



GRADE 2 SUPPLEMENT

Set D3 Measurement: Length in Metric Units

Includes

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Skills & Concepts

- ★ identify objects that represent standard units and use them to measure length
- ★ estimate length in centimeters and meters
- ★ measure length to the nearest centimeter or the nearest meter

Bridges in Mathematics Grade 2 Supplement

Set D3 Measurement: Length in Metric Units

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Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

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Set D3 ★ Activity 1



ACTIVITY

How Long is An Army Ant?

Overview

Using the length of an army ant, students learn about a new, and smaller unit of measure: the centimeter. Then they 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

- ★ identify objects that represent standard units and use them to measure length
- ★ measure length to the nearest centimeter
- ★ generate common measurement referents for centimeters
- ★ generalize connections among mathematics, the environment, and other subjects

You'll need

- ★ Army Ant Strips (page D3.4, quarter class set plus 1 extra, see Advance Preparation)
- ★ Army Ant Ruler Record Sheet (page D3.5, run a class set)
- ★ Army Ants (pages D3.6–D3.9, run 1 copy of each, see Advance Preparation)
- ★ 3 cm × 10 cm strips of poster board, 1 per student, plus 2–3 extra strips
- ★ glue sticks
- ★ scissors
- ★ a ruler marked with both centimeters and inches
- ★ blue and red crayons or colored pencils
- ★ book or video about army ants (optional)

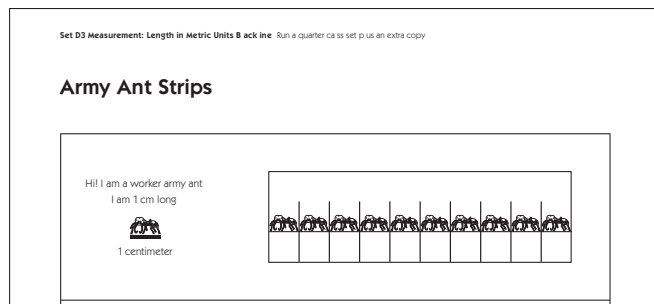
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Advance Preparation Run a quarter class set of the Army Ant Strips on page D3.5. Make sure your copy machine is set at 100% or a percentage that results in strips of ants exactly 10 centimeters long. Cut the sheets in quarters to provide one 10-cm strip for each student. Find Army Ants on pages D3.6–D3.9. Make one copy of each sheet and mount them on construction paper or butcher paper, or simply hang the four sheets on the board near your discussion area.

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Instructions for How Long is An Army Ant?

1. Gather students to the discussion area and have them form a circle. 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. Read (or sing) Army Ants to your class, and then ask the students to read or sing it with you.
2. Ask students to think about the ants they've seen. How long do they think ants are? Is an ant longer than an inch? Shorter than an inch? Can they use their fingers to show approximate the length of an ant? Then give each student an Army Ant Strip. Give them a minute to examine the strip and pair-share their comments and observations.

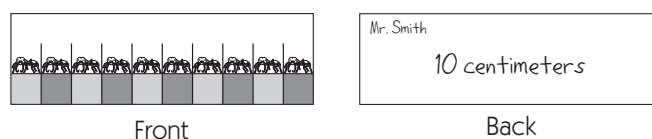
Activity 1 How Long is An Army Ant? (cont.)

3. Invite a few students to share their observations with the class. Then ask students to think about how a centimeter compares with an inch. Is it longer or shorter? How does the width of their 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 they know?

4. Show students the ruler marked with both inches and 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. Today, the students are each going to make their own centimeter ruler with help from the army ants.

5. Then show children the materials they'll use to make their own ruler: a strip of poster board, a red and a blue crayon or colored pencil, a pair of scissors, a glue stick, and the Army Ant Strip they're holding right now.

6. Demonstrate how to color the sections below the ants in a pattern of alternating red and blue. Then cut out the strip and glue it to the poster board. Finally, turn your centimeter ruler over and label it as shown below.



7. When students understand what to do, distribute the materials they'll need and send them back to work at their tables. As a few of the students finish, call the class back to your discussion circle briefly. Give them each a copy of the Army Ant Ruler Record Sheet. Read the sheet with them and explain the tasks as needed. Ask them to work in pairs to complete the sheet as soon as they're finished making their 10-centimeter rulers.

Activity 1 How Long is An Army Ant? (cont.)

Set D3 Measurement: Length in Metric Units Blackline Run a class set

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.


2 Fill in this chart to show what you find.

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


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



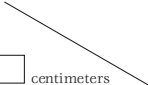
a centimeters



b centimeters



c centimeters



d centimeters

8. If necessary, give students more time the following day, perhaps during a designated seatwork period, to complete the sheet. Be sure they leave their 10-centimeter rulers at school; they'll need them for the next couple activities.

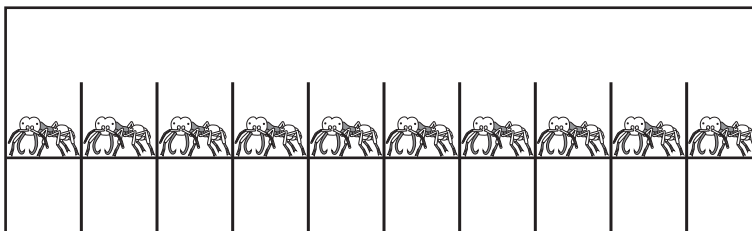
Army Ant Strips

Hi! I am a worker army ant.

I am 1 cm long.



1 centimeter

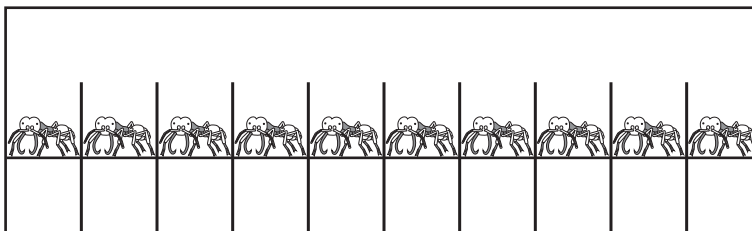


Hi! I am a worker army ant.

I am 1 cm long.



1 centimeter

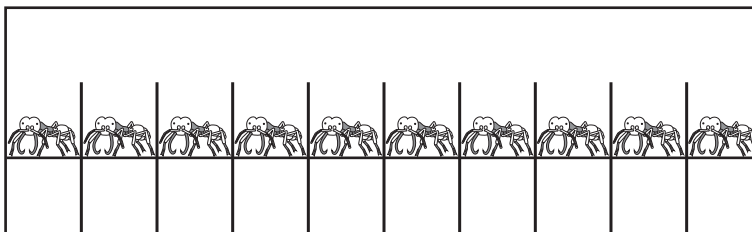


Hi! I am a worker army ant.

I am 1 cm long.



1 centimeter

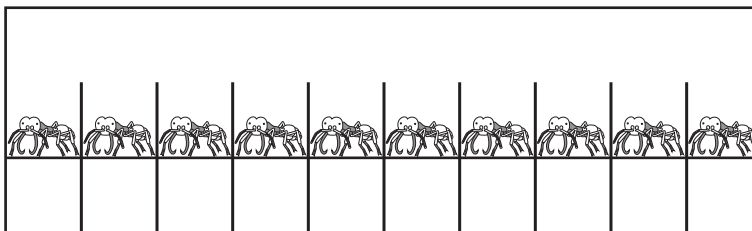


Hi! I am a worker army ant.

I am 1 cm long.



1 centimeter



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.

2 Fill in this chart to show what you find.

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

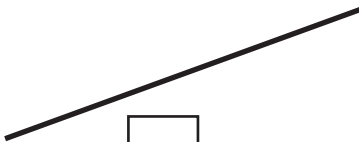
3 Measure these lines with your ant ruler. Label each line to show how long it is.



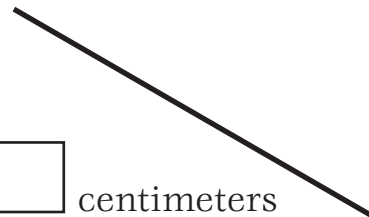
a centimeters



b centimeters



c centimeters

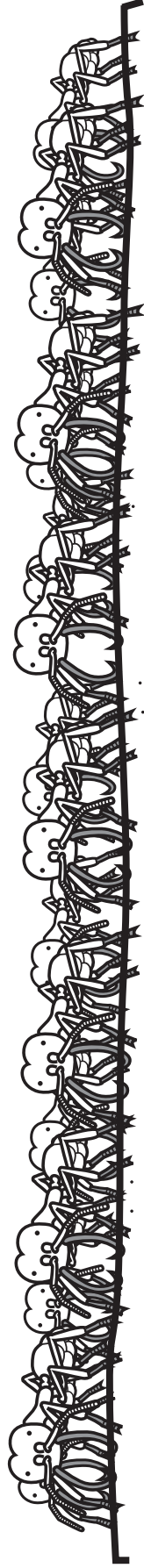


d centimeters

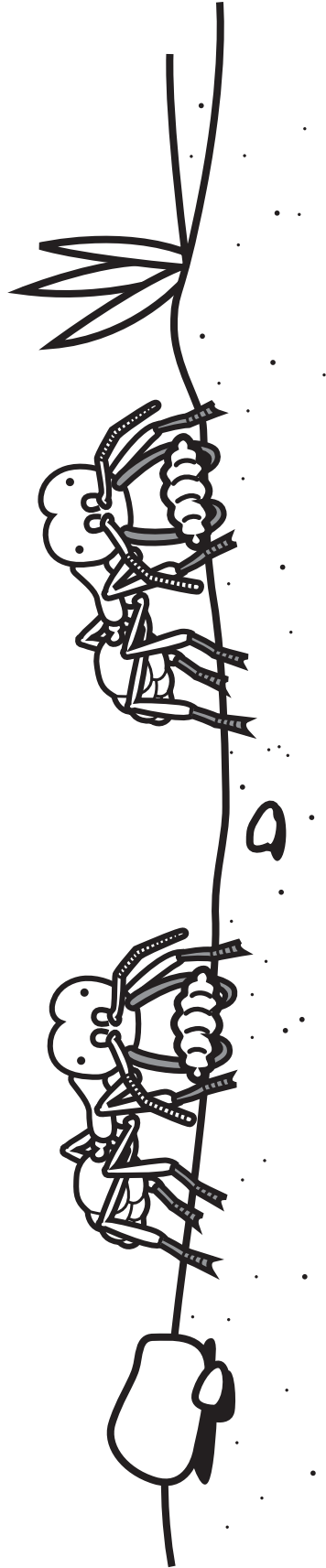
Army Ants

(to the tune of “The Farmer in the Dell”)

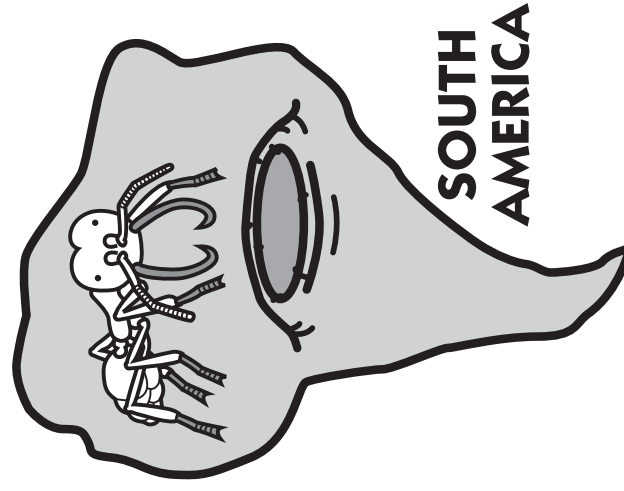
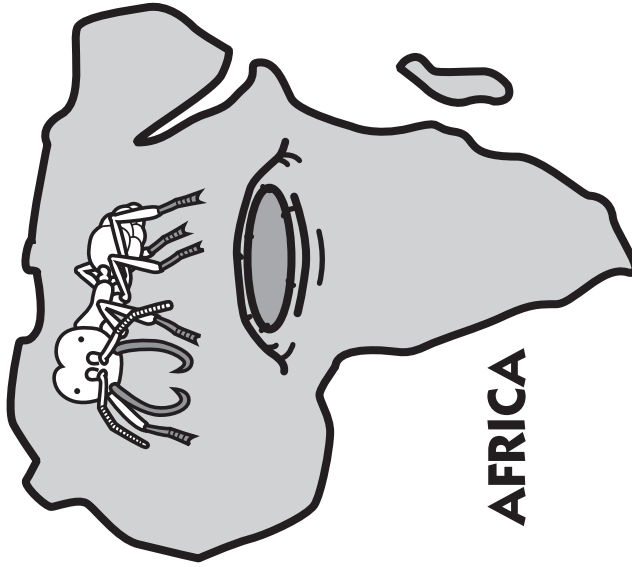
**Army ants are marching,
Thousands at a time,
To find some shelter for the queen,
So she can lay her eggs.**



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

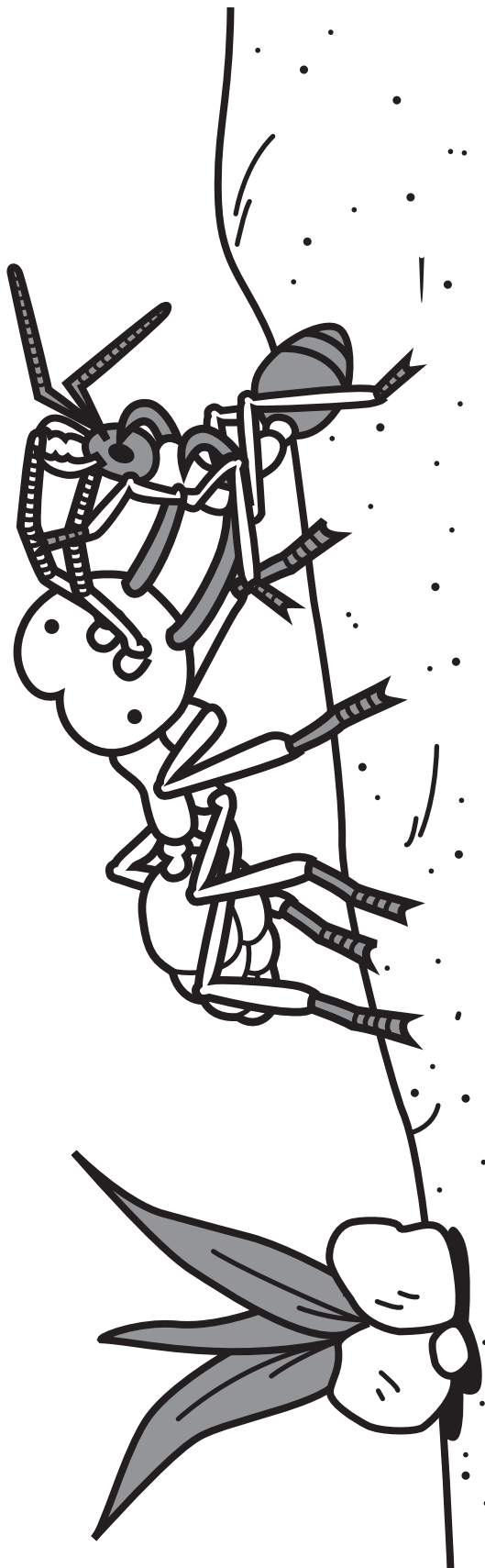


**They march when food is scarce,
Eating as they go,
In Africa and the Amazon,
Ants marching in a row.**



**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



Set D3 ★ Activity 2



ACTIVITY

Estimate & Measure Centimeters

Overview

Students number their army ant rulers so they are easier to read. Then they use their rulers to estimate and measure the length of various objects around the classroom. Students may revisit this activity on their own during Work Places.

Skills & Concepts

- ★ estimate length in centimeters
- ★ measure length to the nearest centimeter

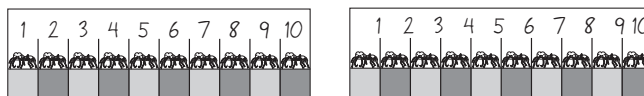
You'll need

- ★ Estimate & Measure Centimeters, Record Sheets 1–3 (pages D3.14–D3.16, class set of each)
- ★ students' army ant rulers from Set D3, Activity 1
- ★ 1" × 10" strips of yellow construction paper, one for every pair of students
- ★ pencils
- ★ several classroom rulers marked with centimeters
- ★ 3 cloth tape measures from your Bridges kit (optional)

Instructions for Estimate & Measure Centimeters

1. Let students know that they are going to use their army ant rulers to do some more measuring today. Have them write numbers on their rulers that will make their measuring job easier. Encourage them to use a system that makes best sense to them.

Many students will probably decide to write their numbers directly above the ants, as shown on the left below. A few, however, perhaps more familiar with rulers, may choose to make a tic-mark between each ant and number the marks. Again, discussion and debate may emerge about the placement of the number 10 on a ruler marked with tic-marks? Why is it appropriate to mark a ruler so that the numbers appear at the end of each section? You may want to have interested students inspect a classroom ruler marked in centimeters to see how the problem has been solved on a “regular” ruler.



2. Ask students to bring their numbered rulers with them and join you in the discussion area. Have them sit in a circle and pair up with the person sitting next to them. Borrow an ant ruler from one of the students. Set it in the middle of the circle and lay one of the yellow construction paper strips alongside. How do the ruler and the strip of paper compare in length? Would it be possible to measure the length of the strip with just one army ant ruler? If so, how?

Students *The yellow paper is way longer!*

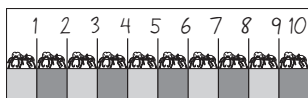
It looks like it would take about 3 of our rulers to fit on that paper.

Yeah! Let's just put some of our rulers together!

But Mr. Carter said 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.

Activity 2 Estimate & Measure Centimeters (cont.)

3. Give each student pair a strip of yellow paper. Ask them to use just one of their rulers to measure the length of the strip. If some of them want to mark the strip to show where to place the ruler each time they move it, encourage them to do so. How many centimeters long is the yellow strip? (between 25 and 26 centimeters) After they have had a minute or two to work, ask them to share their results. Here are some questions to pose:

- 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.)

4. Give students each a copy of the first Estimate & Check Centimeters record sheet. Review the sheet with the class. When students understand what to do, send pairs back to their tables to work together. Explain that they need to help each other with the measuring jobs, but they each need to complete their own sheet.

Extension

- If some students aren't able to complete their measuring sheets during your math period, collect them and give them back to the children to complete sometime in the next few days. There are 2 additional Estimate & Check Centimeters record sheets on pages D3.12 and D3.13. The second sheet invites students to use either their own ant ruler or a classroom ruler marked in centimeters. The third sheet offers the option of using either a centimeter ruler or a tape measure marked in centimeters. Place copies of these two sheets in a tub, along with several classroom rulers and the three cloth measuring tapes from your Bridges kit to create a Work Place for students to revisit on their own sometime in the next couple of months.


Activity 2 Estimate & Measure Centimeters (cont.)







Set D3 Measurement: Length in Metric Units Blackline Run a class set
 NAME _____ DATE _____

Estimate & Measure Centimeters, Record Sheet 1 of 3

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





Set D3 Measurement: Length in Metric Units Blackline Run a class set
 NAME _____ DATE _____

Estimate & Measure Centimeters, Record Sheet 2 of 3

2 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
a Your shoe 	_____ cm	_____ cm
b A book 	_____ cm	_____ cm
c A Piece of paper 	_____ cm	_____ cm
d Your handspan 	_____ cm	_____ cm
e You choose _____	_____ cm	_____ cm

3 Which is longest? (circle one)

1 centimeter 1 inch 1 foot 1 yard

Note Students will need their army ant rulers for the next activity. 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.

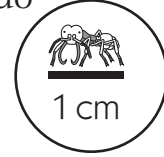
NAME _____



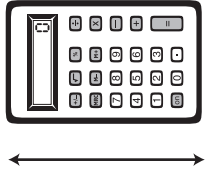


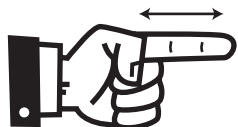
DATE _____

Estimate & Measure Centimeters, Record Sheet 1 of 3

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

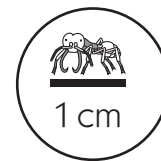
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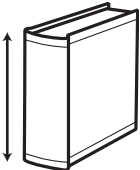
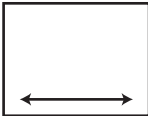

DATE _____

Estimate & Measure Centimeters, Record Sheet 2 of 3

2 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 Your shoe</p> 	<p>_____ cm</p>	<p>_____ cm</p>
<p>b A book</p> 	<p>_____ cm</p>	<p>_____ cm</p>
<p>c A Piece of paper</p> 	<p>_____ cm</p>	<p>_____ cm</p>
<p>d Your handspan</p> 	<p>_____ cm</p>	<p>_____ cm</p>
<p>e You choose</p> <p>_____</p>	<p>_____ cm</p>	<p>_____ cm</p>

3 Which is longest? (circle one)

1 centimeter

1 inch

1 foot

1 yard

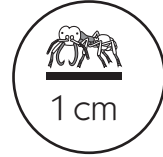
NAME _____

DATE _____

Estimate & Measure Centimeters, Record Sheet 3 of 3

4 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	My Estimate	Length in Centimeters
a You choose _____	_____ cm	_____ cm
b You choose _____	_____ cm	_____ cm
c You choose _____	_____ cm	_____ cm
d You choose _____	_____ cm	_____ cm
e You choose _____	_____ cm	_____ cm
f You choose _____	_____ cm	_____ cm

5 Which is shorter? (circle one)

6 centimeters

3 inches

Set D3 ★ Activity 3



ACTIVITY

One Hundred Army Ants & More

Overview

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. 14 meters has special significance in the world of army ants, as students will discover.

Skills & Concepts

- ★ identify objects that represent standard units and use them to measure length
- ★ measure length to the nearest meter
- ★ generate common measurement referents for meters
- ★ generalize connections among mathematics, the environment, and other subjects

You'll need

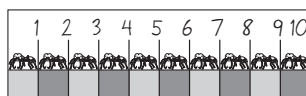
- ★ Army Ant Raids (page D3.20, run 1 copy)
- ★ students' army ant rulers from Set D3, Activity 1 (see Advance Preparation)
- ★ 1 or more meter sticks
- ★ blue masking tape or a piece of chalk
- ★ drawing paper, one sheet per student (optional)
- ★ crayons, felt markers, pencils (optional)
- ★ book or video about army ants (optional)

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Advance Preparation Borrow 12–15 army ant rulers from students before you conduct this activity. Place these rulers and a meter stick where they'll be easily accessible when you meet with students in your discussion area.

Note You will need room for the children to measure a length of 14 meters during this activity. You may want to reserve the gym or the cafeteria for this purpose, or plan to take students out to the playground.

Instructions for One Hundred Army Ants & More

1. Gather students to your discussion area and ask them to form a circle. Set one of the army ant rulers you've borrowed in the middle of the circle. What do students know about this measuring tool? Ask them to pair-share for a few moments, and then invite volunteers to share their ideas with the class.



Students *There are 10 army ants on it in a line.*

They have really weird heads.

Every army ant is 1 centimeter.

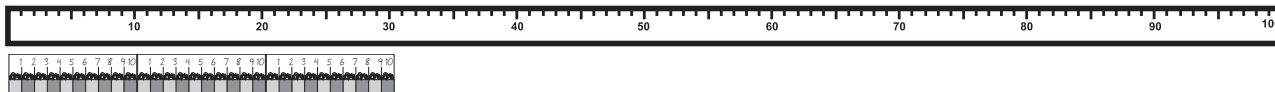
My crayon was almost as long as the little ruler.

It's 10 centimeters long.

Centimeters are really little. They're shorter than inches.

Activity 3 One Hundred Army Ants & More (cont.)

2. Now set a meter stick in the middle of circle beside the 10-centimeter ant ruler. Explain that this measuring tool is called a meter stick, and it is exactly 1 meter long. Just as inches, feet, and yards are related, a meter is related to a centimeter. Ask students to estimate how many centimeters long the meter stick is, using the army ant ruler as a visual benchmark. 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.



3. Record students' estimates on the board. Then have a volunteer carefully lay ant rulers end-to-end down the entire length of the meter stick as the children watch and count. Ask students to pair-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, just like in the story!

A meter is 100 centimeters!

It's 10 tens. That's 100.

4. Ask students to look around the room. What can they see from where they're sitting that appears to be about 1 meter long? List students' suggestions on the board and send volunteers out to measure several of the suggested items. Circle any items on the board that turn out to be quite close to a meter long. Stop well before you have exhausted the list, however, and invite students to measure the additional items on their own over the next few days.

5. Now share the Army Ant Raids sheet. Read it to your students and ask them to imagine a wave of ants 14 meters across. Explain that you are going to take them to the gym (cafeteria, or playground) to measure out a length of 14 meters so they can see just how wide an army ant raid can be.

6. Take the class to the area you have chosen. Bring a meter stick and something to mark the distance at both ends; blue masking tape if you're working inside, or a piece of chalk if you're going out to the playground.


7. When you reach your destination, ask students to sit in a semi-circle. Mark one end of the distance with tape or chalk. Then call volunteers one by one to measure out the distance, moving the meter stick forward one meter at a time until the distance is covered. Ask other children to help as needed to ensure that no gaps are left as the stick is moved each time. When the distance has been measured out, mark the other end with tape or chalk.

8. Ask students to estimate how many of them it would take, standing shoulder to shoulder, to span the distance they just marked off. Are there enough children in your class to cover the distance? Have them line up and try it. If there are not enough of them, plan to revisit the area later in the day if possible with another class to see how many children it takes to make a shoulder-to-shoulder line 14 meters wide.

Activity 3 One Hundred Army Ants & More (cont.)

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Army Ant Raids



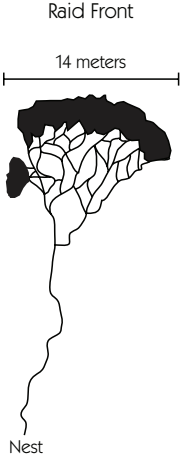
We are army ants. We live in huge groups. It's not unusual to find 1,000,000 or more of us in one colony.

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.

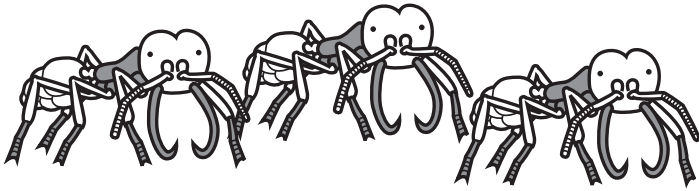
Maybe this sounds a little scary to you, but some people are happy when they see us coming. They leave their houses when we come through because they know when they come back, we will have cleaned out every single pesky bug!



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.
- Challenge interested students to figure out how many ants it would take to make a line 14 meters long.
- Leave the meter stick(s) out so students can continue to find objects around the classroom that are close to 1 meter long. Ask them to refine the list you made on the board during this activity, circling the suggested items that turned out to be close to a meter, and recording additional items they find over the next few days.

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!

