



GRADE 1 SUPPLEMENT

Set D1 Measurement: Comparing Length

Includes

Activity 1: Longer, Shorter, or the Same	D1.1
Activity 2: How Long is the Teacher's Belt?	D1.3
Activity 3: Compare, Spin & Win	D1.5
Activity 4: The Measuring Stick	D1.9
Activity 5: The Packing Box	D1.13

Skills & Concepts

- ★ compare and order objects according to length
- ★ comparing lengths using the transitive property

Bridges in Mathematics Grade 1 Supplement

Set D1 Measurement: Comparing Length

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

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Set D1 ★ Activity 1



ACTIVITY

Longer, Shorter, or the Same?

Overview

Students use the transitive property to compare the lengths of paper strips. (*The transitive property states that if $a = b$ and $b = c$, then $a = c$; or if $a > b$ and $b > c$, then $a > c$; or if $a < b$ and $b < c$, then $a < c$.*)

Skills & Concepts

- ★ compare and order objects according to length
- ★ compare lengths using the transitive property

You'll need

- ★ 12" × 18" construction paper (see Advance Preparation)
- ★ manila envelope
- ★ 12 index cards or 3" × 5" pieces of light-colored construction paper
- ★ wide-tipped felt marker

Advance Preparation Cut six 1-inch strips of construction paper to different lengths, none shorter than 5" and none longer than 18". Use a variety of colors. Then cut two 1" × 9" inch strips, one in blue and one in white, and two 1" × 15" inch strips, one in brown and the other in red. Place all the paper strips in the manila envelope except the two 9-inch lengths.

Instructions for Longer, Shorter, or the Same?

1. Gather children to your discussion circle. Drop the two 1" × 9" strips of paper in the middle of the circle. Ask students to discuss which they think is longer. Then ask them to help you find out for sure. What do you need to do to compare these 2 lengths?

Students *Hold them up together.*

Put them down on the rug right together so you can see.

I can just tell. It's the white one!

2. Use their suggestions to compare the 2 lengths. Don't match them at the ends unless the children tell you to do so. If they don't correct you, press the issue.

Teacher *You told me to put the strips of paper side by side on the rug. Can we tell which is longer now?*



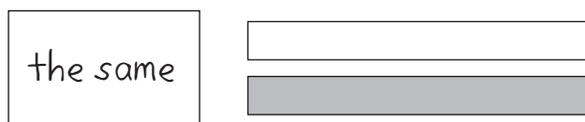
Students *The white one!*

No, the blue one! You can see it's longer because it sticks out more!

You have to make them the same at the end or you can't tell.

Activity 1 Longer, Shorter, or the Same? (cont.)

3. Match the two ends of the paper strips and ask students to compare the lengths now. Which is longer? Write a label on an index card and place it beside the pair of lengths.



Students *They're the same!*

You can see now for sure because you put them together at the end.

4. Remove the blue strip and the label from the rug but leave the white one out. Show students the envelope of paper strips you've prepared. Invite a helper to pull one from the envelope and set it next to the white strip. Is it longer, shorter, or the same as the white one?

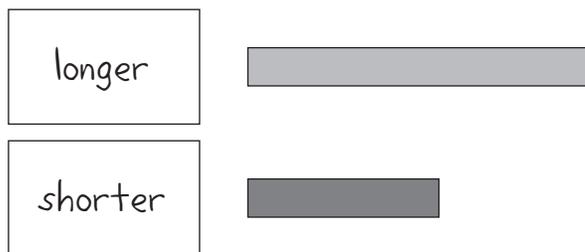
5. Set the new strip a couple of feet away from the white one, and ask a different helper to pull a second strip from the envelope and compare it to the white strip. Is it longer, shorter, or the same as the white one? Challenge students to use this information to predict which of the two strips just pulled from the envelope is longer.

Students *Okay, the red one was longer than the white one, and the green one Eloise just got is shorter than the white one.*

That means the red one has to be longer than the green one.

It is! I can tell by just looking!

6. After the 2 strips have been compared, write a label for each on an index card and have 2 helpers set the labels where they belong.



7. Repeat steps 4–6 until the class has compared and labeled all the paper strips in the envelope.

Extension

- Make the paper strips and the labels available during Work Places so pairs of students can play the game on their own.

Set D1 ★ Activity 2



ACTIVITY

How Long Is the Teacher's Belt?

Overview

Students each cut a piece of string to approximate the length of your belt, use the transitive property to find out how their string compares to your belt, and post it on a chart to show the results. (*The transitive property states that if $a = b$ and $b = c$, then $a = c$; or if $a > b$ and $b > c$, then $a > c$; or if $a < b$ and $b < c$, then $a < c$.*)

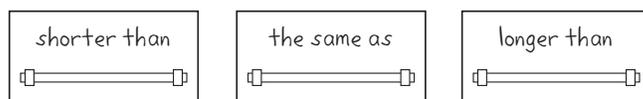
Skills & Concepts

- ★ compare and order objects according to length
- ★ compare lengths using the transitive property

You'll need

- ★ a belt (see Advance Preparation)
- ★ a ball of string for each group of 4 children
- ★ scissors (class set)
- ★ 3 pieces of 6" × 12" construction paper (see Advance Preparation)
- ★ masking tape (see Advance Preparation)
- ★ Work Places currently in use

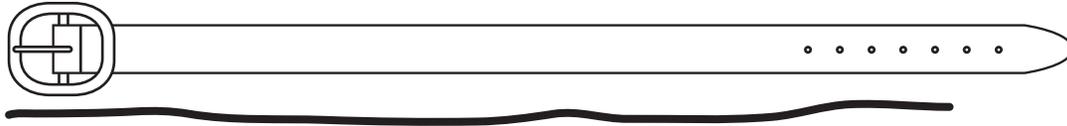
Advance Preparation Label each piece of construction paper as shown below. Then run a length of masking tape, *sticky side out*, along the bottom of each sheet and fasten the ends with short strips of tape. Post these on the whiteboard where the children can reach them easily. Wear a belt to class the day you conduct this activity.



Instructions for How Long Is the Teacher's Belt?

1. Gather children to your discussion circle. Draw their attention to the belt you're wearing today. Ask them to use their arms to show how long they think it is.
2. Then remove your belt and stretch it out in the center of the circle where everyone can see it. Invite the children to make new estimates, again using their arms to show how long they think it is.
3. Show the children a ball of string and a pair of scissors. Explain that each of them is going to cut a piece of string they think matches the length of your belt. After they've cut their string, they're going to test it out and then fasten it to one of the three charts you've posted at the whiteboard.
4. Next, cut a piece of string you estimate to be about the same length as your belt. Then work with input from the class to compare the two.

Teacher *Is my string shorter than, longer than, or the same as my belt?*

Activity 2 How Long Is the Teacher's Belt? (cont.)

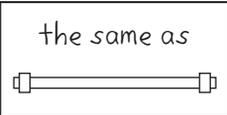
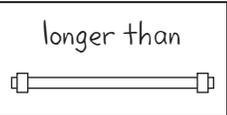
Students *It's shorter!*

Try it again!

Can I try?

5. Now have one of the children cut a length of string she thinks will match the length of your belt. Ask her to hold it up next to your string first. How does it compare to your string? If it's shorter than your string, how will it compare to your belt? Discuss this with the class. If it's longer than your string, how might it compare to your belt? Finally, have the student compare her string to your belt and hang it on the appropriate chart.

My piece of string is _____ the belt.

shorter than 	the same as 	longer than 
---	--	---

A hand-drawn black line is attached to the left side of the 'shorter than' box, extending downwards.

6. When students understand what to do, have them go back to their tables and help one another each cut a length of string they think will match the length of your belt. As they finish, have them hang the string they've cut around the back of their neck, just as a tailor might wear a measuring tape, and go to one of the Work Places. Invite them a few at a time to compare their string to one of the strings already hanging. Ask them to use the results of their comparison to predict whether their string will be shorter than, longer than, or the same length as your belt. Then have them check their prediction by comparing their string to your belt, and hanging it on the appropriate chart.

7. Discuss the results with the class at a later time. How many students cut strings that were shorter than, the same as, or longer than your belt? Which chart has the most strings? How can they tell for sure?

Extension

- Repeat this activity later in the year with something else that might appeal to your students. (Anything you wear or own is almost sure to interest them. You may even have a parent who's willing to bring a pre-crawling baby to class to be measured. If you use blue masking tape to mark the length of the baby on the floor, students can cut string to approximate the length of the baby.)

Set D1 ★ Activity 3



ACTIVITY

Compare, Spin & Win

Overview

The teacher plays a whole-group game with the class to give children more practice using the transitive property to compare lengths. (*The transitive property states that if $a = b$ and $b = c$, then $a = c$; or if $a > b$ and $b > c$, then $a > c$; or if $a < b$ and $b < c$, then $a < c$.*)

Skills & Concepts

- ★ compare and order objects according to length

You'll need

- ★ Length Comparison Spinner (page 7, see Advance Preparation)
- ★ the paper strips and envelope from Set D1, Activity 1
- ★ a 1" by 12" strip of black construction paper

.....
Advance Preparation Follow the instructions on the blackline to prepare a spinner for this game.

Instructions for Compare, Spin & Win

1. Gather children to your discussion circle. Show them the envelope containing the paper strips from Set D1, Activity 1, and explain that you're going to use them to play another game today. Then set the black strip out on the rug and explain that this is the official measuring strip for today.
2. Pull a strip out of the envelope and set it next to the black measuring strip. Is it longer, shorter, or the same? Place your strip on the rug, a couple of feet away from the black strip. Ask a helper to pull a second paper strip out of the envelope for the class. Have the children compare their strip to the black one and use the information to predict whether theirs will be longer, shorter, or the same as yours.



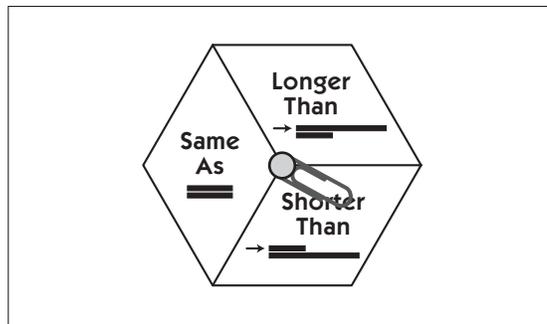
Students *Wow! Our strip is way longer than the black strip.*

Teacher's was shorter than the black strip.

Our strip will be longer than the teacher's!

3. Have students confirm their predictions by comparing their strip to yours directly. Then spin the spinner. If it lands on "longer than," the class (in the example shown above) gets both paper strips. Give them to one of the students to hold. If it lands on "shorter than," you get both strips. Pick them up and hold onto them. If it lands on "same as," both strips go back in the envelope.

Activity 3 Compare, Spin & Win (cont.)



Students *It landed on shorter!*

Teacher gets to have both of the strips.

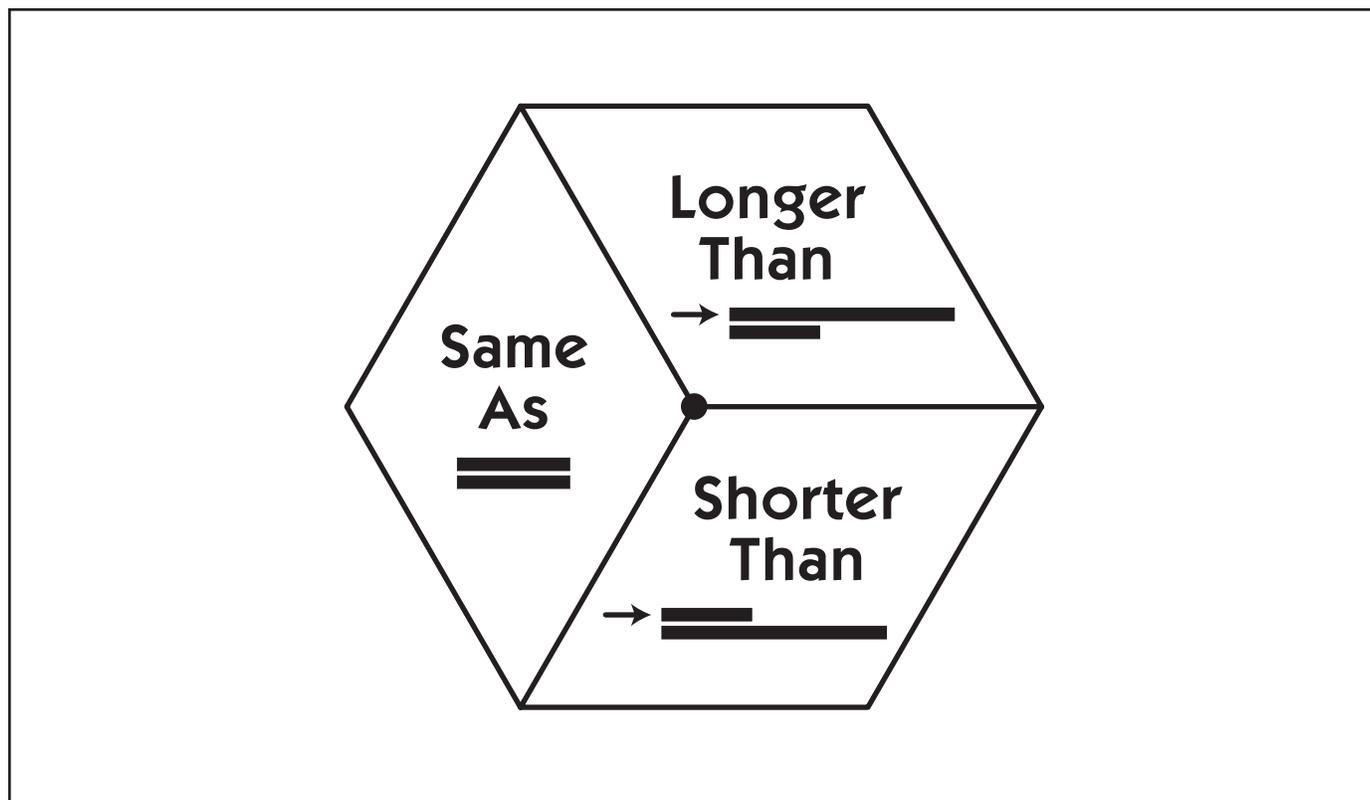
Let's do it again!

4. Repeat the steps above until you've used up all the paper strips.

Extension

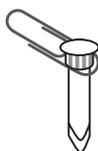
- Set up the envelope of paper strips and the spinner as a Work Place, and let pairs of students play the game on their own.

Length Comparison Spinner



Spinner-Making Instructions

1 Poke a brass fastener through a $\frac{1}{4}$ " length of drinking straw and a paperclip. Be sure to insert the brad and straw into the large end of the paperclip, as shown.



2 Keeping the straw and the paperclip on the brass fastener, insert it into the midpoint hole of the spinner. Once it has been pushed through to the back side, bend each side of the fastener flat against the underside of the game-

board. The section of straw should serve as a spacer so the brad doesn't push the paperclip flat against the gameboard and prevent it from spinning.

3 Give the paperclip a test spin to see if it works.

Set D1 ★ Activity 4



ACTIVITY

The Measuring Stick

Overview

There is a strip of paper marked with 3 big red dots stapled up on one wall, and a second strip of paper marked with 3 big red stars stapled up across the classroom. These two strips might be the same length, but then again, one might be longer than the other. They cannot be removed from the wall and compared directly, and you can't really tell by looking. What to do? This activity becomes a Work Place once it has been introduced to the class.

Skills & Concepts

★ apply the concept of transitivity to comparing lengths (*The transitive property states that if $a = b$ and $b = c$, then $a = c$; or if $a > b$ and $b > c$, then $a > c$; or if $a < b$ and $b < c$, then $a < c$.*)

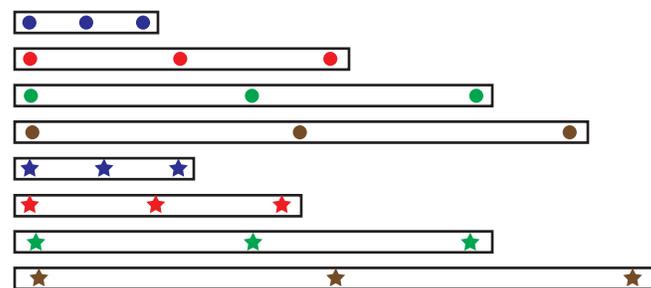
You'll need

- ★ The Measuring Stick (page D1.12, run a half class set)
- ★ adding machine tape (see Advance Preparation)
- ★ 3 measuring sticks (see Advance Preparation)

Advance Preparation Cut 8 pieces of adding machine tape to the following lengths: 12", 15", 24", 28", 40", 40", 48", 54". Code each strip of paper with the color and shape listed below:

- 12" strip—3 large blue dots
- 15" strip—3 large blue stars
- 24" strip—3 large red stars
- 28" strip—3 large red dots
- 40" strip—3 large green stars
- 40" strip—3 large green dots
- 48" strip—3 large brown dots
- 54" strip—3 large brown stars

Staple the four strips marked with dots on one wall. Staple the four strips marked with stars somewhere else in the classroom, ideally clear across the room. Make 3 measuring sticks by cutting three 1" x 12" strips of very heavy cardboard or three 12" lengths of wooden dowling. You can also simply cover the markings on three foot-long rulers with blue masking tape.



Instructions for The Measuring Stick

1. Gather children to your discussion circle. Draw their attention to the two sets of paper strips you have stapled in two different locations. Give them a few moments to pair-share their observations, and then call on volunteers to share their thinking with the class. What do they notice about these paper strips?

Students *The ones over there have big dots on them.*

The ones on the other wall have stars.

I like the one with the red stars. Red is my favorite.

Some of them are really long, like that one with the brown dots.

Some are short and some are long.

Activity 4 The Measuring Stick (cont.)

2. Note with students that there is one strip in each set that has been marked with blue shapes, another in each set that has been marked with red shapes, and so on. Then ask children to compare the two strips marked in blue. Do students think the strip marked with blue stars is shorter than, longer than, or the same length as the strip marked with blue dots? Have them pair-share their ideas, and then call on volunteers to share with the group.

Students *I think they're the same.*

I think the one with stars is longer because it has stars on it.

I think the one with dots might be longer because it looks a little bigger.

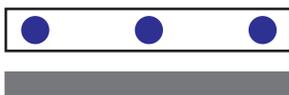
3. Then ask students how they might find out for sure whether one of the two strips is longer or not. Chances are, some students will suggest taking one of the strips off the wall, carrying it over to the other wall, and comparing the two directly. Let them know that the strips have to stay where they are. Is there some way to compare the lengths without moving them?

4. Give students a chance to discuss some possible strategies, and then show them one of the measuring sticks you have prepared. How might they use this measuring stick to help? Give them a few moments to pair-share ideas. Then call on volunteers to share their thinking, as you carry out their suggestions.

Students *Hold the stick up to the strip with blue dots on it.*

Yeah, so you can see how long it is.

Teacher *Like this?*



Students *Hey, look it's exactly the same.*

I think the one with the stars will be the same too.

I think it's longer.

Can I take the stick over to the one with the stars and try it?



Students *I was right! The star paper is longer!*

Are you sure you put the stick right?

I think the one with the dots is longer because it's the same as the stick.

But the stars one sticks out more than the stick – it must be longer!

5. Now show students a copy of the Measuring Stick record sheet. Explain that sometime over the next few days during Work Places, they will each have a chance to work with a partner to measure the strips for themselves. If, after measuring both of the strips marked with blue shapes, they decide the blue dot strip is longer, they will color the dot blue. If they determine that the blue star strip is longer, they will color the star blue. If two of the strips marked in the same color turn out to be the same length, they will color in both the dot and the star.

Activity 4 The Measuring Stick (cont.)

Set D1 Measurement: Comparing Length Blackline Run a half class set and cut in half			
NAME _____		DATE _____	
The Measuring Stick			
Color the shape to show which strip in each pair is longer. If the strips are the same length, color both shapes.			
Blue Dot Strip		Blue Star Strip	
Red Dot Strip		Red Star Strip	
Green Dot Strip		Green Star Strip	
Brown Dot Strip		Brown Star Strip	

6. Let students know where you are placing the record sheets and measuring sticks. You may decide to put them in one of your Work Place tubs, or place them on a small desk or table easily accessible to students during Work Places. There are enough materials for 6 students to do this measuring activity at one time if they work in pairs.

Extension

- Some students might enjoy using Unifix cubes or a measuring tape to determine the exact length of each strip, as well as the difference in length between the strips in the blue pair, the red pair, and the brown pair.

NAME _____

DATE _____

The Measuring Stick

Color the shape to show which strip in each pair is longer. If the strips are the same length, color both shapes.

Blue Dot Strip		Blue Star Strip	
Red Dot Strip		Red Star Strip	
Green Dot Strip		Green Star Strip	
Brown Dot Strip		Brown Star Strip	

NAME _____

DATE _____

The Measuring Stick

Color the shape to show which strip in each pair is longer. If the strips are the same length, color both shapes.

Blue Dot Strip		Blue Star Strip	
Red Dot Strip		Red Star Strip	
Green Dot Strip		Green Star Strip	
Brown Dot Strip		Brown Star Strip	

Set D1 ★ Activity 5



ACTIVITY

The Packing Box

Overview

Sometimes teachers need to store the things in their classrooms over a break so the custodians can get in to clean. What are some of the things in your room that might fit into the cardboard carton you've brought in for today's activity? Students identify tools that will help them with this measuring job. This activity becomes a Work Place once it has been introduced to the class.

Skills & Concepts

- ★ apply the concept of transitivity to comparing lengths

You'll need

- ★ The Packing Box (page D1.15, run a half class set plus a few extra)
- ★ a large cardboard carton with a lid such as a box that holds 10 reams of copy paper
- ★ the 3 measuring sticks from Set D1, Activity 4
- ★ a ball of string
- ★ a pair of scissors
- ★ blue masking tape (see Advance Preparation)

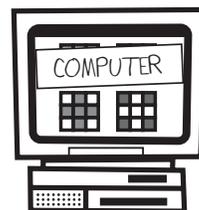
Instructions for The Packing Box

1. Gather children to your discussion circle. Explain that over the coming break, you may need to pack some of the things in the classroom to get them out of the way so the custodians can do a good job of cleaning. Show students the cardboard carton, and explain that this is one of the boxes you will use if you have to pack some of your things. Can the children spot and name things in the room that would fit into the carton when its lid is on? Can they spot things that would be too big? Give them a few moments to pair-share, and then call on volunteers to share with the group.

Students You couldn't fit even one of our chairs in that box.
Some the books on our reading shelf would fit.
You could put a bunch of papers in there.
I bet one of our math tubs could fit in there.
The box of pattern blocks—let's put them in there!

2. Now show students the objects around the room you have marked with blue tape. Explain that you would like the children to identify which of these objects would fit into your packing box, without mov-

Advance Preparation Locate 12 objects in your classroom, four of which are too big to fit into the cardboard carton, and eight of which will fit, one at a time rather than all 8 at once, into the carton when the lid is on. Mark each of the objects you have selected with a piece of blue masking tape labeled with the name of the object. Try to choose some objects that are located at a good distance from your discussion circle.



Activity 5 The Packing Box (cont.)

ing the box from its location or moving any of the objects. Let them know that you'll need to be able to put the lid on the box; the object has to fit entirely inside the box, though it can be all by itself. It doesn't need to fit in with other objects.

Dani *Why can't we just bring the things over and see if they will fit into the box?*

Teacher *Because I don't want to damage the box moving things in and out of it, and all the things I have marked need to stay where they are. Is there a way you can find out whether or not these things will fit into the box without moving the box or the objects I have marked?*

Students *We could maybe use the measuring sticks.*

I think the measuring sticks are too long for the box when the lid is on.

I think they're not big enough to check the long side of the box.

3. If you have found a copy paper box to use for this activity, it will be about 11 inches wide, 17 inches long, and 9 inches deep. Work with input from the class to compare one of the measuring sticks to each dimension of the box. Is the measuring stick a tool that will be accurate enough to help them find out which of the objects will fit into the box, or do they need to come up with something that will give them a better measure?

4. After some discussion, show students the ball of string. Suggest that when it is their turn to find out which of the objects will fit, they might want to cut a piece of string to match the length of the box. Some might want to cut a second string to match the depth, or mark the measuring stick to match. When they are satisfied that they have, or can make the tools they need, show them a copy of the Packing Box record sheet.

Set D1 Measurement: Comparing Length Blackline Run a half class set and out n half	
NAME _____	DATE _____
The Packing Box	
Write the name of each object you measure and where it belongs on the chart.	
It will fit into the box.	It is too big to fit into the box.

5. Review the sheet with the class. Explain it as needed, and note with the students that there is only room to record 6 objects. If they want to measure all 12 objects, they can use two sheets. If necessary, work with input from the students to model the process of measuring one of the objects and recording the results on the sheet.

6. Let students know where you are placing the record sheets, measuring sticks, and string. You may decide to put these materials in one of your Work Place tubs, or place them on a small desk or table easily accessible to students during Work Places. Place the packing box in a designated location and solicit agreement from the class that no one will move the box, or any of the objects you have marked with blue tape. The challenge is to do the job without moving anything.

NAME _____

DATE _____

The Packing Box

Write the name of each object you measure and where it belongs on the chart.

It will fit into the box.	It is too big to fit into the box.

NAME _____

DATE _____

The Packing Box

Write the name of each object you measure and where it belongs on the chart.

It will fit into the box.	It is too big to fit into the box.

