



# GRADE 2 SUPPLEMENT

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## Set D2 Measurement: Length in U.S. Customary Units

### Includes

Activity 1: Measuring Length in Teacher Feet	D2.1
Activity 2: Measuring Length in Giant Feet	D2.5
Activity 3: Head Strings	D2.9
Activity 4: Making Inchworm Rulers	D2.13
Activity 5: Estimate & Measure Inches	D2.19
Activity 6: From Feet to Yards	D2.25
Activity 7: Measuring in Yards	D2.29
Activity 8: How Long? How Tall?	D2.33
Activity 9: Exploring a Line Plot with Teacher Feet	D2.39
Activity 10: Making a Line Plot—Measuring Inches	D2.45
Activity 11: Day 1: Inch by Inch Line Plot—Creating the Inchworm Collage	D2.51
Activity 12: Day 2: Inch by Inch Line Plot—Measuring the Collage & Creating a Line Plot	D2.55
Independent Worksheet 1: Line Plot Practice	D2.61
Independent Worksheet 2: Line Plots	D2.63

### Skills & Concepts

- ★ explain the need for equal length units and the use of standard units of measure
- ★ apply concepts of partitioning and transitivity
- ★ use a measurement tool iteratively to measure the length of an object longer than the tool
- ★ identify objects that represent standard units and use them to measure length
- ★ estimate length in inches, feet, and yards
- ★ demonstrate an understanding that using different measurement units will result in different numerical measurements for the same object
- ★ recall equivalencies associated with length: 12 inches = 1 foot; 3 feet = 1 yard
- ★ measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes
- ★ generate measurement data by measuring lengths of several objects to the nearest whole unit
- ★ show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units

**Bridges in Mathematics Grade 2 Supplement**

**Set D2** Measurement: Length in U.S. Customary 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.

The Math Learning Center is a nonprofit organization serving the education community. Our mission is to inspire and enable individuals to discover and develop their mathematical confidence and ability. We offer innovative and standards-based professional development, curriculum, materials, and resources to support learning and teaching. To find out more, visit us at [www.mathlearningcenter.org](http://www.mathlearningcenter.org).

# Set D2 ★ Activity 1



## ACTIVITY

### Measuring Length in Teacher Feet

#### Overview

Students measure the width of the classroom with their feet. When they discover that the answers vary from one child to the next, they discuss the need for a standard unit of measure. Finally, they use teacher feet to measure various lengths around the classroom.

#### Skills & Concepts

- ★ explain the need for equal length units and the use of standard units of measure
- ★ apply concepts of partitioning and transitivity
- ★ use a measurement tool iteratively to measure the length of an object longer than the tool
- ★ identify objects that represent standard units and use them to measure length
- ★ demonstrate an understanding that using different measurement units will result in different numerical measurements for the same object

#### You'll need

- ★ Teacher Feet Record Sheet (page D2.4, half class set)
- ★ Teacher Feet (half class set, see Advance Preparation)
- ★ whiteboard and markers
- ★ a ruler
- ★ adding machine tape (optional)
- ★ *How Big is a Foot?*, by Rolf Myller (optional)

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**Advance Preparation** Find a shoe, your own or one belonging to another teacher in your building, that's about a foot long (1–2 inches more or less is fine). Lay the shoe on a piece of construction paper and trace around it. Use the tracing as a pattern to cut out a half-class set of teacher feet (each pair of students will need 1 teacher foot for this activity).

**Note** Save the construction paper teacher feet for use in Set D2 Activity 2 and Activity 9. Save the Teacher Feet Record Sheet (D2.4) for Set D2 Activity 9. We recommend doing Activity 9 right after Activity 1.

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#### Instructions for Measuring Length in Teacher Feet

1. Invite students to your discussion circle. As they watch, take 3 or 4 heel-to-toe steps, being careful not to leave any gaps as you walk. If they were to walk across the width of classroom just like this, how many steps do they think it would take? Ask them to pair-share estimates and then call on volunteers to share with the class. Record their estimates on the whiteboard.
2. Choose 3 pairs of helpers. Assign one student in each pair to be Partner A and the other to be Partner B. Have the 3 pairs position themselves along one side of the classroom while the rest of the students stay seated in the circle. Ask each pair to try to choose a location where they'll be able to walk across the room without running into desks, tables, or other furniture. Then have them measure the distance across the classroom, Partner A taking slow and careful heel-to-toe footsteps while Partner B counts. As they finish, have them report their results as you record at the whiteboard. Then ask them to reverse roles, Partner A now counting as Partner B steps back across the room. When they return to the circle, record their second set of results.

**Activity 1** Measuring Length in Teacher Feet (cont.)

3. Ask the class to discuss the 6 measurements. How do the numbers compare? Are they all the same? If not, how might students account for the differences? Which measurement is correct?

Estimates			Actual Number of Foot Steps		
30	25	100	Alesha	50 steps	
	42	35	29	Brant	37 steps
	50	23	40	Marissa	43 steps
			Drexler	34 steps	
			Kelsie	40 steps	
			Javier	45 steps	

4. Explain that people used their feet as a way to measure distances for centuries. As students might guess, this created problems, which some towns solved by choosing the length of one person's foot (perhaps the mayor's or the king's) to be the official length.

5. Then show students one of the construction paper "teacher feet" you've prepared, and demonstrate that it's about the same length as a 12-inch ruler. Explain that they're going to work in pairs to measure various things around the classroom. Each pair will get 1 teacher's foot to use as a measuring tool. Talk with students about how they might measure the length of a table, the width of the calendar pocket chart, or the distance from your desk to the door using a single teacher foot.

**Paulina** *I could set it down at the end of the table and then Amanda could put her finger where it ends. Then I could pick up the foot and move it to where her finger is, and we could just keep going like that.*

**Jose** *We could get together with some other kids and put the feet together in a line. Maybe like 3 or 4 would be long enough to measure some stuff.*

**Marissa** *We could get some long paper and stretch it out as long as what we're measuring. Then we could put the foot down at the start and mark where it comes to with a pencil. If we kept doing that we could see how many feet it took at the end.*

6. Show children a copy of the Teacher Feet Record Sheet. Work with one of the students to model the process of choosing something to measure, estimating how many teacher feet it is, and then measuring to find its actual length in teacher feet.

Things We Measured	Estimate	Actual Answer
the whiteboard ledge	10 TF	8 TF

**Activity 1** Measuring Length in Teacher Feet (cont.)

7. Once students understand what to do, give each pair a teacher foot and a record sheet and send them out to work.

**Extension**

- Read *How Big is a Foot?*, by Rolf Myller after the class does this activity. This book was first published in 1962 and reprinted in 1990. Chances are good you'll find it in your school library. It's very accessible to second graders, and reinforces the need for standard units of measure in a very engaging way.

NAME \_\_\_\_\_

DATE \_\_\_\_\_

# Teacher Feet Record Sheet

**1** How long are some of the things around our classroom in teacher feet?

Things We Measured	Estimate	Actual Answer

**2** What was the longest thing you measured?

**3** What was the shortest thing you measured?

**4** How many teacher feet do you think it would take to measure the distance from the classroom door to the office door?

# Set D2 ★ Activity 2



## ACTIVITY

### Measuring Length in Giant Feet

#### Overview

After listening to the story of *Jack and the Beanstalk*, students work in pairs to draw and cut out a giant's foot about a yard long. Then each pair uses their giant foot to measure various distances in and around the classroom.

#### Skills & Concepts

- ★ apply concepts of partitioning and transitivity
- ★ use a measurement tool iteratively to measure the length of an object longer than the tool
- ★ identify objects that represent standard units and use them to measure length

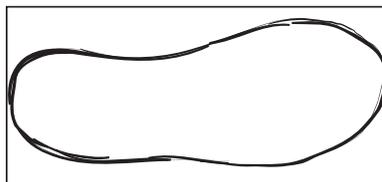
#### You'll need

- ★ Giant Feet Record Sheet (page D2.8, half class set)
- ★ 18" × 36" pieces of butcher paper, half class set, plus a few extra
- ★ Teacher Feet from Set D2 Activity 1
- ★ pencils
- ★ scissors
- ★ a yardstick
- ★ *Jack and the Beanstalk* (see note)

.....  
**Note** You'll probably find several different versions of this folktale in your school library. If not, you can find many different versions online.  
 .....

#### Instructions for Measuring Length in Giant Feet

1. Gather children to your discussion circle. Read *Jack and the Beanstalk* to the class, and take some time to discuss the story.
2. Fasten one of the pieces of butcher paper to the whiteboard. Explain that one of the giant's feet was as long as the paper. As students watch, sketch a footprint on the paper and cut it out.



3. Use some of the Teacher Feet from Set D2 Activity 1 and your yardstick to show students that the giant foot is *about* as same as 3 teacher feet or 1 yard. Ask children to estimate how wide the classroom is in giant feet. Record some of their estimates on the whiteboard.
4. Work with student input and help from one of the children to measure the width of the room with the giant's foot. What do you have to do to measure a distance with a single unit? (One solution is to pick it up and move it as many times as necessary.) How can you ensure that your measurement is as accurate as possible? (One thing you can do is get a partner to mark where the tip of the foot lands each time so you can set the heel down accurately as you move across the floor.)

**Activity 2** Measuring Length in Giant Feet (cont.)

5. When you're finished, record the actual measurement on the whiteboard. How does it compare with some of the measurements students made during Set D2 Activity 1?

6. Have students pair up (or assign partners if you prefer). Explain that you're going to give each pair a piece of butcher paper the same size as the one you just used. They'll need to draw a giant foot on the paper and cut it out. Although the foot needs to match the length of the paper, it can be a different shape. Perhaps they'll decide to make their giant foot look more like an animal paw or some other kind of foot. Once they've prepared their giant foot, they'll use it to measure different distances in and around the classroom.

7. Show children a copy of the Giant Feet Record Sheet. Set the parameters for this activity carefully, letting students know where they can and cannot work. Then have students brainstorm a list of some of the distances they might measure. Record their ideas on the whiteboard.

### Things to Measure in Giant Feet

- the length of the classroom
- the distance from the end of the chalkboard to the teacher's desk
- the distance from our table to our door
- the distance around the big rug
- the distance all the way around the classroom
- the distance from our classroom door to the office door
- the distance from one end of the corridor to the other

Set D2 Measurement: Length in Customary Units Blackline Run a half class set

NAME \_\_\_\_\_ DATE \_\_\_\_\_

### Giant Feet Record Sheet

1 How long are some of the things around our classroom in giant feet?

Things We Measured	Estimate	Actual Answer

8. Once students understand what to do, give each pair a piece of butcher paper and a record sheet and send them out to work.

**Extensions**

- Let students measure you with some of the Teacher Feet from Measurement—Length Activity 1 to get a sense of how your height compares to the size of your foot. Ask them to use this information, along with some of their butcher paper Giant Feet, to see how tall the giant might have been.

**Rachel** *It takes 5 teacher feet and then about half of another to measure Ms. Jones. We could fold one of the giant feet in half to see how tall he was.*

**Activity 2** Measuring Length in Giant Feet (cont.)



**Sam** *Wow! That's huge!*

**Drexler** *Yeah! It's nearly half-way across the room!*

- Have students draw and paint parts of a “life-size” giant on sheets of butcher paper and then tape them together. Post the giant, along with students’ measuring record sheets and a description of the activity in the cafeteria or gym (or someplace where the ceiling is more than 18’ tall). You can also post the display in the hallway if you don’t mind having the giant lying down on the job.
- Give students time to decorate the giant feet they made to accompany the display described above.

NAME \_\_\_\_\_

DATE \_\_\_\_\_

# Giant Feet Record Sheet

**1** How long are some of the things around our classroom in giant feet?

Things We Measured	Estimate	Actual Answer

**2** What was the longest thing you measured?

**3** What was the shortest thing you measured?

**4** How many giant feet do you think it would take to measure the distance across the playground?

# Set D2 ★ Activity 3



## ACTIVITY

### Head Strings

#### Overview

Each student cuts a piece of string to match the circumference of his or her head. Next, students estimate and measure the length of their strings with tile. The children use their strings to estimate the length of other objects around the classroom, and then measure each object with tile.

#### Skills & Concepts

- ★ apply concepts of partitioning and transitivity
- ★ use a measurement tool iteratively to measure the length of an object longer than the tool
- ★ identify objects that represent standard units and use them to measure length

#### You'll need

- ★ Head String Record Sheet (page D2.12, class set)
- ★ a 30" length of string for each student, plus a few extra
- ★ color tile (see Advance Preparation)
- ★ whiteboard and markers
- ★ a large picture book
- ★ pencils
- ★ scissors
- ★ rulers
- ★ *Jim and the Beanstalk*, by Raymond Briggs (optional)

**Advance Preparation** Divide all of your color tile into tubs or containers so that students sitting at each table have access to a good supply. (If you have more than about 20 students, you may want to borrow some tile from another classroom for this activity.)

#### Instructions for Head Strings

1. Gather children to your discussion circle. Let them know that they're going to use color tiles to do some measuring today. Then as they watch, wrap a length of string around your head and cut it to match. Explain that you've cut the string to match the circumference, or the distance around your head. Lay it in the middle of the circle and line up 4–5 tiles beside it, starting at one end of the string. Ask students to use the information to estimate the length of your head string in tiles.



**Students** *I think it's going to be about 20 because it sort of looks like 5, 5, 5, and 5 more will fit. I think more like 15. It just doesn't look like it's as much as 20. I'd say 25. I think it'll be 30.*

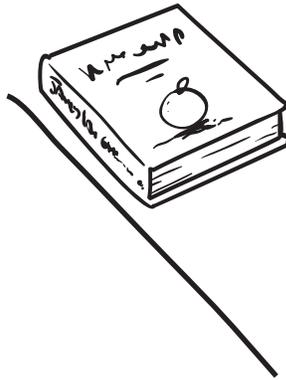
2. Record students estimates on the whiteboard and then add as many tiles as necessary to match the length of the string. Stop when you've reached the halfway point and invite students to revise their estimates.

**Activity 3** Head Strings (cont.)



**Students** *I want to change from 15 to 20. It's 11 so far, and it's already gone halfway.  
Can I change from 30 down to 23? I think it's going to be about 12 more.*

3. When you're finished, record the actual number of tiles it took to measure the string. Then move the tiles aside and set a large picture book in the middle of the circle beside your head string. Ask students to use what they know about the length of the string to estimate how many tiles it will take to measure the length of the book. Record their estimates.



**Students** *That book looks like it's about half as long as the string.  
The string is 22 tiles long, so the book is maybe 11.  
I don't think the book is half way. What happens if you fold the string in half? See? I think it's about 9 or 10 tiles.*

4. Measure the length of the book with tiles and record the answer. Then show students a copy of the Head String Record Sheet and review the instructions with them.

Set D2 Measurement: Length in U.S. Customary Units © Jackline Runa class set

NAME \_\_\_\_\_ DATE \_\_\_\_\_

### Head String Record Sheet

**1** Cut a string to match the circumference of your head.

**2** Estimate how many tile long your head string is.

I estimate that my head string is \_\_\_\_\_ tile long.

**3** Use tile to measure how long your head string is.

My head string is really \_\_\_\_\_ tile long.

**4** Use your head string to help estimate the length of each of the objects below. After you estimate the length of an object, measure it with tile to find out how long it really is.

Object	Estimate (in tile)	Actual Answer (in tile)
your chair 		
a table or desk 		
a large book 		

### Activity 3 Head Strings (cont.)

5. When students understand what to do, send them back to the tables to get their pencils and scissors as you pass out a length of string and a record sheet to each of them. Have helpers place a tub of tiles on each table. Encourage them to help each other cut their head strings, and let them know that they'll need to share the tiles with others at their tables.

6. Reconvene students toward the end of your math time to share and compare their work. How many tiles did it take to measure the length of the ruler? (12) What does that tell them about the length and width of each tile? (Each tile is  $1" \times 1"$ .)

#### Extensions

- If students enjoyed finding the height of the giant in Set D2 Activity 2, they may also enjoy using your head string to cut a length of string that might match the giant's head.

***Hunter** It took 3 teacher feet to fit into a giant foot, right?*

***Shelby** Right, so maybe if we cut a string 3 times as long as the teacher's head string and put it in a circle, we could see how big around the giant's head was!*

***Tate** Let's try it and see if it looks big enough!*

- Read *Jim and the Beanstalk*, by Raymond Briggs to the class. In this modern retelling of the old classic, Jim helps the giant, who's now old and infirm, and does some measuring in the process.

NAME \_\_\_\_\_

DATE \_\_\_\_\_

# Head String Record Sheet

**1** Cut a string to match the circumference of your head.

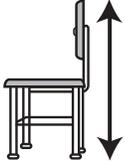
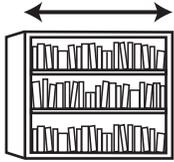
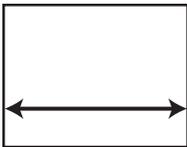
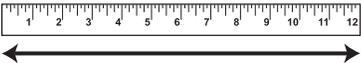
**2** Estimate how many tile long your head string is.

I estimate that my head string is \_\_\_\_\_ tile long.

**3** Use tile to measure how long your head string is.

My head string is really \_\_\_\_\_ tile long.

**4** Use your head string to help estimate the length of each of the objects below. After you estimate the length of an object, measure it with tile to find out how long it really is.

Object	Estimate (in tile)	Actual Answer (in tile)
your chair 		
a table or desk 		
a large book 		
a shelf 		
a big piece of paper 		
the length of a ruler 		

# Set D2 ★ Activity 4



## ACTIVITY

### Making Inchworm Rulers

#### Overview

Students share what they know about 12" rulers. Then they make their own rulers and use them to find things in the classroom that are shorter than, longer than, and the same length as a foot.

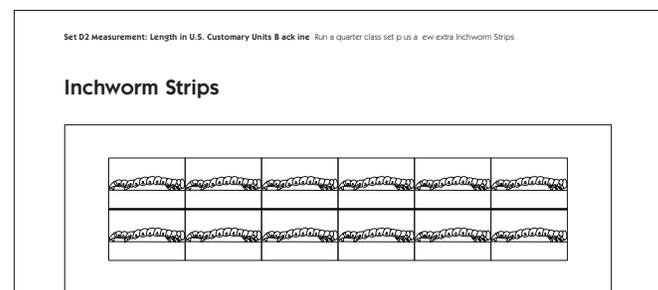
#### Skills & Concepts

- ★ identify objects that represent standard units and use them to measure length
- ★ generate common measurement referents for inches and feet
- ★ learn that there are 12 inches in a foot
- ★ generalize connections among mathematics, the environment, and other subjects

#### You'll need

- ★ Meet the Inchworm! (page D2.16, run 1 copy)
- ★ Inchworm Strips (page D2.17, quarter class set, see Advance Preparation)
- ★ Inchworm Ruler Record Sheet (page D2.18, run a class set)
- ★ 12" ruler
- ★ 2" × 12" strips of poster board, 1 per student, plus 2–3 extra strips
- ★ glue sticks
- ★ scissors
- ★ yellow and green crayons or colored pencils

**Advance Preparation** Run a quarter class set of the Inchworm Strips on page D2.17. Make sure your copy machine is set at 100% or a percentage that results in strips of inchworms that are exactly 6" long. Cut the sheets into quarters to provide two 6" strips for each student.



**Note** Keep the inchworm rulers for Activity 5, 10, 11 and 12.

#### Instructions for Making Inchworm Rulers

1. Invite students to your discussion area. Show them a 12-inch ruler, but don't identify it by name. Ask them to pair-share anything they know about this tool. After a minute or two, ask volunteers to share their ideas with the class. As the discussion unfolds, guide students to address some of the questions below:

- What is the name of this tool?
- What do people use it for?
- Who is likely to use this tool, and when?
- How does a ruler help us measure the length of something?

**Activity 4** Making Inchworm Rulers (cont.)

- How long is it?
- Why is a ruler marked with numbers and lines?

2. Next, explain that the students are each going to make their own ruler today, with the help of an animal called an inchworm. Show them your copy of Meet the Inchworm! and invite any comments they may have about the illustrations. Then read the sheet to the children and ask them to listen carefully to find out why this animal is called an inchworm.

Set D2 Measurement: Length in U.S. Customary Units Blackline Run 1 Copy

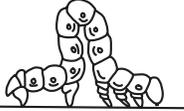
### Meet the Inchworm!



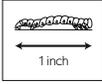
Hi! I am an inchworm. I'm not really this big, but I thought you'd like to get a good look at me. I am a moth larva. When I get older, I will make a cocoon and become a moth.

As you can see, I have 3 pairs of legs in the front and 2 pairs of legs in the back. How many legs is that in all?

When I walk, I hold on with my front legs and move my back legs forward. Then I hold on with my back legs and stretch forward with my front legs. So it's hump up and then stretch out, hump up and then stretch out.

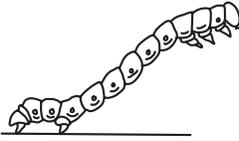


Although some inchworms are shorter and some are longer, many of us are actually 1 inch long.



When I walk in my special way, some people think it looks like I'm measuring things in inches. That's why they call me an inchworm.

When an enemy comes along and disturbs me, I can stand very still on my back legs so I look like a twig. Don't you think that's a good camouflage strategy?

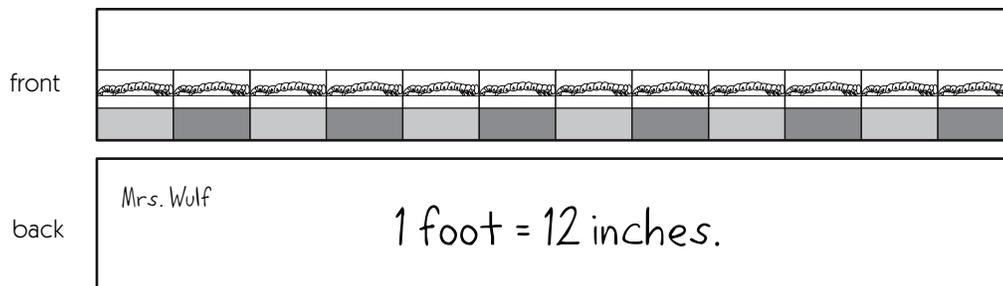


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3. Invite students to share more comments about the inchworm after you finish reading the sheet. Then show them the materials they'll use to make their own ruler: a strip of poster board, a quarter sheet of inchworm strips, a yellow and a green crayon, a pair of scissors, and a glue stick. Use the ruler to measure the poster board strip. Is it really 1 foot long? Give students a few moments to examine the pair of inchworm strips. How long do they think each strip will be when it's cut out? Why? If you cut out the two strips and lay them end-to-end, will they stretch the length of the poster board strip? How do they know?

4. Demonstrate how to color the sections below the inchworms on the strips in a pattern of alternating yellow and green. Then show students how to cut out the 2 strips and glue them to the poster board strip. Finally, turn your ruler over and label it as shown below.

**Activity 4** Making Inchworm Rulers (cont.)



5. 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 Inchworm 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 rulers.

Set D2 Measurement: Length in U.S. Customary Units Blackline Run a class set

NAME \_\_\_\_\_ DATE \_\_\_\_\_

### Inchworm Ruler Record Sheet

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

- shorter than 1 foot
- exactly 1 foot long
- longer than 1 foot

Fill in this chart to show what you find.

SHORTER THAN 1 FOOT	EXACTLY 1 FOOT	LONGER THAN 1 FOOT

**2** My shoe is (circle one)

shorter than a foot                      exactly a foot                      longer than a foot

**3** My arm is (circle one)

shorter than a foot                      exactly a foot                      longer than a foot

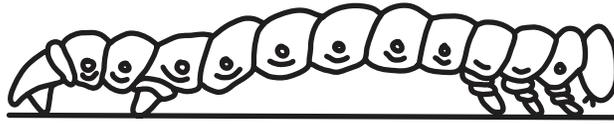
**CHALLENGE**

**4** There are \_\_\_\_\_ inches in 1 foot.

**5** There are \_\_\_\_\_ inches in 2 feet.

6. If necessary, give students more time the following day, perhaps during a designated seatwork period, to complete the sheet. During the next activity in this set, children will number their inchworm rulers and use them for more measuring tasks, so don't send the rulers home yet.

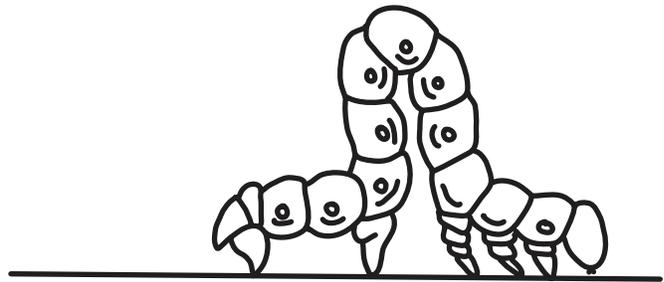
## Meet the Inchworm!



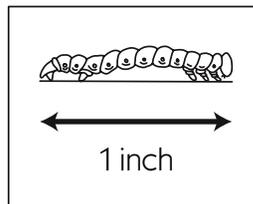
Hi! I am an inchworm. I'm not really this big, but I thought you'd like to get a good look at me. I am a moth larva. When I get older, I will make a cocoon and become a moth.

As you can see, I have 3 pairs of legs in the front and 2 pairs of legs in the back. How many legs is that in all?

When I walk, I hold on with my front legs and move my back legs forward. Then I hold on with my back legs and stretch forward with my front legs. So it's hump up and then stretch out, hump up and then stretch out.

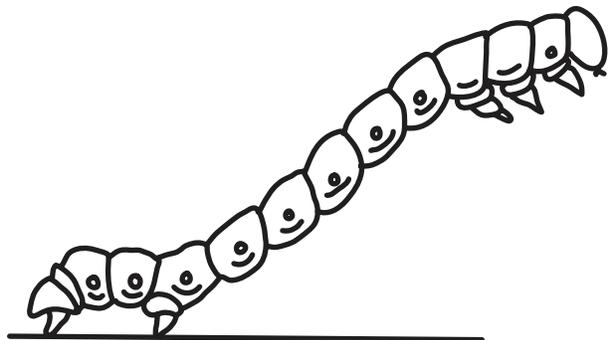


Although some inchworms are shorter and some are longer, many of us are actually 1 inch long.

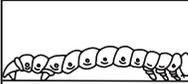
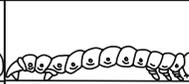
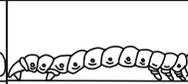
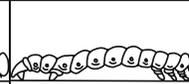
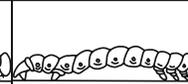
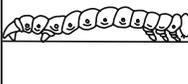
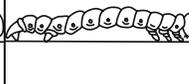
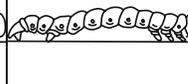
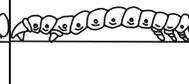
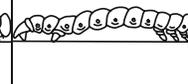
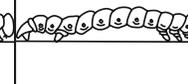


When I walk in my special way, some people think it looks like I'm measuring things in inches. That's why they call me an inchworm.

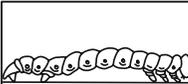
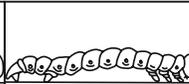
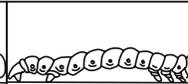
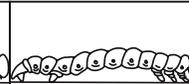
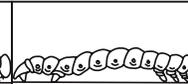
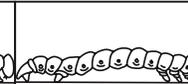
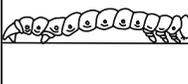
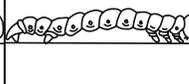
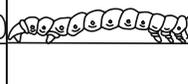
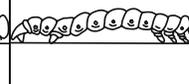
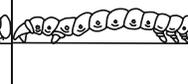
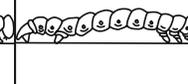
When an enemy comes along and disturbs me, I can stand very still on my back legs so I look like a twig. Don't you think that's a good camouflage strategy?



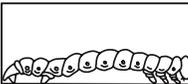
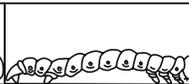
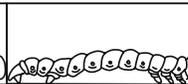
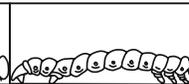
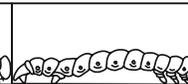
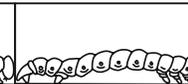
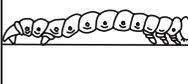
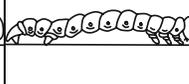
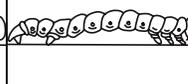
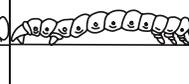
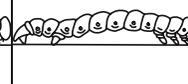
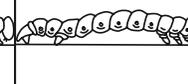
# Inchworm Strips

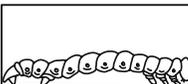
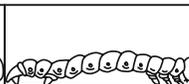
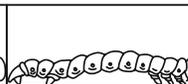
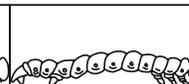
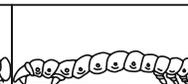
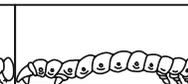
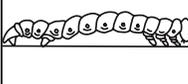
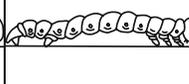
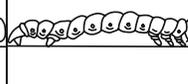
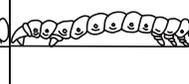
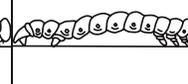
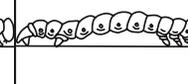
  

NAME \_\_\_\_\_

DATE \_\_\_\_\_

# Inchworm Ruler Record Sheet

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

- shorter than 1 foot
- exactly 1 foot long
- longer than 1 foot

Fill in this chart to show what you find.

SHORTER THAN 1 FOOT	EXACTLY 1 FOOT	LONGER THAN 1 FOOT

**2** My shoe is (circle one)

shorter than a foot

exactly a foot

longer than a foot

**3** My arm is (circle one)

shorter than a foot

exactly a foot

longer than a foot



## CHALLENGE

**4** There are \_\_\_\_\_ inches in 1 foot.

**5** There are \_\_\_\_\_ inches in 2 feet.

# Set D2 ★ Activity 5



## ACTIVITY

### Estimate & Measure Inches

#### Overview

After some group work and discussion, students number their inchworm rulers so they are easier to read. Then they use color tile and 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 inches
- ★ measure length to the nearest inch

#### You'll need

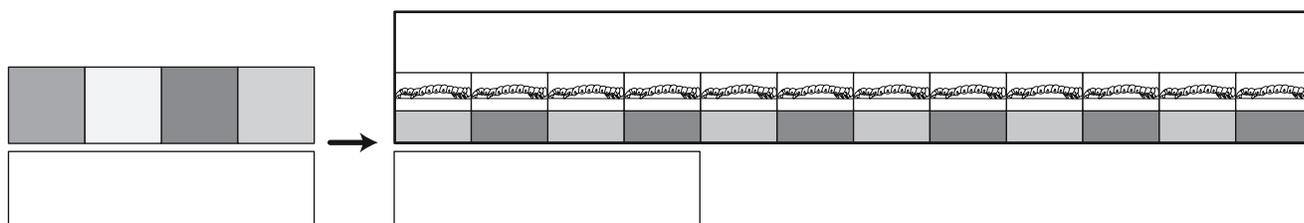
- ★ Estimate & Measure Inches, Record Sheets 1–3 (pages D2.22–D2.24, run a class set of each)
- ★ students' inchworm rulers from Set D2, Activity 4
- ★ inch-wide paper strips (see Advance Preparation)
- ★ color tile (see Advance Preparation)
- ★ pencils
- ★ several classroom rulers marked in inches

**Advance Preparation** Cut a half-class set of inch-wide colored paper strips in the following lengths and colors: 4" yellow strips, 8" blue strips, and 10" red strips. Divide your color tile into tubs or containers so that each pair of students has easy access to 25–30 tile while they are in the discussion circle and later as they are working independently.

**Note** Save the Estimate and Measure Inches, Record Sheets 1–3 for Set D2 Activity 10. We recommend doing Activity 10 right after Activity 5.

#### Instructions for Estimate & Measure Inches

1. Gather students to the discussion area and have them form a circle. Ask them to bring their inchworm rulers and pencils with them. When they're settled, have them pair up with their neighbors. Explain that they are going to work together to measure some strips of paper, first with tile and then with an inchworm ruler. Have one child in each pair put his or her ruler aside for now, and give each pair a container of tile.
2. Hold up one of the 4" yellow construction paper strips. Ask students to estimate its length. Record their ideas on the board. Then give each pair of students one of the 4" strips. Have them place tile end-to-end to measure the length of their strip. Then have them measure the same strip with their inchworm rulers. Discuss the results.



**Activity 5** Estimate & Measure Inches (cont.)

**Students** *It was 4 both times, 4 tiles, and then 4 of those worms on the ruler.*

*Yep, it took 4 tiles first. Then with the ruler, it went up to 4 inchworms.*

*Those tiles are 1 inch, remember?*

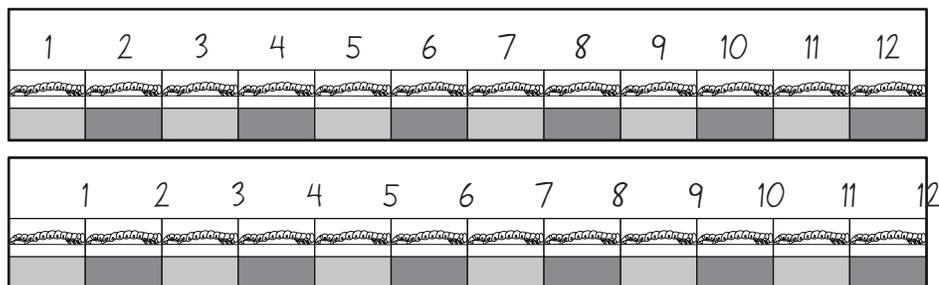
*The ruler is kind of like having tiles stuck together.*

3. Repeat step 2 with the 8" blue paper strips and the 10" red paper strips. Encourage students to use the shorter strips to help estimate the lengths of the longer strips. As you discuss the results of measuring the second and third strips with tile and rulers, ask students which measuring tool is easier to use and why.

4. Although some students may prefer the tile, chances are some will believe that the ruler is quicker and easier because it doesn't require them to line up a collection of objects. Even so, they still have to count the inchworms along the ruler to be sure of the lengths they're measuring. Ask them to discuss the idea of numbering their ruler to make it even easier to use. Is there some way they can write numbers above the inchworms so they don't have to count the worms every time they measure something?

5. Give students a minute or two to pair-share ideas about ways to number their rulers. Then ask volunteers to share their thinking with the class. After some ideas have been shared, ask students to use their pencils to write numbers on their rulers that will make their measuring job easier. Encourage them to use a system that makes best sense to them.

Chances are, many students will number the worms, as shown on the top ruler. A few, however, perhaps more familiar with rulers, may choose to make a tic-mark between each worm and number the marks. This may lead to an interesting discussion about the 12th number. It's clear that there are 12 inch worms on the ruler, but where does the 12 belong if you number a tic-mark at the end of each worm? You may want to have interested students inspect a classroom ruler marked in inches to see how the problem has been solved on a "regular" ruler.



6. When students have numbered their rulers, give them each a copy of the first Estimate & Check Inches record sheet. Review the sheet with the class and clarify as needed. 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. Remind them to estimate the length in inches before they measure, and to measure each item with tile as well as their ruler.

**Note** *Having students measure the same objects twice, once with tile and once with their inchworm rulers will help them make a smoother transition from measuring by lining up and counting concrete objects, to using a ruler, which is more efficient, but also more abstract.*

### Activity 5 Estimate & Measure Inches (cont.)

#### 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 during Work Places sometime in the next few days. There are two additional Estimate & Check Inches record sheets on pages D2.23 and D2.24. The second sheet involves measuring some lengths that are more than 12 inches. The third sheet invites children to choose their own items to measure in inches. Place copies of these two sheets in a tub, along with the tile, to create a Work Place for students to revisit on their own. (This activity may be used to replace Work Place 3C, Math Bucket Mystery Patterns.)

Set D2 Measurement: Length in U.S. Customary Units Blackline Run a class set  
 NAME \_\_\_\_\_ DATE \_\_\_\_\_

**Estimate & Measure Inches Record Sheet** page 1 of 3

**1** Use square inch tiles and your inchworm ruler to estimate and measure length in inches.

- Write down your estimate. How many inches long do you think it is?
- Measure the length with tiles.
- Measure it again with your ruler.

OBJECT	MY ESTIMATE	LENGTH IN TILES	LENGTH IN INCHES
<b>a</b> Pencil 	_____ inches	_____ tiles	_____ inches
<b>b</b> Crayon 	_____ inches	_____ tiles	_____ inches
<b>c</b> Book 	_____ inches	_____ tiles	_____ inches
<b>d</b> Chair Seat 	_____ inches	_____ tiles	_____ inches
<b>e</b> 10 Unifix Cubes 	_____ inches	_____ tiles	_____ inches
<b>f</b> Calculator 	_____ inches	_____ tiles	_____ inches
<b>g</b> You Choose _____	_____ inches	_____ tiles	_____ inches

Set D2 Measurement: Length in U.S. Customary Units Blackline Run a class set  
 NAME \_\_\_\_\_ DATE \_\_\_\_\_

**Estimate & Measure Inches Record Sheet** page 2 of 3

**2** Use square inch tiles and your inchworm ruler to estimate and measure length in inches.

- Write down your estimate. How many inches long do you think it is?
- Measure the length with tiles.
- Measure it again with your ruler.

OBJECT	MY ESTIMATE	LENGTH IN TILES	LENGTH IN INCHES
<b>a</b> Your Hand 	_____ inches	_____ tiles	_____ inches
<b>b</b> Piece of Paper 	_____ inches	_____ tiles	_____ inches
<b>c</b> Shoe 	_____ inches	_____ tiles	_____ inches
<b>d</b> Table 	_____ inches	_____ tiles	_____ inches
<b>e</b> You Choose _____	_____ inches	_____ tiles	_____ inches
<b>f</b> You Choose _____	_____ inches	_____ tiles	_____ inches

**3** How many inches are there in 1 foot? (circle the right answer)

2 inches      10 inches      12 inches      16 inches

**Note** Students will need their inchworm rulers Activities 10, 11 and 12 in this supplement. 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 \_\_\_\_\_

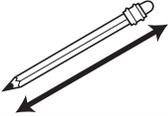
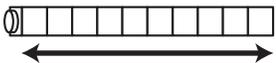
DATE \_\_\_\_\_

# Estimate & Measure Inches Record Sheet

 page 1 of 3

**1** Use square inch tiles and your inchworm ruler to estimate and measure length in inches.

- Write down your estimate. How many inches long do you think it is?
- Measure the length with tiles.
- Measure it again with your ruler.

OBJECT	MY ESTIMATE	LENGTH IN TILES	LENGTH IN INCHES
<b>a</b> Pencil 	_____ inches	_____ tiles	_____ inches
<b>b</b> Crayon 	_____ inches	_____ tiles	_____ inches
<b>c</b> Book 	_____ inches	_____ tiles	_____ inches
<b>d</b> Chair Seat 	_____ inches	_____ tiles	_____ inches
<b>e</b> 10 Unifix Cubes 	_____ inches	_____ tiles	_____ inches
<b>f</b> Calculator 	_____ inches	_____ tiles	_____ inches
<b>g</b> You Choose _____	_____ inches	_____ tiles	_____ inches

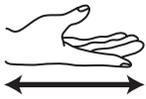
NAME \_\_\_\_\_

DATE \_\_\_\_\_

## Estimate & Measure Inches Record Sheet page 2 of 3

**2** Use square inch tiles and your inchworm ruler to estimate and measure length in inches.

- Write down your estimate. How many inches long do you think it is?
- Measure the length with tiles.
- Measure it again with your ruler.

OBJECT	MY ESTIMATE	LENGTH IN TILES	LENGTH IN INCHES
<b>a</b> Your Hand 	_____ inches	_____ tiles	_____ inches
<b>b</b> Piece of Paper 	_____ inches	_____ tiles	_____ inches
<b>c</b> Shoe 	_____ inches	_____ tiles	_____ inches
<b>d</b> Table 	_____ inches	_____ tiles	_____ inches
<b>e</b> You Choose _____	_____ inches	_____ tiles	_____ inches
<b>f</b> You Choose _____	_____ inches	_____ tiles	_____ inches

**3** How many inches are there in 1 foot? (circle the right answer)

2 inches    10 inches    12 inches    16 inches

NAME \_\_\_\_\_

DATE \_\_\_\_\_

# Estimate & Measure Inches Record Sheet

page 3 of 3

**4** Use square inch tiles and your inchworm ruler to estimate and measure length in inches.

- Choose what you want to measure. Show it on your record sheet.
- Write down your estimate. How many inches long do you think it is?
- Measure the length with tiles.
- Measure it again with your ruler.

OBJECT	MY ESTIMATE	LENGTH IN TILES	LENGTH IN INCHES
<b>a</b> You Choose _____	_____ inches	_____ tiles	_____ inches
<b>b</b> You Choose _____	_____ inches	_____ tiles	_____ inches
<b>c</b> You Choose _____	_____ inches	_____ tiles	_____ inches
<b>d</b> You Choose _____	_____ inches	_____ tiles	_____ inches
<b>e</b> You Choose _____	_____ inches	_____ tiles	_____ inches
<b>f</b> You Choose _____	_____ inches	_____ tiles	_____ inches

# Set D2 ★ Activity 6



## ACTIVITY

### From Feet to Yards

#### Overview

Students estimate the length of a distance you've pre-marked in the corridor outside the classroom and then use their inchworm rulers to measure it in feet. When they return to the classroom, they work in groups of three to cut yard-long lengths of string, and then re-measure the distance in the hall, this time in yards instead of feet.

#### Skills & Concepts

- ★ estimate length in feet and yards
- ★ measure length to the nearest foot and the nearest yard
- ★ learn that there are 3 feet in a yard
- ★ predict whether the measurement will be greater or smaller when different units are used to measure the same length

#### You'll need

- ★ students' inchworm rulers from Set D2, Activity 4
- ★ a yardstick
- ★ a ball of heavy cotton string for each group of 3 children (see note)
- ★ scissors
- ★ felt pens
- ★ blue masking tape (see Advance Preparation)
- ★ a piece of chart paper and a felt pen (see Advance Preparation)
- ★ a piece of 12" × 18" drawing paper for each student (optional)
- ★ pencils and crayons (optional)

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**Advance Preparation** Measure out a length of 24 feet in the corridor outside your classroom. Mark it at either end with a strip of blue masking tape. Post the piece of chart paper on the wall near the length you've marked in the corridor.



**Note** If you don't have multiple balls of string, wind several yards of string around a large craft stick or a small piece of poster board for each group.

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#### Instructions for From Feet to Yards

1. Explain that you're going to take the children into the corridor outside your classroom to do some measuring. Have them to line up at the door with their inchworm rulers. Once they're out in the corridor, have them stand or sit in a line along one wall. (If it's an outside corridor, have them to sit or stand along the edge of the walkway across from the wall.)
2. Have a volunteer walk the distance between the two pieces of masking tape as the other students watch. How many feet long is the distance you've marked off? Ask students to pair-share estimates, and then call on volunteers to share their ideas. Record their estimates on the piece of chart paper you've posted.

**Activity 6** From Feet to Yards (cont.)

3. Then call on students one by one to lay down their inchworm rulers end-to-end, name side up, to measure the distance. If you have fewer than 24 students, ask them to work together to figure out how to measure the remaining distance. They might propose using some of the regular rulers from the classroom, or re-using some of their inchworm rulers. When all the rulers have been laid end-to-end, count them with the class. Then ask students to retrieve their rulers, line up again, walk back into the classroom, and join you in the discussion area.

4. When they're settled back in the classroom, ask students to discuss the length they measured. Here are some questions to pose:

- How many feet long was the distance we just measured?
- What else can you think of that might be about that long?
- Can you think of a tool that might have made our job easier?

5. After some discussion, show students the yardstick. Explain that in addition to using inches and feet, people sometimes measure length in yards. How does the yardstick compare to a foot? After students have made some estimates, borrow some of their inchworm rulers and work with their input to measure the yardstick.

6. When the students have determined that there are 3 feet in a yard, ask them what would happen if you measured the length in the corridor using yards instead of feet. Would it take more or fewer of these units to measure the distance? Ask students to pair-share their ideas, and then call on volunteers to explain their thinking to the class.

**Students** *Those yards are bigger, so it would take more of them.*

*But the stick is longer than our worm rulers. It took a whole bunch of rulers to measure out there. It wouldn't take as many of these sticks.*

7. While some students may be positive that it would take fewer yards than feet to measure the distance, others may be just as convinced that because a yard is longer than a foot, it will take more of them. Explain that you're going to have the students work in groups of 3 to carefully measure and cut a length of string that is one yard long. Borrow an inchworm ruler from one of the students and ask two volunteers to help you model the process in the discussion circle with input from the class. What can you do to ensure that the length you cut is accurate?



**Alex** *Let's pull it a little tighter so the string is really straight!*

8. When students understand what to do, assign the groups of 3 and send them off to work. Encourage them to be as accurate as possible. As groups finish, have them bring their yard-long strings back to the discussion area and seat themselves there until everyone has returned.

9. When all the groups have finished, take the class back out into the corridor. Have them think again about whether it will take more or fewer yards than feet to measure the distance. After they've had a few moments to think about it, ask them to estimate how many yard-long strings it will take to measure the distance. Record their estimates on your chart paper. Then call on students one by one, one from

**Activity 6** From Feet to Yards (cont.)

each group, to place their strings end-to-end to measure the distance. Use blue masking tape to hold the strings down at either end if necessary. Determine the total with the class, and then have students return to the classroom.

10. Collect students' yard-long strings. You will need them for other activities in this set. Collect or have students put away their inchworm rulers for use in future activities.

11. Take a few minutes to discuss the results. Did it take more yards or more feet to measure the distance in the corridor? How did the number of yards compare with the number of feet it took? Why did it work that way? Why is it useful to have different sized units to measure length? What are some other things people might choose to measure in yards instead of feet? What are some things people might choose to measure in inches or feet instead of yards?

**Extensions**

- After you measure the length in the corridor in feet and have determined with the class that there are 3 feet in a yard, ask students to predict how many yards it will take to measure the distance based on the number of feet. That is, if they know the length is 24 feet, and there are 3 feet in a yard, can they use the information to make an accurate prediction before you go out to measure?
- Give students each a piece of drawing paper. Have them fold it into thirds and label each section as shown below. Ask them to draw and label one or more objects in each section that people might choose to measure using that unit. Display their drawings on the classroom wall or in the corridor.

Inches	Feet	Yards



# Set D2 ★ Activity 7



## ACTIVITY

### Measuring in Yards

#### Overview

Students use the yard strings they cut during the previous to measure things around the room to the nearest yard.

#### Skills & Concepts

- ★ estimate length to the nearest yard
- ★ measure length to the nearest yard
- ★ recall equivalencies associated with length:  
12 inches = 1 foot; 3 feet = 1 yard

#### You'll need

- ★ Measuring in Yards (page D2.31, run a class set)
- ★ students' yard strings from Set D2, Activity 6
- ★ string (see Advance Preparation)
- ★ *Twelve Snails to One Lizard*, by Susan Hightower (optional)

.....  
**Advance Preparation** Cut enough extra yard strings so that you have one for each pair of students in your class.  
 .....

#### Instructions for Measuring in Yards

1. Gather students to your discussion area. Explain that they are going to work in pairs today to measure some things around the room in yards. Then give them each a copy of the Measuring in Yards sheet. Read the sheet with the class and provide clarification as needed.

2. Before you send students out to work, ask them to look around the room from where they're sitting. What do they see that is probably shorter than 1 yard? Can they see something that looks like it would be longer than 1 yard, or exactly 1 yard long? Can they spot something that looks like it is about 2 yards long? How many feet would that be? How do they know? When they go out to work with their partner, how will the two of them use a single string that is one yard long to measure 2 yards?

**Students** *We can hold the string together and then move it.*

*First we can stretch it out. Then I can hold it down on one end and Joshua can move it around to do the next yard.*

*We can be like inchworms except measuring yards.*

*We can be yardworms!*

3. Take a minute to talk about measuring to the nearest yard. What if they can't find something that is exactly 3 yards long?

**Shanti** *It says to find something about 3 yards long. It doesn't have to be perfect.*

Work with a volunteer to measure something students estimate to be about 3 yards long. As you do so, talk with students about determining the nearest yard. How will they know if the length is closer to 2 yards or closer to 3 yards?

4. When students understand what to do, give each pair a yard string and send them out to work.

## Activity 7 Measuring in Yards (cont.)

Set D2 Measurement: Length in U.S. Customary Units © Ack Ine Run a class set

NAME \_\_\_\_\_ DATE \_\_\_\_\_

### Measuring in Yards

**1** Use your yard string. Find 2 things in the room that are:

- shorter than 1 yard
- exactly 1 yard long
- longer than 1 yard.

Fill in this chart to show what you find.

SHORTER THAN 1 YARD	EXACTLY 1 YARD LONG	LONGER THAN 1 YARD

**2** My partner is (circle one)

shorter than a yard                  exactly a yard                  longer than a yard

**3** A bookshelf in our room is (circle one)

shorter than a yard                  exactly a yard                  longer than a yard

**4** Find something in the room that is about 2 yards long. Find something that is about 3 yards long. Find something that is about 4 yards long. Fill in the chart to show what you find.

ABOUT 2 YARDS LONG	ABOUT 3 YARDS LONG	ABOUT 4 YARDS LONG

**5** How many feet are there in 1 yard? There are \_\_\_\_\_ feet in 1 yard

**6** How many feet are there in 2 yards? There are \_\_\_\_\_ feet in 2 yards.

**7** How many inches are there in 1 foot? There are \_\_\_\_\_ inches in 1 foot.

**8** How many inches are there in 1 yard? There are \_\_\_\_\_ inches in 1 yard

## Extension

- If you have access to the book, read *Twelve Snails to One Lizard*, by Susan Hightower, to your students. In this story, Milo the Beaver needs to cut a branch exactly 36 inches long to bridge a gap in his dam. As luck would have it, the snails in his neck of the woods are exactly 1 inch long, the iguana lizards are 1 foot long, and the nearest boa happens to be 1 yard long. Not all of Milo's friends are interested in helping with the measuring task at hand, but the story may help children remember the relationships among the inches, feet, and yards.

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## Measuring in Yards

**1** Use your yard string. Find 2 things in the room that are:

- shorter than 1 yard
- exactly 1 yard long
- longer than 1 yard.

Fill in this chart to show what you find.

SHORTER THAN 1 YARD	EXACTLY 1 YARD LONG	LONGER THAN 1 YARD

**2** My partner is (circle one)

shorter than a yard

exactly a yard

longer than a yard

**3** A bookshelf in our room is (circle one)

shorter than a yard

exactly a yard

longer than a yard

**4** Find something in the room that is about 2 yards long. Find something that is about 3 yards long. Find something that is about 4 yards long. Fill in the chart to show what you find.

ABOUT 2 YARDS LONG	ABOUT 3 YARDS LONG	ABOUT 4 YARDS LONG

**5** How many feet are there in 1 yard? There are \_\_\_\_\_ feet in 1 yard

**6** How many feet are there in 2 yards? There are \_\_\_\_\_ feet in 2 yards.

**7** How many inches are there in 1 foot? There are \_\_\_\_\_ inches in 1 foot.

**8** How many inches are there in 1 yard? There are \_\_\_\_\_ inches in 1 yard



# Set D2 ★ Activity 8



## ACTIVITY

### How Long? How Tall?

#### Overview

During this measuring extravaganza, students first estimate and measure the height of the teacher and one of their classmates in yards, feet, and inches. Children then work in small groups to measure, cut, label, and illustrate lengths of adding machine tape to match the lengths of various large animals.

#### Skills & Concepts

- ★ use common referents to make estimates in inches, feet, and yards
- ★ measure length in inches, feet, and yards
- ★ predict whether the measurement will be greater or smaller when different units are used to measure the same object
- ★ recall equivalencies associated with length:  
12 inches = 1 foot; 3 feet = 1 yard
- ★ generalize connections among mathematics, the environment, and other subjects

#### You'll need

- ★ Animal Information Cards (pages D2.36 and D2.37, run 1 copy of each sheet on card stock, see Advance Preparation)
- ★ one small envelope for every 3–4 students
- ★ a roll of adding machine tape for each group of 3–4 students (see note)
- ★ students' inchworm rulers from Set D2, Activity 4
- ★ students' yard strings from Set D2, Activity 6
- ★ classroom rulers
- ★ 1 or more yardsticks
- ★ 3 cloth measuring tapes (from your Bridges kit)
- ★ scissors
- ★ crayons, colored pencils, and felt markers
- ★ Internet access or animal books (optional)
- ★ *Is a Blue Whale the Biggest Thing There Is?*, by Robert E. Wells (optional)

**Advance Preparation** Run one copy of both sheets on card stock. Cut the 12 cards apart. Each group of 3–4 children in your class will need one card. Choose the cards you want to use and place each in a small envelope. You may also want to pre-arrange the work groups taking into consideration which students work best together.

**Note** You can either provide each group with its own roll of adding machine tape, or pre-cut a length of about 18 feet for each group from a single roll. If you cut lengths, gently fold each length back and forth on itself and fasten it in the middle with a paperclip to make it more manageable to carry around.

**Activity 8** How Long? How Tall? (cont.)**Instructions for How Long? How Tall?**

1. Gather students to your discussion area. Place a cloth measuring tape, a yardstick, a classroom ruler, an inchworm ruler, and a yard string within easy reach and sight of the students. Stand up and invite one of the children to stand next to you. Ask students to compare your heights, and make some estimates. Here are some questions to pose:

- Which one of us is taller? Which one of us is shorter?
- Is either of us taller than 1 yard? Is either of us taller than 2 yards?
- About how many feet tall do you think I am? What about my volunteer? (Record students' estimates on the board.)
- About how much taller am I than my volunteer?

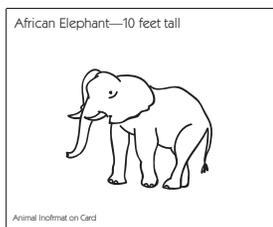
2. Place the end of the yardstick on the floor and hold it upright between you and your student volunteer. Ask students to use the visual benchmark provided by this tool to reconsider their estimates. If they know there are 3 feet in a yard, and they can see the 3-foot measure right next to you and your volunteer, does the information help them make more accurate estimates? Invite them to change their estimates if they want to. Record any new estimates on the board in a different color.

3. Work with help from students to measure your height and that of your volunteer to the nearest yard, the nearest foot, and the nearest inch. As you measure in different units, solicit students' ideas about which tools to use for each task. Have students predict whether the results will be greater or smaller as you switch from one unit to the next. Record the measurements as you go. Which unit gives the most accurate measure? Why?

How tall are we to the nearest whole unit?	
Mrs. Hill	Gabe
2 yards	1 yard
5 feet	4 feet
65 inches	47 inches

4. Now ask students to think of some of the large animals they've seen at the zoo, or in a video, or on TV, or in a book. What are some of the tallest animals they can think of? What are some of the longest animals? How do the heights or lengths of some of these animals compare to the students' heights?

5. After some discussion, explain that they are going to work in groups of 3 or 4 to measure, cut, label, and illustrate the height or length of a large animal. If you have pre-arranged the work groups, assign children to their groups now. Ask them to rearrange themselves in your discussion area so they are sitting in their groups. Then show them the envelopes you've prepared. Tell them that each envelope has a card in it with a picture of a large animal. Ask one student from one of the groups to select an envelope from your hand. Have that student open the envelope, show the animal card to his or her team-mates, and then give you the card to show to the class.

**Activity 8** How Long? How Tall? (cont.)

6. Examine the card with the class. Show them a roll or length of adding machine tape. What tools could they use to measure and cut a length of tape as long as an African elephant is tall? Discuss students' ideas. Then explain that they'll need to do the following:

- Measure and cut the tape to match the height or length of their animal.
- Put their names on the back of the tape.
- Write the name of the animal on the front.
- Write the length or height of the animal in feet.
- Figure out the animal's length or height to the nearest yard and write that on the tape.
- Decorate the tape to communicate something about the animal. Students might draw pictures of the animal or color the tape to match the animal's colors and markings.

7. When students understand what to do, let each group pick an envelope from your hand, open it to discover their assigned animal, and start to work. Once they've started, you may want to list the job expectations in short form on the board. Circulate to provide help and encouragement as needed.

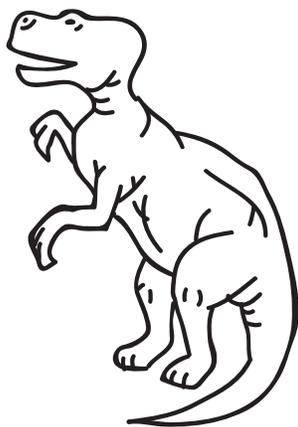
8. Post the finished tapes in order of length in the hallway outside the classroom.

**Extensions**

- Challenge some or all of the groups to determine and record their animal's height or length in inches.
- Provide animal books or Internet access so children can see photos of their animal. Ask each group member to write one fact about the animal on the tape.
- If you have access to the book, read *Is a Blue Whale the Biggest Thing There Is?*, by Robert E. Wells, to your students. Not a story as such, this book begins with the question, "Is a Blue Whale the Biggest Thing There Is?" and answers it with a series of examples, each larger than the previous, starting with a blue whale and ending with the universe.

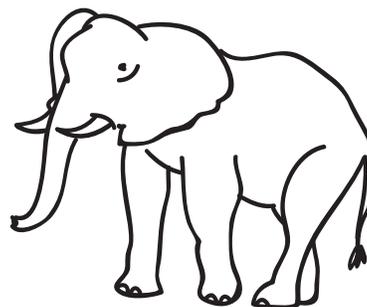
# Animal Information Cards page 1 of 2

Tyrannosaurus Rex—18 feet tall



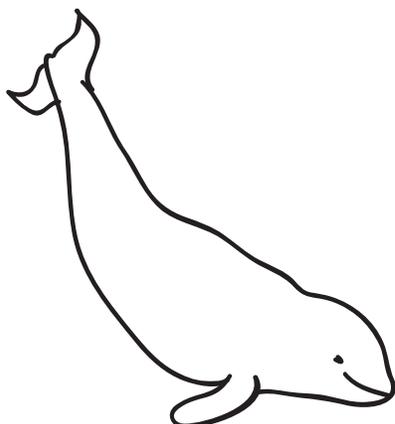
Animal Information Card

African Elephant—10 feet tall



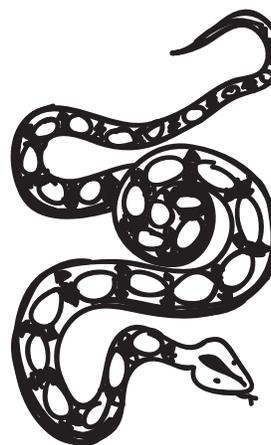
Animal Information Card

Beluga Whale—15 feet long



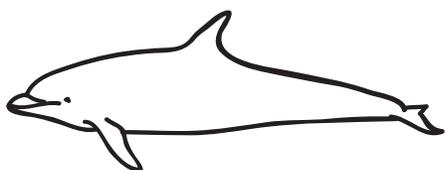
Animal Information Card

Boa Constrictor—9 feet long



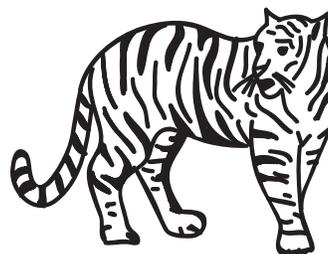
Animal Information Card

Bottlenose Dolphin—12 feet long



Animal Information Card

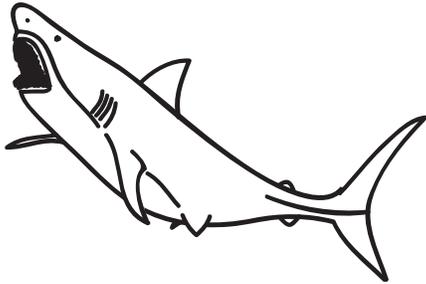
Siberian Tiger—10 feet long



Animal Information Card

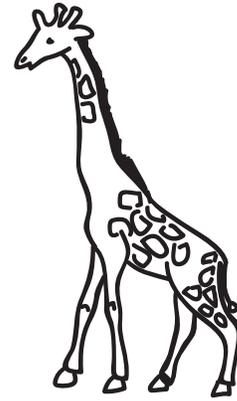
# Animal Information Cards page 2 of 2

Great White Shark—15 feet long



Animal Information Card

Female Giraffe—14 feet tall



Animal Information Card

Red Kangaroo—6 feet tall



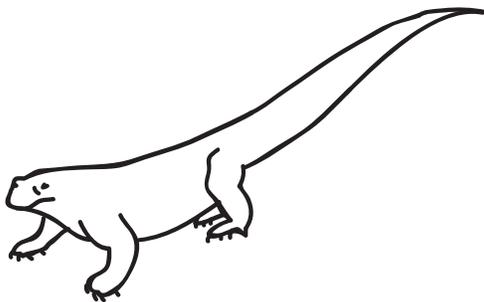
Animal Information Card

Eastern Diamondback Rattlesnake—8 feet long



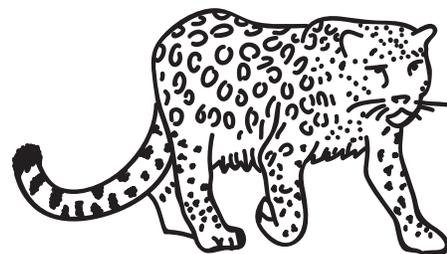
Animal Information Card

Komodo Dragon—10 feet long



Animal Information Card

Snow Leopard—6 feet long



Animal Information Card



# Set D2 ★ Activity 9



## ACTIVITY

### Exploring a Line Plot with Teacher Feet

#### Overview

Students will use the measurement data from Measuring Length in Teacher Feet to collect and record data and construct a line plot as a class.

#### Skills & Concepts

- ★ Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes
- ★ Estimate lengths using units of feet
- ★ Generate measurement data by measuring lengths of several objects to the nearest whole unit
- ★ Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units

#### You'll need

- ★ Teacher Feet from Set D2, Activity 1
- ★ Teacher Feet Record Sheets from Set D2, Activity 1 (page D2.4)
- ★ Exploring a Line Plot with Teacher Feet (page D2.43, run a class set, plus 1 for display)
- ★ variety of large objects around classroom (for example: door, table, desk, bookcase)
- ★ classroom rulers
- ★ 3" x 5" index cards or sticky notes, class set plus some extras (see advanced prep)
- ★ twelve 5" x 8" index cards or half sheets of copy paper (see advanced prep)
- ★ masking tape

**Advance Preparation** Prepare twelve 5" x 8" index cards (or half sheets of copy paper). You'll record the lengths from the Measuring Length in Teacher Feet activity (most likely 1–12).

Mark a large X on a class set of 3" x 5" index cards. Have some extras ready for early finishers (see extension activities)

#### Instructions for Exploring a Line Plot with Teacher Feet

1. Gather students around the discussion circle and ask them to bring their Teacher feet from Activity 1. Invite students to think-pair-share their experiences, specifically how a Teacher foot compares to a ruler. Randomly call on students to share one item they measured from that day and how long it was. Hold up a sample record sheet if students need help remembering some items to share.

Set D2 Measurement: Length in Customary Units Blackline Run a half class set		
NAME <u>Mrs Ramirez and Brandt</u>	DATE _____	
<b>Teacher Feet Record Sheet</b>		
1 How long are some of the things around our classroom in teacher feet?		
Things We Measured	Estimate	Actual Answer
the whiteboard ledge	10 TF	8 TF

**Activity 9** Exploring a Line Plot with Teacher Feet (cont.)

**Teacher** Who measured something that was only 1 foot long? Who measured something that was really long? How long was it?

2. Record the lengths in short columns on a piece of chart paper or white board. Discuss what they notice about the data.

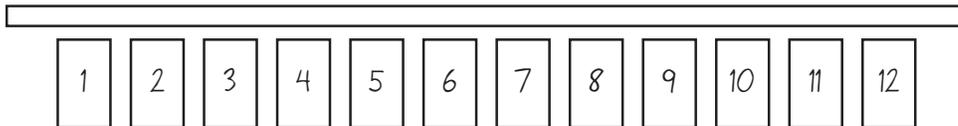
Lengths of Classroom Objects		
1	6	4
3	2	5
4	1	3
3	5	3

**Teacher** What do you notice? What if we wanted to know how many items we measured were 3 feet long? Or 5 feet long? How can we organize this data so we can see how many items were 3 feet long or 5 feet long?

**Students** Count them up! I think we should group them first, and then count. Maybe use tally marks to count how many of each length we have?

**Teacher** Excellent ideas! Mathematicians love to group and sort numbers. Let's create a card for each length we have. Which is the shortest length on our chart? I will create a card for our shortest length. Which was our longest length? Let's do a card for that one.

3. Write large numerals from the shortest length (1) to the longest length (probably 12) on the 5" × 8" index cards. Place the number cards in a row below the masking tape line on the floor of the discussion area to create the horizontal scale of your line plot. Include all lengths from 1–12 teachers' feet even if you didn't have data for these on the chart.



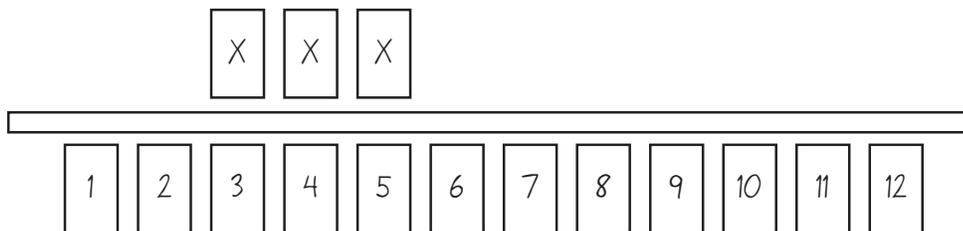
4. Hold up an index card with a big X on it. Using an item from the chart, write in pencil, the name of the item and its length on the back of the card. Using the card you wrote on, ask where you should place your X?

**Teacher** If this X means one object measured 4 feet in length, where should I place this X on our floor chart to show that data?

**Students** On top of the 4!

Demonstrate placing an X above the corresponding number card for 2–3 items from your Teacher Feet Record Sheet.

**Activity 9** Exploring a Line Plot with Teacher Feet (cont.)

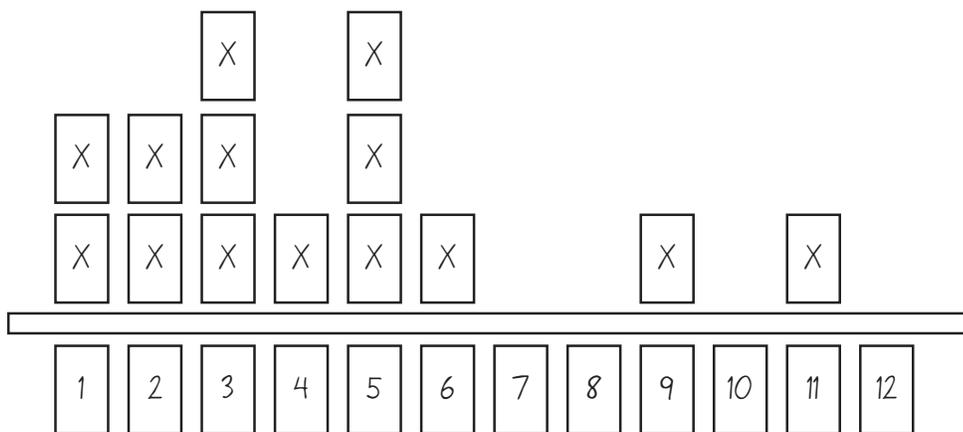


5. Pass out one index card per student and ask them to pick one item from their Teacher Feet Record Sheet and note how long the item was on their index card. Have them bring the X card to the line plot and place it above the number card representing the length of the item they chose.

When all Xs have been placed on the floor, think-pair-share how this way of showing the data from our measuring compares to the list of lengths we created on the chart paper.

**Teacher:** *What do you notice about our graph on the floor? Can you quietly come up with three observations about our floor graph?*

**Students** *I see lots of Xs over the 5 feet card  
10 feet doesn't have any X's  
The Xs make lines above the number cards*



6. Introduce the Line Plot term

**Teacher** *Mathematicians call this kind of graph a line plot. Why do you suppose that is?*

**Students** *The Xs make lines above the numbers!*

**Teacher** *Good observation. This line of numbers at the bottom is called the "horizontal scale" of the line plot."*

Continue by asking the following:

- Which length has the most Xs? The fewest?
- How many more items were 5 feet long than those that were 3 feet long?
- How many total items are on this line plot? How did you figure that out?

**Activity 9** Exploring a Line Plot with Teacher Feet (cont.)

7. Have students return to their seats to complete their line plot record sheet. Include a title (Lengths of Classroom objects) and record three observations about their line plot.

**Extensions**

- If time allows, have the early finishers work with a partner to measure additional items around the room with either their teacher feet or rulers, and then create more X cards to place on the classroom floor line plot.
- Challenge students to determine how many inches they measured on the Teacher Feet Record Sheet converting one Teacher Foot = 12 inches.
- Create more class line plots with measurement data from other Supplement lessons.

NAME \_\_\_\_\_

DATE \_\_\_\_\_

# Exploring a Line Plot with Teacher Feet

Title: \_\_\_\_\_



Write three observations about this line plot:

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_



# Set D2 ★ Activity 10



## ACTIVITY

### Making a Line Plot Measuring Inches

#### Overview

Students will use the data collected from Estimate & Measure Inches Activity 5 to create a line plot.

#### Skills & Concepts

- ★ Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes
- ★ Generate measurement data by measuring lengths of several objects to the nearest whole unit
- ★ Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units

#### You'll need

- ★ Record sheets from Estimate & Measure Inches Set D2 Activity 5 pages D2.22–D2–24
- ★ Making a Line Plot: Measuring Inches Record Sheets pages D2.48 and D2.49, run a class set plus some extras
- ★ student inchworm rulers from Activity 5
- ★ classroom rulers marked in inches
- ★ variety of objects around classroom or inside student desks (see Advance Preparation)
- ★ chart paper

**Advance Preparation** Gather at least 8 of the items students measured from the Estimate & Measure Inches lesson Set D2 Activity 5 in a container. Objects that vary in size would be preferable, such as used pencils, books, crayons, Unifix cube trains, calculators, markers, and papers. You'll need a copy of the Estimate & Measure Inches Record Sheet from Set D2 Activity 5.

#### Instructions for Making a Line Plot: Measuring Inches

1. Gather students to the discussion area. Have a classroom ruler or inchworm ruler handy, along with the objects you collected. Hold up the inchworm ruler and a classroom ruler. Review how long an inch is and have students compare how their inchworm rulers are similar to the classroom ruler.

**Teacher** *How is our inchworm ruler like a classroom ruler? How is it different?*

**Students** *One has those little inchworms on it, and one has little lines on it.*

*The classroom ruler has lines on both sides of it. My dad says the other side is centimeters.*

*They both have inches! An inchworm is about an inch long. That's why they call it an inchworm!*

**Teacher** *You are right! Can you think of anything else that is about an inch long? (Examples might include a paper clip, eraser, or small pencil sharpener)*

*What were some of the objects you measured the other day? Do you remember how long each one was? Were the objects you measured small or really big? Would you want to measure our playground with the ruler? Why not?*

**Activity 10** Making a Line Plot Measuring Inches (cont.)

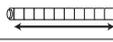
2. Display both page 1 of the record sheet from Estimate & Measure Inches Activity 5, with data already recorded on it and page 1 of Making a Line Plot. Record the length of about 4 items from the Estimate & Measure Inches sheet using tally marks in Part 1 of Making a Line Plot record sheet.

Set D2 Measurement: Length in U.S. Customary Units Blackline Run a class set  
 NAME \_\_\_\_\_ DATE \_\_\_\_\_

**Estimate & Measure Inches Record Sheet** page 1 of 3

1 Use square inch tiles and your inchworm ruler to estimate and measure length in inches.

- Write down your estimate. How many inches long do you think it is?
- Measure the length with tiles.
- Measure it again with your ruler.

OBJECT	MY ESTIMATE	LENGTH IN TILES	LENGTH IN INCHES
a Pencil 	5 inches	6 tiles	6 inches
b Crayon 	2 inches	3 tiles	3 inches
c Book 	8 inches	8 tiles	8 inches
d Chair Seat 	13 inches	12 tiles	12 inches
e 10 Unifix Cubes 	8 inches	8 tiles	8 inches

NAME \_\_\_\_\_

**Making a Line Plot: Measuring Inches**

1 Record the lengths of each of the items you measured from Estimate & Measure Inches Record Sheet using tally marks in the table below.

Length of Item	Tally Marks
1 inch	
2 inches	
3 inches	
4 inches	
5 inches	
6 inches	
7 inches	
8 inches	
9 inches	
10 inches	
11 inches	
12 inches	

3. Then hold up one of the items you have with you, such as the pencil.

**Teacher** *How many of you measured a pencil? Were the pencils you and your partner measured the same length?*

Choose a student to help you measure your pencil to the nearest inch, and add its length to the tally chart. Probe student thinking with questions like the ones below:

**Teacher** *Is the length of my pencil the same as any of yours? If we looked at all the different measurements we made of pencils recently, do you think we would get different lengths? Why do you think so? Do you think some of the measurements might be the same as yours? How could we find out?*

4. Hold up another item such as a book. Ask students to how long their books were and record several pieces of data on the tally chart. Then call on another student to help you measure your book and add the measurement to the tally chart. Was it the same as any of the books students measured the other day?

5. Continue with a few more items, from either your container of objects or from the Estimate & Measure Record Sheet until you have about 20 data points. Lead a discussion about collecting and organizing data with a line plot.

**Teacher** *I am wondering how to keep track of our numeric data. What did we do with the data from the Teacher Feet activity? Could we use a line plot for the objects we measured in inches from our Estimate & Measure Inches activity?*

6. Ask students to pair share how a line plot looks and then refer to part 2 of the Making a Line Plot: Measuring Inches Record Sheets. First, label the horizontal scale with numerals 1–12 to represent inches. Us-

**Activity 10** Making a Line Plot Measuring Inches (cont.)

ing the data you just collected on the tally chart, have students help you record about 20 lengths on to the line plot with an X. Title the Line Plot appropriately.

Discuss what students notice about the data.

NAME \_\_\_\_\_ DATE \_\_\_\_\_

**Making a Line Plot: Measuring Inches** page 1 of 2

**1** Record the lengths of each of the items you measured from Estimate & Measure Inches Record Sheet using tally marks in the table below.

Length of Item	Tally Marks
1 inch	
2 inches	
3 inches	
4 inches	
5 inches	
6 inches	
7 inches	
8 inches	
9 inches	
10 inches	
11 inches	
12 inches	

**2** Make a line plot using the data from the frequency table.

**a** Write the numerals 1–12 on the lines along the bottom of the line plot. This will be your scale. Label the scale below.

**b** Record each length from the frequency table, using an X above your labels for each time that length appears.

**c** Give your line plot a title.

Title \_\_\_\_\_

					X						
		X			X						
X		X	X	X	X	X	X				
X		X	X	X	X	X	X	X		X	
1	2	3	4	5	6	7	8	9	10	11	12

\_\_\_\_\_

(continued on next page)

Set D2 Measurement: Length in U.S. Customary Units: Bridges

**Teacher** How can you tell which lengths showed up the most? The least?

**Student** That's easy, just count those little X's above the numbers! Most of the objects we measured were 6 inches. We only had one object that was 9 inches long. That means 9 inches showed up the least.

**Teacher** So, what is the difference between the number of lengths we had the most of compared to the number of lengths we had the least of? Who has an equation to show how they figured this out?

**Student** I see four X's above the 6, that's the length we had the most of. That's 3 more X's than the one X above the 9.

**Student** I think it's  $4 - 1 = 3$ , since we had 4 items that were 6 inches and only 1 thing that was 9 inches. So  $4 - 1 = 3$ . The difference is 3.

**Teacher** Good thinking! So we had 3 more items that were 6 inches long than items that were 9 inches long. How many objects were 8 inches long? Were there any lengths that didn't show up in our data?

**Students** I see we have 2 measurements that are 8 inches. We didn't have any that were 2 inches long, or 11 or 12.

**Teacher** How many objects were 6 inches or less? How many objects in all? How did you get that?

7. Pass out the Making a Line Plot Record Sheet and the student measurement data from their Estimate & Measure Record Sheets. Review directions as needed and send students off to work with a partner.

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**Activity 10** Making a Line Plot Measuring Inches (cont.)

Encourage students to use data from both their record sheets but to complete their own line plot, including recording a title and the horizontal scale.

Have students answer the questions about the line plots independently.

**Extensions**

- Have pairs compare their line plots with another pair of students. Were there results the same? Why or why not?
- Using extra Making a Line Plot record sheets, have early finishers combine data from another pair of students to create a line plot with more data points. Have students compare the data sets using equations.
- Have students measure objects greater than 12", and create a new line plot using pages 2 and 3 of the Estimate & Measure Inches record sheet



NAME \_\_\_\_\_

DATE \_\_\_\_\_

## Making a Line Plot: Measuring Inches page 2 of 2

Answer the following questions about your line plot

**1a** Which length did you record the least number of times? \_\_\_\_\_

**b** How many times? \_\_\_\_\_

**2a** Which length did you record the most number of times? \_\_\_\_\_

**b** How many times? \_\_\_\_\_

**3** Write an equation to show the difference between the number of most recorded and least recorded lengths:

**4** How many items were 5 inches or less? \_\_\_\_\_

**5** How many items were 6 inches or more? \_\_\_\_\_

**6** How many total items did you record? \_\_\_\_\_

**7a** Were there any lengths you didn't have? \_\_\_\_\_

**b** Which length(s)? \_\_\_\_\_

# Set D2 ★ Activity 11



## ACTIVITY

### Day 1: Inch by Inch Line Plot Creating the Inchworm Collage

#### Overview

After listening to the story *Inch by Inch*, by Leo Lionni, students create a paper collage scene of the Inchworm measuring his way through blades of grass. In Activity 12, they will measure the lengths of the blades of grass in their collages with a partner and create a line plot with their data.

#### Skills & Concepts

- ★ Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
- ★ Estimate lengths using units of inches, feet, centimeters, and meters.
- ★ Generate measurement data by measuring lengths of several objects to the nearest whole unit. (CCSS 2.MD.9)
- ★ Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units

#### You'll need

- ★ Picture book, *Inch by Inch*, by Leo Lionni (see Advanced Preparation) optional
- ★ 12" × 9" sheets white construction paper, 1 for each student, plus 2 extra
- ★ 12" × 3" strips brown construction paper, 1 for each student, plus 2 extra
- ★ 1 sheet of green construction paper per student (See advanced preparation)
- ★ Inchworm Rulers from Activity 5 or classroom rulers showing inches, class set
- ★ glue sticks
- ★ scissors
- ★ chart paper and chart stand or easel

**Advance Preparation** Locate a copy of the story, *Inch by Inch*, by Leo Lionni in your school or local library. This engaging story about a very clever inchworm, has beautiful artwork and received the Caldecott Honor Award. For the collage: Each child will need twelve, 1" wide strips, cut into various lengths from 4"–8", in two or more colors of green construction paper. The variety of light and dark green colors and lengths will create a more visually appealing collage. To cut a variety of lengths, divide the sheets into 3 groups. Cut the first group of sheets lengthwise into strips of 4" and 8". The second group into strips of 5" and 7", and the last group of sheets into 6" strips. Divide the supply of green strips into tubs or trays so that pairs or small groups of students can easily access 12 strips, randomly chosen, so they will have a variety of strips that are 4"–8" long. Also have ready the white background sheet and brown strip for the ground ready on the trays as well. You might want to create your own sample of the collage before teaching this lesson.



**Activity 11** Day 1: Inch by Inch Line Plot (cont.)**Instructions for Creating the Inchworm Collage**

1. Gather students to the discussion area. Have materials for one collage handy along with the sample collage you made, including scissors and glue stick.

Remind students that we have been using our inchworm rulers to measure things around our classroom. Hold up the book, *Inch by Inch*, by Leo Lionni, and tell them you have a short story to read about a very clever inchworm that went around measuring things too. Read the story and have students pay close attention to the artwork, the use of cut paper, and especially the scenes in which the inchworm measures through a patch of grass to escape becoming a bird's next meal!

2. Discuss the story briefly. Then using a scene from the last few pages of the story, have children note the artwork, blades of grass, and different lengths of the grass the inchworm crawled through.

**Teacher** *What do you notice about the blades of grass?*

**Students** *There are a lot of them! They are all different lengths!*

**Teacher** *I wonder how long the blades of grass are?*

**Student** *I think about 7 inches long. But some look shorter, and some look longer.*

**Teacher** *Those are good estimates. I wonder how many of these blades of grass are 7 inches, and how many are longer or shorter?*

3. Tell students that today they will be creating their own collage of a patch of grass for the inchworm to measure along. Then later they will measure the blades of grass with our inchworm rulers and create line plots to show all the data.

Show a sample of the collage you made and have students briefly pair share things they notice about the collage.

**Students:** *I see brown paper for the ground the inchworm crawled along.*

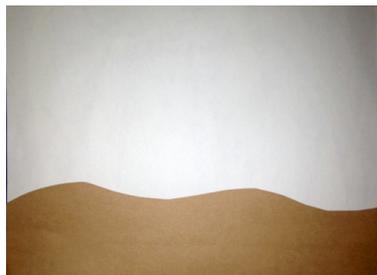
*I see grass with different colors of green! Green is my favorite color!*

*The blades of grass are different lengths ... just like in the story! They're kind of wavy like real grass, too.*

*I think I counted twelve blades of grass, but I'm not sure.*

4. Using the sample materials, demonstrate constructing part of a collage using the following procedures:

First cut along one of the long sides of the brown paper strip to create a slight wavy edge. Then holding the white paper horizontally, glue the brown strip along the bottom edge of the white background, straight side facing down, and wavy side facing up. This is the foreground of the collage.



**Activity 11** Day 1: Inch by Inch Line Plot (cont.)

They will choose twelve 1" strips from the supplies at their desks, making sure to pick different lengths and different colors of green.

They will need to trim one end of each strip to make points like the tops of the blades of grass from the story (pinching one end in the middle, might help some students trim more precisely). Demonstrate with a few strips.

Then trim along the long sides to create slight wavy edges along the blades of grass, similar to the ground line. Demonstrate with your strips.

Starting in the middle of the collage, glue the wavy grass strips, pointy end facing up, onto your background, being sure to glue grass over the ground and a little ways up from the bottom edge of the collage. Continue gluing grass strips, working from the middle of the background out to the edges, gluing blades fairly close together to fit all twelve strips on the background (This helps keep the finished collage visually centered on the background). They don't need to touch, but if some strips overlap, that is fine.



5. Call on a few students to explain the procedures. Then ask students to head back to their seats, get out scissors, glue sticks, and pencils. Students who finish first can offer to help others cut or glue. Don't forget to have them write their name in one corner of the collage.

.....  
*Note* Save student collages for use in Activity 12  
 .....

**Extension**

Early finishers can retell the *Inch by Inch* story using their collages as a prompt.

**INDEPENDENT WORKSHEET**

Use Independent Worksheet 1 page D2.61 for additional practice with line plots.



# Set D2 ★ Activity 12



## ACTIVITY

### Day 2: Inch by Inch Line Plot Measuring the Collage & Creating a Line Plot

#### Overview

Using their Inchworm collages, students measure the lengths of the blades of grass with a partner, record the data, and then create a line plot.

#### Skills & Concepts

- ★ Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
- ★ Estimate lengths using units of inches.
- ★ Generate measurement data by measuring lengths of several objects to the nearest whole unit.
- ★ Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.

#### You'll need

- ★ *Inch by Inch*, by Leo Lionni, optional
- ★ Inch by Inch Line Plot Record Sheet, pages D2.59 and D2.60 (run a class set, plus one for display)
- ★ Student Inchworm collages from Set D2, Activity 11
- ★ 1" paper clips (“inchworms”) class set, plus two extra
- ★ Inchworm Rulers from Activity 5 or classroom rulers, class set
- ★ glue sticks
- ★ chart paper and chart stand or easel

#### Instructions for Measuring the Collage & Creating a Line Plot

1. Bring students to the discussion circle and comment on the beautiful collages they created. Display the collage you made (or use a student collage). Have a 1" paper clip inchworm handy along with an Inchworm Ruler or classroom ruler, and a copy of the Inch by Inch Line Plot Record Sheet.

Lead a discussion on the various lengths of the blades of grass on the collage. What do they notice about the lengths?

**Teacher** *I wonder how long some of those blades of grass are that our clever inchworm crawled through? What could we use to measure the lengths of the blades of grass in our collages?*

**Students** *We could use Inchworm Rulers? Or maybe the square tiles? How about our rulers?*

**Teacher** *Those are all good suggestions. How many of these blades do you think are 5 inches? How many might be 7 inches? How could we keep track of the different lengths?*

**Student** *Maybe make a list of the lengths? Hmm, I think this is another line plot lesson ...*

2. Hold up your 1" paper clip and say “I have an inch worm to help me estimate and measure the blades of grass in my collage, just like the Inchworm did in our story yesterday.”

Choose one blade of grass and invite students to pair-share their estimates—How long is this blade of grass? Then using two paper clips, measure the length of a blade of grass to the nearest inch, demonstrating how to “leapfrog” end-to-end, one after the other. Then using an inchworm ruler or a classroom

**Activity 12** Day 2: Inch by Inch Line Plot (cont.)

ruler, check the length again to the nearest inch. Estimate, measure and record the length of about 5 blades of grass at the bottom, using the abbreviation for inch (in.).

**Note** Using the inchworms or paperclips to leapfrog the lengths helps reinforce the concept of linear measurement as an iteration of equal size units.

3. Hold up the Inch by Inch Line Plot Record Sheet, and tell students that today, to keep track of the lengths, you have a record sheet for them to use. Ask them to pair-share what they notice about the sheet.

**Students** It has a little chart with 12 spaces at the top of the sheet. It looks kind of like the line plots we made when we measured objects from our classroom. It has little boxes under a line with numbers in them at the bottom of the sheet, but it doesn't start with one!

**Teacher** You are very observant. This is our Inch by Inch Line Plot record sheet. Remember that line plots are a handy way to keep track of data we are using. And ... they don't always have to start with one. Today this line plot represents the range of lengths of our blades of grass from our collages. Now, I will record the first blade we measured which was 5 inches long.



Then, in the “Length Data Chart”, on page 1 of the record sheet, write the number 5 in the first space. Call on a few more students to help estimate, measure and record the length of 4–5 more blades in a box on the Data Chart.

Set D2 Measurement: Length in U.S. Customary Units Black line

NAME \_\_\_\_\_ DATE \_\_\_\_\_

**Inch by Inch Line Plot Record Sheet** page 1 of 2

**1** With a partner, measure the length of each blade of grass to the nearest inch on your Inchworm Collage.

**a** Use 2" yarn inchworms or two 1" paper clips linked together. Place them end-to-end, leapfrog style and add up the total.

**b** Use a ruler to check your measurement.

**c** Record each length at the bottom of each blade on your collage.

**d** Record each length below in the Length Data Chart. You should have 12 measurements recorded in the chart.

**Length Data Chart**

5	7	6	4	5							
---	---	---	---	---	--	--	--	--	--	--	--

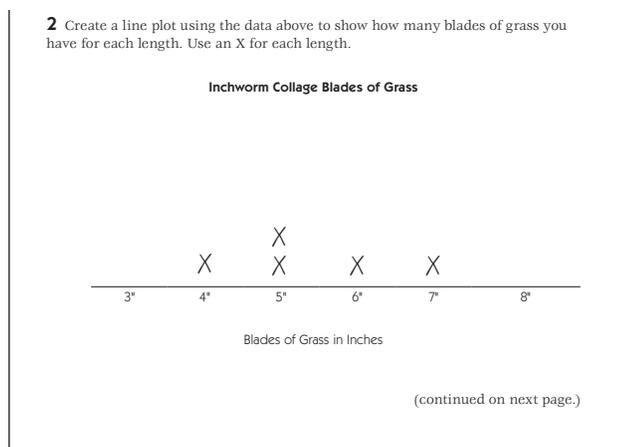
4. Demonstrate placing X's on the line plot at the bottom of page 1 of the record sheet, using the first few lengths you recorded in the data chart.

**Activity 12** Day 2: Inch by Inch Line Plot (cont.)

**Teacher** So, the first length I recorded in my Length Data Chart was 5 inches. So where should I place my X on the line plot for this length?

**Student** Above that 5 inch label, above the line!

Demonstrate by placing an X above the 5 on the line plot. Place Xs for a few more lengths from the Length Data Chart on the line plot as needed for students to get the idea. You may also cross off each length in the boxes as you go, to help keep track.



5. Give each student a recording sheet and paper clip inchworm. Have students work with a partner to measure all the blades of grass on their collage. Remind them to leapfrog with the two paper clips, check their measurements with rulers to the nearest inch, and then record the length at the bottom end of each blade. They should have 12 lengths recorded on the Length Data Chart.

6. While students are working, quickly finish measuring and recording the rest of your data on your record sheet. Display page 2 and then check on student progress.

7. When students are done collecting the data, call them back to the discussion circle. Call their attention to your data and line plot. Discuss what they notice about your line plot and what conclusions they could draw. Include questions such as:

- Which was the shortest length I had? The longest length? How did you figure that out?
- Which length did I have the most of? How many times did I use this length?
- Which length did I have the least number of times? How many times did I use that length?
- How many blades of grass were less than 7 inches? How many blades were 7 inches or more? How does the line plot help us figure this out?

8. Complete several of the questions on page 2 of the Inch by Inch Line Plot Record Sheet using the data from your line plot. Then send students back to their seats to work independently to answer the questions on page 2 about their data and line plot.

9. If time permits draw a quick line plot on the white board similar to the one on the recording sheet. Call on students to share how many of each length they measured and fill in the line plot with Xs until you have a significant amount of data to carry on a discussion.

**Activity 12** Day 2: Inch by Inch Line Plot (cont.)

**Teacher** *What do you notice about our class line plot? What should we title it?*

*Which length did we have the least of? How many?*

*Which length had the most? How many more did we have of this length?*

*How does the line plot help us figure this out? What is an equation we can use to show our thinking?*

**Extensions**

- Create a large classroom bulletin board line plot display using all the data from the students' measurements of their blades of grass. Discuss what the line plot reveals about their class data.
- Have students retell the *Inch by Inch* story to each other, using their collages.
- Have students add up all the different lengths of their blades of grass on their collages to find the total length. They may record this on their collages if they wish.
- Use the collage later to measure the lengths in centimeters and use the data to create another line plot.



**INDEPENDENT WORKSHEET**

Use Independent Worksheet 2 on page D2.63 for additional practice with line plots.

NAME \_\_\_\_\_

DATE \_\_\_\_\_

# Inch by Inch Line Plot Record Sheet page 1 of 2

**1** With a partner, measure the length of each blade of grass to the nearest inch on your Inchworm Collage.

**a** Use two 1" paper clips to measure. Place them end-to-end, leapfrog style and add up the total, to find the length of each blade.

**b** Use a ruler to check your measurement.

**c** Record each length at the bottom of each blade on your collage.

**d** Record each length below in the Length Data Chart. You should have 12 measurements recorded in the chart.

**Length Data Chart**

--	--	--	--	--	--	--	--	--	--	--	--

**2** Create a line plot using the data above to show how many blades of grass you have for each length. Use an X for each length.

**Inchworm Collage Blades of Grass**



Blades of Grass in Inches

(continued on next page.)

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## Inch by Inch Line Plot Record Sheet page 2 of 2

**3** Answer these questions about your line plot:

**a** Which length did you use the least (not counting zero)? \_\_\_\_\_ inches

**b** How many times did you use this length? \_\_\_\_\_

**c** Which length did you use the most? \_\_\_\_\_ inches

**d** How many times did you use this length? \_\_\_\_\_

**e** What is the difference between the number of least used and most used lengths? \_\_\_\_\_

**f** Write an equation to show your thinking:

**g** How many blades of grass were shorter than 7 inches? \_\_\_\_\_

**h** How many blades of grass were 7 inches or longer? \_\_\_\_\_

**i** What else do you notice?

NAME \_\_\_\_\_

DATE \_\_\_\_\_

# Set D2 ★ Independent Worksheet 1



## INDEPENDENT WORKSHEET

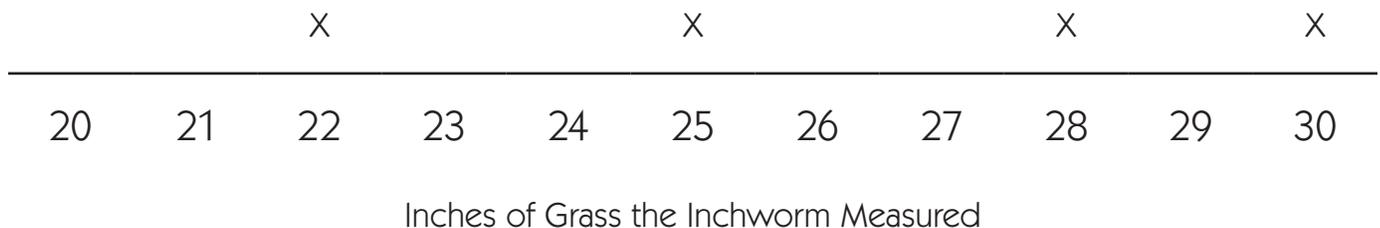
### Line Plot Practice

Our inchworm has been very busy crawling and measuring blades of grass. The data below shows how many inches of blades of grass the inchworm measured each day for 24 days.

<del>22</del>	<del>30</del>	<del>25</del>	<del>28</del>	21	20	29	28	22	24	24	22
26	23	25	29	23	25	30	21	25	27	26	24

**1** Complete the line plot that has been started for you using the information above. Remember to add a title,

Title \_\_\_\_\_



(continued on the next page.)

NAME \_\_\_\_\_

DATE \_\_\_\_\_

**2** Answer the following questions about the Line Plot.

**a** How many times did the inchworm measure 25 inches of grass? \_\_\_\_\_

**b** How many times did the inchworm measure only 20 inches of grass? \_\_\_\_\_

**c** How many times did he measure 25 or more inches of grass? \_\_\_\_\_

**d** How many times did he measure 24 inches or less? \_\_\_\_\_

NAME \_\_\_\_\_

DATE \_\_\_\_\_

# Set D2 ★ Independent Worksheet 2



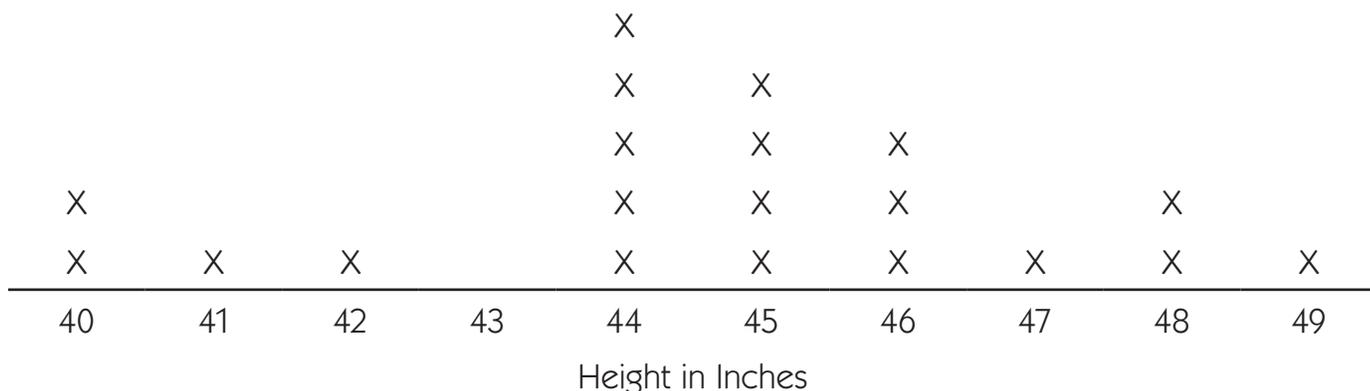
## WORKSHEET

### Line Plots

Read the story below and then answer the questions about the line plot.

Our class measured the height of each second grader in inches. Then we made a line plot to show our data. Use the line plot below to answer each question.

**Height of Second Graders**



- 1 How many students were 46 inches tall? \_\_\_\_\_
- 2 How tall were the most students? \_\_\_\_\_
- 3 How many students were the shortest in the class? \_\_\_\_\_
- 4 How many students were less than 44 inches? \_\_\_\_\_
- 5 How many students were more than 44 inches? \_\_\_\_\_
- 6 How many students were measured altogether? \_\_\_\_\_
- 7a How many more students were 44 inches tall than those who were 46 inches?  
\_\_\_\_\_
- b How did you figure that out? \_\_\_\_\_

