one centimeter. Students create army ant rulers to estimate and measure the lengths of objects in centimeters. The class then works together to combine ten rulers to make a meter and spends a session measuring longer lengths and distances in meters. Three new Work Places are introduced during Module One: a game that involves adding and subtracting two digit numbers; an activity that allows for more practice measuring in centimeters; and a second activity in which students estimate, measure, and compare lengths of paper ant paths created by their classmates.

Planner

Session & Work Places	P&I	WP	A	HC
<p>Session 1 Introducing Work Place 7A Race to the Cookie Jar</p> <p>To open the new unit, which features double and triple-digit computation, metric measurement, and fractions, the teacher introduces Race to the Cookie Jar. In this game, students spin three multiples of 10, adding the first two and then subtracting the last, to determine how many moves toward the finish they can take. When students understand how to play the game, they take a unit pre-assessment and then go out to Work Places as they finish.</p> <p>Introducing Work Place 7A Race to the Cookie Jar</p> <p>To start, each player chooses one side of the game board and places a marker at 0. Players take turns spinning the first two spinners on a triple spinner, adding the two numbers, then spinning a third spinner and subtracting that number from the sum of the first two. The player then moves her marker that number of spaces on a game board numbered in multiples of 10. The first player to reach the cookie jar wins the game.</p>		●	●	●
<p>Session 2 How Long Is an Army Ant?</p> <p>The teacher introduces metric measure by discussing army ants with students and then comparing the length of an army ant to a centimeter. Students work to understand this new unit of length by comparing it to an inch and to common objects such as the width of a finger. After the teacher models the steps for creating a centimeter army ant ruler, students make their own army ant rulers and use them to find things in the classroom that are about 1 centimeter long, between 1 and 10 centimeters long, and about 10 centimeters long.</p>	●	●		
<p>Session 3 Estimate & Measure Centimeters</p> <p>To start the session, students number their army ant rulers so they are easier to read. Then they work in pairs to estimate and measure the length of various objects around the classroom. The teacher then reconvenes the class to discuss the work, and introduces a related Work Place, along with a special work station where students each create an ant path for use in the session after next.</p> <p>Introducing Work Place 7B Estimate & Measure Centimeters</p> <p>Students estimate and measure the lengths of different items around the room in centimeters, using their army ant rulers, regular rulers marked in centimeters, or tape measures marked in centimeters.</p>	●	●		●
<p>Session 4 One Hundred Army Ants and More</p> <p>Students combine some of their 10-centimeter rulers to form a meter, and identify objects in the classroom that are about 1 meter long. Then they work together to measure a distance of 14 meters in the hallway, the gym, or on the playground. Fourteen meters has special significance in the world of army ants, as students will discover. The session ends with students returning to Work Places and continuing to make their ant paths in pairs.</p>	●	●		
<p>Session 5 Ant Paths</p> <p>Students add more detail to their ant paths and work as a group to estimate, measure, and compare the lengths of two different paths. The teacher then introduces Work Place 7C Ant Paths, a partner activity similar to the one completed as a group, and sends students out to Work Places if time allows.</p> <p>Introducing Work Place 7C Ant Paths</p> <p>Partners select two Ant Paths, roll them out, and estimate the lengths of the paths. Then they work together to measure both paths and find the difference between the two lengths.</p>	●	●		●

P&I – Problems & Investigations, WP – Work Place, A – Assessment, HC – Home Connection

Materials Preparation

Each session includes a complete list of the materials you'll need to conduct the session, as well as notes about any preparation you'll need to do in advance. If you would like to prepare materials ahead of time for the entire module, you can use this to-do list.

Task	Done	
Copies	Run copies of Teacher Masters T1–T20 according to the instructions at the top of each master.	
	Run a single display copy of Student Book pages 89–90.	
	If students do not have their own Student Books, run a class set of Student Book pages 89–90.	
	If students do not have their own Home Connections books, run a class set of the assignments for this module using pages 151–156 in the Home Connections Book.	
	Make one copy of T3 (Unit 7 Pre-Assessment) sheet 2, and check it to make sure that Line Segment A measures exactly 6 cm and Segment B measures exactly 9 cm. If the measurements are off, set your copy machine to enlarge or reduce until the measurements are correct, and then run a class set. If you are printing from a digital file, make sure your print settings are set to 100% (no reduction or enlargement).	
	Make one copy of T12 (Army Ant Strips Teacher Master) and check it to make sure that each strip of army ants measures exactly 10 centimeters. If the measurements are off, set your copy machine to enlarge or reduce until the measurements are correct, and then run a quarter-class set of the sheets, plus an extra copy or two. Then cut the sheets into quarters to provide each student with one 10 cm strip of army ants.	
Work Place Preparation	Prepare the materials for Work Places 7A–7C using the lists of materials on the Work Place Guides (Teachers Masters T6, T13, T18).	
	Prepare students' Work Place folders, following the instructions at the beginning of Session 1, and store them in a box or tub.	
Paper Cutting	Cut poster board into 3 cm × 10 cm strips, one per student plus several extra.	
	Cut 1" × 10" strips of yellow construction paper (half-class set).	
	Cut 4" sections of cardboard tubing (class set plus a few extra).	
Special Items	If the rulers you have on hand are marked in both inches and centimeters, use masking tape to cover the inch side of each ruler temporarily.	
	Before Session 3, you'll need to gather enough cardboard tubes to give each student a 4" piece and have a few available as extras. You will also need several toilet paper and paper towel tubes in Unit 8, so hang on to any extras you might collect. In Unit 8 you'll also need long sturdy cardboard tubes such as those from fabric or furniture stores—1 per student. Gift wrap tubes will serve in a pinch.	



Additional Resources

Please see this module's Resources section of the Bridges Educator site for a collection of resources you can use with students to supplement your instruction.

Session 1

Introducing Work Place 7A

Race to the Cookie Jar

Summary

To open the new unit, which features double and triple-digit computation, metric measurement, and fractions, the teacher introduces Race to the Cookie Jar. In this game, students spin three multiples of 10, adding the first 2 and then subtracting the last, to determine how many moves toward the finish they can take. When students understand how to play the game, they take a unit pre-assessment, and then go out to Work Places as they finish. Finally, the teacher introduces and assigns the Different Ways to Look at the Same Number Home Connection.

Skills & Concepts

- Add and subtract with sums and minuends to 1000 (2.NBT.7)
- Mentally add or subtract 10 to or from any 3-digit number (2.NBT.8)
- Explain why strategies for adding and subtracting 2- and 3-digit numbers work, using place value and the properties of operations (2.NBT.9)
- Measure the length of an object in centimeters using a ruler (2.MD.1)
- Represent whole-number sums and differences on a number line (2.MD.6)
- Solve money story problems involving quarters, dimes, nickels, and pennies (2.MD.8)
- Partition circles and rectangles into two, three, or four equal shares, and describe the shares using the words halves, thirds, fourths, etc. (2.G.3)
- Construct viable arguments and critique the reasoning of others (2.MP.3)
- Look for and make use of structure (2.MP.7)

Materials

Copies	Kit Materials	Classroom Materials
Work Places Introducing Work Place 7A Race to the Cookie Jar		
TM T1 Units 7 & 8 Work Place Log TM T6 Work Place Guide 7A Race to the Cookie Jar TM T7 Work Place Instructions 7A Race to the Cookie Jar	<ul style="list-style-type: none"> • Race to the Cookie Jar Game Boards (1, but have the other 2 available to use for support suggestion) • Race to the Cookie Jar Spinner 	<ul style="list-style-type: none"> • student whiteboards, markers, and erasers or scratch paper and pencil (class set) • 2 kidney beans for game markers • students' Work Place pocket folders (see Preparation)
Assessment Unit 7 Pre-Assessment		
TM T2–T5 Unit 7 Pre-Assessment	<ul style="list-style-type: none"> • large base ten area pieces • plastic coins 	<ul style="list-style-type: none"> • rulers marked in centimeters (class set, see Preparation) • privacy screens (optional) • paper dollars (see Preparation)
Work Places in Use		
6A Last Shape in Wins (introduced in Unit 6, Module 1, Session 1) 6B Find the Area (introduced in Unit 6, Module 2, Session 4) 6C Make the Area (introduced in Unit 6, Module 2, Session 4) 6D Fill for Less (introduced in Unit 6, Module 3, Session 1) 6E Halves & Half-Nots (introduced in Unit 6, Module 3, Session 5) 7A Race to the Cookie Jar (introduced in this session)		
Home Connection		
HC 151–152 Different Ways to Look at the Same Number		

HC – Home Connection, **SB** – Student Book, **TM** – Teacher Master
Copy instructions are located at the top of each teacher master.

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

hundreds*
multiples
skip-counting
tens*

Preparation

Work Places

- In today's session, you'll introduce Work Place 7A Race to the Cookie Jar. Before this session, you should review the Work Place Guide and Work Place Instructions and assemble the bin for Work Place 7A (which replaces Work Place 5E, Jump-a-Hundred), using the materials listed. The work Place Guide also includes suggestions for differentiating the activity to meet students' needs.
- Remove the Unit 5 Work Place Log from the front of each student's Work Place pocket folder, and move the Unit 6 Work Place Log from the back to the front of each folder. Then staple a copy of the Units 7 & 8 Work Place Log at all four corners to the back of each student's Work Place pocket folder. This will allow students to keep track of the number of times they have visited the Unit 6 Work Places that will remain in use during Unit 7, and also track their progress through the new Work Places as they're introduced in Units 7 and 8. Units 7 and 8 have a combined Work Place Log because there are only two new Work Places introduced in Unit 8.

Unit 7 Pre-Assessment

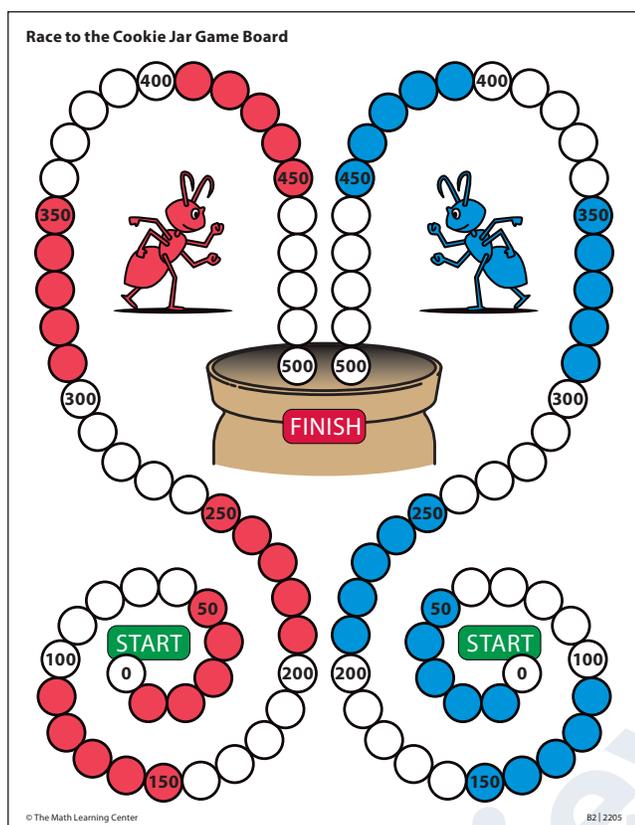
- Make one copy of the Unit 7 Pre-Assessment Teacher Master, sheet 2, and check it to make sure that Line Segment A measures exactly 6 centimeters and Segment B measures exactly 9 centimeters. If the measurements are off, set your copy machine to enlarge or reduce until the measurements are correct, and then run a class set.
- Make sure you have a ruler for each student to use during the pre-assessment. If the rulers you have on hand are marked in both inches and centimeters, use masking tape to cover the inch side of each ruler temporarily.
- Students should also have access to large base ten area pieces and plastic coins/paper dollars (you can photocopy paper dollars from TM T9 in Module 3 of this unit or use those from Work Place 5D). Consider preparing a basket or other container with these materials for each table or cluster of desks. If you do prepare these containers, keep them for use in Modules 3 and 4.



Work Places

Introducing Work Place 7A Race to the Cookie Jar

- 1 Open the session by explaining that you are starting a new unit of study about adding and subtracting large numbers, measuring length in metric units, and working with fractions.
Let students know that in the process of developing their skills in these areas, they will also learn more about ants, who play a major role in Unit 7.
- 2 Then briefly describe the day's activities.
 - First, you are going to teach students how to play a new addition and subtraction Work Place game called Race to the Cookie Jar.
 - Then they will take a unit pre-assessment, where they'll have a chance to show you some of the things they know about 2- and 3-digit addition and subtraction, metric measurement, and fractions.
 - They will go to Work Places, including the new one, as they finish the assessment.
- 3 Display the Race to the Cookie Jar Game Board and invite students to make observations about the board.
 - Use the discussion to bring out the idea that each space stands for ten units and every 5 spaces, or 50 units, are grouped together by color.



The game board may look familiar to students as it is a variation on the game boards for the Steps & Leaps and Star Power Work Places. It is essentially a number line where each space stands for 10 instead of 1, and where only the multiples of 50 have been marked.

Students This board reminds me of that Star Power game. It has bigger numbers, though. It goes all the way to 500. Some of the spaces don't have numbers. Do you think there are really 500 spaces on the board?

Teacher Take a look at the first spaces with numbers. What do you notice?

Students It starts at 0 and goes to 50. I know there aren't 50 spaces there. I only see 5. They must be counting by 10s.

Teacher Can you show everyone what you mean?

Student (Comes to display and counts the first group of 5 spaces by 10s.) See? It starts at 0, and then it goes 10, 20, 30, 40, 50.

Teacher OK. What else do you notice? Is there anything special about this group of 50?

Students They are all the same color. Yeah, and the next 50 are white, and then the next 50 are colored. It's a pattern!

SUPPORT Have students practice counting by 10s forward and backward from 0 to 500 a few times before moving on. Students will need to have a good understanding of skip-counting by 10s to enjoy the game.

- 4 Ask students to think about where they would find 370 on the game board and then pair-share their ideas.
 - Invite a student volunteer to explain where to find the number.

- Then repeat this exercise using several other 3-digit numbers.

If students need a little help getting started, try asking students to start at a space that is marked and is close to 370, such as 350 or 400.

Teacher The number 370 isn't on the board. Is there a number close to 370?

Students Well, 300 is close.

And 350 is even closer. We could start there.

Would it matter where we start?

Teacher What do you think?

Students No, you can get there from anywhere. Even from zero!

You would just count more spaces if you didn't start closer.

Teacher So let's say you start at 350. How would you find 370?

Student A Just count by 10s. (Comes to display and points to spaces as she counts.) Here's 350, then 360, then 370.

Student B Could you start at 400 and count back?

Teacher Sure! Come show us.

Student C (Comes to the display and points to spaces as he counts).

Start at 400, then 390, then 380, then 370.

SUPPORT Ask students to first find a number on the game board that is less than 100. Some students will need to start at 0 and count up by 10s until they are comfortable with the game board. By starting with a smaller number, students will have a chance to gain that familiarity.

CHALLENGE Ask students to find a number that is not on the board, such as 243. Have students explain why the number would not be found on this board and give examples of other numbers between 0 and 500 that would not be found.

- Next, put a game marker on 230 and ask students where the marker would be on the board if you moved forward 100 units (or 10 spaces).
 - Have students pair-share their ideas and then invite a student volunteer to show her work.
 - Repeat this exercise using different starting points and moves forward, including a move of 50 and a move that is neither 50 nor 100.

While many students will insist on moving around the board by counting every step by 10, it is important to engage them in thinking about making larger moves of 50 and 100. Students should discover that moves of 100 will result in the game marker landing on a space of the same color and the same distance from a numbered space. Moves of 50 also result in being the same distance from a numbered space, but the resulting space will be a different color.

- Now briefly summarize the game before playing against the class. To start, each player chooses one side of the game board and places a marker at 0. Players take turns spinning the first two spinners on a triple spinner, adding the two numbers, then spinning a third spinner and subtracting that number from the sum of the first two. The player then moves her marker that number of spaces on a game board numbered in multiples of 10. The first player to reach the cookie jar wins the game.
- Then play the game using the Work Place Instructions 7A Race to the Cookie Jar Teacher Master as needed.
 - Have a student volunteer pass out whiteboards and pens or pencils and paper and tell students they will use these to help with the calculations.
 - Call on different students to come up to spin and move for the class.

- Play the game all the way through with the class if necessary. Chances are, most students will understand how to play without going through the entire game, however.
- While taking turns with the class:
 - » Record an equation to represent your three spins, and share your strategies for solving the equation, each time it's your turn.
 - » Ask students to work independently or in pairs to record the equation on their whiteboards or paper and find the answer each time one of them takes a turn for the class. Walk around and look for examples of different strategies as students work. Call on students who demonstrate particularly interesting or efficient strategies to share with the class.

Teacher Our last spin was 80, 50, and 80. I noticed that many of you wrote the equation $80 + 50$ on your boards, solved it, then wrote $130 - 80$ and solved that equation. But I also noticed a few of you seemed to get the answer without going through those steps. Can you explain how you got your answer so quickly?

Student It's kind of hard since I did it in my head, but if you start with 80, add 50 and then subtract 80, you'll end up with just 50. It's like the 80s disappear.

Students I don't get it.
Are you sure that really works?

Teacher Let's try it out together to find out. Here's an open number line. If we want to add $80 + 50$, where should we start?

Students You have to start at 0 and go 80, and then 50 more.
I disagree. I get what you're saying, but I think we can just put a mark on the line and call it 80. Then we can add on 50 more.

Teacher Let's give that a try and see what happens. I'll make a mark on the line and label it 80. I want to give myself plenty of room to work, so I'll put it near the middle of the line.

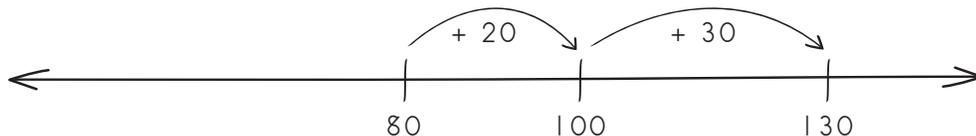


Teacher Who has a suggestion for how to add 50?

Student You only need 20 to get to 100, so I would break up the 50 into 20 and 30.

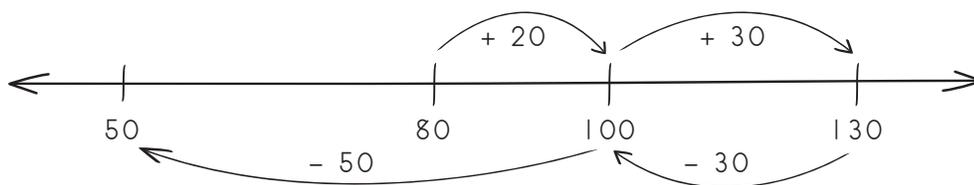
Teacher Can you show us?

Student (Comes to display and adds to the open number line.) We are at 130.



Teacher Now we need to go back 80. What should we do?

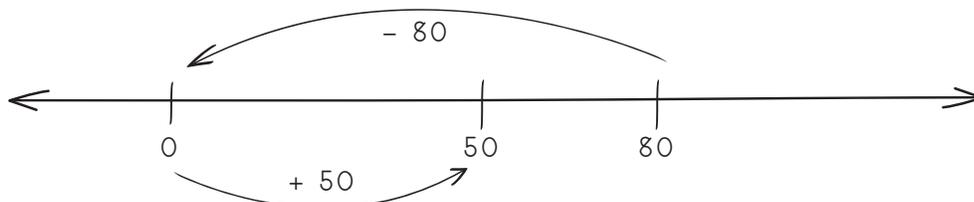
Student If we go back 30 first, we get to 100. Then you can just jump back 50. We'll be at 50.



Teacher That's what we thought we would get. Is this what you had in mind? How could you show your thinking on the open number line?

Student A Well, you know you're going to start at 80 and take 80 away, right? So you can just start at 0 and add 50.

Student B Oh! So then you only have to jump 50 to get there. Like this.



Students That is a lot faster.
It's faster, but I wouldn't think of it.

Teacher That's OK. Both ways we got the same answer. One way is just a little faster than the other. You do it the way that works for you.

While most students will not be ready to think about integer work formally, this type of exploration with addition and subtraction of numbers will help to build a foundation. If similar ideas come up, take the time to model them on an open number line to help all students visualize what is happening.

- 8 Then ask students to figure out where a player will land given the following scenario: A player is on 320. He spins a 70 and a 60 and his last spin is a 50. How far will the player move and where will he land?

- Have each student use a whiteboard or paper to determine where the player will land:
- Select one or two students to share their work.

SUPPORT Have all three of your Race to the Cookie Jar Game Boards available for pairs or small groups of students to use as they think about the moves to make. Encourage these students to move forward 70 from 320, then forward 60 more, and finally back 50 to find the answers.

- 9 End this part of the session by making sure all students know how to play the game.

- Ask students if they have any questions about the game.
- Then have students turn to a partner to summarize the directions.

Note

The Grade 2 Assessment Guide includes a Work Places Differentiation Chart for each unit. If you like, you can use these charts to make notes about which students need support or challenge with the skills featured in each Work Place.



Assessment

Unit 7 Pre-Assessment

- 10 Take a brief stretch, and have students return to their tables or desks to take the Unit 7 Pre-Assessment. Briefly review what a pre-assessment is and describe how you'd like students to work on the pre-assessment they will complete today.

Hand out privacy screens, or seat students in such a way that they can do their own work. Remind students that a pre-assessment is a way for them to see what they will be learning in the next month or so. It is also a tool that helps you do a better job of teaching, because students' responses to the problems on the pre-assessment will help you learn about what they already know and what they still need to learn. For these reasons, there will be some problems on the pre-assessment that they will probably not be sure how to solve, and that's all right.

Explain that you would like students to do the following thing as they work on the pre-assessment:

- Work independently.
 - Raise your hand if you have a question, or need me to read an item on the assessment to you again.
 - Try to answer all the problems, even those you don't fully understand.
 - Explain how they solved a problem when the directions ask you to. You can use pictures, numbers, and words in your explanations.
- 11 Explain that the upcoming module is all about measuring length in centimeters and meters, and one of the tools students will use in many of the sessions, as well as today's pre-assessment is a ruler marked in centimeters.
- Share the rulers you have prepared for students to use today during the Pre-Assessment. Explain that rulers are often marked in two different units—inches and centimeters. Today, they will need to use the side of the ruler that is marked in centimeters.
 - Show students how you have covered the inch side of each ruler with masking tape to prevent them from getting confused during the assessment.
- 12 Use the display copy of the Unit 7 Pre-Assessment to review the pre-assessment with the class.
- Display your copy of the pre-assessment and give each student a copy.
 - Have helpers place a container with base ten area pieces and plastic coins/paper dollars at each table or cluster of desks. Have students get out their pencils and rulers, and explain that these are all tools they'll need to complete the assessment.
 - Read each problem out loud, and clarify as needed.
 - Here are some things to be aware of as you review each of the problems with the class:
 - » In order to complete item 6a, they need to measure each line (not including the tiny segments at either end) in centimeters, and write the measurement in the space provided.
 - » Students have some control over the level of difficulty in problem 7. They can choose any of the three children and any two of the toys in the collection because any and all combinations will work.
 - » In problem 7, students are expected to find the total amount owed for the two toys, and also the amount of change the child they selected will get back.

- » Let students know that they need to use a strategy more sophisticated than counting by 1s, or counting on or backward to solve problems 8 and 9. They can model and solve these problems on an open number line, or by using and then making labeled sketches of base ten area pieces, or by using an algorithm they have invented or learned.

- 13 Invite students to spend the rest of the period working on the pre-assessment and let them know that they can go to Work Places and work quietly if they finish early.
- While students work independently, circulate to observe how they work, and answer questions as needed. You might want to make note of students who appear to be having difficulty with one or more of the different types of problems on the assessment, so you can provide more targeted support as you teach the sessions in this unit.
 - If some students aren't able to complete the pre-assessment during this session, give them additional time tomorrow during seatwork or Work Places. None of the items on the assessment are intended to be timed.

Note

See the Grade 2 Assessment Guide for scoring and intervention suggestions.



Work Places

- 14 As students finish the assessment, have them turn in their papers, get their Work Place folders, and choose a Work Place to use quietly.
- 15 Close the session.
- 16 Have students clean up and put away the Work Place bins.
- 17 Take a few minutes to discuss the Unit 7 Pre-Assessment. Invite volunteers to talk about some problems that seemed easy to them, as well as some that seemed challenging or downright difficult right now.
- 18 Remind students that they will take a post-assessment again in a few weeks, and when they do, the kinds of problems that seemed hard today may seem easier.



Home Connection

- 19 Introduce and assign the Different Ways to Look at the Same Number Home Connection, which provides more practice with the following skills:
- Demonstrate an understanding that the digits in a 3-digit number represent amounts of hundreds, tens, and ones (2.NBT.1)
 - Demonstrate an understanding that 100 can be thought of as a bundle or group of 10 tens, called a hundred (2.NBT.1a)
 - Demonstrate an understanding that multiples of 100 from 100 to 900 refer to some number of hundreds and 0 tens and 0 ones (2.NBT.1b)
 - Write numbers to 1000 represented in expanded form (2.NBT.3)

Session 2

How Long Is an Army Ant?

Summary

The teacher introduces metric measure by discussing army ants with students and then comparing the length of an army ant to a centimeter. Students work to understand this new unit of length by comparing it to an inch and to common objects such as the width of a finger. After the teacher models the steps for creating a centimeter army ant ruler, students make their own army ant rulers and use them to find things in the classroom that are about 1 centimeter long, between 1 and 10 centimeters long, and about 10 centimeters long.

Skills & Concepts

- Measure the length of an object in centimeters using a ruler (2.MD.1)
- Estimate length in centimeters (2.MD.3)
- Measure length to the nearest whole unit in centimeters (supports 2.MD)
- Use appropriate tools strategically (2.MP.5)
- Attend to precision (2.MP.6)

Materials

Copies	Kit Materials	Classroom Materials
Problems & Investigations How Long Is an Army Ant?		
TM T8–T11 Army Ants TM T12 Army Ant Strips SB 90* Army Ant Ruler Record Sheet		<ul style="list-style-type: none"> • poster board (see Preparation) • glue sticks (class set) • scissors (class set) • blue and red crayons or colored pencils (class set) • book or video about army ants (optional) • 1 ruler marked in cm (class set optional)
Work Places in Use		
6A Last Shape in Wins (introduced in Unit 6, Module 1, Session 1) 6B Find the Area (introduced in Unit 6, Module 2, Session 4) 6C Make the Area (introduced in Unit 6, Module 2, Session 4) 6D Fill for Less (introduced in Unit 6, Module 3, Session 1) 6E Halves & Half-Notes (introduced in Unit 6, Module 3, Session 5) 7A Race to the Cookie Jar (introduced in Unit 7, Module 1, Session 1)		

HC – Home Connection, **SB** – Student Book, **TM** – Teacher Master
Copy instructions are located at the top of each teacher master.

*Run 1 copy of this page for display.

Preparation

- Cut poster board into 3 cm × 10 cm strips, one per student plus several extra.
- Make one copy of the Army Ant Strips Teacher Master and check it to make sure that each strip of army ants measures exactly 10 cm. If the measurements are off, set your copy machine to enlarge or reduce until the measurements are correct, and then run a quarter-class set of the sheets, plus an extra copy or two. Then cut the sheets into quarters to provide each student with one 10 cm strip of army ants.
- Mount the Army Ants Teacher Masters on construction paper or butcher paper for display, or simply hang the four sheets on the board near your discussion area.

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

centimeter (cm)*
length*
measure

Problems & Investigations

How Long Is an Army Ant?

- 1 Invite students to the discussion circle and explain that in the next few sessions they will think about army ants and use the length of an ant as a way to measure things.

- Ask them to share anything they already know about army ants.

If you have access to a book or short video about army ants, share at least some of it with the students right now.

- 2 Read (or sing) *Army Ants* to your class, and then ask students to read or sing it with you.

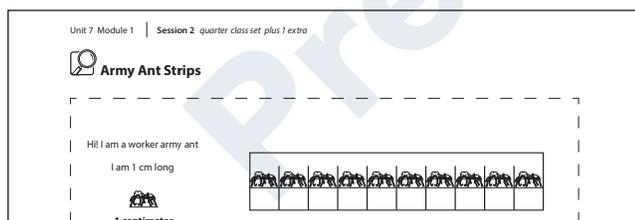
CHALLENGE The term *bivouacs* may be new to many students. Invite interested students to research the term and share its meaning with the class.

- 3 Help students make connections by asking them to think about the ants they've seen and to estimate their lengths.

If students need help getting this conversation started, ask them how the length of an ant compares to an inch. Is it larger or smaller? Ask students to use their fingers to show the approximate length of an ant.

Because most students are not as familiar with metric measures, it is important to relate the length of the ant to a common measure or object. This simple work will help to anchor in the students' minds the length of a centimeter.

- 4 Then provide each student with an Army Ant Strip. Give them a minute to examine the strip and pair-share their comments and observations before inviting a few students to share with the class.



Students should note that there are ten ants on the ruler.

- 5 Continue making connections between less familiar metric measures and more familiar customary measurement units by asking students to think about how a centimeter compares with an inch.

- Ask students to think of other common items that are about a centimeter long.
- Some questions that may help in this regard include:
 - » Is a centimeter longer or shorter than an inch?
 - » How does the width of your little finger compare with a centimeter?
 - » Can they think of other things that are about a centimeter long?
 - » How many centimeters long is the row of ants? How do you know?

- 6 Show students a ruler marked with both inches and centimeters and explain the differences between customary and metric units of length. Then tell students that they will be making their own centimeter rulers with a little help from the army ants.

About This Session

Worker army ants vary in size, generally measuring from 8 to 12 millimeters in length. For the purposes of this exercise, worker army ants will be treated as measuring 10 millimeters, or 1 centimeter.



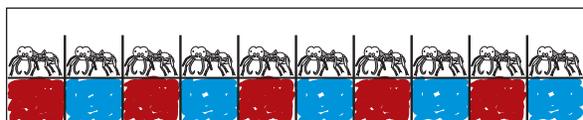
Math Practices in Action 2.MP.5

One aspect of using appropriate tools strategically is selecting the most appropriate unit for measuring a particular object. By relating a centimeter to familiar objects, you are helping students develop referents for this unit of measure, which will help them make reasonable estimates in the future and decide when it makes the best sense to measure in centimeters.

Explain that in the United States, we often measure length in inches, but scientists, engineers, and people in other countries around the world measure length in centimeters instead. You may wish to give each student a ruler during this part of the session and allow students to pair-share any observations they have about the differences between the centimeter and inch sides of the ruler.

7 Model how to create an army ant centimeter ruler.

- Color the sections below the ants on one Army Ant Strip in a pattern of alternating red and blue.
- Cut out the strip.
- Glue the strip to a pre-cut piece of poster board.
- Label the back of the ruler with your name and “10 centimeters.”



Front



Back

8 Then give each student a strip of poster board and have them return to their seats to make rulers.

Students will also need their Army Ant Strips, scissors, blue and red crayons or colored pencils, and glue or glue sticks.

ELL Have completed examples of rulers available for students to use as a model while working.

9 As a few of the students finish their rulers, reconvene the class. Display the Army Ant Ruler Record Sheet Student Book page.

- Read the sheet with the class and explain the tasks as needed.

10 Then have students complete their rulers, and work in pairs to complete the Army Any Ruler Record Sheet.

Let students know that even though they'll be working in pairs, they are each responsible for completing the sheet in their own Student Book.

SUPPORT Give students more time during the day to complete the sheet. If you have student take the sheet home to complete, be sure they bring their army ant rulers back with them. They will need the rulers for the next few sessions.



Work Places

11 Invite students to spend the rest of the session doing Work Places.

12 Close the session.

- Have students clean up and put away the Work Place bins.
- Collect students' ant rulers or have them put their rulers away somewhere safe for use over the next few sessions.
- Measure the length of an object in the room, such as the length of a desk, in inches. Ask students if they think the number of centimeters needed to measure the same length would be more or less and why.

Extension

Have students find the continents presented in the Army Ants song on a world map. Challenge them to find the Amazon River.

Preview

Session 3

Estimate & Measure Centimeters

Summary

To start the session, students number their army ant rulers so they are easier to read. Then they work in pairs to estimate and measure the length of various objects around the classroom. The teacher then reconvenes the class to discuss the work, and introduces a related Work Place, along with a special work station where students each create an ant path for use in the session after next. Finally, the teacher introduces and assigns the Ants & Hotdogs Home Connection.

Skills & Concepts

- Measure the length of an object in centimeters using a ruler (2.MD.1)
- Estimate length in centimeters (2.MD.3)
- Measure length to the nearest whole unit in metric units (supports 2.MD)
- Use appropriate tools strategically (2.MP.5)
- Attend to precision (2.MP.6)

Materials

Copies	Kit Materials	Classroom Materials
Problems & Investigations Estimate & Measure Centimeters		
SB 91* Estimate & Measure Centimeters	<ul style="list-style-type: none"> • adding machine tape (1 roll) 	<ul style="list-style-type: none"> • students' army ant rulers from the previous session • 1" × 10" strips of yellow construction paper (half-class set) • masking tape (see Preparation) • 4" sections of cardboard tubing (class set plus a few extra, see Preparation) • clear adhesive tape (1 roll) • paperclips (1 per student) • 2 baskets or other containers (see Preparation) • list of student names (see Preparation)
Work Places Introducing Work Place 7B Estimate & Measure Centimeters		
TM T13 Work Place Guide 7B Estimate & Measure Centimeters TM T14 Work Place Instructions 7B Estimate & Measure Centimeters TM T15–T16 7B Estimate & Measure Centimeters Record Sheet	<ul style="list-style-type: none"> • measuring tape (optional) 	<ul style="list-style-type: none"> • army ant ruler (borrow one from a student)
Work Places in Use		
6B Find the Area (introduced in Unit 6, Module 2, Session 4) 6C Make the Area (introduced in Unit 6, Module 2, Session 4) 6D Fill for Less (introduced in Unit 6, Module 3, Session 1) 6E Halves & Half-Notes (introduced in Unit 6, Module 3, Session 5) 7A Race to the Cookie Jar (introduced in Unit 7, Module 1, Session 1) 7B Estimate & Measure Centimeters (introduced in this session)		
Home Connection		
HC 153–154 Ants & Hotdogs		

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

centimeter (cm)*
estimate*
length*
measure
ruler

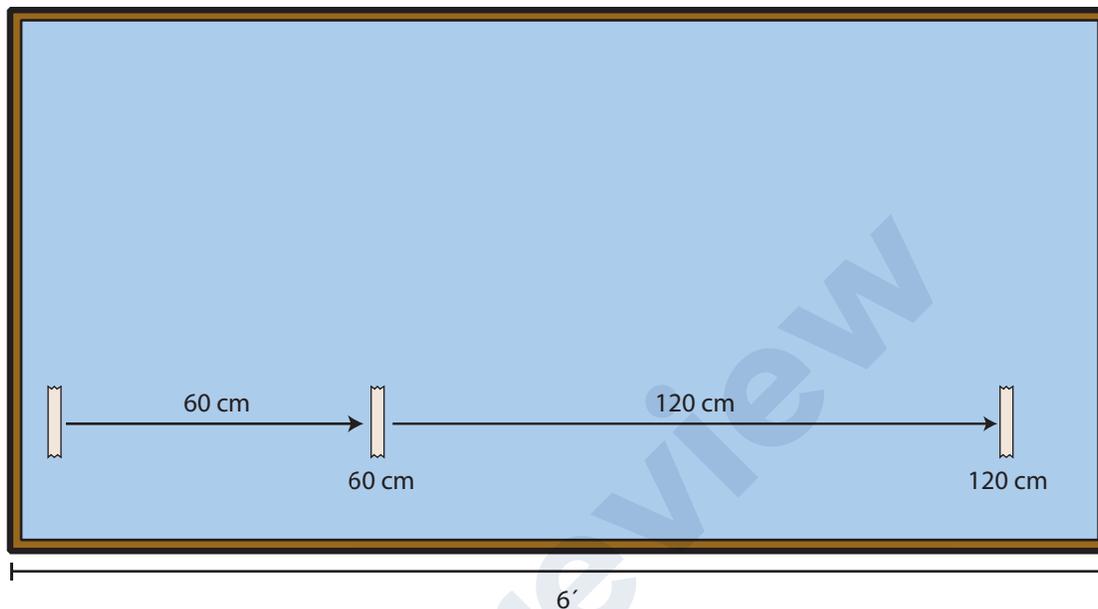
HC – Home Connection, SB – Student Book, TM – Teacher Master
Copy instructions are located at the top of each teacher master.

*Run 1 copy of this page for display.

Preparation

Ant Path Work Station

- Identify a table (or a floor area if necessary) that is out of the way and at least 6 feet long.
- Place a basket of 4-inch long cardboard tubes (one per student), a roll of clear adhesive tape, a box of paperclips, a roll of adding machine tape, a pair of scissors, and another basket or container for storing the finished ant paths on the work table.
- Set up a cutting guide for students by marking the table or floor area with three strips of masking tape as shown here. Affix a 3-inch length of masking tape to the far left side of the table. Affix a second strip of masking tape 60 centimeters away from the first strip. Affix a third strip of masking tape 120 centimeters away from the second strip (or a total of 180 centimeters away from the first strip).



- Post a list of student pairs near the Ant Path Work Station.

Note

In addition to doing Work Place activities during the latter part of today's session, students will begin taking turns creating paper ant paths for use in a Work Place you will introduce during the session after next. To facilitate this, you will need an area where students can work in pairs to each cut a length of adding machine tape and tape it to a 4-inch section of cardboard tubing (e.g., a toilet paper tube, a third of a paper towel tube, or a 4-inch section of a gift-wrap tube), so that it can be neatly rolled up and paperclipped in place for storage.

Work Places

In today's session, you'll introduce Work Place 7B Estimate & Measure Centimeters. Before this session, you should review the Work Place Guide and Work Place Instructions and assemble the bin for Work Place 7B (which replaces Work Place 6A Last Shape in Wins), using the materials listed. The Work Place Guide also includes suggestions for differentiating the activity to meet students' needs.



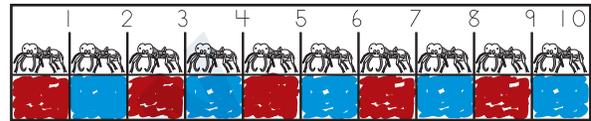
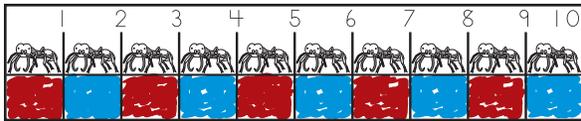
Problems & Investigations

Estimate & Measure Centimeters

- 1 Start the session by explaining that today students will use their army ant rulers to do more measuring.

- Give students their army ant rulers.
- Then ask them to label their rulers by writing numbers on them so that their measuring job is easier.

Watch to see which students simply write a number above each ant, and which students number the tic-mark *after* each ant. It doesn't really matter which way the rulers are numbered for the activities in this module, but students who number the tic-marks rather than the ants are demonstrating an important understanding about measurement, which is that each unit of measure spans the distance from the start to the end of the ant. The difference between the two different numbering methods is subtle but reflects an understanding (or lack of understanding) about one of the big ideas in length measurement.

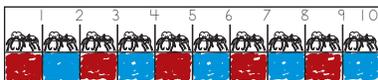


- 2 Ask students to bring their numbered rulers to the discussion circle and share their numbering method with the person next to them.

- Then invite a few students, including at least one (even if it's you) who numbered the tic-marks instead of the ants, to share their thinking with the class about how to number the ruler.

Encourage discussion and debate about the placement of the numbers, even if you're the only one to number the tic-marks instead of the ants. Press the issue by asking students to inspect some of the commercially manufactured rulers in the classroom. Why are rulers consistently numbered at the *end* of each unit instead of in the middle of the space between one unit and the next? How have the people who made these rulers handled the problem of how to squeeze the last number onto the ruler?

- 3 Next, borrow a ruler from one of the students and set it in the middle of the circle with one of the yellow construction paper strips alongside it. Ask students to compare the two items and discuss ways to measure the yellow strip using just a single army ant ruler.



Students The yellow paper is way longer!
 It looks like it would take about three of our rulers to fit on that paper.
 Yeah! Let's just put some of our rulers together!
 But we can only use one ruler.
 We need a longer ruler to measure that paper.
 You could just move the ruler ahead until you get to the end of the yellow paper.

- 4 Have students practice using some of their measurement ideas by giving pairs of students a strip of yellow paper and asking them to use just one of their rulers to measure the strip.

If some students want to mark the strip to show where to place the ruler each time they move it, encourage them to do so. They should find that the strips you've given them measure between 25 and 26 centimeters.

- Then ask them to share their results.
- Use this time to discuss issues of accuracy in measurement and how to handle situations where a measurement falls between two units.
- Ask questions such as:
 - » Did you all get the same answer? Why or why not?
 - » What do you need to do to measure something longer than your ruler with accuracy? How can you keep track of how many times you have moved the ruler, and how many centimeters you've measured so far?
 - » What if the length of the object doesn't land exactly at the end of a centimeter space? (Encourage your students to measure to the nearest whole centimeter, but don't hesitate to show them how to record $\frac{1}{2}$ " if some want to be more precise.)

- 5 Have students return to their seats with their rulers. Display a copy of the Estimate & Check Centimeters Student Book page, and have students find the corresponding sheet in their Student Books.

- Review the sheet with the class.
- Borrow an army ant ruler from one of the students, and model for the class how to do the first task on the sheet by estimating and measuring an eraser in centimeters.
- Ask each student pair to do the same with one of their two erasers (have them choose the longer of the two).
- Take a minute to survey students quickly. Did they all get the same results? Why or why not? Do their results fall within a certain range, say between 2 and 6 centimeters? Why would that be?

- 6 When students understand what to do, have them go to work in pairs to complete the assignment.

Let students know that even though they're working in pairs, they are each responsible for completing the page in their own student book.

- 7 As the first few pairs of students complete the assignment, call them back to the discussion circle to review results.

- Ask students to explain their strategies for estimating and measuring.
- Assure students that they will have time to finish the assignment before the session ends.



Math Practices in Action 2.MP.6

This activity helps students attend to precision in handling their measuring devices and taking final measurements. This is, of course, an important part of learning to take measurements, and it also draws upon students' computation skills and nascent understandings about fractions.

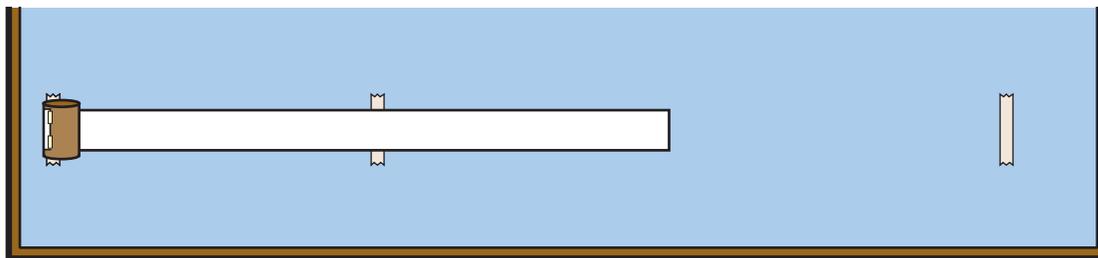


Work Places

Introducing Work Place 7B Estimate & Measure Centimeters

- 8 While students are in the discussion circle, introduce Work Place 7B Estimate & Measure Centimeters.
- Display a copy of the 7B Estimate & Measure Centimeters Record Sheet Teacher Master.
 - Explain that this Work Place will give them more practice at estimating and measuring length in centimeters.
- 9 Briefly summarize the activity.
- Students estimate and measure the lengths of different items around the room in centimeters, using their army ant rulers, regular rulers marked in centimeters, or tape measures marked in centimeters.
- 10 Note with students that the 7B Estimate & Measure Centimeters Record Sheet is double-sided. The first side of the sheet mostly specifies items for them to measure, while on the second side, they choose all of their own objects.
- Since students are not likely to complete both sides of the record sheet within one or even two Work Place periods, this is a good time to review the fact that unfinished sheets should always be stored in students' Work Place folders on the unfinished side to be completed when they next return to Work Places.
- 11 Before sending students out to Work Places or back to their seats to complete the assignment in their Student Books, explain that while they are at Work Places today and tomorrow, they will also take turns cutting strips of paper that will be used in a future Work Place.
- Show students the area you have set up for making ant paths and tell them the strips of paper they cut and attach to cardboard rolls will represent different paths of army ants.
- 12 Model how to make an ant path.
- Ask a volunteer to help you place one of the rolls of adding machine tape on the first mark on the cutting table, and unroll it to a length that falls somewhere between the second and third marks on the table.
 - Cut the adding machine tape and tell students that it doesn't matter how long a strip is as long as it stretches farther than the second mark but ends before the third mark.

Because students will be comparing the lengths of their ant paths in the upcoming Work Place, it is important to have a wide variety of lengths. Challenge student pairs to cut lengths that are very different from one another, and let them know that in this activity, longer is not better. The important thing is to cut a length somewhere between the second and third piece of tape on the table, and to make sure that it's different from the length their partner has cut.



- 13 After you have cut a length of tape as described in step 12, show students how to attach the strip to a cardboard tube and secure it for storage.
- Tape one end of the strip to a cardboard tube.
 - Carefully roll the paper up.
 - Secure the rolled-up strip to the cardboard tube with a paperclip.
 - Write your name on the cardboard tube.
 - Place it in the empty basket on the table for storage.
- 14 Show students the list you have posted in the work area and explain they will come to the table in pairs as listed. When a pair is finished preparing their ant paths, they should find the next pair on the list and call them to the table. Make sure students understand that while they are working in pairs, each student will need to make an ant path.
- 15 When students understand what to do, send the first pair on the list to the work area to make their ant paths, and send the rest of the students back to their tables to finish their assignment. If they're finished already, give them their folders and send them to Work Places.
- 16 Close the session.
- Have students clean up and put away their materials.
 - Check to see that all completed ant paths are neatly stored and that the materials are in place for the next pair on the list next session.

Note

Students will need their army ant rulers for the next few activities. They can take their rulers home after that, but you may also choose to laminate the rulers and have students keep them at school for use throughout the year.

**Home Connection**

- 17 Introduce and assign the Ants & Hotdogs Home Connection, which provides more practice with the following skills:
- Compare pairs of 3-digit numbers and use $>$, $=$, and $<$ symbols to record comparisons (2.NBT.4)
 - Order numbers from 0–1,000 (supports 2.NBT)
 - Add with sums to 1000 (2.NBT.7)
 - Measure the length of an object in centimeters using a ruler (2.MD.1)
 - Read and write numbers to 1000 represented with numerals (2.NBT.3)
- 18 When you review the first page of the homework assignment with the class, note with students that they will need a ruler marked with centimeters to measure the ants' paths. Arrange for students who don't have a ruler at home to borrow one and bring it back to school when they return the assignment.

Session 4

One Hundred Army Ants & More

Summary

Students combine some of their 10-centimeter rulers to form a meter, and identify objects in the classroom that are about 1 meter long. Then they work together to measure a distance of 14 meters in the hallway, the gym, or on the playground. Fourteen meters has special significance in the world of army ants, as students will discover. The session ends with students returning to Work Places and continuing to make their ant paths in pairs.

Skills & Concepts

- Measure the length of an object in centimeters using a ruler (2.MD.1)
- Measure the length of an object in meters using a meter stick (2.MD.1)
- Estimate length in meters (2.MD.3)
- Measure length to the nearest whole unit in meters (supports 2.MD)
- Use appropriate tools strategically (2.MP.5)
- Attend to precision (2.MP.6)

Materials

Copies	Kit Materials	Classroom Materials
Problems & Investigations One Hundred Army Ants & More		
TM T17 Army Ant Raids		<ul style="list-style-type: none"> • student-made army ant rulers (see Preparation) • 1 or more meter sticks • blue masking tape or a piece of chalk • drawing paper, one sheet per student (optional) • crayons, felt markers, pencils (optional) • book or video about army ants (optional)
Work Places in Use		
6B Find the Area (introduced in Unit 6, Module 2, Session 4) 6C Make the Area (introduced in Unit 6, Module 2, Session 4) 6D Fill for Less (introduced in Unit 6, Module 3, Session 1) 6E Halves & Half-Notches (introduced in Unit 6, Module 3, Session 5) 7A Race to the Cookie Jar (introduced in Unit 7, Module 1, Session 1) 7B Estimate & Measure Centimeters (introduced in Unit 7, Module 1, Session 3)		

HC – Home Connection, **SB** – Student Book, **TM** – Teacher Master

Copy instructions are located at the top of each teacher master.

Preparation

- Borrow 12–15 army ant rulers from students before this session. Place these rulers and a meter stick where they'll be easily accessible in the discussion circle.
- You will need room for students to measure a length of 14 meters during this session. You may want to reserve the gym or the cafeteria for this purpose, or plan to take students outside.

Note

Students will continue to work in pairs to make the ant paths they will need for Session 5. Before sending students to Work Places, remind them what is expected of them and call the next pair on the list to the table to work. Remind students that they should get the next pair on the list when they finish their work.

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

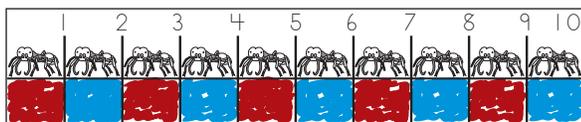
centimeter (cm)*
 estimate*
 length*
 measure
 meter (m)*



Problems & Investigations

One Hundred Army Ants & More

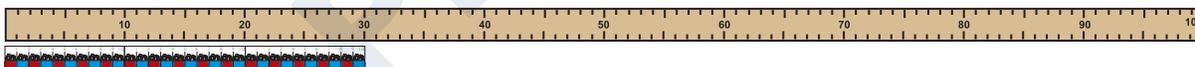
- 1 Invite students to the discussion circle and set out one of the army ant rulers you borrowed. Ask students to share what they have learned so far about this measuring tool.



Students There are 10 army ants on it in a line.
They have really weird heads.
Every army ant is 1 centimeter.
My crayon was almost as long as the little ruler.
It's 10 centimeters long.
Centimeters are really little. They're shorter than inches.

- 2 Then explain that today the class will learn about a new tool and a new unit of measure that will help them measure longer lengths and distances.
 - Show students a meter stick and explain that the measuring tool is called a meter stick because it is exactly 1 meter long.
 - Tell students that just as inches, feet, and yards are related, a meter is related to a centimeter.
- 3 Set the meter stick in the middle of circle beside the 10-centimeter ant ruler and ask students to estimate the number of centimeters in the meter stick.
 - Record students' estimates on the board.

If students feel that a single ant ruler doesn't give them enough information to make a good estimate, lay a second, and even a third ant ruler down end-to-end with the first.



SUPPORT You may wish to begin by asking students to estimate how many rulers it would take to measure the stick. Then work with students to count by tens using these estimates to get an estimate of the number of centimeters.

- 4 Then ask a volunteer to carefully lay army ant rulers end-to-end down the entire length of the meter stick as the other students watch and count.
 - Ask students to share anything they know about the length of a meter now.

Students A meter is the same as 10 of our little rulers.
That's 100 ants, all lined up in one long line.
A meter is 100 centimeters!
It's 10 tens. That's 100.

- 5 Challenge students to find things in the room that are about a meter long and write their suggestions on the board.
 - Send volunteers out to measure several of the suggested items with a meter stick and circle any items on the board that are indeed quite close to a meter long.

CHALLENGE You may choose to stop measuring before the end of the list, and invite students to measure the additional items on their own over the next few days. Students can list the lengths of the items in exact centimeters as well as indicate if the lengths are close to a meter or not.

- 6 Next, display the Army Ant Raids Teacher Master and read it to your students. Ask students to imagine a wave of ants 14 meters across and if they can think of any spaces in the school that might be that long.
 - Give students time to share their ideas.
- 7 Now explain that the class is going somewhere (such as the gym, cafeteria, or playground) to measure out a length of 14 meters.
 - Gather a meter stick and something to mark the ends of the distance and take students to the chosen location. Blue masking tape works well for indoor locations while chalk is a good choice for distances outside.
- 8 Ask students to sit in a semicircle as you work with the class to measure a distance of 14 meters.
 - Mark one end of the distance with tape or chalk.
 - Call volunteers one by one to measure out the distance, moving the meter stick forward 1 meter at a time until the distance is covered.
 - Ask other students to help as needed to ensure that no gaps are left as the stick is moved each time.
 - When the distance is measured out, mark the other end with tape or chalk.
- 9 Ask students to estimate how many of them it would take, standing shoulder to shoulder, their arms down by their sides, to span the distance they just marked off. Then have students line up to see if there are enough of them to span the distance.

If there are not enough students to cover the distance, plan to revisit the area later in the day if possible with another class to see how many students it takes to make a shoulder-to-shoulder line 14 meters wide.
- 10 Close this part of the session by having students take one more look at the 14-meter distance before returning to the classroom.

CHALLENGE Ask students to calculate how many army ants it would take to make a 14 meter line.

Extensions

- Have students write and draw what they've learned about army ants. Ask them to use the word *centimeter* and the word *meter* at least once in their work.
- Read a book or show a video about army ants, and continue to discuss these interesting creatures with your class.



Work Places

- 11 Invite students to spend the rest of the session doing Work Places. Have student pairs that haven't yet made their ant paths do so during Work Places.
- 12 Close the session.
 - Have students clean up and put away the Work Place bins.
 - Invite students to think of items in their homes that could be measured with a meter stick. Is it easier to create a list of items that could be measured in meters or centimeters? Why?

Note All students need their ant paths before next session. When all the ant paths are prepared, mark each cardboard tube with an alphabet letter using a permanent black marker. If you have more than 26 students in your class, use a coding such as A1, B1, C1, and so on to mark the tubes after you've marked the first 26 in the collection. Marking the tubes in this way will make it possible for students to record their work during the Work Place activity.

Preview

Session 5

Ant Paths

Summary

Students add more detail to their ant paths and work as a group to estimate, measure, and compare the lengths of two different paths. The teacher then introduces Work Place 7C Ant Paths, a partner activity similar to the one completed as a group, and sends students out to Work Places if time allows. Finally, the teacher introduces and assigns the Subtraction & Measuring Practice Home Connection.

Skills & Concepts

- Use strategies based on place value, properties of operations, or the relationship between addition and subtraction to subtract with minuends to 1000 (2.NBT.7)
- Relate strategies for subtracting with minuends to 1000 to written methods (2.NBT.7)
- Use written numbers and symbols to represent strategies for subtracting with minuends to 1000 (2.NBT.7)
- Select and use the appropriate tool for measuring the length of an object (2.MD.1)
- Measure the length of an object in centimeters a ruler, meter stick or measuring tape (2.MD.1)
- Estimate length in centimeters (2.MD.3)
- Measure length to the nearest whole centimeter (supports 2.MD)
- Determine exactly how much longer one object is than another, and express the difference in terms of a standard unit of length (2.MD.4)
- Represent whole-number differences from minuends up to 100 and beyond on a number line (2.MD.6)
- Make sense of problems and persevere in solving them (2.MP.1)
- Construct viable arguments and critique the reasoning of others (2.MP.3)
- Model with mathematics (2.MP.4)
- Attend to precision (2.MP.6)

Materials

Copies	Kit Materials	Classroom Materials
Problems & Investigations Ant Paths		
	<ul style="list-style-type: none"> • measuring tape 	<ul style="list-style-type: none"> • student-made ant paths (see Preparation) • book or video about army ants • crayons, colored pencils, or markers • student-made army ant rulers • ruler marked in centimeters • student whiteboards, markers, and erasers (class set)
Work Places Introducing Work Place 7C Ant Paths		
TM T18–T19 Work Place Guide & Instructions 7C Ant Paths TM T20 7C Ant Paths Record Sheet	<ul style="list-style-type: none"> • 15 measuring tapes (for support suggestion) 	<ul style="list-style-type: none"> • student-made ant paths (for support suggestion) • student-made army ant rulers (for support suggestion)
Work Places in Use		
6C Make the Area (introduced in Unit 6, Module 2, Session 4) 6D Fill for Less (introduced in Unit 6, Module 3, Session 1) 6E Halves & Half-Notes (introduced in Unit 6, Module 3, Session 5) 7A Race to the Cookie Jar (introduced in Unit 7, Module 1, Session 1) 7B Estimate & Measure Centimeters (introduced in Unit 7, Module 1, Session 3) 7C Ant Paths (introduced in this session)		
Home Connection		
HC 155–156 Subtraction & Measuring Practice		

HC – Home Connection, SB – Student Book, TM – Teacher Master
 Copy instructions are located at the top of each teacher master.

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

centimeter (cm)*
 estimate*
 length*
 meter (m)*
 unit*

Preparation

- In today's session, you'll introduce Work Place 7C Ant Paths. Before this session, you should review the Work Place Guide and Work Place Instructions and assemble the bin for Work Place 7C (which replaces Work Place 6B Find the Area), using the materials listed. The Work Place Guide also includes suggestions for differentiating the activity to meet students' needs.
- Before this session begins, all students need to finish making their ant paths. When all the ant paths are prepared, mark each cardboard tube with an alphabet letter using a permanent black marker. If you have more than 26 students in your class, use a coding such as A1, B1, C1, and so on to mark the tubes after you've marked the first 26 in the collection. Marking the tubes in this way will make it possible for students to record their work during the Work Place activity.

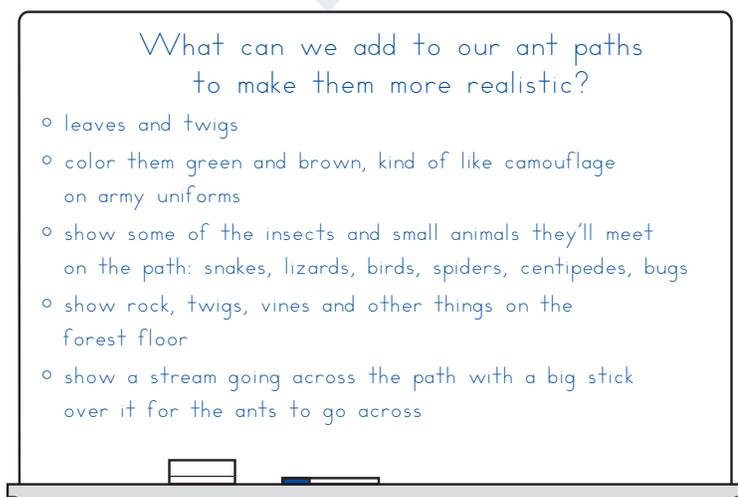


Problems & Investigations

Ant Paths

- 1 Call students to the discussion circle and explain that today they will add details to the ant paths they made, and then use them to practice measuring and comparing lengths.
 - First they will use them in a whole class activity and then during a new Work Place.
- 2 Hold up one of the ant paths still rolled up on its cardboard tube and show students how you marked this tube, along with all the rest, with an alphabet letter so they can easily record their work with the paths during Work Places.
- 3 Then explain that students are going to add some visual details to their paths to make them more realistic.
 - Talk with students a little more about the habitats and habits of army ants. Where do these creatures live and how do they get their food? What might students add to their ant paths to show the kind of terrain these ants traverse every day, and some of the things they encounter along the way?
 - Show some of the illustrations or photos from a book about army ants or a brief video clip to spark students' thinking, and list some of their ideas on the board.

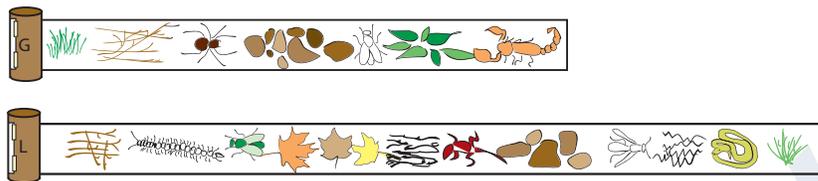
You will find a variety of short video clips (3–5 minutes) about army ants online.



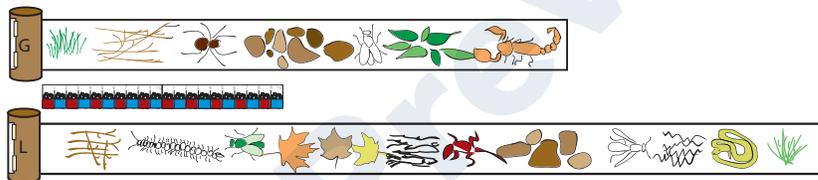
- 4 Now give students their ant paths, still rolled and clipped to the cardboard tubes, and send them to their seats to unroll the strips and add details using crayons, colored pencils, or markers.

Let students know they have 15 minutes to work on this project, and give them a signal 5 minutes, and then 1 minute before the end of the work period, so they can pace themselves. *Some students will want to spend more time adding detail to their ant paths than you'll be able to provide during this session. If possible, allow these students to get their ant paths out of the Work Place bin later today or tomorrow to finish up.*

- 5 At the end of the 15-minute work period, have students each roll up their strip and secure it to the cardboard tube with the paperclip. Then have the class join you in the discussion circle, and ask two of them to bring their ant paths with them.
- 6 When everyone is settled, ask your volunteers to roll out their paths side-by-side so that the cardboard tubes line up at one end. Give students a few moments to pair-share observations.



- 7 Invite students to estimate the length of each path in centimeters. List estimates for each path on the board.
 - Borrow a couple of army ant rulers from students and set them alongside the paths to provide a benchmark.
 - Remind students that they are estimating and will measure the lengths of the paper strips, rather than any of the markings on the strips.



Our Estimates	
Path G	Path L
100 cm	125 cm
70 cm	100 cm
75 cm	105 cm
80 cm	110 cm
78 cm	99 cm
85 cm	108 cm
90 cm	120 cm

- 8 Then work with help and input from the class to measure the length of each ant path in centimeters. Record the length of each path on the board as you finish.
 - As you begin the task, set out one of the student-made army ant rulers, a standard ruler, and a measuring tape. Talk with students about which of these tools would be the easiest to use and the most accurate.

- If students opt to use the measuring tape, it only goes up to 150 centimeters, so they may need to decide how to measure the remaining length if one or both of the paths are longer than that. Accept and implement their suggestions, which may include marking the path at 150 centimeters and then measuring the remaining length with the measuring tape, a standard ruler, or one of the army ant rulers.
- If either path does not measure an exact number of centimeters, talk with students about measuring to the nearest whole centimeter.

9 Next, have helpers pass out whiteboards, markers, and erasers, and ask students to work in pairs to find the difference between the two path lengths.

- After they've had a couple of minutes to work, solicit and record students' answers on the board. (You will likely get several or more different solutions. Record all of them without giving any indication about which is correct.)
- Then invite two or three pairs of students to share and explain their strategies to the class.
- As each pair shares, replicate or model their thinking on the board so the class can follow along more easily.

SUPPORT If students have difficulty getting started with this task, draw an open number line on the board and mark and label a point near the beginning of the line with the length of the shorter path. If this is not enough of a prompt to get students started, work with input from the class to draw and label skip-jumps from the lower of the two numbers to the higher. Then ask students to do something similar on their own boards, devising their own methods of skip-jumping to find the difference between the two path lengths.

Student A We found that the long path is 29 centimeters more than the short path. We made a number line and put the 85 kind of at the start.

Student B Then we just made jumps to get up to 114. First we went 5 to get up to 90. Then 10 more to get to 100, and then we just went 14 more to get up to 114.

Teacher What did you do then?

Student A We added up all the jumps: $5 + 10 + 14 = 29$.

Student B So then we knew that the other path was 29 longer.

Teacher Twenty-nine longer? Twenty-nine what? Inches, miles, meters?

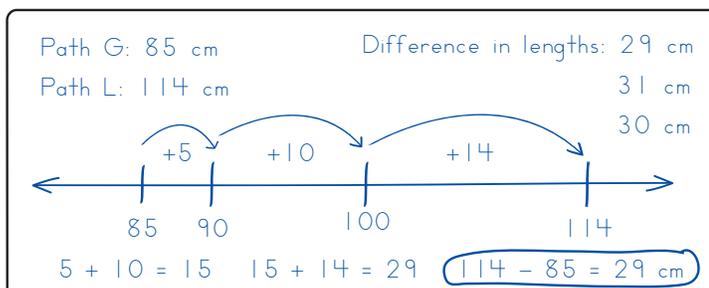
Students Twenty-nine centimeters!

Teacher How would we write an equation to show the difference between these two paths? Talk to the person next to you.

Student C You could go $85 + 29 = 114$.

Teacher That's true, but we usually use subtraction when we're talking about the difference between two numbers.

Student D I think you have to go $114 - 85 = 29$.

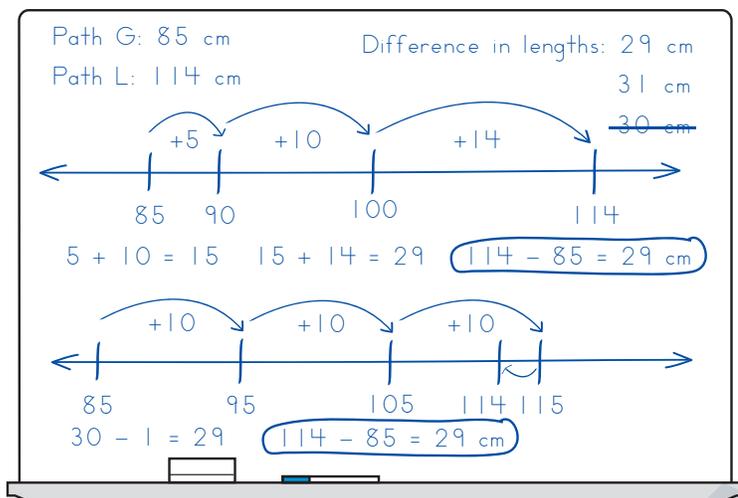


Teacher OK! You and your partner got a different answer. Would you be willing to explain what you did?

Student E We started at 85 and did jumps of 10, like 95, 105, 115, so we got 30 for an answer.

Student F But it's 114, not 115!

Student E Oh wait! We jumped back 1 from 115, but we forgot to show that. OK, you're right. The answer has to be 29, not 30.



Student F How come we have to do all this stuff? The two paths are right here on the ground. Couldn't we just measure the space between the two to find out how much longer the big one is?

Teacher That's a great idea. I want you to have the practice of measuring both paths and using numbers to find the difference, but you could definitely measure the distance between the paths to double-check your answer. Let's try that.

- 10 To close this part of the session, model rolling up both ant paths neatly and securing both with paperclips so they're ready for other people to use.



Work Places

Introducing Work Place 7C Ant Paths

- 11 While students are still seated in the discussion circle, introduce the Work Place version of this activity.
- Show the contents of the Work Place bin. Place the two rolled up ant paths with which you just worked in the bin. Let students know that in a few minutes, they'll all put their ant paths in the bin, so they'll have lots to choose from when they go to this Work Place.
- 12 Briefly summarize the activity.
- Partners select two ant paths, roll them out, and estimate the lengths of the paths. Then they work together to measure both paths and find the difference between the two lengths.
- 13 Display a copy of the 7C Ant Paths Record Sheet Teacher Master and note with students that there is room on the sheet to measure and compare two pairs of ant paths.
- Note that the record sheet has spaces for each step you just completed together: estimating the lengths of two paths, measuring the two paths, and finding the difference in their lengths.*

14 Be sure all students understand how to complete the record sheet.

Use the information from the group work to model how to fill out a sheet. Show students how to use the alphabet letters on the cardboard rolls to identify the paths they choose.

- Ask students if they have any questions about the activity.
- Then, have students turn to a partner to summarize the directions.

SUPPORT If necessary, give each student a copy of the record sheet, and repeat the entire activity with another pair of ant paths. This time, have students fill in the record sheet with you as you work with their input to go through all the steps. After you've completed the first round of the activity together, send students out in pairs to do a second round of the activity, using their own ant paths, army ant rulers, a measuring tape, and the bottom half of the record sheet.

15 If enough time remains in the session, give students their folders and let them go out to Work Places. If not, you might introduce the Home Connection and let students get started on the work in class.

16 Close the session.

- Have students clean up and put away the Work Place bins.
- Remind them that they will measure more ant paths again during Work Places.
- Have all students place their rolled up ant paths in the Work Place bin.

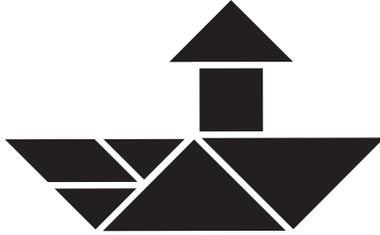


Home Connection

17 Introduce and assign the Subtraction & Measuring Practice Home Connection, which provides more practice with the following skills:

- Solve one-step addition and subtraction story problems with sums and minuends to 100 involving situations of putting together and comparing, with unknowns in all positions (2.OA.1)
- Use strategies based on place value, properties of operations, or the relationship between addition and subtraction to subtract fluently with minuends to 100 (2.NBT.5)
- Measure the length of an object in centimeters using a ruler (2.MD.1)
- Determine exactly how much longer one objects is than another, and express the difference between the two lengths in terms of a standard unit of length (2.MD.4)
- Solve addition and subtraction story problems with sums and minuends to 100 involving lengths given in the same units (2.MD.5)
- Represent whole number differences from minuends up to 100 on a number line (2.MD.6)

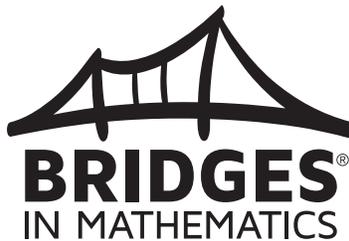
18 When you review the second page of the homework assignment with the class, note with students that they will need a ruler marked with centimeters to measure the ants' paths. Arrange for students who don't have a ruler at home to borrow one and bring it back to school when they return the assignment.



Teacher Masters

GRADE 2 – UNIT 7 – MODULE 1

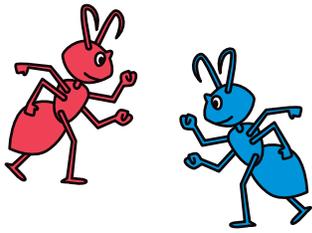
Preview



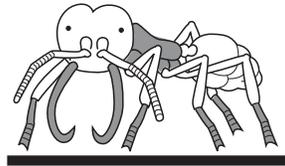


Units 7 & 8 Work Place Log

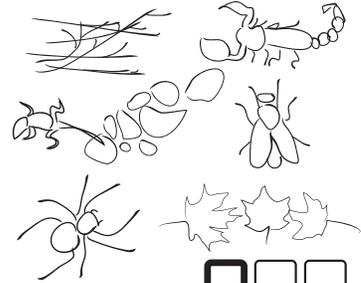
7A Race to the Cookie Jar



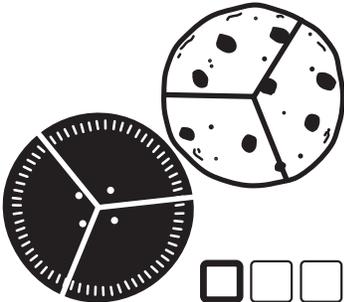
7B Estimate & Measure Centimeters



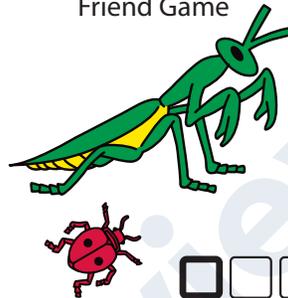
7C Ant Paths



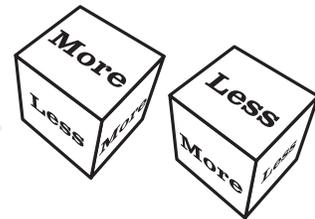
7D Fair Shares



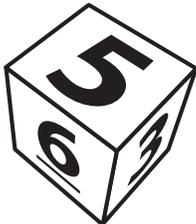
7E The Gardener's Friend Game



8A Sum It Up



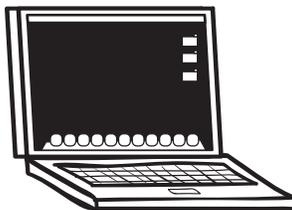
8B Roll & Subtract 1,000



Personal Practice



Computer Activity



Work with the Teacher



NAME _____

DATE _____

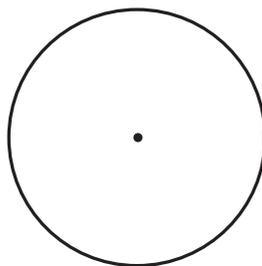


Unit 7 Pre-Assessment page 1 of 4

- 1 Which of these rectangles is divided into thirds? Fill in the bubble to show.

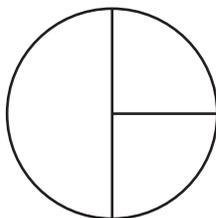


- 2 Use this circle to solve the problems below.

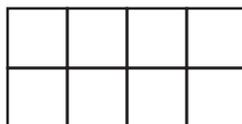


- Divide the circle into 4 equal parts. Use your ruler to help draw straight lines if you like.
- Color one-fourth of the circle green.
- Color two-quarters of the circle purple.

- 3 Max says this circle is *not* divided into thirds. Do you agree with Max? Why or why not?



- 4 Color in half of this array.



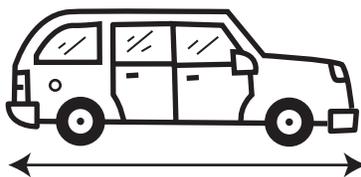
(continued on next page)

NAME _____

DATE _____

Unit 7 Pre-Assessment page 2 of 4

5 Jon wants to measure his mom's car to see how long it is.



- a** Which tool should he use? Fill in the bubble to show.
- centimeter ruler a measuring tape a meter stick
- b** Explain your answer. Why should Jon use the tool you chose?
- c** Which one of these measurements most likely shows the length of the car?
- 5 meters 53 centimeters 14 meters

6 Use these two lines to solve the problems below.



- a** Measure each line with your centimeter ruler.
- Line A is _____ centimeters long Line B is _____ centimeters long.
- b** How much shorter is Line A than Line B? Write and solve an equation to show.
- Line A is _____ centimeters shorter than Line B.
- c** If you put the two lines together to make one long line, how long would it be? Write and solve an equation to show. Label your answer with the correct units.

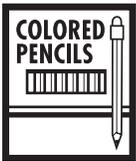
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NAME _____

DATE _____

Unit 7 Pre-Assessment page 3 of 4**7** Use these pictures to solve the problems below.

 Arthur has 82¢	 Norman has 95¢	 Violet has \$1.40
--	--	---

 Kite 19¢	 Crayons 39¢	 Ball 28¢
 Colored Pencils 29¢	 Puppet 18¢	 Hat 19¢

- a** Circle 1 of the 3 children in the picture above—Arthur, Norman, or Violet. Then circle two toys for this child to buy.
- b** How much money did the child spend to buy the two toys? Show your work.

_____ spent _____ to buy the two toys.

- c** How much money did the child get back in change? Show your work.

_____ got _____ back in change.

(continued on next page)

NAME _____

DATE _____

Unit 7 Pre-Assessment page 4 of 4

- 8** Use numbers, labeled sketches, or words to model and solve this addition problem. Show all of your work.

$$\begin{array}{r} 263 \\ + 119 \\ \hline \end{array}$$

Answer: _____

- 9** Use numbers, labeled sketches, or words to model and solve this subtraction problem. Show all of your work.

$$\begin{array}{r} 290 \\ - 105 \\ \hline \end{array}$$

Answer: _____



Work Place Guide 7A Race to the Cookie Jar

Summary

To start, each player chooses one side of the game board and places a marker at 0. Players take turns spinning the first two spinners on a triple spinner, adding the two numbers, then spinning a third spinner and subtracting that number from the sum of the first two. The player then moves her marker that number of spaces on a game board numbered in multiples of 10. The first player to reach the cookie jar wins the game.

Skills & Concepts

- Add and subtract with sums and minuends to 1000 (2.NBT.7)
- Mentally add or subtract 10 to or from any 3-digit number between 100 and 900 (2.NBT.8)
- Represent whole-number sums and differences on a number line (2.MD.6)
- Look for and make use of structure (2.MP.7)

Materials

Copies	Kit Materials	Classroom Materials
TM T6 Work Place Guide 7A Race to the Cookie Jar TM T7 Work Place Instructions 7A Race to the Cookie Jar	<ul style="list-style-type: none"> • 3 Race to the Cookie Jar Game Boards • 3 Race to the Cookie Jar Spinners 	<ul style="list-style-type: none"> • student whiteboards, markers, and erasers or scratch paper and pencils (enough for 6 students) • 6 kidney beans to use as game markers

Assessment & Differentiation

Here are some quick observational assessments you can make as students begin to play this game on their own. Use the results to differentiate as needed.

If you see that...	Differentiate	Example
A student is struggling to find the sums and differences.	SUPPORT Modify the order of the spins and moves so that students use the board as a version of the open number line.	A student spins a 40 and moves 4 spaces before spinning again. Then the student spins a 50 and moves forward 5 spaces. Before making the third spin, work with the student to illustrate that the total number of steps taken was 90 and that $40 + 50 = 90$. Then spin the third and final spin and use the steps backward to illustrate the subtraction. In this way students are practicing one-to-one correspondence on a number line.
One or more students are struggling to move efficiently around the board.	SUPPORT Play the game with students in a small group. Model using the colored squares as guides for moving in larger chunks of 50 and 100.	You are on 260 and need to move 130, or 13 spaces. Ask students to think about moving 100, or 10 spaces in just one move. When students suggest that you will be at 360, move to that space and note that just as when you were at 260, you are now on the first white space after a group of colored spaces. Then ask students how much farther you need to move. Count by tens three times to move the remaining 30, or 3 spaces.
A pair or group of students are comfortable with the game and finish it quickly without support.	CHALLENGE Pair students working at roughly the same level and invite them to try game variations A or B.	

English-Language Learners Use the following adaptations to support the ELL students in your classroom.

- Have ELL students observe other students playing the game before playing it themselves.
- Pair each ELL student with a supportive partner (an English speaking student or another ELL student with more command of English) who can offer support and explain the instructions while they play.
- Play the game with ELL students yourself.
- Instead of asking ELL students to use words to explain their moves, encourage them to write an equation or use symbols to communicate their ideas.



Work Place Instructions 7A Race to the Cookie Jar

- Each player needs a game marker and a whiteboard and marker, or piece of scratch paper and a pencil. Players share a game board and a spinner.
- Each player spins the first spinner once. The player who lands on the higher number starts first and decides whether to play for the red ant or the blue ant.
 - Players each set their game marker at 0 on their side of the game board.
- Player 1 spins all three spinners. Then she adds the first two numbers and subtracts the third number from the sum of the first two.
 - Players use the whiteboard or paper to help with the calculations if necessary.

Race to the Cookie Jar Spinner

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$$40 + 70 = 110$$

$$110 - 60 = 50$$

I spun a 40 and then a 70. My last spin was a 60.
So I added 40 and 70 and then subtracted 60. The answer is 50.

- Player 1 moves her marker the designated number of spaces.
 - Each space is worth 10, so if a player gets an answer of 50, she gets to move her marker 5 spaces up the path toward the cookie jar.
- Player 2 takes his first turn. Then the two players go back and forth, spinning and moving, until one of them reaches the cookie jar to win the game.
 - Players do not have to go out evenly. If a player is only 4 spaces away from the cookie jar and gets 70 on his next turn, he still wins the game.

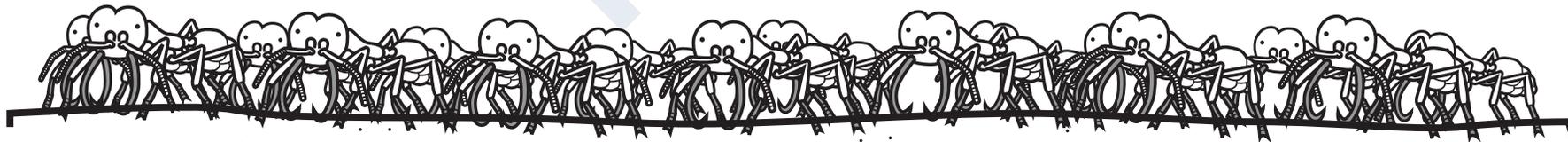
Game Variations

- Allow students to choose which two numbers to add and which one to subtract. How can you get the greatest move possible? What strategies can you use?
- Change the rules of the game so that students double the number on the last spin, which may result in a negative answer and a move backward instead of forward. For example, if a 40, 50, and then a 50 are spun, the player will solve the equation $(40 + 50) - 2(50)$ to determine how many spaces to move (-10 or 1 space backward in this case). This provides a challenge for students who are ready to engage the idea of subtracting a larger number from a smaller number. Be aware that given the right conditions, the student might be asked to subtract from 0, moving the game piece “underground,” so to speak.

 **Army Ants** page 1 of 4

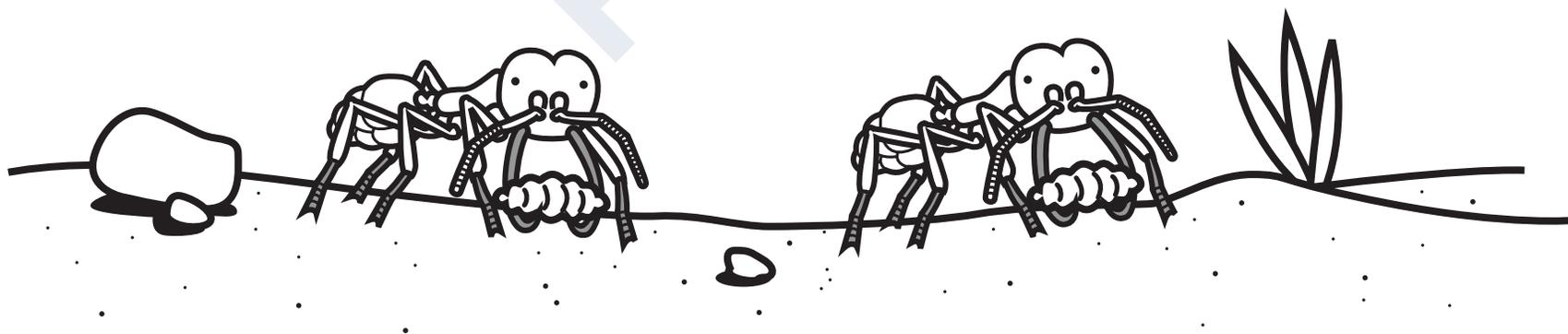
(to the tune of "The Farmer in the Dell")

**Army ants are watching,
Thousands at a time,
To find some shelter for the queen,
So she can lay her eggs.**



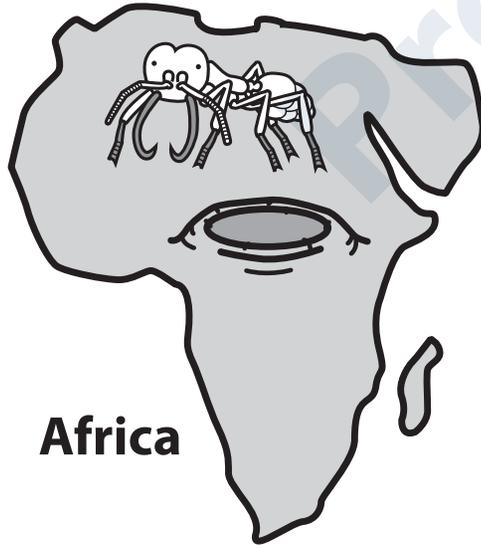
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**Workers link their bodies,
Ant bivouacs,
When it's time to move again,
They carry all their young.**



(continued on next page)

**They march when food is scarce,
Eating as they go,
In Africa and the Amazon,
Ants marching in a row.**



Africa

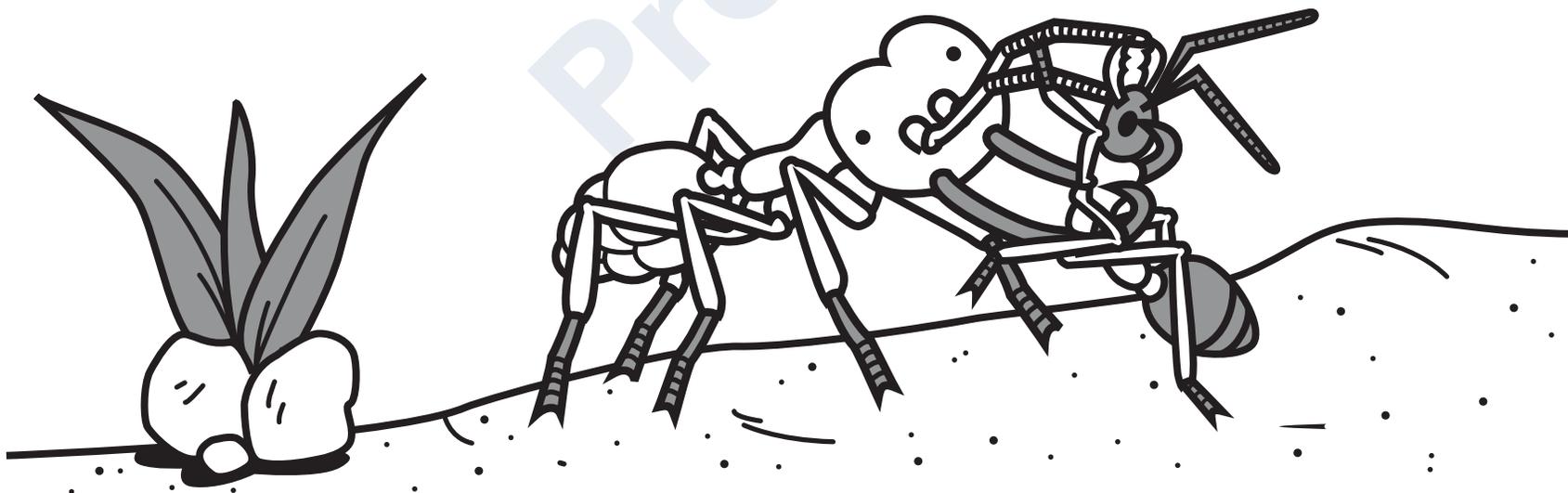


**South
America**

(continued on next page)

**Soldiers on patrol,
As fierce as they can be,
Defending from the enemy,
I'm glad they won't find me.**

by Donna Burk
illustrated by Tyson Smith





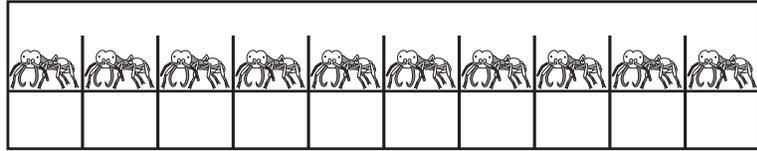
Army Ant Strips

Hi! I am a worker army ant.

I am 1 cm long.



1 centimeter

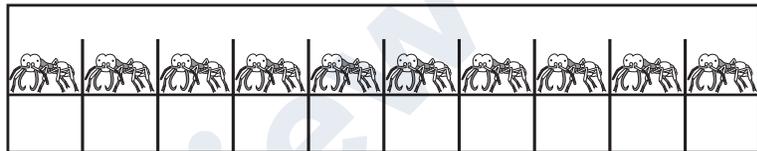


Hi! I am a worker army ant.

I am 1 cm long.



1 centimeter

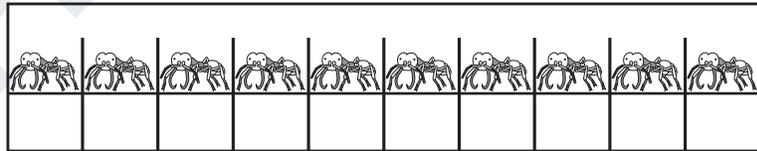


Hi! I am a worker army ant.

I am 1 cm long.



1 centimeter

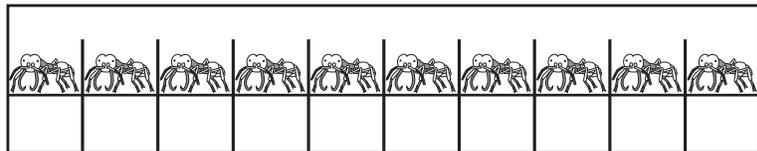


Hi! I am a worker army ant.

I am 1 cm long.



1 centimeter





Work Place Guide 7B Estimate & Measure Centimeters

Summary

Students estimate and measure the lengths of different items around the room in centimeters, using their army ant rulers, regular rulers marked in centimeters, or tape measures marked in centimeters.

Skills & Concepts

- Select and use the appropriate tool for measuring the length of an object (2.MD.1)
- Measure the length of an object in centimeters using a ruler or a tape measure (2.MD.1)
- Estimate length in centimeters (2.MD.3)
- Measure length to the nearest whole unit in metric units (supports 2.MD)
- Attend to precision (2.MP.6)

Materials

Copies	Kit Materials	Classroom Materials
TM T13 Work Place Guide 7B Estimate & Measure Centimeters TM T14 Work Place Instructions 7B Estimate & Measure Centimeters TM T15–16 7B Estimate & Measure Centimeters Record Sheet	<ul style="list-style-type: none"> • 3 tape measures 	<ul style="list-style-type: none"> • student-made army ant rulers • 1 or more meter sticks (optional, for challenge suggestion)

Assessment & Differentiation

Here are some quick observational assessments you can make as students begin to play this game on their own. Use the results to differentiate as needed.

If you see that...	Differentiate	Example
One or more students are struggling to measure longer lengths with their army ant rulers.	SUPPORT Suggest that students use a tape measure marked in centimeters instead.	If a student chooses to measure the length of the room, using a 10-centimeter ruler can be a challenge. Model using a tape measure to measure part of the distance, and then give the student support as he finishes the task. Students may need extra support as they use the tape because the measurement markings stop before the end of the tape.
A student finishes quickly and wants to measure more items.	CHALLENGE Ask the student to make a list of longer items to measure and consider which ones would be better measured with a meter stick and which would be better measured with a tape measure.	The length of a rectangular table would be easier to measure with the meter stick because the stick is rigid and easily maneuvered along the straight side of the table. The circumference of a circular table would be better measured with the tape measure because it can bend to fit around the edge.

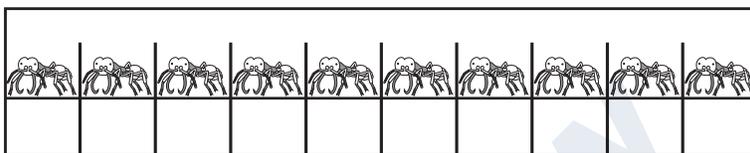
English-Language Learners Use the following adaptations to support the ELL students in your classroom.

- Consider the fact that students recently arrived from other countries may already be familiar with metric measure. Such students may be able to draw on previous experiences to help their classmates estimate and measure in centimeters.



Work Place Instructions 7B Estimate & Measure Centimeters

- 1 Students need their army ant rulers and a copy of the Estimate & Measure Centimeters Record Sheet.
- 2 If an item is pictured on the record sheet, students estimate its length in centimeters and record their estimates in the appropriate column.
- 3 If the sheet asks students to choose an item, they should first record the name of the item and then an estimate of its length in centimeters.
- 4 Students then measure the length of the item with their army ant rulers, and record the result.
Note If some of the items are quite a bit longer than 10 centimeters, students may be encouraged to use the centimeter side of a classroom ruler or a measuring tape marked in centimeters instead of their army ant rulers.
- 5 Students continue until they have completed both sides of the record sheet.



NAME _____

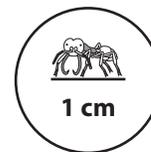
DATE _____

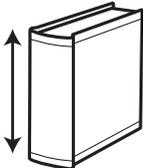
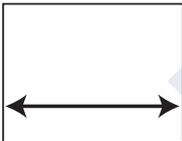


7B Estimate & Measure Centimeters Record Sheet page 1 of 2

1 Use your army ant ruler or a classroom ruler marked in centimeters to estimate and measure length in centimeters.

- Write down your estimate.
How many centimeters long do you think it is?
- Measure the length with your ruler.
- Record the answer.



Object	My Estimate	Length in Centimeters
<p>a</p>  <p>Your shoe</p>	<p>_____ cm</p>	<p>_____ cm</p>
<p>b</p>  <p>A book</p>	<p>_____ cm</p>	<p>_____ cm</p>
<p>c</p>  <p>A piece of paper</p>	<p>_____ cm</p>	<p>_____ cm</p>
<p>d</p>  <p>Your handspan</p>	<p>_____ cm</p>	<p>_____ cm</p>
<p>e</p> <p>You choose</p>	<p>_____ cm</p>	<p>_____ cm</p>

2 Which is the longest? (circle one)

1 centimeter 1 inch 1 foot 1 yard

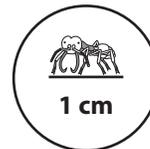
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NAME _____

DATE _____

7B Estimate & Measure Centimeters Record Sheet page 2 of 2**3** Use a centimeter ruler or tape measure to estimate and measure length.

- Write down your estimate.
How many centimeters long do you think it is?
- Measure the length with your ruler or tape measure.
- Record the answer.



Object (you choose)	My Estimate	Length in Centimeters
a	_____ cm	_____ cm
b	_____ cm	_____ cm
c	_____ cm	_____ cm
d	_____ cm	_____ cm
e	_____ cm	_____ cm

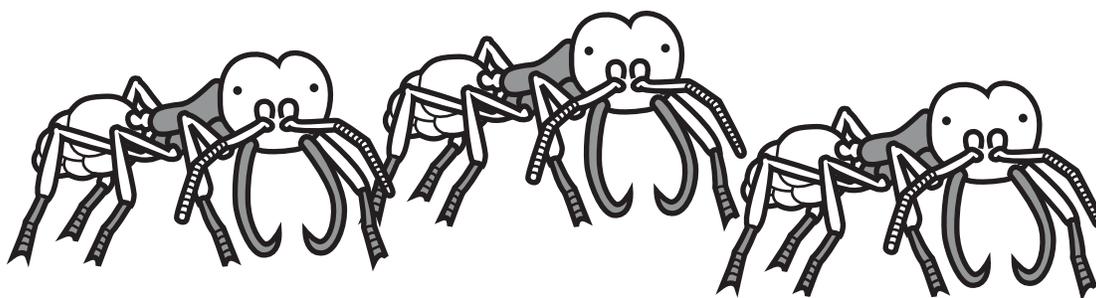
4 Which is shorter? (circle one)

6 centimeters

3 inches



Army Ant Raids



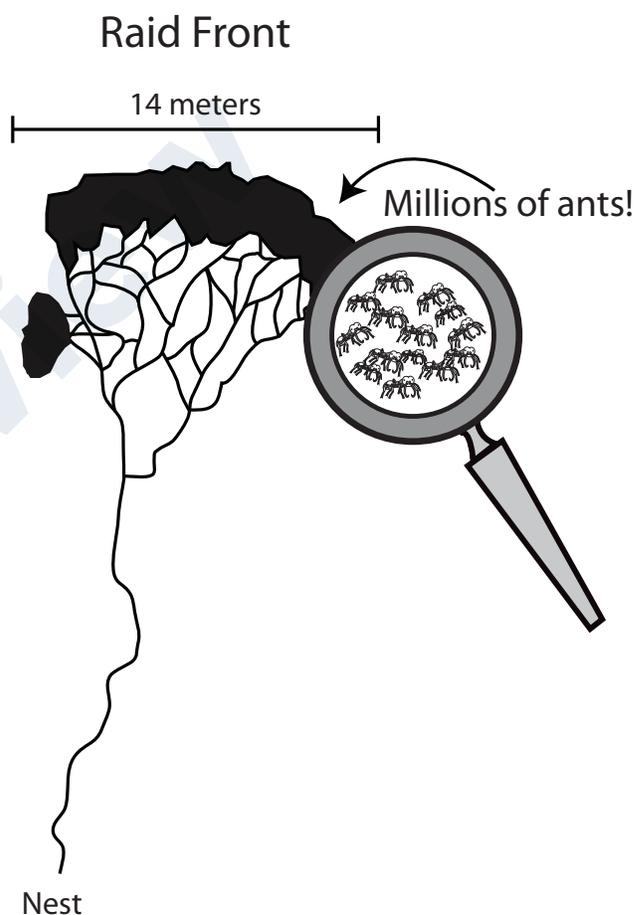
We are army ants. We live in huge groups. It's not unusual to find 1,000,000 or more of us in one colony.

We eat other insects, sometimes lizards and snakes, and sometimes even larger animals. We have to capture at least 100,000 insects a day to feed the colony.

To get all that food, we begin raiding at dawn. We pour out of our nest. Some army ants form columns when they go out on raids, but we are swarm raiders.

Up to 100,000 of us work together when we go on a raid. We fan out like a giant net and capture every insect in our path. This picture shows how we look when we're in formation. Believe it or not, our raids can be 14 meters across at the front.

Maybe this sounds a little scary to you, but some people are happy when they see us coming. They leave their houses when we come through because they know when they come back, we will have cleaned out every single pesky bug!





Work Place Guide 7C Ant Paths

Summary

Partners select two Ant Paths, roll them out, and estimate the lengths of the paths. Then they work together to measure both paths and find the difference between the two lengths.

Skills & Concepts

- Use strategies based on place value, properties of operations, or the relationship between addition and subtraction to subtract with minuends to 1000 (2.NBT.7)
- Use written numbers and symbols to represent strategies for subtracting with minuends to 1000 (2.NBT.7)
- Select and use the appropriate tool for measuring the length of an object (2.MD.1)
- Measure the length of an object in centimeters a ruler, meter stick or measuring tape (2.MD.1)
- Estimate length in centimeters (2.MD.3)
- Measure length to the nearest whole centimeter (supports 2.MD)
- Determine exactly how much longer one object is than another, and express the difference in terms of a standard unit of length (2.MD.4)
- Represent whole-number differences from minuends up to 100 and beyond on a number line (2.MD.6)
- Attend to precision (2.MP.6)

Materials

Copies	Kit Materials	Classroom Materials
TM T18 Work Place Guide 7C Ant Paths TM T19 Work Place Instructions 7C Ant Paths TM T20 7C Ant Paths Record Sheet	<ul style="list-style-type: none"> • 3 measuring tapes 	<ul style="list-style-type: none"> • student-made army ant rulers • student-made ant paths rolled up on cardboard tubes • meter stick (one or more, optional) • masking tape (one roll)

Assessment & Differentiation

Here are some quick observational assessments you can make as students begin to play this game on their own. Use the results to differentiate as needed.

If you see that...	Differentiate	Example
One or more students are struggling to measure longer lengths with their army ant rulers.	SUPPORT Suggest that students use the tape measure in addition to, or instead of their army ant rulers.	
Students are having difficulty subtracting.	SUPPORT Provide additional resources to help students model their subtraction.	Some students may need a gentle nudge toward using an open number line to subtract. Try drawing the number line for students and marking the two lengths. Suggest counting by a number such as 10 to get to the larger length. For students who need even more support, try bringing out base ten area pieces to model subtraction.
Students are insisting that it is better to just measure the distance between the ends of the two ant paths to find the difference in their lengths.	CHALLENGE Ask them to use subtraction to compare the lengths of the ant paths, and then measure the distance between the ends of the paths as a way to double-check their work. If they prefer, they can measure the distance between the ends of the paths first, and then do the computation to check their results.	

English-Language Learners Use the following adaptations to support the ELL students in your classroom.

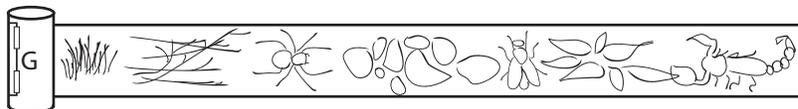
- Consider the fact that students recently arrived from other countries may already be familiar with metric measure. Such students may be able to draw on previous experiences to help their classmates estimate and measure in centimeters.



Work Place Instructions 7C Ant Paths

- Partners each need their army ant ruler and a record sheet. They share a measuring tape and two ant paths.
- Partners work together to remove the paperclip from each ant path they've selected and stretch the paths out to their full lengths. They place the paths side-by-side, even at the end where each path is attached to the cardboard tube.

Note Students can use a couple small pieces of masking tape to hold the tubes or the ends of the paths to prevent them from moving around or curling at the ends.



- Partners estimate the length of each ant path in centimeters and write their estimates on their record sheets.
 - Partners' estimates do not have to be the same.
 - Encourage students to use their army ant rulers as benchmarks to help make more accurate estimates.
- Partners work together to measure the length of each ant path using their army ant rulers or a measuring tape. Then they record the lengths on their record sheets.
- Partners work together to find the difference between the lengths of the paths.
 - Students show their work and write the solution in the space on the record sheet.
- Partners help each other neatly roll up both ant paths, put paperclips on them, and put them back into the Work Place bin. Then they choose a second set of two ant paths and repeat the activity.

NAME _____

DATE _____



7C Ant Paths Record Sheet

Round 1

Path Letter	Estimate in Centimeters	Actual Length in Centimeters

Write and solve an equation to show the difference between the lengths of the two ant paths. Use labeled sketches, numbers, or words to help find the solution. Show all of your work.

The difference in length between these two ant paths is _____ centimeters.

Round 2

Path Letter	Estimate in Centimeters	Actual Length in Centimeters

Write and solve an equation to show the difference between the lengths of the two ant paths. Use labeled sketches, numbers, or words to help find the solution. Show all of your work.

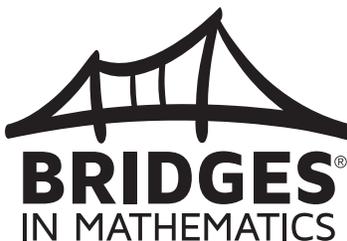
The difference in length between these two ant paths is _____ centimeters.



Student Book

GRADE 2 – UNIT 7 – MODULE 1

Preview



NAME _____

DATE _____

Army Ant Ruler Record Sheet

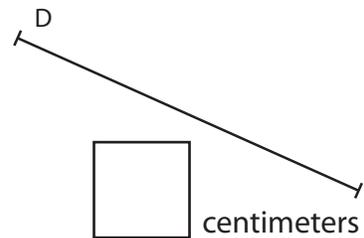
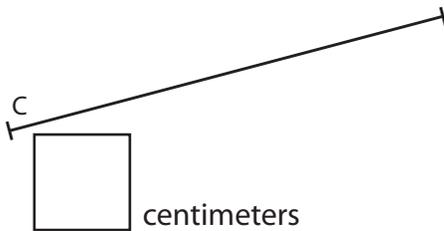
1 Use your army ant ruler. Find at least 4 things in the room that are:

- about 1 centimeter long
- between 1 and 10 centimeters long
- about 10 centimeters long

Fill in this chart to show what you find.

About 1 centimeter long	Between 1 and 10 centimeters long	About 10 centimeters long

2 Measure these lines with your ant ruler. Label each line to show how long it is.



NAME _____

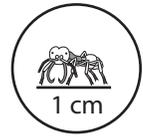
DATE _____

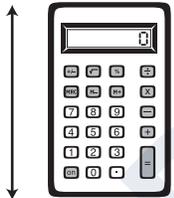
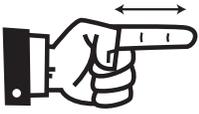


Estimate & Measure Centimeters

1 Use your army ant ruler to estimate and measure length in centimeters.

- Write down your estimate. How many centimeters long do you think it is?
- Measure the length with your ruler.
- Record the answer.



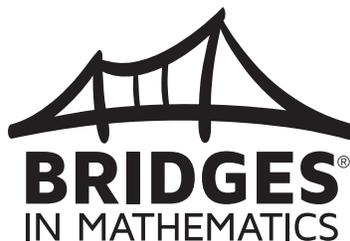
	Object	My Estimate	Length in Centimeters
a	 Eraser	_____ cm	_____ cm
b	 Glue Stick	_____ cm	_____ cm
c	 Calculator	_____ cm	_____ cm
d	 Pencil	_____ cm	_____ cm
e	 10 Unifix cubes	_____ cm	_____ cm
f	 Your pointer finger	_____ cm	_____ cm



Home Connections

GRADE 2 – UNIT 7 – MODULE 1

Preview



NAME _____

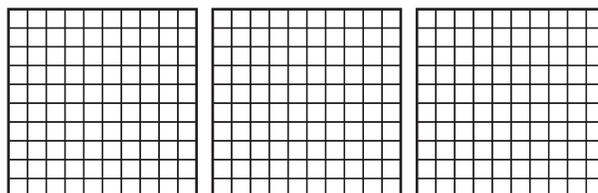
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Different Ways to Look at the Same Number page 1 of 2

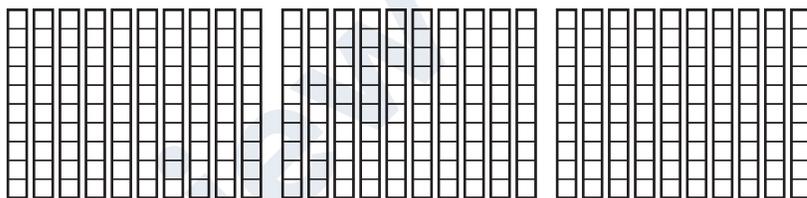
1 Use the pictures to help fill in the answers below.

a Sara built 300 with hundreds mats.



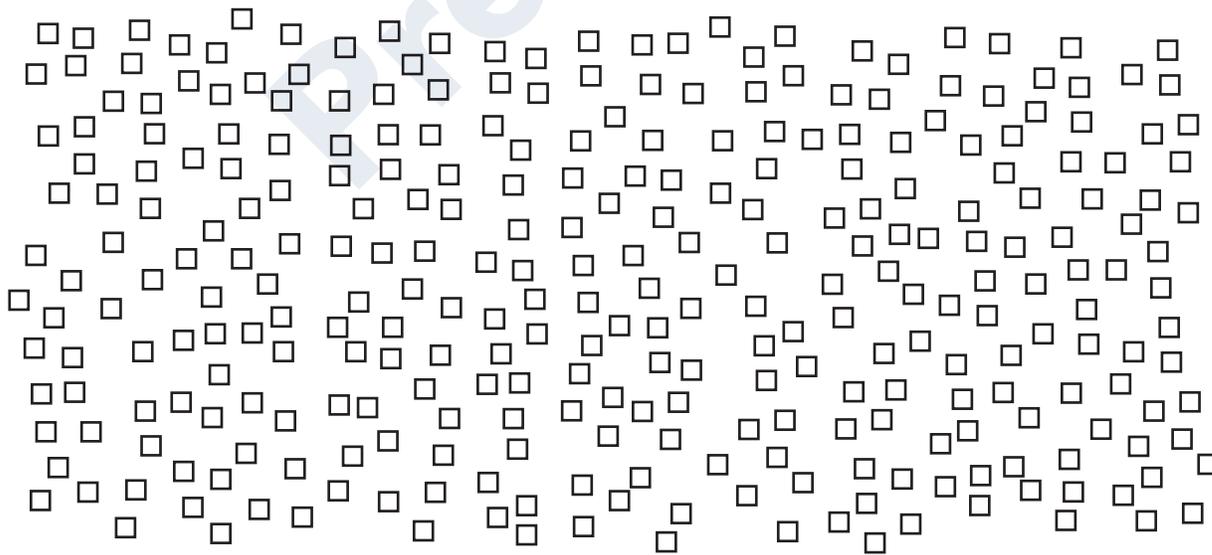
There are _____ 100s in 300.

b Her brother traded in each mat for 10 strips of tens.



There are _____ 10s in 300.

c If you traded in all the strips for units of one, how many 1s would that be?



There are _____ 1s in 300.

2 Check to make sure there are really 300 units. Loop groups of 10s in different colors. Then label the groups of 10. (10, 20, 30, ...)

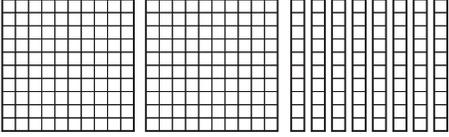
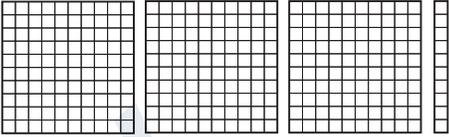
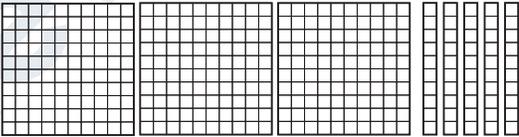
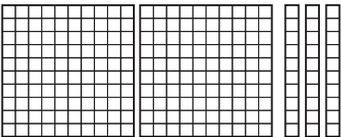
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NAME _____

DATE _____

Different Ways to Look at the Same Number page 2 of 2

- 3** Tell how many hundreds, tens, and ones there are in each number. Use the pictures to help.

<p>ex There are <u> 2 </u> hundreds in 280.</p> <p>There are <u> 28 </u> tens in 280.</p> <p>There are <u> 280 </u> ones in 280.</p>	
<p>a There are _____ hundreds in 310.</p> <p>There are _____ tens in 310.</p> <p>There are _____ ones in 310.</p>	
<p>b There are _____ hundreds in 350.</p> <p>There are _____ tens in 350.</p> <p>There are _____ ones in 350.</p>	
<p>c There are _____ hundreds in 230.</p> <p>There are _____ tens in 230.</p> <p>There are _____ ones in 230.</p>	

- 4 CHALLENGE** Draw a line from the number on the left to its matching number on the right.

5 hundreds + 2 tens + 9 ones
42 tens
30 tens + 9 ones
1 hundred + 20 tens + 9 ones

420 ones
52 tens + 9 ones
12 tens + 9 ones
3 hundreds + 9 ones



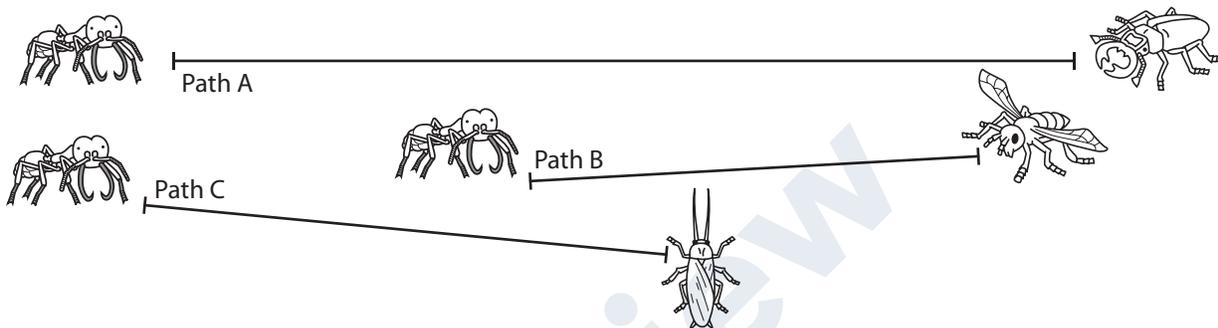
Ants & Hotdogs page 1 of 2

1 How many centimeters does the army ant have to go to get to each bug? Use the centimeter side of your ruler to find out.

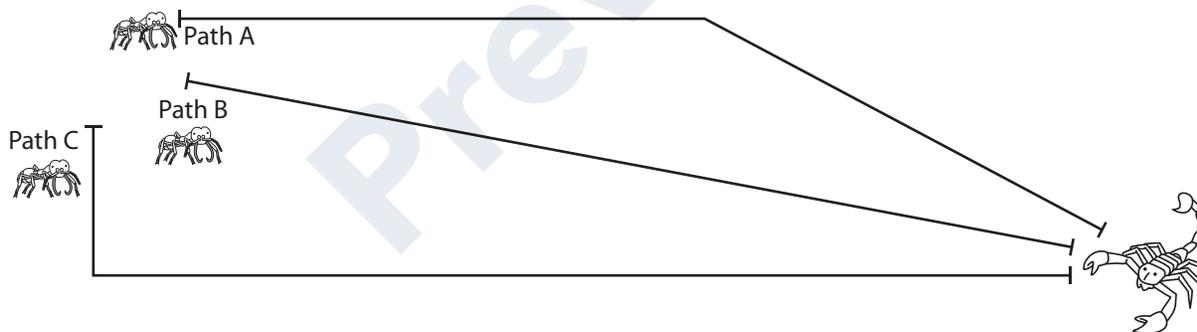
a On Path A the army ant has to travel _____ centimeters.

b On Path B the army ant has to travel _____ centimeters.

c On Path C the army ant has to travel _____ centimeters.



2 The army ants want to get the scorpion. They can use Path A, B, or C.



a Use the centimeter side of your ruler to measure each path. Write each length on the lines below.

Path A _____ Path B _____ Path C _____

b If you were an army ant, which path would you use? Path _____
Why?

(continued on next page)

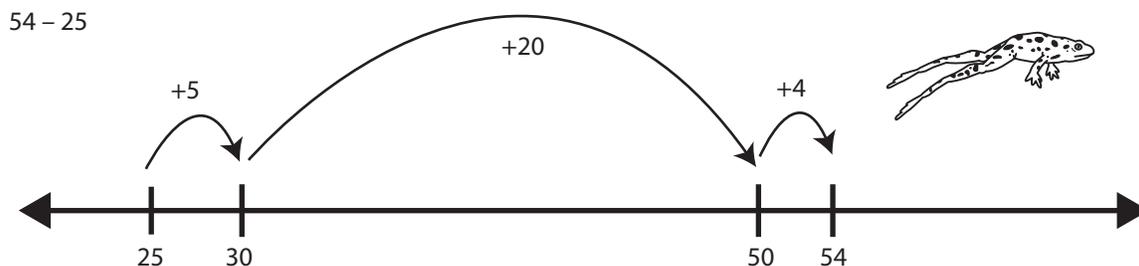
NAME _____

DATE _____



Subtraction & Measuring Practice page 1 of 2

DJ likes to make hops on the number line to solve 2-digit subtraction problems, like this:



$$\underline{5} + \underline{20} + \underline{4} = \underline{29} \quad \text{so } 54 - 25 = \underline{29}$$

1 Solve each of the subtraction problems below. You can use DJ's number line strategy or some other way to solve the problem. Show your work each time.

a 56 - 29

_____ so 56 - 29 = _____

b 70 - 36

_____ so 70 - 36 = _____

c 63 - 19

_____ so 63 - 19 = _____

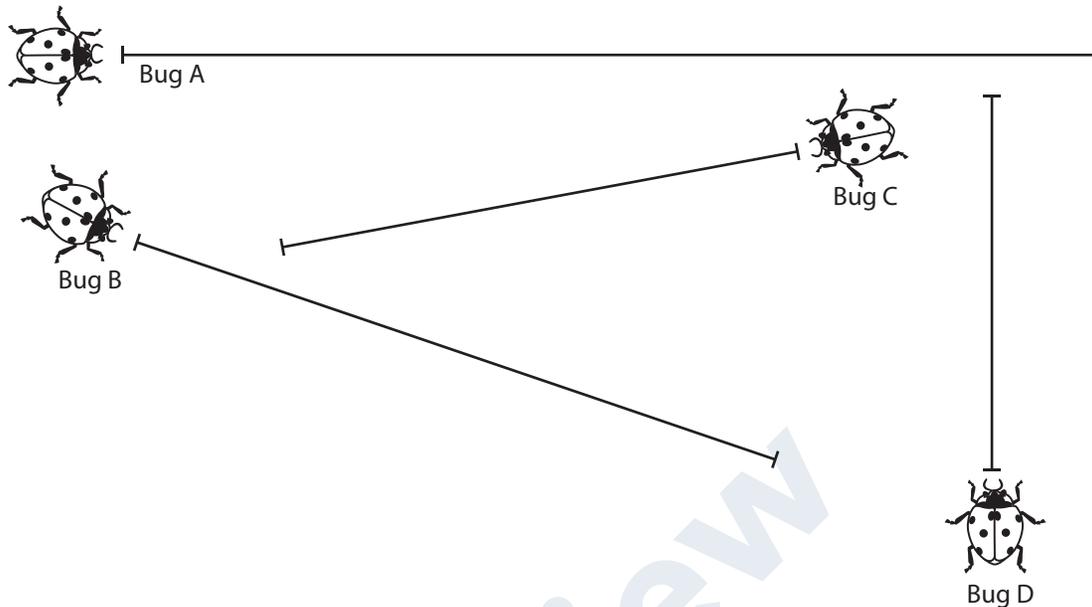
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NAME _____

DATE _____

Subtraction & Measuring Practice page 2 of 2

- 2** Measure the ladybugs' paths below. Use the centimeter side of your ruler. Write the length of each path on the correct line.



Bug A walked _____ cm

Bug B walked _____ cm

Bug C walked _____ cm

Bug D walked _____ cm

- 3** Which ladybug has the longest path? (circle one)

Bug A Bug B Bug C Bug D

- 4** How much longer is Bug A's path than Bug B's path? _____

- 5** How much shorter is Bug D's path than Bug A's path? _____

- 6** How far did the 4 ladybugs walk in all? Write an equation to show.

- 7** Draw a path from the ladybug to the flower. Measure it with the centimeter side of your ruler.



My path is _____ centimeters long.