Lesson Overview

LESSON 30

Order Objects by Length

Lesson Objectives

Content Objectives

- Directly compare the lengths of three objects.
- Order three objects by length.

Language Objectives

- Order three classroom objects by length and height (shortest to longest or longest to shortest; shortest to tallest or tallest to shortest).
- Explain why one end of all the objects being compared must be aligned.
- Draw a line that is shorter or longer or taller than two given objects.

Prerequisite Skills

- Compare quantities within 10.
- Use direct comparison to identify which of two objects is longer or shorter.
- Describe measurable attributes of objects such as length.

Standards for Mathematical Practice (SMP)

SMPs 1, 2, 3, 4, 5, and 6 are integrated in every lesson through the *Try-Discuss-Connect* routine.*

In addition, this lesson particularly emphasizes the following SMPs:

2 Reason abstractly and quantitatively.

3 Construct viable arguments and critique the reasoning of others.

5 Use appropriate tools strategically.

6 Attend to precision.

*See page 431i to see how every lesson includes these SMPs.

Lesson Vocabulary

- **length** how long something is.
- **longer** greater in length.
- **longest** greatest in length.
- **shorter** lesser in length or height.
- **shortest** least in length or height.
- **taller** greater in height.
- **tallest** greatest in height.

Review the following key term.

- **compare** to decide if numbers, amounts, or sizes are greater than, less than, or equal to each other.

Learning Progression

In Kindergarten children begin to describe measurable attributes, such as length. They directly compare two objects to see which object is longer or shorter.

In Grade 1 children compare and order objects by length. They use a nonstandard reference unit to measure objects by laying multiple copies of a shorter object end to end. They understand that the number of such reference objects is the length measurement of the item being measured.

In this lesson children compare the lengths of three objects, lining them up so that the ends of all objects are aligned, and put the items in order by length. They identify the shortest, tallest, and longest objects.

In Grade 2 children use standard tools to measure objects and compare lengths using different units and measurement systems.

Lesson Pacing Guide

Whole Class Instruction

SESSION 1 **Explore** *45–60 min*	**Ordering Objects by Length** • Start *5 min* • Try It *20 min* • Connect It *15 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 697–698
SESSION 2 **Develop** *45–60 min*	**Ordering Objects by Length** • Start *5 min* • Try It *15 min* • Discuss It *10 min* • Model It *5 min* • Connect It *10 min* • Apply It *5 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 703–704 **Fluency Practice** Add Two-Digit Numbers
SESSION 3 **Develop** *45–60 min*	**Ordering Objects by Length** • Start *5 min* • Try It *15 min* • Discuss It *10 min* • Model It *5 min* • Connect It *10 min* • Apply It *5 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 709–710 **Fluency** Ordering Objects by Length
SESSION 4 **Refine** *45–60 min*	**Ordering Objects by Length** • Start *5 min* • Apply It *35 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 713–714
SESSION 5 **Refine** *45–60 min*	**Ordering Objects by Length** • Start *5 min* • Apply It *15 min* • Small Group Differentiation *20 min* • Close: Exit Ticket *5 min*	**Lesson Quiz** or **Digital Comprehension Check**

Lesson Materials

Lesson *(Required)*	*Per child:* 3 pieces of string of different lengths, 3 objects of different lengths, 2 crayons (1 red, 1 blue), copy of Start slide (Sessions 1–5), copy of Close slide (Sessions 1, 3–4) *Per pair:* 15 connecting cubes (3 red, 5 green, 7 yellow), 3 straws of different lengths
Activities	*Per pair:* base-ten blocks (9 tens rods, 18 ones units), 4 or 5 objects of different heights or lengths *Per group:* connecting cubes, 1 straightedge, 1 set of three classroom objects of different lengths, 3 books of different heights *Activity Sheet:* Addition Practice 3
Math Toolkit	connecting cubes

Teacher Toolbox

Small Group Differentiation

PREPARE

Ready Prerequisite Lesson

Grade K
- Lesson 31 Compare Length and Height

RETEACH

Tools for Instruction

Grade K
- Lesson 31 Compare Length and Height

Grade 1
- Lesson 30 Order by Length

REINFORCE

Math Center Activity

Grade 1
- Lesson 30 Use Vocabulary for Length

EXTEND

Enrichment Activity

Grade 1
- Lesson 30 Longer and Shorter Scavenger Hunt

Connect to Family, Community, and Language Development

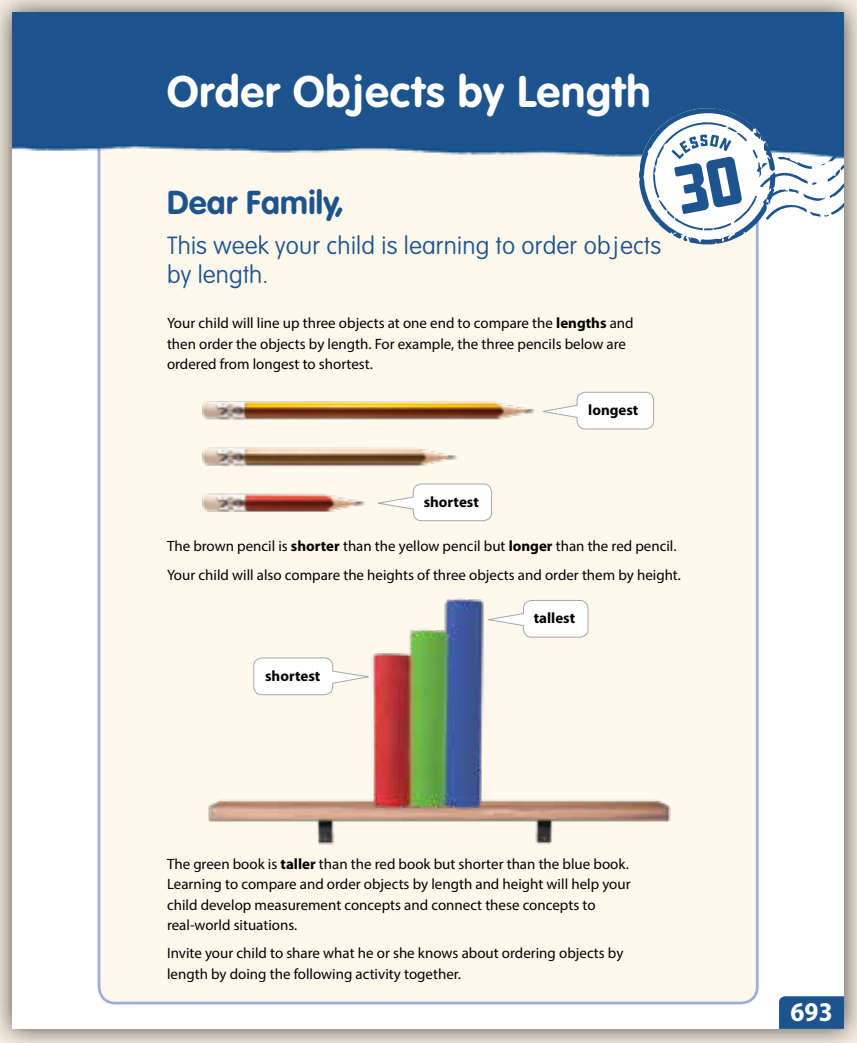
The following activities and instructional supports provide opportunities to foster school, family, and community involvement and partnerships.

Connect to Family

Use the **Family Letter**—which provides background information, math vocabulary, and an activity—to keep families apprised of what their child is learning and to encourage family involvement.

Available in Spanish

Teacher Toolbox



Order Objects by Length

LESSON 30

Dear Family,

This week your child is learning to order objects by length.

Your child will line up three objects at one end to compare the **lengths** and then order the objects by length. For example, the three pencils below are ordered from longest to shortest.

longest

shortest

The brown pencil is **shorter** than the yellow pencil but **longer** than the red pencil.

Your child will also compare the heights of three objects and order them by height.

tallest

shortest

The green book is **taller** than the red book but shorter than the blue book. Learning to compare and order objects by length and height will help your child develop measurement concepts and connect these concepts to real-world situations.

Invite your child to share what he or she knows about ordering objects by length by doing the following activity together.

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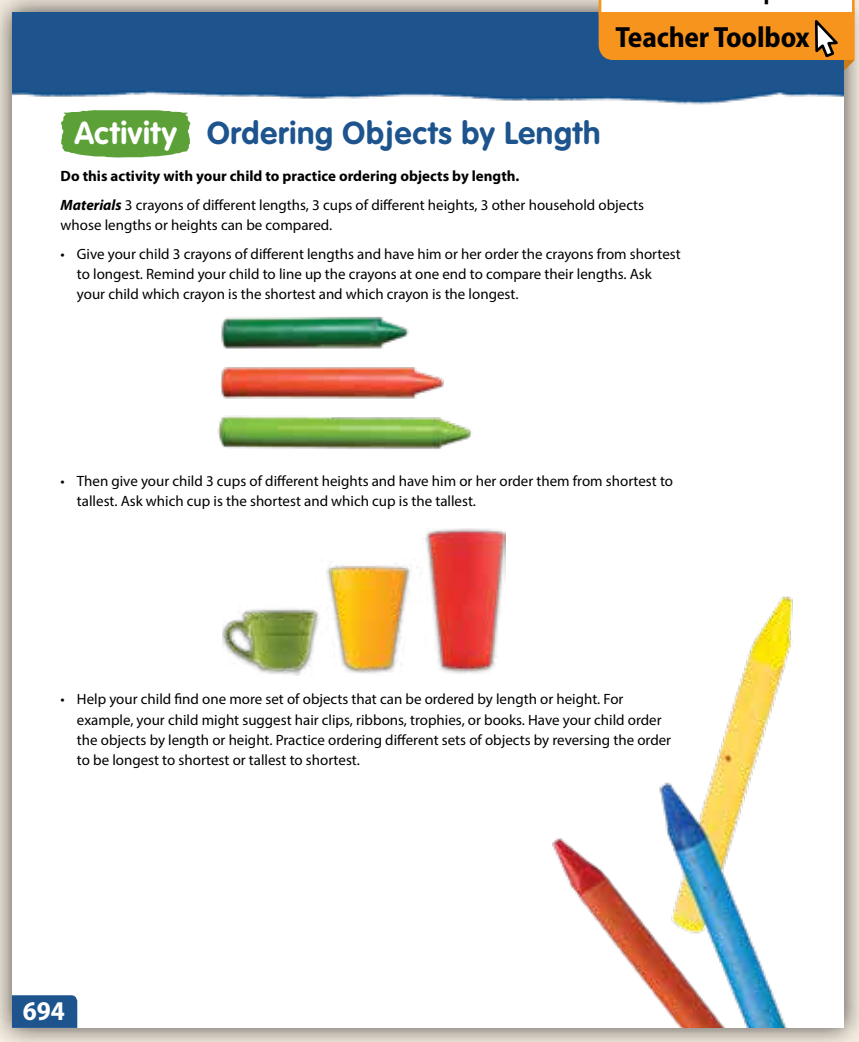

Activity Ordering Objects by Length

Do this activity with your child to practice ordering objects by length.

Materials 3 crayons of different lengths, 3 cups of different heights, 3 other household objects whose lengths or heights can be compared.

- Give your child 3 crayons of different lengths and have him or her order the crayons from shortest to longest. Remind your child to line up the crayons at one end to compare their lengths. Ask your child which crayon is the shortest and which crayon is the longest.

- Then give your child 3 cups of different heights and have him or her order them from shortest to tallest. Ask which cup is the shortest and which cup is the tallest.

- Help your child find one more set of objects that can be ordered by length or height. For example, your child might suggest hair clips, ribbons, trophies, or books. Have your child order the objects by length or height. Practice ordering different sets of objects by reversing the order to be longest to shortest or tallest to shortest.

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Goal

The goal of the Family Letter is to explore ordering objects by length and comparing the lengths and heights of various objects.

Activity

Learning to compare and order objects by length and height will help children develop measurement concepts. Look at the *Ordering Objects by Length* activity and adjust if necessary to connect with children.

Math Talk at Home

Encourage children and their family members to order objects in the home, such as toys, books, or crayons, by height and length.

Conversation Starters Below are additional conversation starters children can write in their Family Letter or math journal, with your guidance, to engage family members:

- *Which object is the longest?*
- *Which object is the tallest?*
- *Which object is the shortest?*

Connect to Community and Cultural Responsiveness

Use these activities to connect with and leverage the diverse backgrounds and experiences of all children.

Session 2 **Use anytime during the session.**

- Display a photograph of a place in the community, such as a shoe store or community garden. Encourage children to compare objects in the photograph using the terms *taller, shorter,* or *longer.*

Session 3 **Use anytime during the session.**

- Put children in pairs. Challenge children to see which pair will be the first to order groups of objects correctly. Place sets of three mystery objects of varying heights and lengths in large paper bags. Items may include pencils, books, shoes, and spoons. Give a bag to each pair. Say: *Order the objects from longest to shortest. Go!* Have pairs open their bags to reveal their objects and race to order them correctly.

Sessions 4 and 5 **Use anytime during these sessions.**

- Challenge children to notice objects in the classroom that they might order by height, such as library books, chairs, toys, mugs, and tins. Encourage children to use the terms *taller, shorter,* or *longer* to talk about the objects.

Connect to Language Development

For ELLs, use the Differentiated Instruction chart to plan and prepare for specific activities in every session.

English Language Learners: Differentiated Instruction

Prepare for Session 1
Use with *Connect It*.

Levels 1–3	Levels 2–4	Levels 3–5
Listening/Speaking Read the ***Connect It*** problem aloud. Give small groups of children three straws of different heights. Have them compare the straws. Clarify that *tallest* means having the greatest height, and *shortest* means having the least height. Ask: *Which straw is the tallest?* Use gestures to communicate *tallest. Which straw is shortest?* Make gesture for *shortest*. Encourage children to respond to each of the questions by pointing to the correct straw and completing the sentence starter: • *This straw is the* _____ .	**Speaking/Writing** Read the ***Connect It*** problem aloud. Pair children up, and ask them to use red, blue, and yellow crayons to identify each straw. Have partners take turns describing the straws using the following sentence frames: • *The* _____ *is the shortest.* • *The* _____ *is the longest.* Write the sentence frames on the board. Encourage children to first practice saying the completed sentences orally and then copy the frames into their math journals for future reference.	**Speaking/Writing** Pair children up to read and discuss the ***Connect It*** problem. Ask them to use red, blue, and yellow crayons to identify each straw. Tell children to explain to their partner how they compared the straws. Write the following sequence words on the board: *First*, *Next*, *Then*. Ask children to use the sequence words to write a connected series of sentences explaining how they compared the straws in their math journals. Have children take turns reading their sentences to a new partner. The new partner listens to the explanation, then tries to re-create the order of the straws by following the steps.

LESSON 30

SESSION 1 Explore

Purpose In this session, children develop a process for comparing and ordering the horizontal lengths of three objects. Then they do the same with the heights of three objects.

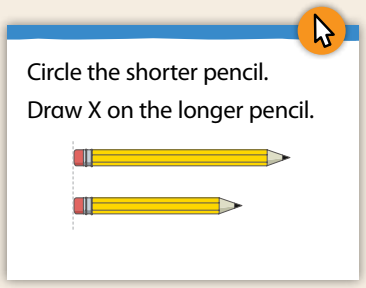
Start

Connect to Prior Knowledge

Materials For each child: copy of printed slide

Why Review directly comparing two objects and naming which object is shorter or longer to prepare children for comparing three objects.

How Children compare pencils. They circle the pencil that is shorter and draw an X on the one that is longer.



Solution
Children draw an X on the top pencil and circle the bottom pencil.

Try It

Materials For each pair: 15 connecting cubes (3 red, 5 green, 7 yellow)

Compare Cube Trains to Find the Shortest

Read the problem aloud together. Have children connect cubes of the same color to make three trains: one red, one green, and one yellow.

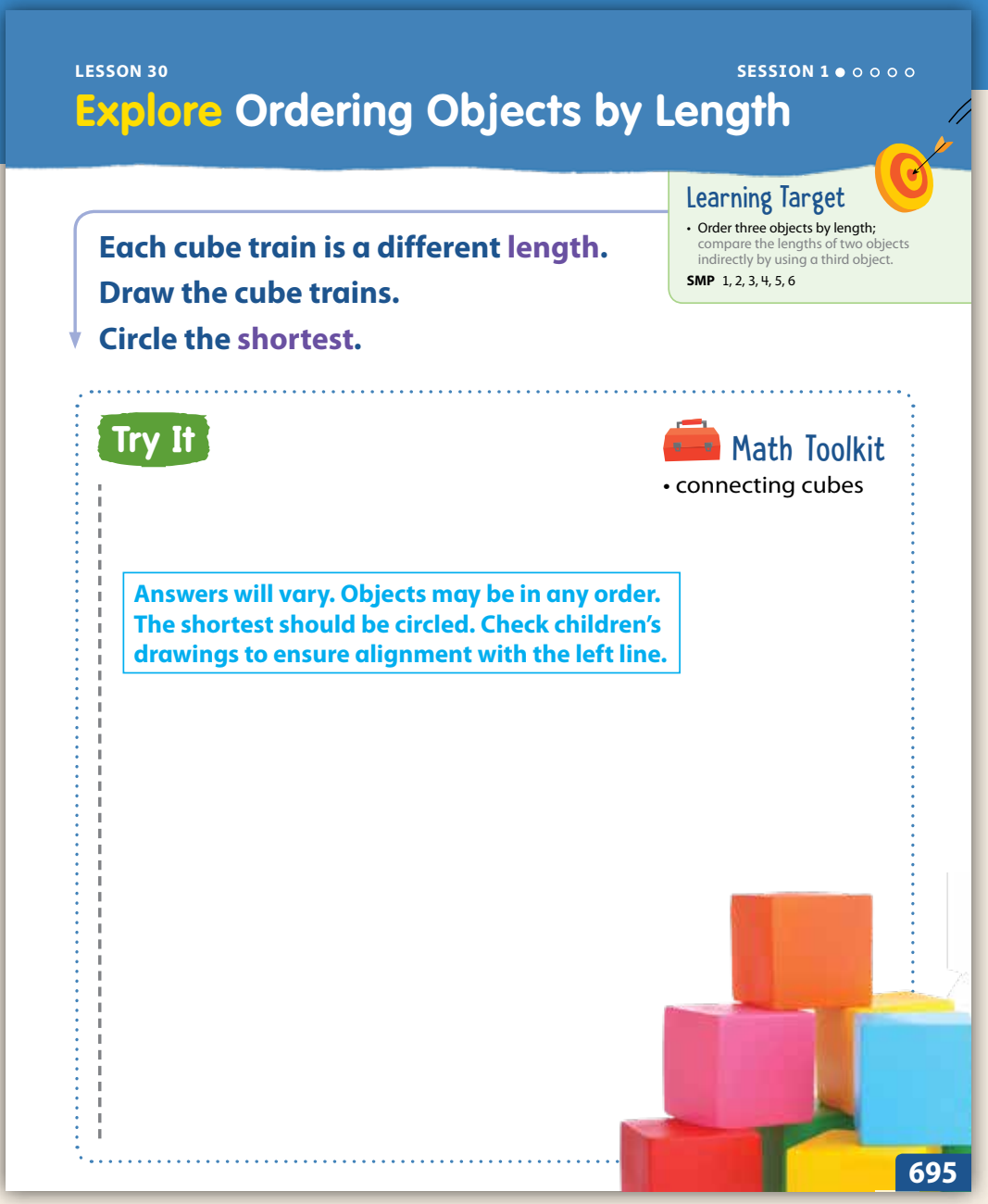
Ask *How can we compare the lengths of the cube trains to find out which one is the shortest?*

Listen for We can lay the cube trains next to each other. We can count how many cubes in each train.

Have children work in pairs to lay their cube trains on the Student Worktext page. Prompt them to align one end of each train with the dashed line on the workmat.

Ask *Which cube train is the shortest? How do you know?*

Listen for The red cube train is the shortest. When I line up the cube trains starting at the dashed line, the red one does not stick out as far as the others.



Ask *How would you describe the green cube train and the yellow cube train?*

Listen for The yellow cube train is the longest. The green cube train is not the longest or the shortest. It is in the middle or in between. It is the medium length.

Have one partner per pair point out which cube train is shortest and the other partner point out which cube train is longest. Have partners discuss how to draw the three cube trains on their workmat and circle the shortest one.

Support Whole Class Discussion

Have pairs explain how they compared and ordered the three cube trains.

Ask *How would you describe your process for finding the shortest cube train?*

Listen for We started all three trains at the dashed line. The yellow train sticks out the farthest. The red cube train does not stick out as far as the green or yellow, so it is the shortest.

Common Misconception **If** children do not understand how to find the shortest, **then** they may only identify *short* with height and not length. Guide them to align each cube train with the dashed line. Ask them whether they think the shortest train should have the least or the most cubes. Stand cube trains up to compare heights and affirm the relationship between shortest height and shortest length.

Connect It

Materials For each pair: 3 straws of different lengths

Pose a Different Problem

Read the next problem aloud together. Distribute three straws of different lengths to each pair.

Ask *How is this problem like the problem on the last page? How is it different?*

Listen for Same: I need to compare the straws to find the tallest. I need to use the dashed line to start them at the same place. Different: This question asks to find the tallest instead of the shortest. The straws need to stand up on the dashed line instead of going sideways.

Model the Problem

Ask *How can you tell which straw is the tallest?*

Listen for I can place them on the dashed line like they are standing and compare heights. The straw that goes the highest is the tallest.

Have pairs work together to compare the straws and find the tallest one. Have children record their work by drawing lines on their workmats that are the same heights as the straws.

Support Whole Class Discussion

Have pairs volunteer their strategies for finding the tallest straw.

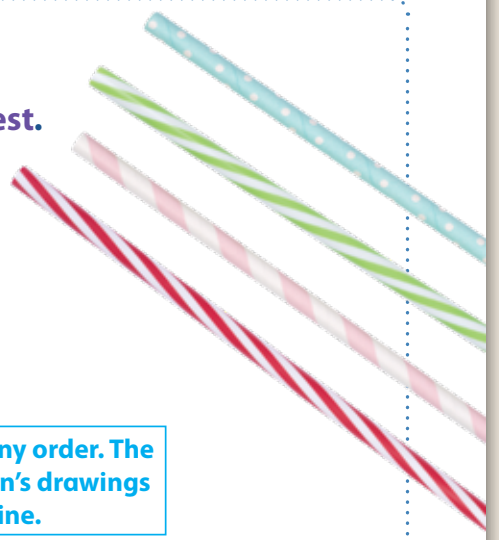
Ask *What strategy did you use to find the tallest straw?*

Listen for We placed the straws standing up on the dashed line. The tallest straw sticks up the most. The other straws were shorter than it.

Ask *How are comparing the cube trains and comparing the straws the same? How are they different?*

Listen for Same: You line up the ends of each object to compare both lengths and heights. Different: You lay the objects on their sides to compare lengths and place objects up and down to compare heights. With the cube trains, we could count the cubes and use numbers. With the straws, we looked to see which one sticks up the highest.

Children will spend more time learning about the concept of length in the Additional Practice.



Connect It

Draw the straws. Circle the tallest.

Answers will vary. Objects may be in any order. The tallest should be circled. Check children's drawings to ensure alignment with the bottom line.

Close: Exit Ticket

Materials For each child: copy of printed slide

Have children draw three lines in order from shortest to longest.

Draw 3 different lines.
Start at the gray line and go across.
Put the shortest one first.
Put the longest one last.

Look for Children draw three horizontal line segments in order from shortest to longest, with the left end point of each one starting at the dashed line.

Common Misconception **If** children draw lines in the opposite order, **then** provide labels with the words *tallest, shortest,* and *longest* to help with positioning.

Real-World Connection

Encourage children to think about everyday places or situations where people might see objects arranged by lengths or heights. Have volunteers share their ideas. Examples: class pictures, choral groups, buildings, blocks.

Solutions

Support Vocabulary Development

1 Have children show the meaning of the term *length* by completing the graphic organizer with words, numbers, and pictures. If children need support, pair them up to compare the length of their shoes. Ask: *Which shoe is longer? Which shoe is shorter?* Then have them work with a new partner and compare the length of their pencils. Encourage children to use the information to complete their graphic organizers.

2 Choral read the problem with children. Ask them to circle the phrase *same length*. Discuss the meaning of *same*. Ask: *Where will you start your line? Where will your line end?* Have children point to the start and end point before drawing the line.

Supplemental Math Vocabulary

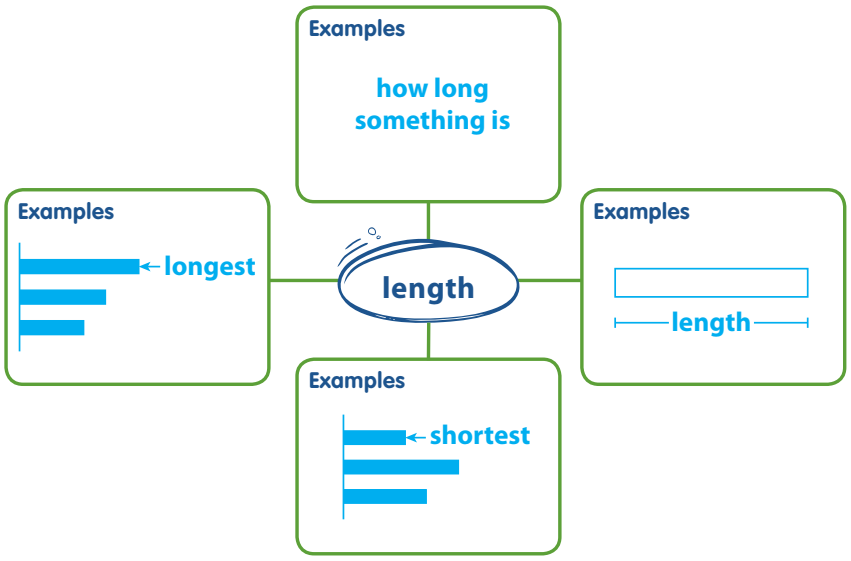
- *compare*

Name: _____ LESSON 30 SESSION 1

Prepare for Ordering Objects by Length

1 Think about what you know about length.
Fill in each box. Use words, numbers, and pictures.
Show as many ideas as you can.

Possible answers:



2 Draw a line the same length as the crayon.

3 Assign problem 3 to provide another look at ordering objects by length.

This problem is very similar to the problem about finding the shortest cube train. In both problems, children are given objects of various lengths to arrange in a workspace. The question asks which crayon is the longest.

Children may want to compare the lengths of actual crayons (or other objects representing crayons) before drawing.

Suggest that children read the problem three times, asking themselves one of the following questions each time:

- *What is this problem about?*
- *What is the question I am trying to answer?*
- *What information is important?*

Solution:

Children should draw three crayons of different lengths (in any order) and circle the longest one. Check to see that they aligned the ends of the crayons for accuracy.

Medium

3 Solve the problem. Draw to show your work.

Draw 3 crayons of different lengths.
Circle the longest.

Answers will vary. Crayons may be in any order. The longest one should be circled. Check children's drawings to ensure alignment with the left line.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 2
Use with *Model It*.

Levels 1–3

Listening/Speaking Use three different-colored pencils of different lengths to demonstrate the process explained in the ***Model It*** problem. Say each sentence, then show the action. Ask: *Which pencil is the longest? Which pencil is the shortest?* Encourage children to use the color of the pencils to complete the sentence frame:

- *The _____ pencil is the (longest/shortest).*

Have children work with a partner to practice asking and answering questions about the shortest and longest pencils.

Levels 2–4

Reading/Speaking Organize children in groups of three and review the process for ordering objects by length presented in the ***Model It*** problem. Write the following sentences on sentence strips, creating one set of sentence strips for each group of three:

- *Lay the pencils on the table.*
- *Line up the ends.*
- *Put them in order from shortest to longest.*

Mix up the sentences. Ask each group member to choose a sentence and read it. Encourage children to collaborate to arrange the sentences in the correct order.

Levels 3–5

Reading/Writing Pair children up to review the process for ordering objects by length presented in the ***Model It*** problem. Have them close their books and work together to restate the instructions, using the following frames:

- *Find the _____ and longest pencils.*
- *Lay the _____ on the table.*
- *Line up the _____.*
- *Put them in _____ from shortest to _____.*

If children need additional support, provide a word bank: *longest, shortest, ends, order, pencils.*

LESSON 30

SESSION 2 Develop

Purpose In this session, children align the end points of three pencils being compared to determine the longest and shortest pencils. The purpose of this problem is to focus on precise modeling and language as children put three objects in order from shortest to longest.

Start

Connect to Prior Knowledge

Materials For each child: 2 pieces of string of different lengths, copy of printed slide

Why Provide concrete experience with ordering two objects by length to prepare children for ordering three objects.

How Children identify the shorter and longer pieces of string and draw to record their work.

Draw your longer string on top.
Draw your shorter string below.

Look for Children draw the longer string on top and the shorter string below. One end point of each string is left-aligned with the dotted line.

Develop Language

Why Develop understanding of how to compare length using comparative words.

How Explain that when comparing two objects, we often add *-er* to the word that describes the object with more of a certain characteristic. So, *long* becomes *longer*, *tall* becomes *taller*, and *short* becomes *shorter*. Then explain that when comparing three or more objects, we often add *-est* to the word that describes the object with the greatest amount of a certain characteristic. So, *long* becomes *longest*, *tall* becomes *tallest*, and *short* becomes *shortest*.

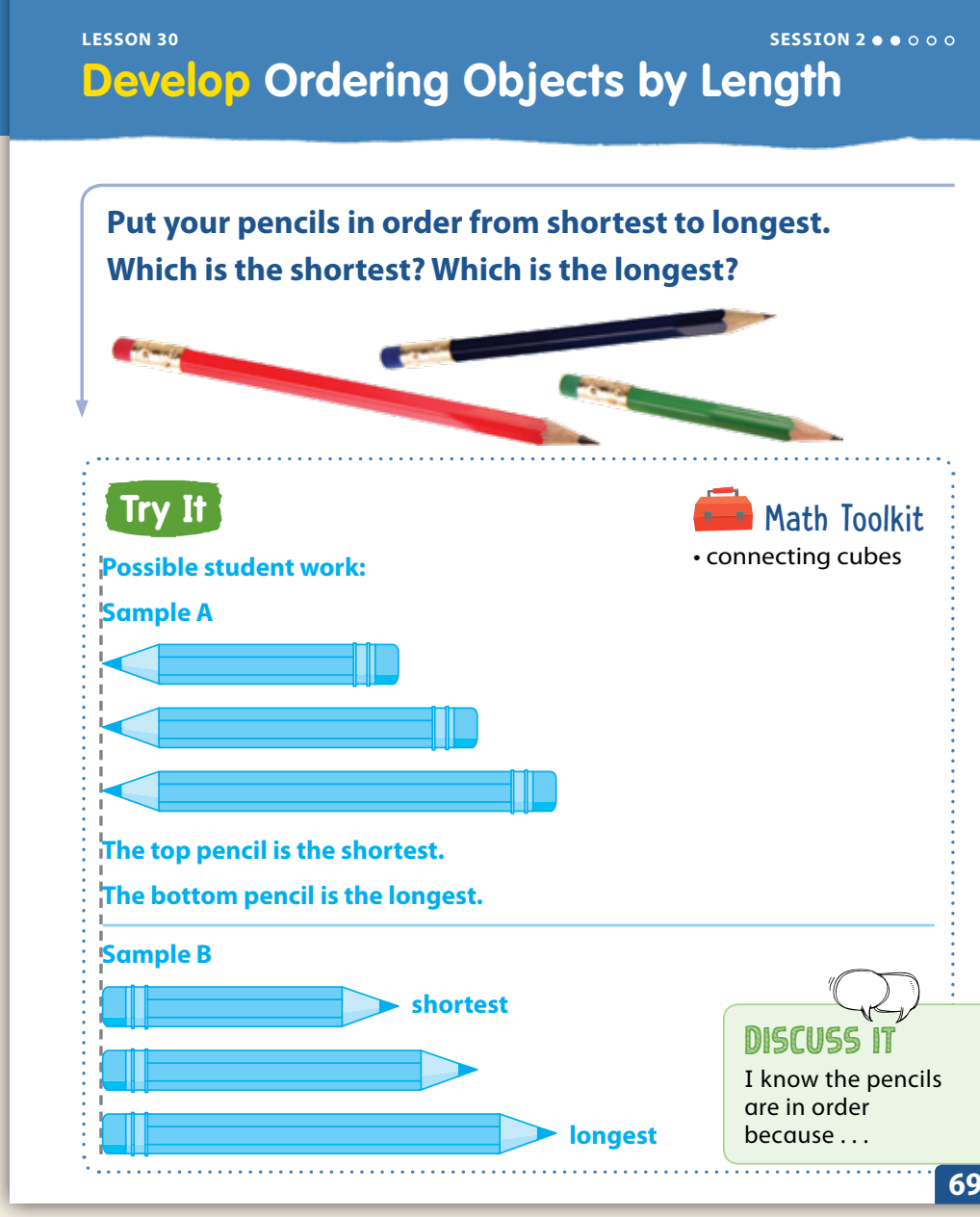
Try It

Make Sense of the Problem

Read the problem aloud. To support children in making sense of the problem, prompt them to relate the problem to the previous session.

Provide each child with three pencils of different lengths.

Ask *How are you being asked to organize the pencils?*



Discuss It

Support Partner Discussion

Encourage children to share the process they used to order the pencils.

Support as needed with questions such as:

- *How did you start?*
- *What did you do?*
- *Can you explain why you did it that way?*

Common Misconception **If** children do not align the end points of the pencils along a left edge, **then** they may not understand why alignment matters. Demonstrate how an object may appear longer or shorter relative to other objects when not aligned properly. Contrast this with proper alignment. Provide a physical straightedge such as a piece of cardboard or a ruler along the dashed line so that children can physically touch the ends of their objects against an edge to check for alignment.

Select and Sequence Solutions

One possible order for whole class discussion:

- ordering the three pencils correctly without aligning them along one edge
- ordering the three pencils correctly but labeling or naming them incorrectly (longest/shortest)
- correctly aligning, ordering, and labeling pencils from shortest to longest

Support Whole Class Discussion

Compare and connect the different representations and have children identify how they are related.

Ask *How can you describe your process for finding which pencil is the shortest? The longest?*

Ask *How do you know that you put the pencils in order from shortest to longest?*

Listen for I lined up one end of each pencil and compared the lengths. I picked the one that stuck out the least distance as the shortest and put that one on top. I picked the one that stuck out the greatest distance as the longest and put that one on the bottom. I put the other pencil in between. I know the order is correct because the middle pencil is longer than the shortest but shorter than the longest.

Model It

If no child presented the model shown on the Student Worktext page, connect the picture to the children's models by having children identify how they represent the problem.

Ask *How do you know which pencil is the shortest?*

Listen for The green pencil sticks out the least distance, so I know it is the shortest.

Ask *How do you know which pencil is the longest?*

Listen for The red pencil sticks out the most, so I know it is the longest.

Ask *How do you know the picture shows the pencils in order from shortest to longest?*

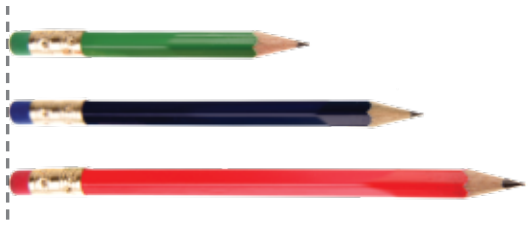
Listen for The eraser end of all three pencils is lined up. The top pencil sticks out the least distance and the bottom pencil sticks out the greatest distance. The other pencil is in between, so I know the pencils are in order from shortest to longest.

Have children write the colors of the pencils to complete the sentences at the bottom of the page.

Put your pencils in order from shortest to longest.
Which is the shortest? Which is the longest?

Model It

Find the shortest and longest pencils.
Lay the pencils on the table.
Line up the ends.
Put them in order from shortest to longest.



The ___green___ pencil is the shortest.

The ___red___ pencil is the longest.

Deepen Understanding

Comparing Lengths

SMP 6 Attend to precision.

Ask these questions when discussing how to put the pencils in order. Listen for precision of language as well as precision in methodology.

Ask *What labels did you use with your answer? Why?*

Listen for *Shortest* and *longest*. The shortest pencil is the smallest, and the longest pencil is the biggest.

Ask *Why is the "smallest" pencil the least? Why is the "biggest" pencil the longest?*

Listen for The shortest pencil has the smallest length. The longest pencil is the biggest because it has the greatest length.

Ask *What if the end of one of the pencils is not lined up with the other pencils?*

Listen for It might look shorter or longer than it really is. It might stick out more than it should or not as far as it should. Two pencils might be the same length but look different if they are not lined up at the same starting edge.

Connect It

Support Whole Class Discussion

Ask children to look at what they drew and wrote to solve the problem and compare it to the picture in *Model It*.

1 Help children make sense of the picture by comparing the pencils to their own model.

Ask *How does your way of ordering the pencils compare to* Model It*?*

Listen for I lined up the pencils and put them in order from shortest to longest like *Model It*. My way has blue as the middle pencil and so does *Model It*.

2 **Ask** *Why it is important to line up one end of the objects when you order them by length?*

Listen for The objects all have to start at the same place so you can see which one is the shortest and which is the longest. Sometimes two objects can be almost the same length, and the only way to tell which one is longer is to put both ends on the same starting line to compare them.

Apply It

Explain that the next problems are an opportunity for children to practice ordering objects by length.

Make string available.

3 The blue spoon is the shortest.
The purple spoon is the longest.

Connect It

1 How is your way like **Model It**? How is it different?

Children may say they put the pencils in order from top to bottom like Model It does and they labeled them "shortest" and "longest."

2 Why is it important to line up one end when you order objects by length?

Possible answer: They all need to start at the same place so you can see how far they go. You can tell which one is the longest because it goes the farthest from the starting place.

Apply It

3 Order the spoons by length. Complete the sentences.

The **blue** spoon is the shortest.

The **purple** spoon is the longest.

Hands-On Activity

Compare lengths of classroom objects.

If . . . *children are unsure about ordering objects by length,*

Then . . . *use the activity below to connect the model on the Student Worktext page to other concrete representations.*

Materials For each group: 1 straightedge, 1 set of three classroom objects of different lengths (e.g., strings, paper clip chains, paper strips, straws, or crayons)

- Ask children how they can use the straightedge to help them compare the lengths of the three objects. Listen for recognition that a straightedge can be used like the dashed line is used to align one end of each object.
- Have children compare the lengths of their objects using the straightedge. Circulate to monitor and provide guidance.
- Have children describe their process and prompt them to explain why they need to accurately line up the objects on one end. One way to order the objects is to place the shortest and longest objects at the top and bottom of the order and then put the third object in between.
- Repeat with other objects.

4 The red comb is the shortest.
The orange comb is the longest.

5 Children circle the second group of pencils.

6 Any blue line that is longer than the black line and any red line that is shorter than the black line are acceptable. Ensure that lines originate at the dashed line.

Support Whole Class Discussion

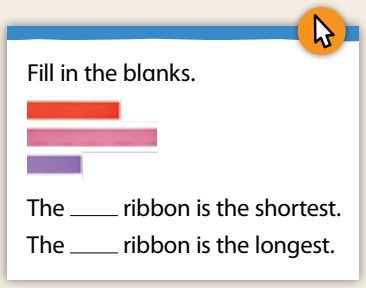
When children have completed problems 3–6, discuss the answers as a class.

Ask *How can you tell which object is the shortest or the longest if they are not arranged in order?*

Listen for Lining up the edges helps you compare the lengths. They all start at the same place and they end at different distances from the edge, so you can look at where the other end is compared to other objects.

Close: Exit Ticket

Have children compare the three ribbons by length and complete the sentences.



Solutions

The purple ribbon is the shortest.

The pink ribbon is the longest.

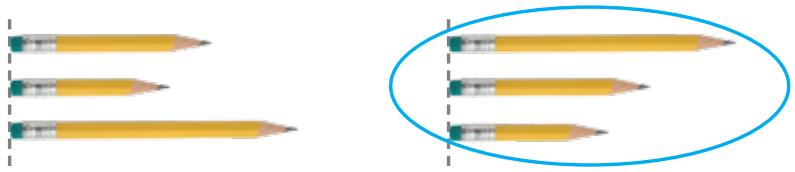
Error Alert **If** children say the red ribbon is the shortest, **then** they may have difficulty seeing the comparison of three objects when they are not arranged in order, or they may not understand comparative words such as *shorter* and *shortest*. Have children arrange colored strips of paper in order, aligned on the left side. Discuss how the red ribbon is shorter than the pink but is not the shortest because the purple ribbon is shorter.

4 Order the combs by length. Complete the sentences.

The red comb is the shortest.

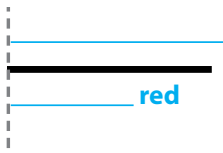
The orange comb is the longest.

5 Circle the group of pencils that shows them in order from longest to shortest.



6 Draw a blue line that is **longer** than this line.
Draw a red line that is **shorter** than this line.

Possible answer:



Solutions

1 The black dog is the shortest.
The white dog is the longest.
Basic

2 The yellow ribbon is the shortest.
The blue ribbon is the longest.
Medium

Name: _____ LESSON 30 SESSION 2

Practice Ordering Objects by Length

Look at the Example. Then solve problems 1–5.

Example

The pencils are lined up at one end.
They are ordered by length.
The green pencil is the shortest.
The red pencil is the longest.

1

The black dog is the shortest.
The white dog is the longest.

2

The yellow ribbon is the shortest.
The blue ribbon is the longest.

Fluency Practice

Add two-digit numbers.

Materials For each pair: base-ten blocks (9 tens rods, 18 ones units), Activity Sheet *Addition Practice 3*

- Distribute Activity Sheet *Addition Practice 3*.
- Explain to children that they will practice regrouping when adding two-digit numbers.
- Have children complete the problems in pairs. Partners take turns modeling each problem with base-ten blocks and recording the totals.
- If pairs disagree on an answer, they should work together to explain their thinking and find the correct answers using base-ten blocks.

3 The green paintbrush is the longest.
The purple paintbrush is the shortest.
Medium

4 The blue paint streak is the longest.
The yellow paint streak is the shortest.
Medium

5 Children may draw a red line of any length longer than the given line and a blue line of any length shorter than the given line. Ensure that lines originate at the dashed line.
Challenge

3

The ___green___ paintbrush is the longest.

The ___purple___ paintbrush is the shortest.

4

The ___blue___ paint streak is the longest.

The ___yellow___ paint streak is the shortest.

5 Draw a red line that is longer than this line.
Draw a blue line that is shorter than this line.

Possible answer:

_____ red

_____ blue

ELL English Language Learners: Differentiated Instruction

Prepare for Session 3
Use with *Apply It*.

Levels 1–3

Reading/Writing Use with ***Apply It*** problem 5. Write the following questions and sentence frames on sentence strips:

- *Which animal is the shortest?*
- *The _____ is the shortest. Which animal is the tallest?*
- *The _____ is the tallest.*

Mix up the sentence strips. Put children in small groups. Give one set of questions and sentence frames to each group. Have children read the sentences and order the animals to match the questions to the answers. Encourage them to write the answer that completes each sentence on sticky notes. Children may write or draw the animal that completes the sentence.

Levels 2–4

Listening/Speaking Pair children up to discuss ***Apply It*** problem 5. Encourage pairs to verbalize their process for deciding which picture to circle, using complete sentences that include the terms *tallest*, *shortest*, and *in order*. Have each child make a list of the terms in their math journals and check off the terms as they hear their partner use them in his or her explanation.

Levels 3–5

Reading/Speaking Pair children up to compare the heights of the animals in ***Apply It*** problem 5. Write the adjectives *tall* and *short* on index cards. Write the endings *-er* and *-est* on sticky notes. Have partners take turns making new words by combining an index card and a sticky note. Tell them to use the word in a sentence that describes an animal in the problem.

LESSON 30

SESSION 3 Develop

Purpose In this session, children order three books on a shelf by height. The purpose of this problem is for children to understand that comparing length both horizontally and vertically requires aligning one end of the objects being compared.

Start

Connect to Prior Knowledge

Materials For each child: 3 pieces of string of different lengths, copy of printed slide

Why Review ordering three objects by length to prepare children for ordering three objects by height.

How Children put three pieces of string in order from shortest to longest and draw to record their work.

Draw your 3 strings in order.
Put the shortest on top.

Look for Children draw 3 strings in order from shortest to longest with end points of all strings left-aligned.

Develop Language

Why Clarify the meaning of the term *order*.

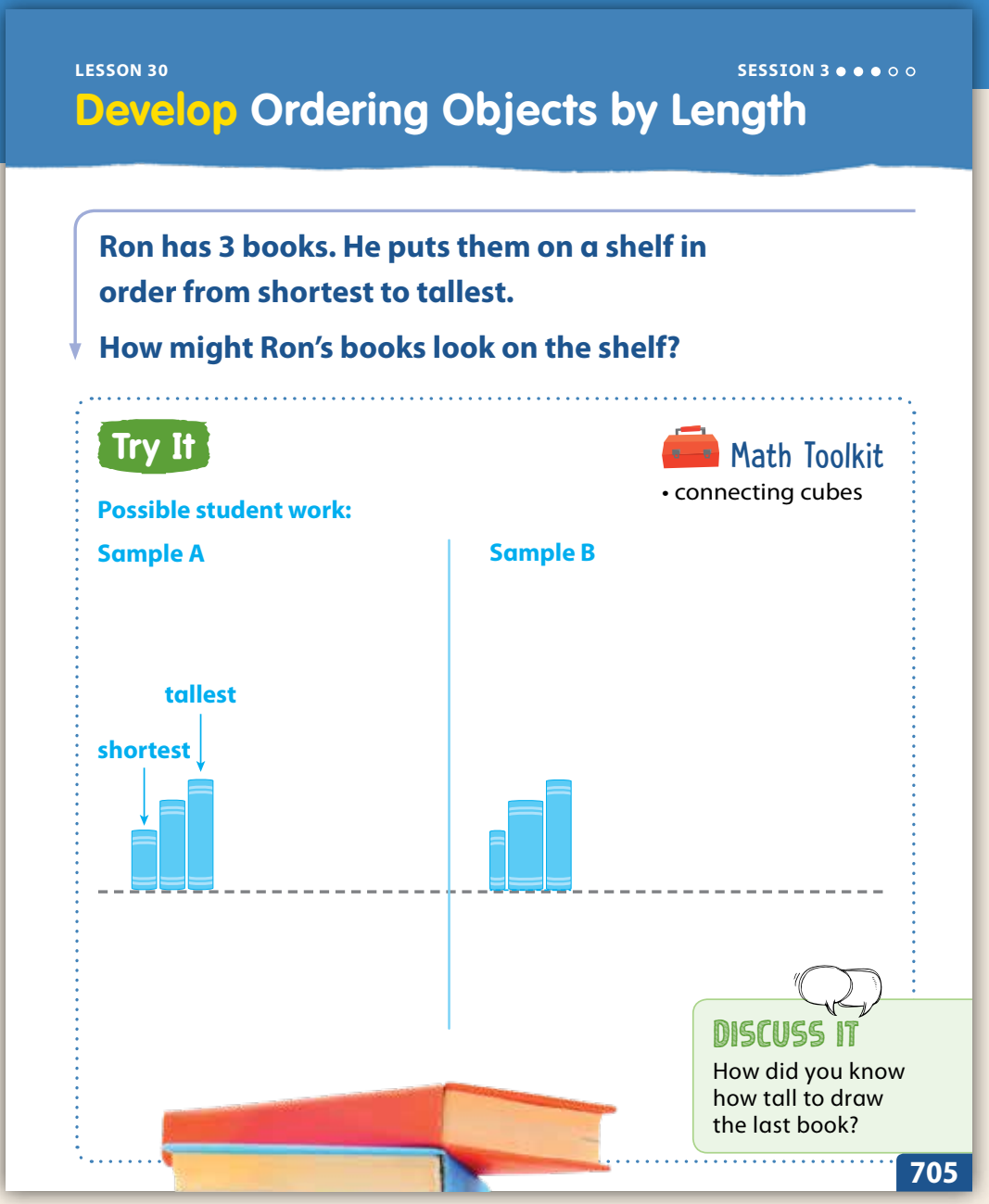
How Explain that to order things is to organize them in a certain way, according to a particular quality. Tell children that things can be ordered alphabetically so that they are organized by letter from A to Z. Have children line up, ordering themselves alphabetically by their first names. Then explain that people or objects can also be ordered by other attributes, like length or height. Encourage children to order themselves by height from shortest to tallest.

Try It

Make Sense of the Problem

Read the problem aloud. To support children in making sense of the problem, prompt them to understand that the problem is asking them to draw three books on a shelf in order from shortest to tallest.

Ask *How is comparing the heights of three books like comparing the lengths of three pencils? How is it different?*



Discuss It

Support Partner Discussion

Encourage children to use the word *compare* as they share what they did to show how the books might look on the bookshelf.

Support as needed with questions such as:

- *What did you think about to help you know what to draw?*
- *How would you describe your process for drawing the books in order?*
- *How was your approach different from your partner's?*

Common Misconception **If** children struggle to draw the books in order by height, or if they put the books in reverse order, **then** suggest that they use three books to model the problem. Provide support for them to arrange the books standing on end from shortest to tallest on a flat surface. Provide a view of the books' spines as children draw a picture to represent them.

Select and Sequence Solutions

One possible order for whole class discussion:

- drawing of 3 books with overall sizes different, laid flat on table with top covers facing up
- drawing of 3 spines of books on a shelf in correct height order, but not aligned on the bottom edge
- drawing of 3 spines of books aligned at the bottom in order from shortest to tallest

Support Whole Class Discussion

Compare and connect different representations and have children identify how they are related.

Ask *How do different drawings show Ron's books on the shelf?*

Listen for Children describe how accurate drawings can look different as long as they have the edges aligned and the books in ascending order. Some drawings may show the tallest books much taller (or only slightly taller) than the other books.

Model It

If no child presented the model shown on the Student Worktext page, connect the picture to children's models by having children identify how they represent the problem.

Ask *How does the picture show the books in order?*

Listen for The blue book is first because it is the shortest. The red book is last since it is the tallest. The yellow book is in between because it is taller than the blue book and shorter than the red book. The books are all lined up on the same shelf.

Have children mark the books as indicated and complete the sentences at the bottom of the page.

Connect It

Support Whole Class Discussion

Ask children to look at what they drew to solve the problem and compare it to the picture in *Model It*.

1 **Ask** *How was your way like* Model It*? How was it different?*

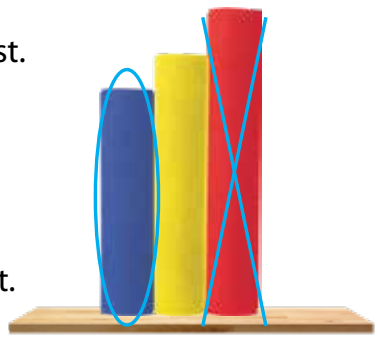
Listen for Children describe how they drew the books on the shelf. They may have varied the heights or widths of the books.

Ron has 3 books. He puts them on a shelf in order from shortest to tallest.

How might Ron's books look on the shelf?

Model It

Order the books from shortest to tallest.
Line up the bottom edges.
Circle the shortest.
Put an X on the tallest.



The blue book is the shortest.

The red book is the tallest.

Connect It

1 How is your way like **Model It**? How is it different?

Children may say that they put the books in order like Model It, with the shortest book on the left and the tallest book on the right. Model It shows all books the same thickness while children's drawings may show some books of different widths.

Deepen Understanding

Measurable Attributes

SMP 2 Reason abstractly and quantitatively.
SMP 3 Construct arguments.

Constructing a viable argument to explain how to order objects will deepen children's understanding of measurement and measurable attributes.

Ask *How can you explain what you did to show Ron's books in order?*

Listen for Children may describe drawing a shelf to show the importance of aligning the books at the bottom. They explain how the shortest book comes first (or on the left) and the tallest book comes last (or on the right).

Ask *How did you know what size to draw the shortest book?*

Listen for Children should recognize that there is not just one correct measurement for the shortest; the size is relative to the other sizes drawn.

Generalize *What do you know about ordering objects by length and by height?* Listen for children's awareness that the shortest, tallest, and longest are found at the beginning or end of the series, while objects in the middle fall between the extremes.

Connect It (continued)

2 **Ask** *Do you agree with Buzz that the red flower is the shortest? Why or why not?*

Listen for I disagree with Buzz because the bottom of the red flower's stem is not lined up with the other flowers, so it looks shorter than the others. If you move it up to sit on the dashed line, the red flower is taller than the orange flower. The orange flower is shortest.

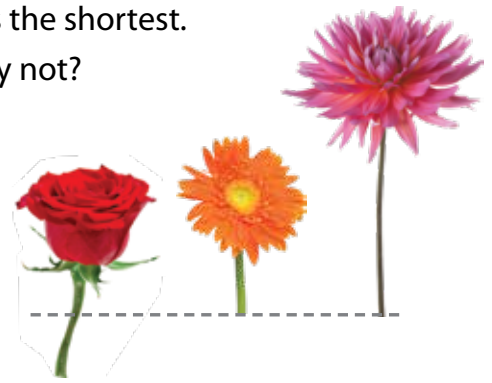
Apply It

Explain that the next problems are an opportunity for children to practice ordering objects by length and height.

3 Children circle the first plant and draw an X on the last plant.

2 Buzz says the red flower is the shortest. Do you agree? Why or why not?

Possible answer: I do not agree. When the red flower's stem is put on the line with the other flowers, it is taller than the orange flower.



Apply It

3 Circle the shortest plant. Put an X on the tallest plant.

Hands-On Activity

Compare and order books by heights.

If . . . *children struggle with ordering objects vertically*

Then . . . *use the activity below to connect the model on the Student Worktext page to a concrete representation.*

Materials For each group: 3 books of different heights

- Organize children in groups of three. Give each child one book, making sure that each group has books of three different heights.
- Have children stand their books up on a flat surface to show the direction for measuring the book's height (up and down). Have them compare the heights of their books and put the books in order from shortest to tallest.
- Help children understand that the thickness of a book or the length of its cover does not affect the ordering of the books by height.
- Listen for children to recognize that the amount of height difference between books doesn't matter; the word still describes the relationship.
- Have children exchange books with another group and repeat the activity.

4 The black pencil is taller than the green pencil.
The yellow pencil is shorter than the green pencil.

5 Children circle the first group of animals.

6 Children circle the second pin.
Children draw an X on the third pin.

Support Whole Class Discussion

When children have completed problems 3–6, discuss the answers as a class.

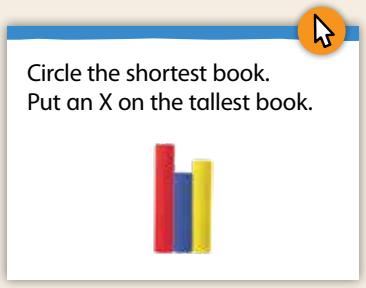
Ask *Why does one end of each object have to be lined up to properly compare the lengths of objects?*

Listen for I need to line up the edges of the objects to compare their lengths or heights because they all need to start at the same place. Then I look to see how far the other end is from the lined-up ends.

Close: Exit Ticket

Materials For each child: copy of printed slide

Have children circle the shortest book and put an X on the tallest book.



Solutions

Children circle the middle book.

Children draw an X on the first book.

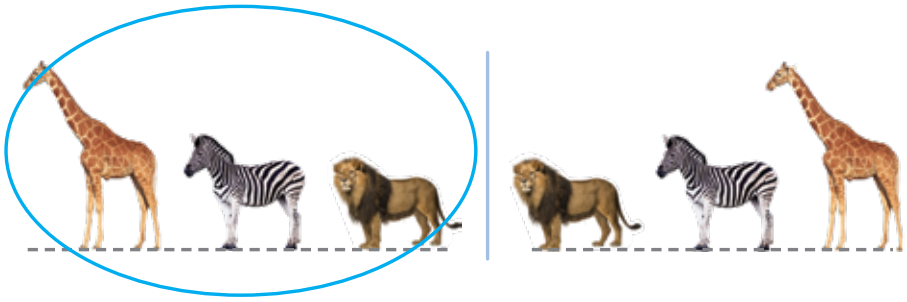
Error Alert **If** children think the shortest book must be on one end or the other, **then** provide additional practice with ordering three objects using concrete objects. Label sticky notes with the words *shortest*, *tallest*, and *longest*. Place them on the objects to help children see that no matter what the arrangement is, the relative size of the object compared to the other objects is the same. Use a straightedge placed appropriately to serve as a baseline for alignment.

4 Complete the sentences.

The black pencil is **taller** than the green pencil.

The yellow pencil is shorter than the green pencil.

5 Circle the group of animals that shows them in order from tallest to shortest.



6 Circle the shortest pin.
Put an X on the tallest pin.

Solutions

1. Children circle the first plant.
   Children draw an X on the third plant.
   Basic

2. Children draw an X on the first flower.
   Children circle the second flower.
   Medium

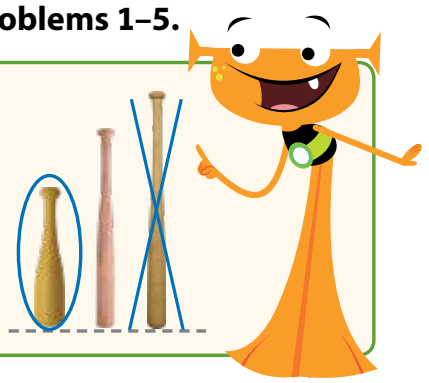
Name: _____ LESSON 30 SESSION 3

Practice Ordering Objects by Length

Look at the Example. Then solve problems 1–5.

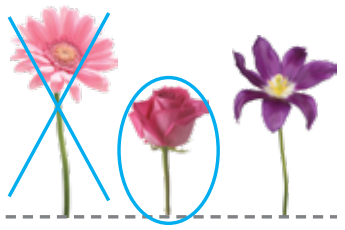
Example

The bats are ordered from shortest to tallest.
A circle is around the shortest bat.
An X is on the tallest bat.



1. Circle the shortest plant.
   Put an X on the tallest plant.

2. Circle the shortest flower.
   Put an X on the tallest flower.

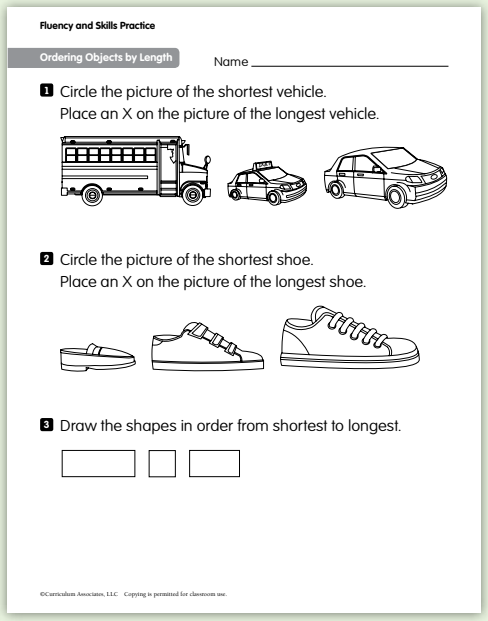


Fluency & Skills Practice

Teacher Toolbox

Assign *Ordering Objects by Length*

In this activity children practice ordering a set of three objects from shortest to longest. Children might want to make similar comparisons in real-world situations. For example, children may want to determine who in their family is the tallest and who is the shortest, use the longest string from a group of strings to make a necklace, or find the shortest piece of train track in a train set.



Fluency and Skills Practice

Ordering Objects by Length Name _____

1 Circle the picture of the shortest vehicle.
Place an X on the picture of the longest vehicle.

2 Circle the picture of the shortest shoe.
Place an X on the picture of the longest shoe.

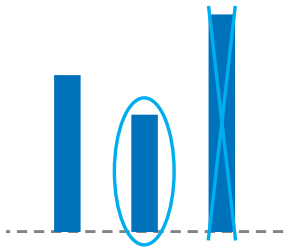
3 Draw the shapes in order from shortest to longest.

3 Children circle the second rectangle.
Children draw an X on the third rectangle.
Medium

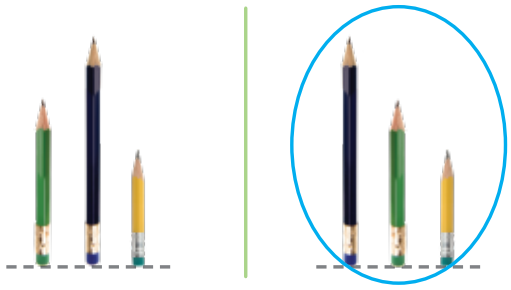
4 Children circle the second group of pencils.
Medium

5 Boom is right. Children may mention that the black ribbon is mostly below the baseline and to be compared with the other two ribbons, it would need to sit on the baseline.
Challenge

3 Circle the shortest rectangle.
Put an X on the tallest rectangle.



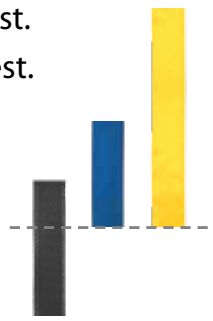
4 Circle the group of pencils that shows them in order from tallest to shortest.



5 Buzz says the black ribbon is the shortest.
Boom says the blue ribbon is the shortest.

Who is right? Circle.

Buzz (Boom)



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ELL English Language Learners: Differentiated Instruction

Prepare for Session 4
Use with *Apply It*.

Levels 1–3	Levels 2–4	Levels 3–5
Reading/Listening Review the color words *red, yellow,* and *blue*. Read ***Apply It*** problem 2 aloud to children. Have them listen to the clues and color the dogs. Then pair children up and give them an envelope with the following sentence cut up into individual words: *The red dog is longest*. Ask children to arrange the words in the correct order. Encourage pairs to use clues such as capital letters and end punctuation to help them arrange the words correctly. If children need additional support, have them look at the picture they colored for a hint or match the words to the sentence in the problem.	**Reading/Writing** Pair children up to solve ***Apply It*** problem 2. Give each pair an envelope with the following sentence cut up into individual words: *The yellow dog is shorter than the red dog.* Ask them to arrange the words in the correct order. Remind children to check the picture to make sure the sentence makes sense. Have children write a new sentence in their math journal comparing the blue dog to the red dog.	**Listening/Writing** After children solve ***Apply It*** problem 2, have them cut three strips of paper of different lengths, then color each one red, yellow, or blue. Ask children to use the clues in the problem as a guide to write two new clues for a partner. The partner should draw three rectangles of different lengths in their math journal and color the rectangles according to the clues given by the partner. Have children check their drawings to see if they match their partner's strips of paper.

LESSON 30

SESSION 4 Refine

Purpose In this session, children practice comparing and arranging three objects by length or by height in a specified order. They also identify the longest, shortest, or tallest object in a group.

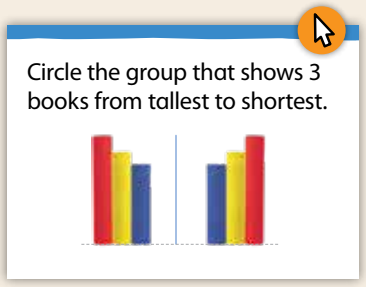
Start

Develop Fluency

Materials For each pair: copy of printed slide

Why Practice identifying visual patterns associated with words. Understand the convention of arranging and observing objects left to right when ordering horizontally.

How Give each pair a copy of the slide. Have pairs work together to identify and circle the group of books arranged in order from tallest to shortest.



Solution
Children circle the group of books on the left.

Example

Read the Example problem aloud and have children describe how the picture shows which strip is shortest and which is longest.

Ask *How does the word* shorter *help you know which strip to color?*

Listen for The green strip in the middle is longest, so we need to compare the top strip and the bottom strip to see which of them is shorter. The top strip is shorter than the bottom strip, so the top strip must be yellow and the bottom strip must be red.

Apply It

1. Shortest: third pencil;
   Tallest: second pencil
   DOK 2
2. Children color the top dog red, the middle dog blue, the bottom dog yellow.
   DOK 2

LESSON 30 SESSION 4

Refine Ordering Objects by Length

Complete the Example. Then solve problems 1–5.

Example

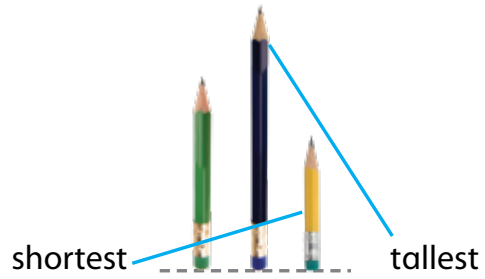
Read the clues. Then color the strips.
The green strip is longest.
The yellow strip is shorter than the red strip.

yellow

red

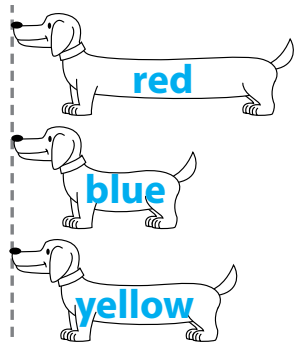
Apply It

1. Draw lines to show which pencil is tallest and which is shortest.



2. Read the clues. Then color the dogs.

The red dog is longest.
The blue dog is shorter than the yellow dog.



711

3 Children draw an X on the top caterpillar.
Children circle the bottom caterpillar.
DOK 2

4 No, I do not agree with Boom; See possible answer on the Student Worktext page.
DOK 3

5 Children color the first car yellow, the second car red, the third car blue.
DOK 2

Close: Exit Ticket

Check for Understanding

Materials For each child: 3 objects of different lengths, copy of printed slide

Ask children to put three objects in order from shortest to longest and draw a picture to record their work.

Put your objects in order from shortest to longest. Draw a picture to show your work.

Look for Children's drawings show three objects aligned in order from shortest to longest.

Error Alert For children who are still struggling, use the table on the right to guide remediation.

After providing remediation, check children's understanding by asking them to put three different objects in order from longest to shortest.

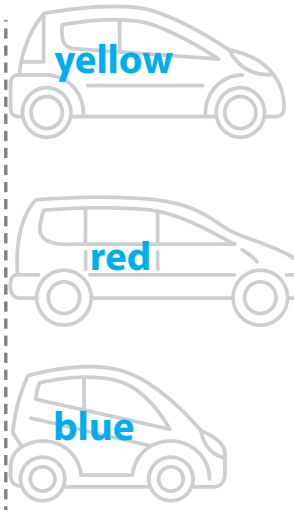
3 Circle the shortest one.
Put an X on the longest one.

4 Boom says the red cup is the shortest.
Do you agree? Why or why not?

Possible answer: I do not agree. When the bottom of the red cup is placed on the line with the other cups, it is taller than the yellow cup.

5 Read the clues.
Color the cars.

The blue car is shortest.
The red car is longer than the yellow car.



Error Alert

If the error is . . .	*Children may . . .*	*To support understanding . . .*
objects are drawn in reverse order	not understand conventional directions of arrangement.	Have children point to the shortest and the longest. Remind them that items are arranged from top to bottom with the shortest on top.
objects are drawn in incorrect order	not have aligned one end of each object or may have compared the other ends incorrectly.	Guide children to align the ends of the objects and identify which one sticks out the least. Name this the shortest and place it on top. Continue for the other two objects.
objects jumbled or piled	not understand the task.	Organize the objects so that they are almost aligned. Guide them as described above.

Solutions

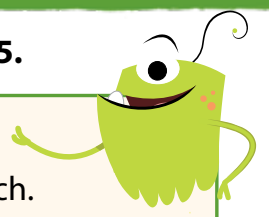
1. Children color the first rectangle red and the second rectangle blue.
Medium

2. Children draw an X on the top paintbrush. Children circle the middle paintbrush.
Basic

Name: _____ LESSON 30 SESSION 4

Practice Ordering Objects by Length

Look at the Example. Then solve problems 1–5.



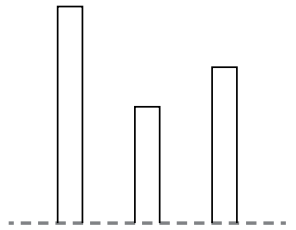
Example

Read the clues. Then color the crayons to match.

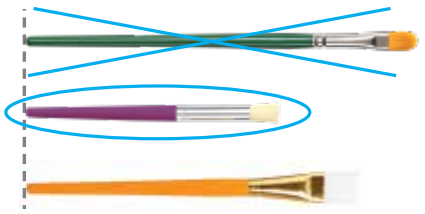
The blue crayon is shortest.

The yellow crayon is longer than the red crayon.

1. Color the tallest rectangle red.
Color the shortest rectangle blue.



2. Circle the shortest paintbrush. Put an X on the longest paintbrush.

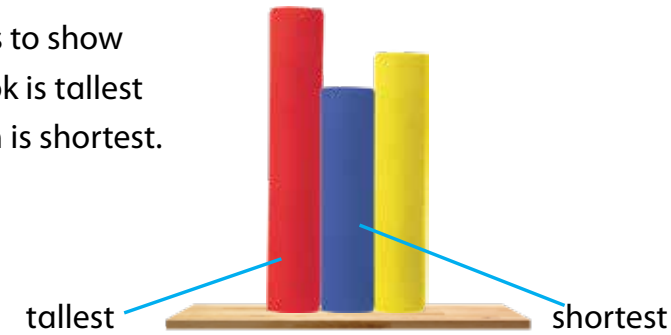


3 Tallest: first book;
Shortest: second book
Basic

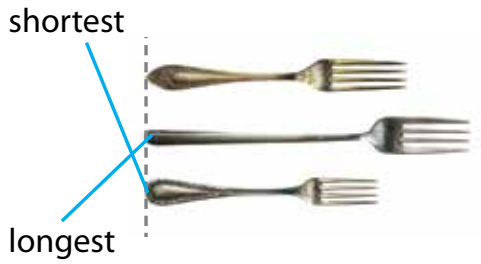
4 Shortest: bottom fork;
Longest: middle fork
Medium

5 Children color the top boat red, the middle boat blue, and the bottom boat yellow.
Challenge

3 Draw lines to show which book is tallest and which is shortest.

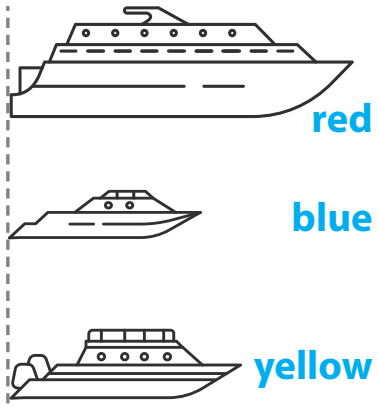


4 Draw lines to show which fork is longest and which is shortest.



5 Read the clues.
Then color the boats.

The blue boat is shortest.
The red boat is longer than the yellow boat.



LESSON 30

SESSION 5 Refine

Purpose In this session, children continue to compare lengths and heights of three objects arranged in different orders.

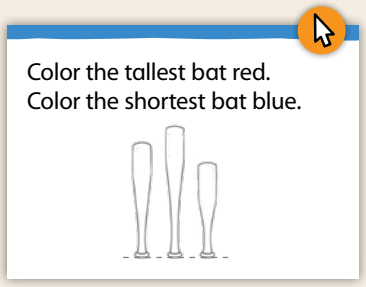
Start

Develop Fluency

Materials For each child: red and blue crayon, copy of printed slide

Why Practice ordering three objects by height.

How Children color the tallest and shortest bats on the slide to match the directions.



Solutions

Children color the middle bat red.

Children color the last bat blue.

Apply It

1. Children color the top bat green, the middle bat purple, and the bottom bat blue.
DOK 2

2. Children circle *longer*; Children draw an X on *shorter*.
DOK 2

3. Children may draw a line of any height that is taller than both rectangles.
DOK 2

4. Buzz knows the pink ribbon is not lined up correctly; See possible answer on the Student Worktext page.
DOK 3

5. Children color the top rectangle red, the middle rectangle purple, and the bottom rectangle blue.
DOK 2

6. Children circle *shorter*; Children draw an X on *taller*.
DOK 2

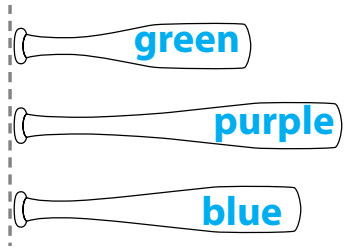
Refine Ordering Objects by Length

Apply It

Solve problems 1–6.

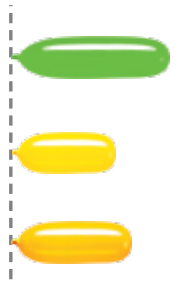
1. Read the clues.
Then color the bats.

The green bat is shortest.
The purple bat is longer than the blue bat.

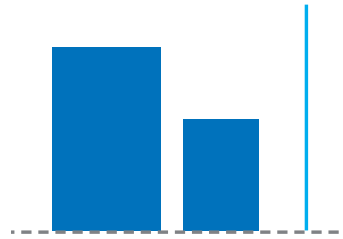


2. Circle the word that makes the sentence true. Put an X on the other word.

The green balloon is ~~shorter~~ (longer) than the orange balloon.



3. Draw a line that is taller than both rectangles.
Possible answer:



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Differentiated Instruction

RETEACH

Hands-On Activity

Compare heights of connecting cube towers.

Children struggling with comparing heights

Will benefit from additional practice with concrete materials.

Materials For each group of 3: connecting cubes (3 different colors, different quantity of each color)

- Designate one color for each child to use to build a cube tower.
- Ask groups to order their towers from shortest to tallest, aligning them in a vertical position along a baseline. Circulate and provide guidance as appropriate.
- Prompt children to check the order of their towers and discuss the arrangement until all group members agree that the order is correct.
- Give three more cubes of a single color to one child to add to his or her tower. Ask the group to reorder their towers if needed. Repeat with other cube sets.

Close: Exit Ticket

Math Journal

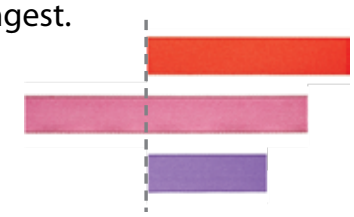
Distribute sets of three classroom objects of different lengths to children. Have them draw to show two ways to order the three objects.

Show your objects in order in two ways.

Look for Children may draw them shortest to longest, longest to shortest, shortest to tallest, or tallest to shortest. Check to see if children know to use a guide for alignment; assist in providing this line if necessary.

Error Alert **If** children find only one way to order objects, **then** prompt them to consider reversing the order, keeping the same dimension (length or height) as the arrangement they have. After they have done this, suggest they turn their objects so they see how to consider the other dimension.

4 Boom says the red ribbon is the longest.
Buzz says that Boom is wrong.
How does Buzz know?



Possible answer: Buzz knows that one of the ribbons is not lined up correctly. If one end of the pink ribbon is placed on the line, it is longer than the other ribbons. The pink ribbon is the longest.

5 Read the clues.
Color the rectangles.

The red rectangle is shortest.
The purple rectangle is longer than the blue rectangle.

red
purple
blue

6 Circle the word that makes the sentence true.
Put an X on the other word.
The blue mug is taller/shorter than the yellow mug.

EXTEND

Challenge Activity

Order four or five objects by length or height.

Children who have achieved proficiency

Will benefit from deepening understanding of ordering more objects

Materials For each pair: 4 or 5 objects of different heights or lengths

- Give pairs of children four or five objects of different heights or lengths.
- Ask children to put the objects in order by length (or height) from longest (or tallest) to shortest.
- Invite each pair to describe how they solved the problem and explain their answer.

PERSONALIZE

i-Ready

Provide children with opportunities to work on their personalized instruction path with *i-Ready* Online Instruction to:

- fill prerequisite gaps
- build up grade-level skills

Lesson Overview

LESSON 31

Compare Lengths

Lesson Objectives

Content Objectives

- Recognize that sometimes it is not possible to compare lengths directly.
- Compare two objects by comparing their lengths to a third reference object.
- Use logical reasoning to indirectly compare the lengths of objects.

Language Objectives

- Tell which object is shorter or longer than a given object.
- Use a paper strip to find and describe classroom objects that are longer, shorter, and the same size as the paper strip.
- Explain why an object that is shorter than a given object must also be shorter than a second object that is longer than the given object.

Prerequisite Skills

- Compare the lengths of two objects.
- Use direct comparison to identify which of two objects is longer or shorter.
- Order three objects by length.

Standards for Mathematical Practice (SMP)

SMPs 1, 2, 3, 4, 5, and 6 are integrated in every lesson through the *Try-Discuss-Connect* routine.*

In addition, this lesson particularly emphasizes the following SMPs:

5 Use appropriate tools strategically.

6 Attend to precision.

*See page 431i to see how every lesson includes these SMPs.

Lesson Vocabulary

There is no new vocabulary. Review the following key terms.

- **compare** to decide if numbers, amounts, or sizes are greater than, less than, or equal to each other.
- **length** how long something is.

Learning Progression

In Kindergarten children begin to understand the concept of length, which is a core measurement concept. They use direct comparison to compare the lengths of two objects.

In Grade 1 children compare and order three objects by length. They iterate a nonstandard reference unit to measure objects and understand that the number of iterations of such reference units is the length of the item being measured.

In this lesson children develop an understanding of indirect comparison, which underlies the use of standard measuring tools. They reason that if Object A is longer than the reference object and Object B is shorter than the reference object, then Object A is longer than Object B.

In Grade 2 children come to understand the need for standard units and begin using standard measurement tools to measure objects and compare lengths.

Lesson Pacing Guide

Whole Class Instruction

SESSION 1 Explore *45–60 min*	**Comparing Lengths** • Start *5 min* • Try It *20 min* • Connect It *15 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 721–722
SESSION 2 Develop *45–60 min*	**Comparing Lengths** • Start *5 min* • Try It *15 min* • Discuss It *10 min* • Model It *5 min* • Connect It *10 min* • Apply It *5 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 727–728 **Fluency Practice** Add Two-Digit Numbers
SESSION 3 Develop *45–60 min*	**Comparing Lengths** • Start *5 min* • Try It *15 min* • Discuss It *10 min* • Model It *5 min* • Connect It *10 min* • Apply It *5 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 733–734 **Fluency** Comparing Lengths
SESSION 4 Refine *45–60 min*	**Comparing Lengths** • Start *5 min* • Apply It *35 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 737–738
SESSION 5 Refine *45–60 min*	**Comparing Lengths** • Start *5 min* • Apply It *15 min* • Small Group Differentiation *20 min* • Close: Exit Ticket *5 min*	**Lesson Quiz** or **Digital Comprehension Check**

Lesson Materials

Lesson *(Required)*	*Per child:* 3 connecting cubes, 3 index cards, string, 1 paper strip, 1 new unsharpened pencil, 2 small classroom objects of different lengths, copy of Start slide (Sessions 1, 3–5), copy of Close slide (Sessions 1–5) *Per pair:* string (about 3 feet long) *For display:* 1 three-inch paper strip
Activities	*Per child:* 1 strip of heavy paper (about 12 inches long) *Per pair:* 10 connecting cubes, 2 index cards, string, modeling clay *For display:* painter's tape *Activity Sheet:* Addition Practice 6
Math Toolkit	connecting cubes, string

Teacher Toolbox

Small Group Differentiation

PREPARE

Ready Prerequisite Lesson

Grade K
- Lesson 31 Compare Length and Height

RETEACH

Tools for Instruction

Grade K
- Lesson 31 Compare Length and Height

Grade 1
- Lesson 31 Compare Lengths

REINFORCE

Math Center Activity

Grade 1
- Lesson 31 Shorter and Longer Objects

EXTEND

Enrichment Activity

Grade 1
- Lesson 31 Grid Games

Connect to Family, Community, and Language Development

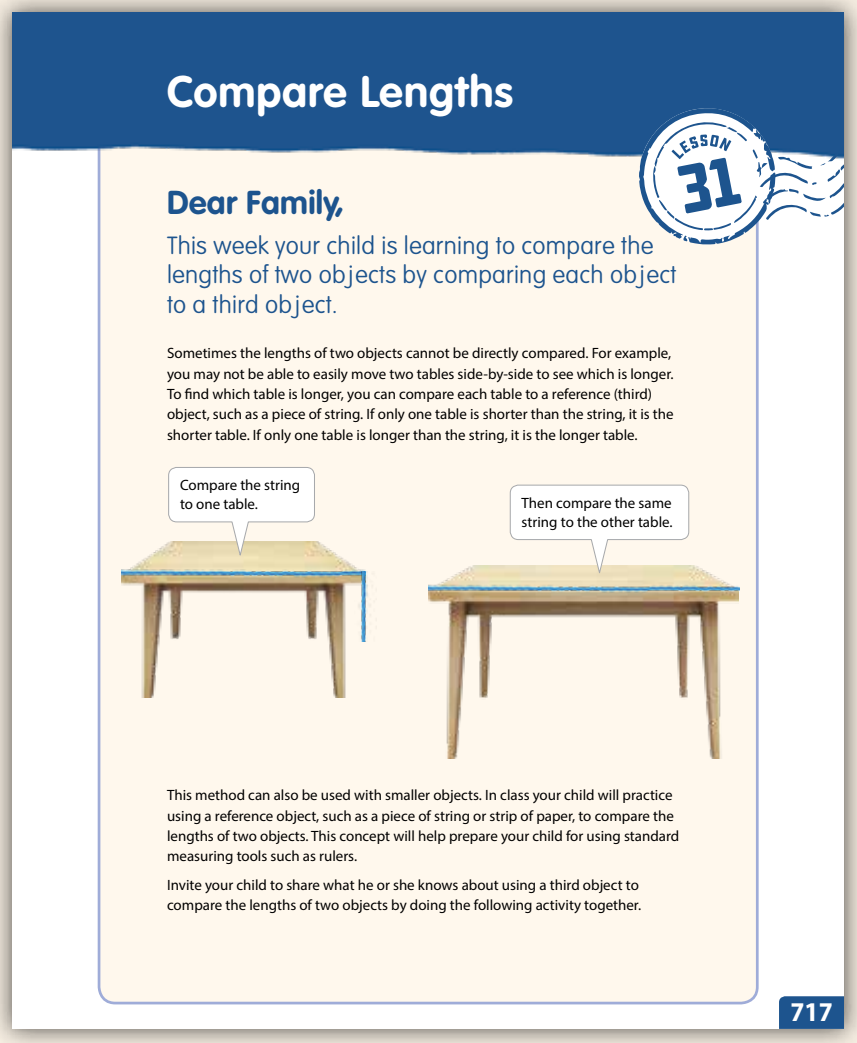
The following activities and instructional supports provide opportunities to foster school, family, and community involvement and partnerships.

Connect to Family

Use the **Family Letter**—which provides background information, math vocabulary, and an activity—to keep families apprised of what their child is learning and to encourage family involvement.

Available in Spanish

Teacher Toolbox



Compare Lengths

LESSON 31

Dear Family,

This week your child is learning to compare the lengths of two objects by comparing each object to a third object.

Sometimes the lengths of two objects cannot be directly compared. For example, you may not be able to easily move two tables side-by-side to see which is longer. To find which table is longer, you can compare each table to a reference (third) object, such as a piece of string. If only one table is shorter than the string, it is the shorter table. If only one table is longer than the string, it is the longer table.

Compare the string to one table.

Then compare the same string to the other table.

This method can also be used with smaller objects. In class your child will practice using a reference object, such as a piece of string or strip of paper, to compare the lengths of two objects. This concept will help prepare your child for using standard measuring tools such as rulers.

Invite your child to share what he or she knows about using a third object to compare the lengths of two objects by doing the following activity together.

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Activity Comparing Lengths

Do this activity with your child to practice comparing lengths.

Materials yarn, string, or ribbon; large household objects to compare, such as a table and a dresser or a sofa and a kitchen counter; smaller household objects

- Help your child select two large objects in your home whose lengths cannot be easily compared, either because the objects are in different rooms or because you cannot tell which is longer or shorter simply by looking. For example, you and your child may choose to compare the lengths of a table and a dresser.
- Cut a piece of yarn (or string/ribbon) that is the same length as one of the objects. Help your child use the yarn to compare the lengths of the two objects. Ask your child which of the two objects is longer and why.
- Then cut the yarn to about 6 inches and ask your child to find one object that is shorter than the piece of yarn and one object that is longer. Have your child tell which object is shorter and why.

The comb is shorter than the yarn, and the spoon is longer than the yarn. So, the comb is shorter than the spoon.

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Goal

The goal of the Family Letter is to explore comparing the length of two objects indirectly by comparing each object to a third object.

Activity

Comparing the length of two objects by comparing each of them to a third object is helpful when objects cannot be directly compared, and prepares children for using standard measuring tools such as rulers. Look at the *Comparing Lengths* activity and adjust if necessary to connect with children.

Math Talk at Home

Encourage children and their family members to find opportunities at home and in their community to compare the lengths of two objects by comparing each object to a third object.

Conversation Starters Below are additional conversation starters children can write in their Family Letter or math journal, with your guidance, to engage family members:

- *Which object is longer?*
- *Which object is shorter?*
- *Which object is taller?*

Connect to Community and Cultural Responsiveness

Use these activities to connect with and leverage the diverse backgrounds and experiences of all children.

Session 1 **Use with *Try It*.**

- Ask: *Have you ever participated in a race?* Say: *When people race, they line up at the starting line.* Place a string on the floor to mark a starting line. Have three volunteers act out lining up for a race at the starting line. Then move one player forward several feet and another player back several feet. Ask: *Is this a good way to start a race? Why or why not?* Develop understanding that a common starting place is also important when comparing lengths.

Session 2 **Use with *Model It*.**

- Encourage authentic problem solving by having children use a string to compare lengths of things in the classroom that cannot be easily lined up side by side. For example, children might compare the length of the door and the length of a bookshelf or compare the length of a windowsill and the length of a poster. Have them discuss how they use the string and what conclusions they can draw about the lengths of the two items.

Sessions 3 and 4 **Use anytime during these sessions.**

- Adjust the activity from Session 2 by having children use a string to compare the length of a table in the classroom to a table at home. Invite children to share their comparisons during Session 4.

Connect to Language Development

For ELLs, use the Differentiated Instruction chart to plan and prepare for specific activities in every session.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 1
Use with *Try It*.

Levels 1–3	Levels 2–4	Levels 3–5
Speaking/Writing Ask children to compare their strip of paper to the strip of paper in the ***Try It*** problem. Encourage them to use the terms *taller, shorter,* and *the same.* After children choose the correct term to describe the length of their strip in comparison to the strip in the problem, have them write the answer in a complete sentence in their math journals. Provide the sentence starter: • *My strip is* _____. Pair children up to share their sentences. Tell partners to check the sentence by comparing the height of their partner's strip of paper to the height of the strip in the ***Try It*** problem.	**Listening/Speaking** Organize children into two groups to compare the height of their strips of paper to the height of the strip in the ***Try It*** problem. Instruct the groups to form two lines, facing one another. Ask children to compare the height of their strip of paper with the height of the paper held by the person facing them. Encourage them to use the sentence starter: • *My strip is* _____. Tell the children in one line to move one position to the right so that they are facing a new partner. The child on the end moves to the beginning of the line. The other line remains stationary. Have children compare their strip of paper with a new partner. Repeat the activity two more times.	**Writing/Speaking** Use with the ***Try It*** problem. Encourage children to compare their strips of paper in small groups. Ask them to use the terms *taller, shorter,* and *the same* as they compare. Have children write two complete sentences on note cards, using two of the three terms. For example, possible answers include: *My strip is taller than Martin's strip. Yoshi's strip is shorter than my strip.* Have children write their initials on the front of the note cards and place them facing down. Mix the cards up, choose one, and read it aloud. Challenge children to listen to the sentence and guess who wrote the sentence.

LESSON 31

SESSION 1 Explore

Purpose In this session, children compare one paper strip to another to see if it is taller, shorter, or the same length as the pictured strip. Then they draw lines that are longer and shorter than a given pencil.

Start

Connect to Prior Knowledge

Materials For each child: copy of printed slide

Why Review directly comparing the lengths of two objects to prepare children for indirectly comparing the lengths of two objects using a third object.

How Children circle the comparison term that makes the statement true and put an X on the other word.

Circle the word that makes the sentence true. Put an X on the other word.

The fork is shorter/longer than the spoon.

Solutions

Children circle the word *longer*. Children draw an X on the word *shorter*.

Try It

Materials For each child: 1 paper strip (each child's strip is a different length, with some longer than 3 inches, some shorter than 3 inches, and a few exactly 3 inches); For display: one 3-inch paper strip for use as a benchmark

Compare Using a Reference Object

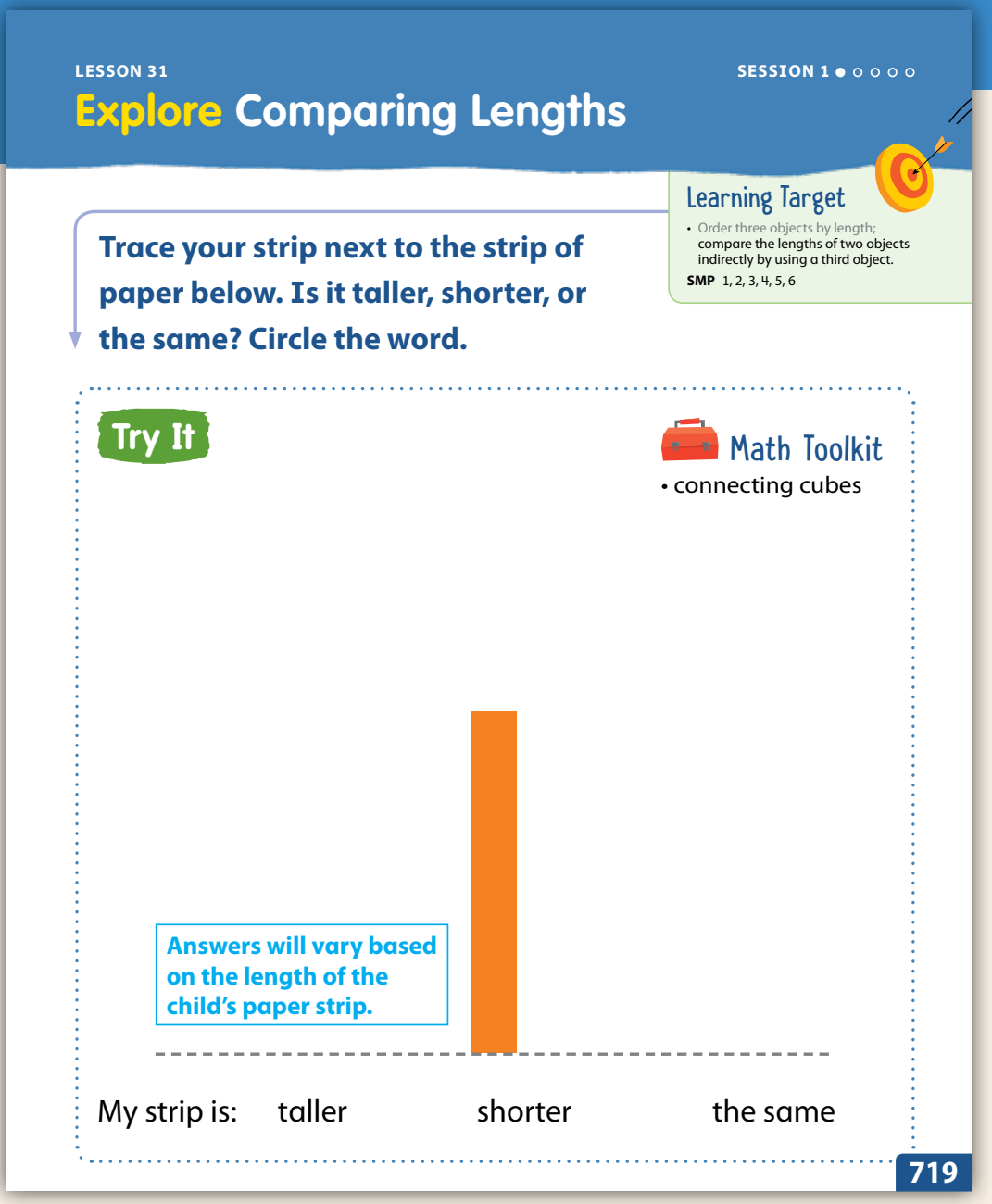
Read the problem aloud together. Distribute the paper strips to children. Display your strip vertically to serve as the reference.

Ask *How can we find out who has a strip that is taller than mine and who has one that is shorter than mine?*

Listen for Put the two strips next to each other, standing up. Line up the ends of both strips to compare them.

Sort the Children

Invite children one by one to the front of the room to compare their strip to your strip. Have children with *shorter* strips form one group and those with *taller* strips form another group. Children with strips that are *the same* as your strip return to their seats.



Compare the Two Groups

Have one child from each of the *taller* and *shorter* groups step forward.

Ask *Without putting the strips next to each other, can you tell whether [child from taller group]'s strip is taller than [child from shorter group]'s strip? How do you know?*

Listen for [Child from the taller group] has a strip taller than your strip, so it is also taller than the strips of everyone in the shorter group.

Have children trace their strip on either side of the strip on the Student Worktext page. Then they circle if their strip is *taller*, *shorter*, or *the same* as the strip on the page.

Support Whole Class Discussion

Have children explain how they compared the strips.

Ask *How would you describe your process for comparing the paper strips?*

Listen for I put the edge of my strip on the dashed line next to the strip on the page. The top of my strip sticks up past the strip on the page, so I circled *taller*.

Common Misconception **If** children confuse taller and shorter, **then** help them align and compare the two strips. Remind them to describe how their strip compares to the reference strip using appropriate comparative terms such as *taller, shorter,* and *the same as.*

Connect It

Materials For each child: new unsharpened pencil

Compare Using a New Reference Object

Give each child a new unsharpened pencil. Have pairs search the room for one object longer and one object shorter than the pencils. After pairs have found the two objects, have partners describe to each other how, without directly comparing them, to decide which of the found objects is shorter.

Ask *How can you tell without comparing them which of the two objects you found is shorter?*

Listen for The object that is shorter than the pencil is also shorter than the other object, which is longer than the pencil.

Draw Lines to Model Shorter and Longer

Read aloud each problem on the Student Worktext page, allowing children time after each one to draw the lines as directed.

Ask them to compare their lines with a partner and explain how they know which of the two lines they drew is longer.

Support Whole Class Discussion

Have children share how they know which of the two lines they drew is longer.

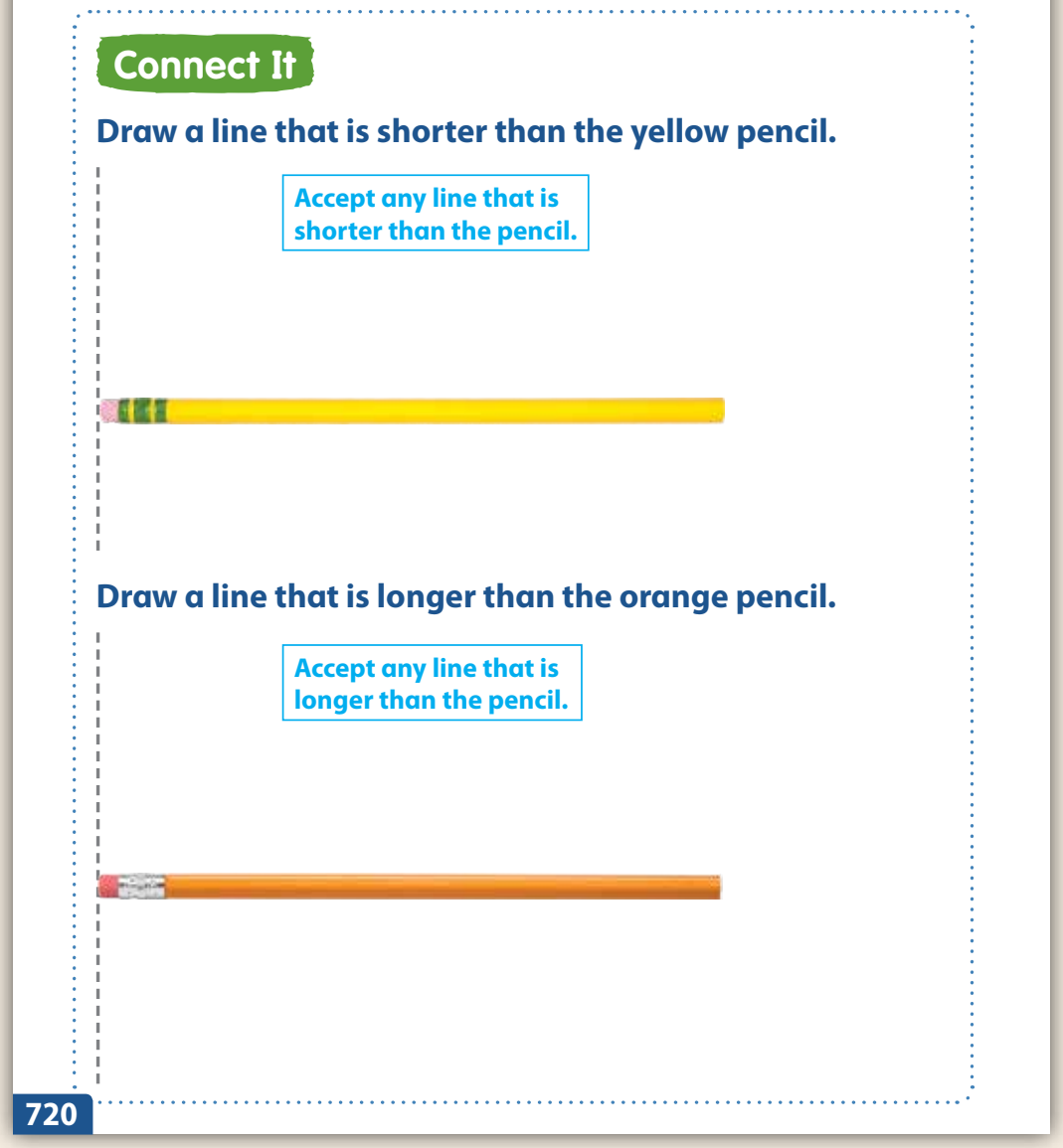
Ask *How do you know which of the two lines you drew is longer?*

Listen for Children may describe how they used the pencil on the page. Since the lines they drew are not easily directly compared, listen for awareness that a third object can be used as a reference for reasoning about which line must be longer.

Ask *How is comparing objects to the paper strip like comparing objects to the pencils?*

Listen for You don't always need to put two objects next to each other to find out which one is longer and which one is shorter. You can compare both of them to something else.

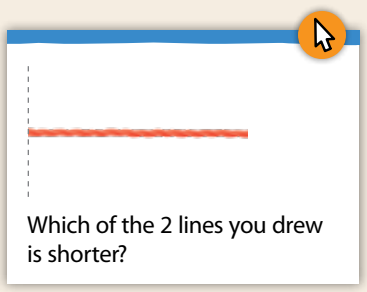
Children will spend more time learning about the concept of longer in the Additional Practice.



Close: Exit Ticket

Materials For each child: copy of printed slide

Have children draw one line longer and one line shorter than the yarn.



Solution The line that is shorter than the yarn is the shorter line that I drew.

Look for Children draw lines shorter and longer than pieces of yarn shown with one end aligned on the dashed vertical line.

Common Misconception **If** children do not understand how to use a reference object, **then** the logical reasoning may be too abstract. Provide more concrete experience with indirect comparison using a 3-cube train as the reference.

Real-World Connection

Encourage children to think about everyday places or situations where people might need to compare objects indirectly. Have volunteers share their ideas. Examples: a rug and a room, a ladder and a doorframe, large furniture.

Solutions

Support Vocabulary Development

1 Read the directions aloud as children follow along with their fingers. If children need support to complete the graphic organizer, pair them up to discuss their ideas. Ask: *What does it mean if one object is longer than another?* Possible answers: *It means that the object is greater in length. The other one is shorter.* Ask the following questions, pausing between each one to allow children time to turn and talk with a partner: *How could you draw a picture to show the word* longer? *What are some examples of* longer*? Can you use it in a sentence? What is a nonexample of* longer*?*

2 Have children circle the term *longer* and use it in a sentence to compare the arrows.

Supplemental Math Vocabulary

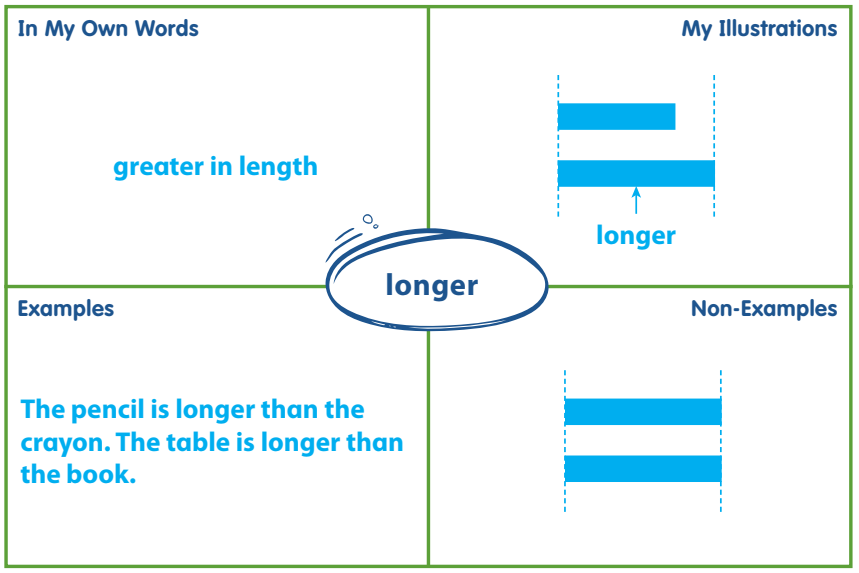
- *shorter*
- *taller*

Name: _____ LESSON 31 SESSION 1

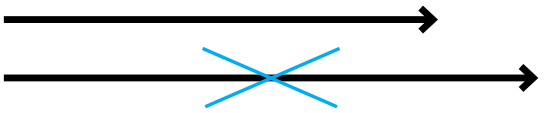
Prepare for Comparing Lengths

1 Think about what you know about length and the word longer. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.

Possible answers:



2 Draw an X on the longer arrow.



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3 Assign problem 3 to provide another look at comparing lengths.

This problem is very similar to the problem about drawing lines shorter and longer than a pencil. In both problems, children are given two workspaces, each with an object in them. Children are asked to draw a line shorter than the object in the first workspace. Then children are asked to draw a line longer than the object in the second workspace. The question asks children to draw lines shorter and longer than a crayon.

Suggest that children read the problem three times, asking themselves one of the following questions each time:

- *What is this problem about?*
- *What is the question I am trying to answer?*
- *What information is important?*

Solution:

In the first workspace, accept any line that is shorter than the crayon. In the second workspace, accept any line that is longer than the crayon.

Medium

3 Solve the problem. Draw to show your work.

Draw a line that is shorter than the orange crayon.

Accept any line that is shorter than the crayon.

Draw a line that is longer than the green crayon.

Accept any line that is longer than the crayon.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 2
Use with *Model It*.

Levels 1–3

Writing/Speaking Have children reflect on the ***Model It*** problem by drawing a picture of the problem in their math journals. Tell them to label the tables with the terms *shorter* and *longer*. Pair children up to explain their drawings to a partner. Encourage them to use the sentences in the ***Model It*** problem to explain their drawings.

Levels 2–4

Writing/Speaking After children fill in the blanks in the ***Model It*** problem, have them write the following sentence frames in their journals:

- *The _____ is _____ than the _____.*
- *The _____ is _____ than the _____.*
- *So, _____.*

Pair children up and have them use two index cards to cover the ***Model It*** problem so that only the pictures are showing. Have them discuss the problem, then ask them to complete the sentence frames to compare the two objects after comparing each of them to the reference object.

Levels 3–5

Writing/Speaking Pair children up to discuss the ***Model It*** problem. Ask them to choose two objects in different areas of the classroom. Have them use a string to compare the lengths of the two objects. Write the following sentence frames on the board:

- *The _____ is _____ than the _____.*
- *The _____ is _____ than the _____.*
- *So, _____.*

Encourage children to use the sentence frames to write a series of connected sentences about the objects they compared.

LESSON 31

SESSION 2 Develop

Purpose In this session, children explore the concept of indirect comparison by finding which of two tables is longer without directly comparing them. The goal is to develop understanding of how to compare lengths indirectly using a third object.

Start

Connect to Prior Knowledge

Materials For each child: 1 piece of string that is 4–5 inches long

Why Provide concrete experience to prepare children for indirectly comparing two objects.

How Children compare objects to a piece of string to determine if the objects are longer or shorter than the string.

Find something longer than the string. Draw it.

Find something shorter than the string. Draw it.

Put the 2 objects next to each other to compare them.

Look for Children align the endpoints of the string and objects to compare lengths. Children verify that the object shorter than the string is the shorter of the two objects.

Develop Language

Why Reinforce the meaning of the word *compare*.

How When you *compare*, you look at two or more things closely to decide which one has more or less of a certain quality, such as height or length. Explain that when comparing the length of two objects, we add *-er* to the end of the words *long* and *short* to create the words *longer* and *shorter*. Have children find two objects in the classroom, such as tables, books, or posters, and compare their lengths using the sentence frame:

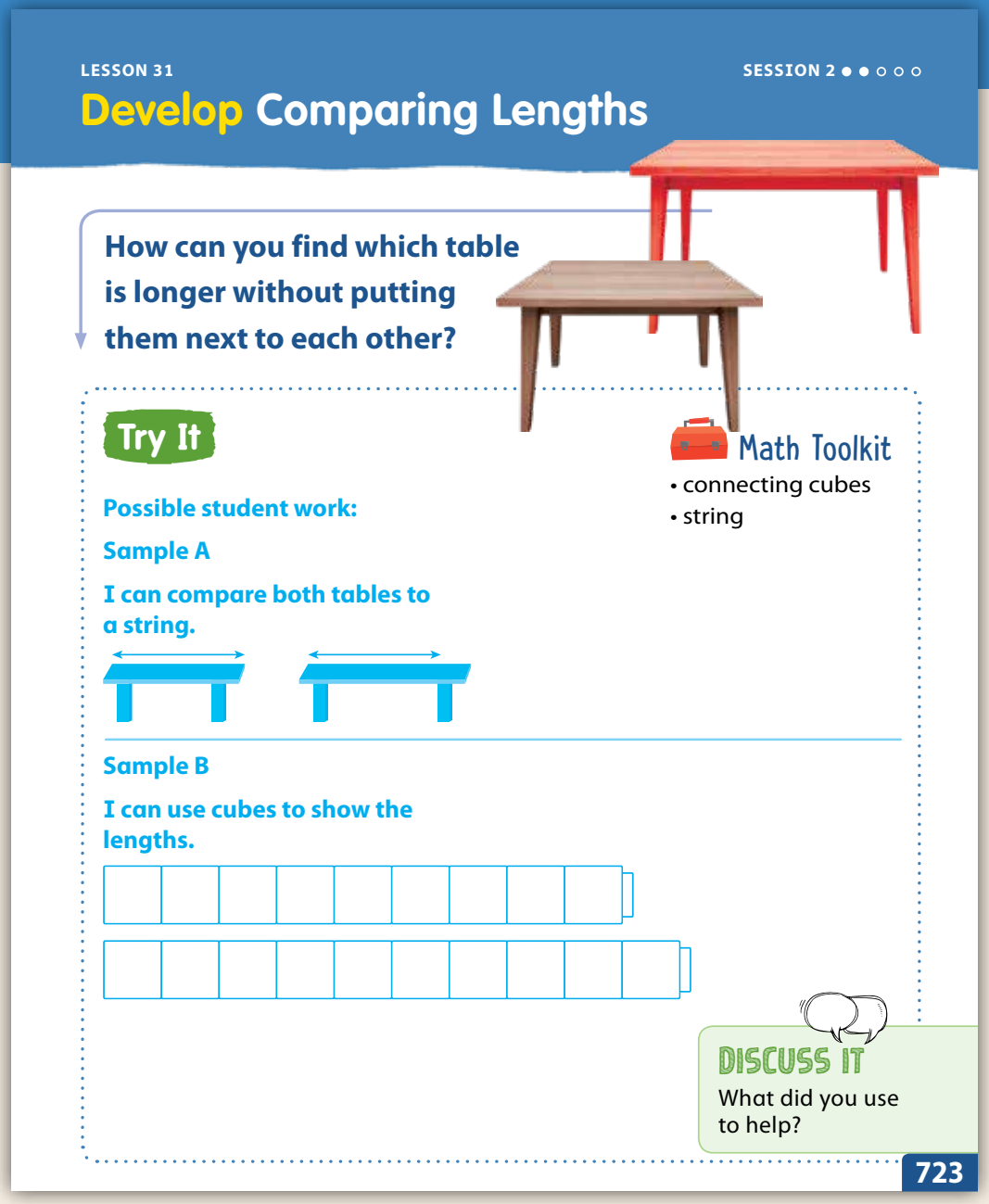
_____ *is shorter/longer than* _____.

Try It

Make Sense of the Problem

Read the problem aloud. To support children in making sense of the problem, prompt them to relate the problem to the previous session.

Read the problem aloud and guide children as needed to relate the problem to the previous session. Provide each pair with 1 piece of string (about 3 feet long) and designate two tables or other edges for partners to compare using the piece of string.



Ask *How is this problem like the one you did in the previous session? How is it different?*

Discuss It

Support Partner Discussion

Encourage children to use the word *length* as they discuss their solutions.

Support as needed with questions such as:

- *How did you show how to compare the length of the tables?*
- *Can you explain how you used a third object?*

Common Misconception **If** children are struggling with transitive thinking, **then** provide additional concrete practice comparing the lengths of two objects using a third object and have children describe the comparisons. Support children in using comparative terms appropriately to express logical relationships in three statements, ending with a conclusive statement. For example: *The crayon is shorter than the yarn. The paintbrush is longer than the yarn. So, the crayon is shorter than the paintbrush.* Connect this to a visual image, removing the reference object to prompt the conclusive statement.

Select and Sequence Solutions

One possible order for whole class discussion:

- guessing which table is longer without offering evidence
- using connecting cubes to measure the length of each table
- using string to indirectly compare the tables but not explaining how or why the method works
- using a length of string as a third reference object to indirectly compare the tables and explaining the reasoning that leads to the conclusion

Support Whole Class Discussion

Compare and connect the different representations and have children identify how they are related.

Ask *What is important when finding which table is longer?*

Listen for It is important to compare both tables to the same thing to know which one is longer.

Model It

If no child presented the model shown on the Student Worktext page, connect the picture to children's models by having children identify how they represent the problem.

Ask *How can you tell if the brown table is longer or shorter than the string?*

Listen for The string hangs over the edge of the brown table, so the brown table is shorter than the string.

Ask *How can you tell if the red table is longer or shorter than the string?*

Listen for The string doesn't reach to the edge of the red table, so the red table is longer than the string.

Ask *How can you tell if the red table is longer or shorter than the brown table?*

Listen for The red table is longer than the string, and the brown table is shorter than the string. I know the brown table must be shorter than the red table.

Children write *shorter* or *longer* to complete the sentences at the bottom of the page.

How can you find which table is longer without putting them next to each other?

Model It

Find which table is longer.
Use another object, such as a piece of string.
Compare it to the length of each table.

The red table is longer than the string.

The brown table is shorter than the string.

So, the red table is longer than the brown table.

Deepen Understanding

Indirect Comparison

SMP 6 Attend to precision.

Ask these questions when discussing how to use a string to compare the lengths of the tables.

Ask *What comparison words did you use in your answer? Why?*

Listen for Shorter and longer. I compared the tables to the string. The brown table is shorter and the red table is longer than the string.

Ask *What if you change the order and compare the string to each table?*

Listen for The string is longer than the brown table and shorter than the red table. The opposite word is with each table because I said the string first.

Ask *What if the string and the table end are not lined up?*

Listen for I wouldn't be able to tell which table is longer.

Generalize *Do you think that the ends of objects always have to be lined up when you compare lengths? Explain.* Listen for children to state why accurate comparisons of lengths only occur if one endpoint of the objects is aligned.

Connect It

Support Whole Class Discussion

Ask children to look at what they drew and wrote to solve the problem and compare it to the picture and completed sentences in *Model It*.

1 Help children make sense of *Model It* by comparing it to their own model.

Ask *How does your way of comparing the length of the tables compare to* Model It*?*

Listen for I compared both tables to something else to find which is longer like the *Model It*, but I used my arms instead of a string.

2 **Ask** *How would using a piece of string help you compare the lengths of two tables?*

Listen for I can compare the lengths of both tables to the piece of string if one table is longer than the string and one table is shorter than the same string. That will tell me which table is longer and which table is shorter.

Apply It

Explain that the next problems are an opportunity for children to practice using a third object to compare the lengths of different objects.

Make string available.

3 The pink comb is shorter than the string.
So, the blue comb is longer than the pink comb.

Connect It

1 How is your way like **Model It**? How is it different?

Children may say that like Model It, they used a third object to compare the two tables, but they may have used connecting cubes or their arms instead of a string.

2 How would using a piece of string help you compare the lengths of the tables?

Possible answer: The string doesn't change so when you compare each table to it, you can tell which table is longer or shorter. You can move the string more easily than you can move the tables.

Apply It

3 Compare each comb to the same piece of string. Which comb is longer?

The blue comb is longer than the string.

The pink comb is **shorter** than the string.

So, the blue comb is **longer** than the pink comb.

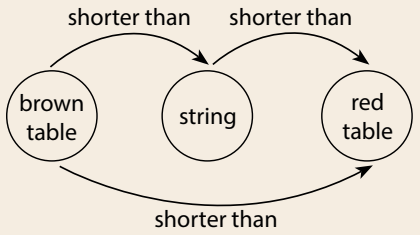
Visual Model

Model the logic of indirect comparison.

If . . . *children are unsure about indirect comparisons of lengths,*

Then . . . *use the activity below to help children see it another way.*

- Draw this diagram on the board, without including the labels *shorter than* on the curved arrows.



- Relate this to the problem and ask children whether to record *shorter than* or *longer than* on each curved arrow to show the comparisons of the lengths of the brown table, the red table, and the piece of string.
- Prompt children to justify their ideas and explain how the diagram models the problem. Help them to see how this is similar to comparing three objects.

4 The blue dresser is shorter than the string.
The pink dresser is longer than the string.
So, the blue dresser is shorter than the pink dresser.

5 The lizard is shorter than the string.
The cat is longer than the string.
So, the cat is longer than the lizard.

Support Whole Class Discussion

When children have completed problems 3–5, discuss the answers as a class.

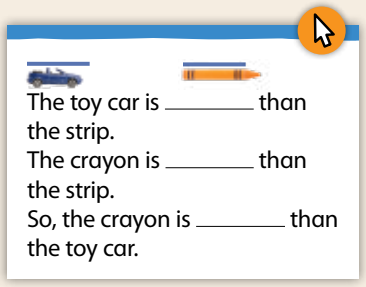
Ask *How does using a third object, such as a piece of string, help you compare the lengths of two objects?*

Listen for I know if one object is longer than the string and the other object is shorter than the string, the object that is longer than the string must also be longer than the other object.

Close: Exit Ticket

Materials For each child: copy of printed slide

Have children compare the lengths and complete the sentences.



Solutions

The toy car is shorter than the strip.
The crayon is longer than the strip.
So, the crayon is longer than the toy car.

Error Alert **If** children fill in the first two blanks correctly but not the last blank, **then** they may still be struggling with reasoning of using a third object as a reference. Cut out the toy car, the crayon, and one strip. Have children put them in order and see that the strip is between the toy car and the crayon. Ask them to remove the strip and compare the two objects directly.

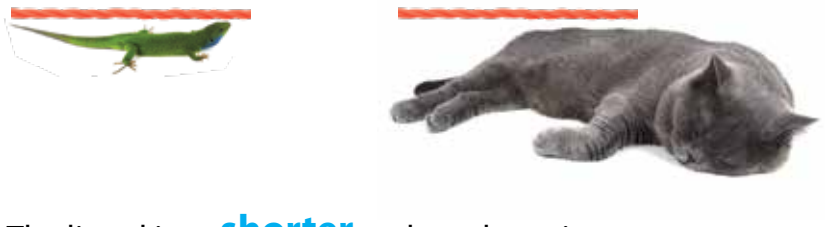
4 Which dresser is shorter?

The blue dresser is shorter than the string.

The pink dresser is longer than the string.

So, the blue dresser is shorter than the pink dresser.

5 Which animal is longer?



The lizard is shorter than the string.

The cat is longer than the string.

So, the cat is longer than the lizard.

Solutions

1 The blue bench is longer than the string.
The brown bench is shorter than the string.
So, the blue bench is longer than the brown bench.
Basic

Fluency Practice

Add two-digit numbers.

Materials For each child: Activity Sheet *Addition Practice 6*

- Distribute Activity Sheet *Addition Practice 6*.
- Explain to children that they can use strategies they know like making a ten to evaluate two-digit addition problems and determine whether regrouping is needed to find the sum.
- Children may or may not solve every problem. Encourage them to analyze each problem and check the Yes or No box to indicate whether they will compose a new ten before they solve.
- Have children complete the problems and then have pairs work together to check each other's work.
- If pairs disagree on an answer they should work together to prove the correct answers.

Name: _____ LESSON 31 SESSION 2

Practice Comparing Lengths

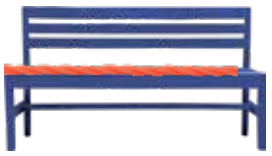
Look at the Example. Then solve problems 1–3.

Example

Which desk is longer?
Use a piece of string.
Compare it to the length of each desk.

The blue desk is shorter than the string.
The pink desk is longer than the string.
So, the pink desk is longer than the blue desk.

1 Compare each bench to the same piece of string.
Which bench is longer?



The blue bench is ___longer___ than the string.

The brown bench is ___shorter___ than the string.

So, the blue bench is ___longer___ than the brown bench.

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2 The blue shelf is shorter than the string.
The green shelf is longer than the string.
So, the blue shelf is shorter than the green shelf.
Medium

3 Boom
Challenge

2 Which bookshelf is shorter?

The blue shelf is **shorter** than the string.

The green shelf is **longer** than the string.

So, the blue shelf is **shorter** than the green shelf.

3 Boom measured the two desks with the same piece of string.

Buzz says the green desk is longer.
Boom says the purple desk is longer.
Who is right? Circle.

Buzz (Boom)

ELL English Language Learners: Differentiated Instruction

Prepare for Session 3
Use with *Connect It*.

Levels 1–3	Levels 2–4	Levels 3–5
Writing/Listening Have children cover ***Connect It*** problem 2 with a sticky note. Ask children to listen to the following sentences and draw a simple picture, labeling the people with the names they hear: *Chris is shorter than Amy. Ray is taller than Amy.* Tell them to move the sticky note to reveal ***Connect It*** problem 2. Have children turn and talk with a partner about the problem. Encourage children to use their drawing to support their answer.	**Listening/Speaking** Pair children up to solve ***Connect It*** problem 2. Have partners read the problem and decide how to solve it. Then display the following and use it to solve the problem: *Shortest* *Tallest* _____ _____ _____ Write the names *Chris, Amy,* and *Ray* on sticky notes and arrange the sticky notes as you read the comparisons. Ask: *How is your way like my way? How is it different?*	**Writing/Reading** Ask children to respond to ***Connect It*** problem 2 in their math journals using a series of connected sentences. Provide the following bank of suggested terms for children to include as applicable: *taller, shorter, tallest, shortest, so,* and *because.* When children have finished writing, have them trade journals with a partner and read each other's answers. After reading each other's sentences, have the pairs discuss whether or not they agree with their partner's sentences, and why.

LESSON 31

SESSION 3 Develop

Purpose In this session, children compare the lengths of a shoe and a spoon to a strip of paper to determine if the shoe is longer or shorter than the spoon. The goal is for children to reason about how to compare two objects indirectly using a third object and state the comparison in two ways.

Start

Connect to Prior Knowledge

Materials For each child: 3 connecting cubes, 2 small classroom objects of different lengths, copy of printed slide

Why Provide concrete experience to prepare children for indirectly comparing the lengths of two objects.

How Children make a 3-cube train and compare the lengths of 2 objects to it. They draw a picture to show how they ordered the three objects.

Order your three objects from shortest to longest. Draw them.

Look for Children draw the 3-cube train and their two objects in order from shortest to longest.

Develop Language

Why Clarify the use of the phrase *from . . . to . . .* as used to order several objects.

How Explain that the phrase *from . . . to . . .* can be used to talk about ordering objects by a particular characteristic, such as size, length, or height. Display three books of different heights. Have children watch as you order them from shortest to tallest, pointing out left to right or top to bottom sequencing. Then say: *I ordered the books from shortest to tallest,* emphasizing the words *from . . . to . . .* Then re-order the books from tallest to shortest. Have children describe how you ordered the books, using the sentence frame:

You ordered the books from _____ to _____.

Try It

Make Sense of the Problem

Read the problem aloud. To support children in making sense of the problem, help them understand that the strip of paper used as a third reference is not pictured in the problem.

Develop Comparing Lengths

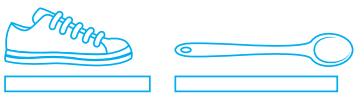
This shoe is shorter than a strip of paper.
This spoon is longer than the same strip of paper.
Is the shoe longer or shorter than the spoon?
How do you know?


Try It

Math Toolkit
• connecting cubes

Possible student work:

Sample A



The shoe is shorter than the paper and the paper is shorter than the spoon so the shoe is shorter than the spoon.

Sample B

Shortest **Longest**

shoe, paper, spoon

The shoe is shorter than the spoon.

DISCUSS IT
Can you explain your thinking to me?

Ask *How is comparing the lengths of a shoe and a spoon to a paper strip like comparing the lengths of two tables to a piece of string? How is it different?*

Discuss It

Support Partner Discussion

Encourage children to share what they did to show how they compared the lengths of the shoe and the spoon.

Support as needed with questions such as:

- *What did you think about to help you compare the lengths of the objects?*
- *Did you draw a picture or a model? Can you describe how you drew it?*
- *Did you agree with your partner's approach? Why or why not?*

Common Misconception **If** children want to compare the spoon directly with the shoe by estimating their lengths, **then** guide them to include the strip of paper as a way to be more precise. Cut out a paper strip and make a mark on it to show where the shoe ends. Provide support for children to carry out two separate comparisons and then draw a conclusion.

Select and Sequence Solutions

One possible order for whole class discussion:

- guessing that the spoon is longer than the shoe without offering proof or reasoning
- drawing a picture comparing the shoe and the spoon to the paper strip separately
- showing the shoe, paper, and spoon in order from shortest to longest

Support Whole Class Discussion

Compare and connect different representations and have children identify how they are related.

Ask *How did you show that the spoon is longer than the shoe without being able to line them up?*

Listen for Children describe how they drew a picture or used a physical model to show the comparison.

Model It

If no child presented the model shown on the Student Worktext page, connect the picture to children's models by having children identify how they represent the problem.

Ask *How does the picture show how the shoe and spoon compare to the paper strip?*

Listen for The shoe is shorter than the paper and the spoon is longer than the paper.

Ask *How do you know the spoon is longer than the shoe?*

Listen for The paper strip is the same. The spoon is longer than the paper and the shoe is shorter than the same paper, so I know the spoon is longer than the shoe.

Have children complete the sentences at the bottom of the Student Worktext page.

This shoe is shorter than a strip of paper.
This spoon is longer than the same strip of paper.
Is the shoe longer or shorter than the spoon?
How do you know?

Model It

Use a paper strip.
Compare each object to the paper.
Fill in the blanks.

The shoe is shorter than the spoon.

The spoon is longer than the shoe.

Deepen Understanding

Indirect Comparison

SMP 5 Use tools.

Having children share their thinking and reasoning will deepen children's conceptual understanding of indirectly comparing lengths.

Ask *Would it be helpful to use a cube as a reference to compare the lengths of the shoe and the spoon? Why or why not?*

Listen for No, the spoon and the shoe are both longer than the cube, so it doesn't tell which one of them is longer than the other.

Ask *Why was it helpful to use a paper strip longer than the shoe?*

Listen for The paper strip was longer than one object and shorter than the other object, so it is easy to tell which object is longer and which is shorter.

Generalize *Is it better to use a third object that is longer, shorter, or the same length as one object to compare the lengths of two objects? Why?* Listen for children's awareness that choosing a reference object that is between the lengths of the two objects or is the same as one of the objects gives evidence for how the two objects compare to each other.

Connect It

Support Whole Class Discussion

Ask children to look at what they drew to solve the problem and compare it to the picture in *Model It*.

1 **Ask** *How is your way like* Model It*? How is it different?*

Listen for Children may have used a different reference object than *Model It* but used it in a similar way.

2 **Ask** *Do you agree with Boom that Chris is shorter than Ray? Why or why not?*

Listen for I agree with Boom. Since Ray is taller than Amy and Chris is shorter than Amy, then Chris is also shorter than Ray. Amy is like the strip of paper: she is in between Chris and Ray because she is taller than Chris and shorter than Ray.

Apply It

Explain that the next problems are an opportunity for children to compare lengths. Help children understand that they are still using the paper as the third reference object but that they are not stating each comparison between the object and the paper. The statements children complete are two ways of stating the final conclusion about the comparison of the two objects.

Make paper strips available.

3 The pin is longer than the pencil.
The pencil is shorter than the pin.

Connect It

1 How is your way like **Model It**? How is it different?

Children may say that they put the shoe, paper strip, and spoon in order using the clues while Model It compared the shoe and the spoon to the paper separately.

2 Chris is shorter than Amy.
Ray is taller than Amy.
Boom says Chris is shorter than Ray.

Do you agree? Why or why not?

Possible answer: I agree with Boom. If Chris is shorter than Amy and Ray is taller than Amy, then Amy must be in between them. Chris is the shortest of the three people.

Apply It

3 Compare each object to the paper.
Fill in the blanks.

The pin is **longer** than the pencil.

The pencil is **shorter** than the pin.

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Hands-On Activity

Compare lengths of classroom objects.

If . . . *children struggle with understanding indirect comparisons,*

Then . . . *use the activity below to connect the model on the Student Worktext page to a concrete representation.*

Materials For each child: 1 strip of heavy paper (about 12 inches long)

- Give each child a strip of heavy paper to use as a reference unit.
- Have children find at least three objects in the classroom that are longer than the reference unit.
- Have children find at least three objects in the classroom that are shorter than the reference unit. Circulate to monitor and provide guidance.
- Have children choose one object from the longer group and one object from the shorter group and use the paper strip to indirectly compare them. Then have them directly compare the two objects to verify their conclusion.
- Guide children to see the usefulness of a third reference object when comparing objects that are not easy to compare directly.

4 The toy car is longer than the lizard.
The lizard is shorter than the toy car.

5 Kai is shorter than Rob.

6 The spoon is longer than the pencil.
The pencil is shorter than the spoon.

Support Whole Class Discussion

When children have completed problems 3–6, discuss the answers as a class.

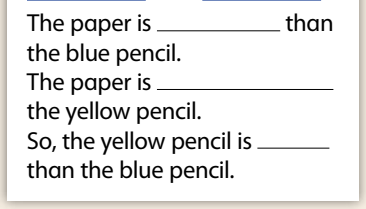
Ask *How can you prove that you can use a third object to compare the length of two objects?*

Listen for The third object doesn't change, so it helps to show the difference between the other two objects.

Close: Exit Ticket

Materials For each child: copy of printed slide

Have children compare each object to the paper. Then fill in the blanks to complete the sentences.



Solutions

The paper is longer than the blue pencil.

The paper is the same as (or equal to) the yellow pencil.

So, the yellow pencil is longer than the blue pencil.

Error Alert **If** children confuse or reverse the comparative terms, **then** provide additional practice concretely comparing two lengths using a third object. Label shorter and longer objects to practice using the comparative terms correctly.

4 Compare each object to the paper.
Fill in the blanks.

The toy car is longer than the lizard.

The lizard is shorter than the toy car.

5 Rob is taller than Pia.
Kai is shorter than Pia.

Kai is shorter than Rob.

6 Compare each object to the paper.
Fill in the blanks.

The spoon is longer than the pencil.

The pencil is shorter than the spoon.

Solutions

1 The spoon is shorter than the toy car.
The toy car is longer than the spoon.
Basic

Name: _____ LESSON 31 SESSION 3

Practice Comparing Lengths

Look at the Example. Then solve problems 1–4.

Example

Compare each object to the paper.
Fill in the blanks.

The shoe is longer than the fork.
The fork is shorter than the shoe.

1 Compare each object to the paper.
Fill in the blanks.

The spoon is shorter than the toy car.

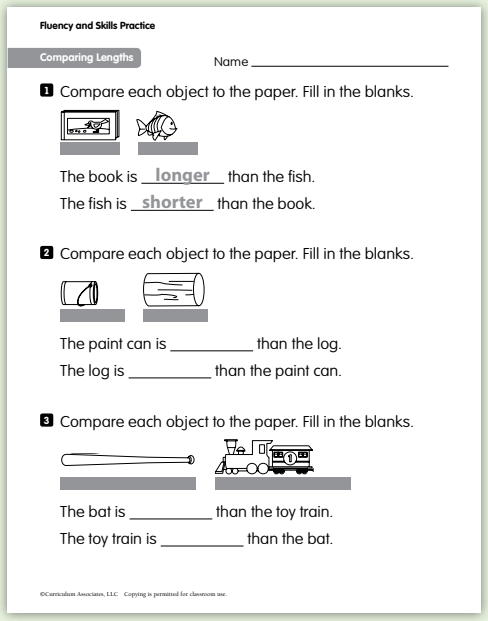
The toy car is longer than the spoon.

Fluency & Skills Practice

Teacher Toolbox

Assign *Comparing Lengths*

In this activity children practice comparing the lengths of two objects to determine which is longer and which is shorter. Children might want to make similar comparisons in real-world situations. For example, children may want to compare the lengths of a new pencil and an old pencil, the lengths of a chain of paper clips they built and a chain their friend built, or the lengths of their school desk and their teacher's desk.



Fluency and Skills Practice

Comparing Lengths Name _____

1 Compare each object to the paper. Fill in the blanks.

The book is longer than the fish.
The fish is shorter than the book.

2 Compare each object to the paper. Fill in the blanks.

The paint can is _____ than the log.
The log is _____ than the paint can.

3 Compare each object to the paper. Fill in the blanks.

The bat is _____ than the toy train.
The toy train is _____ than the bat.

2 The flower is shorter than the toy boat.
The toy boat is longer than the flower.
Medium

3 Buzz
Challenge

4 Yuki, Steve, Carla
Challenge

2 Compare each object to the paper.
Fill in the blanks.

The flower is **shorter** than the toy boat.

The toy boat is **longer** than the flower.

3 Carla is taller than Steve.
Yuki is shorter than Steve.
Boom says Steve is the shortest.
Buzz says Yuki is the shortest.
Who is right? Circle.

(Buzz) Boom

4 Look at problem 3. Write the names in order from the shortest to the tallest.

Yuki **Steve** **Carla**

ELL English Language Learners: Differentiated Instruction

Prepare for Session 4
Use with *Apply It*.

Levels 1–3	Levels 2–4	Levels 3–5
Listening/Speaking Have children work in groups of three to discuss ***Apply It*** problem 2. Distribute a crayon, a pencil, and a notebook that correspond to the lengths in the problem to each group. Ask children to order the objects from shortest to longest. Write the following terms on the board: *longer than, longest, shorter than,* and *shortest.* Have children take turns choosing one of the terms and using it in a phrase or simple sentence to describe the objects.	**Reading/Writing** Pair children up to solve ***Apply It*** problem 2. Encourage them to draw a picture in their math journals to show the problem. After children complete the sentence in the problem, have them write two additional sentences in their math journals comparing objects from the drawing. Tell them to use the word *longer* in each sentence. Possible answers include: *The notebook is longer than the pencil. The pencil is longer than the crayon.*	**Writing/Listening** Encourage children to use ***Apply It*** problem 2 as a guide for writing a new problem for a partner to solve. Have them write two clues that compare two objects to a third. Then ask children to read their writing aloud to a partner. Have the partner draw a picture to order the objects and then check their answer with their partner.

LESSON 31

SESSION 4 Refine

Purpose In this session, children practice using a third object as a reference to indirectly compare three objects both visually and using verbal clues.

Start

Connect to Prior Knowledge

Materials For each pair: copy of printed slide

Why Practice transitive thinking to prime children for applying logic to solve problems.

How Give each pair a copy of the slide. Have pairs work together to identify the comparative term to correctly fill the blanks. Encourage partners to draw pictures and explain their reasoning to each other to justify their answers.

1. Jim is taller than Mike.
   Juan is shorter than Mike.
   Juan is _____ than Jim.
2. Kim is shorter than Ava.
   Lee is taller than Ava.
   Lee is _____ than Kim.

Solutions

1. Juan is shorter than Jim.
2. Lee is taller than Kim.

Example

Read the Example problem aloud and have children describe how the words and picture describe comparing the lengths of three bars.

Ask *Which bar is both longer and longest? Which bar is both longer and shorter? How do you know?*

Listen for The red bar is longer than the blue and green bars, so it is the longest. The blue bar is longer than the green bar and it is shorter than the red bar, so it depends on which bar is being compared to.

Apply It

1. Children draw a line longer than the pencil and circle the pencil.
   DOK 2

2. The crayon is shorter than the notebook.
   DOK 2

Refine Comparing Lengths

Complete the Example. Then solve problems 1–5.

Example

The red bar is longer than the blue bar.
The blue bar is longer than the green bar.

The _____red_____ bar is the longest.

Apply It

1. Draw a line that is longer than the pencil.
   Circle the shortest object.

2. The crayon is shorter than the pencil.
   The pencil is shorter than the notebook.

   The crayon is _____shorter_____ than the notebook.

3 Children circle the words *longer than*.
DOK 2

4 Buzz is correct; See possible answer on the Student Worktext page.
DOK 3

5 The lizard is shorter than the dog.
DOK 2

Close: Exit Ticket

Check for Understanding

Materials For each child: 3 index cards (labeled *Pam*, *Joe*, and *Robin*), copy of printed slide

Ask children to put the names in order by height from shortest to tallest and state who is the shortest. Give the following clues: *Pam is taller than Joe. Robin is taller than Pam.*

Put the names in order from shortest to tallest.

- Pam is taller than Joe.
- Robin is taller than Pam.

Who is the shortest? _____

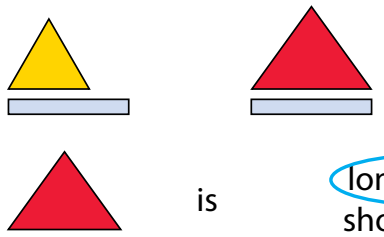
Solution Joe is the shortest.

Look for Three cards are arranged in order from shortest to tallest: Joe, Pam, Robin.

Error Alert For children who are still struggling, use the table at the right to guide remediation.

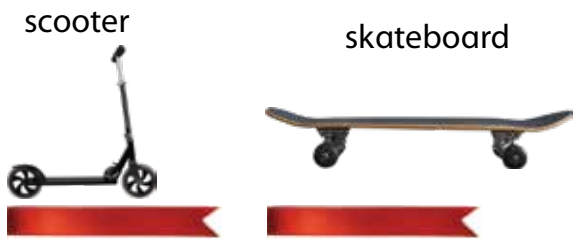
After providing remediation, check children's understanding with this problem: Sam is shorter than Ken. Ken is shorter than Lee. Who is the tallest? [Lee]

3 Compare lengths. Then circle the correct words.



is (longer than / shorter than) .

4 Buzz says the skateboard is longer than the scooter.
Boom says the scooter is longer than the skateboard.
Who is correct? Why?



Possible answer: Buzz is correct. The skateboard is longer than the scooter because the skateboard is longer than the ribbon and the scooter is shorter than the ribbon.

5 The cat is longer than the lizard.
The dog is longer than the cat.

The lizard is **shorter** than the dog.

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Error Alert

If the error is . . .	*Children may . . .*	*To support understanding . . .*
Robin, Joe, Pam	have focused on the first comparison and then placed Robin incorrectly.	Read the first sentence and verify that Joe and Pam are in the correct order. Read the second sentence and have the children place Robin relative to Pam.
Pam, Robin, Joe	have focused on the second comparison and then placed Joe incorrectly.	Read the second sentence and verify that Pam and Robin are in the correct order. Read the first sentence and have children place Joe relative to Pam.
Robin, Pam, Joe	have put the cards in order from tallest to shortest.	Provide labels showing shortest on the left and tallest on the right and have children try the problem again.

Solutions

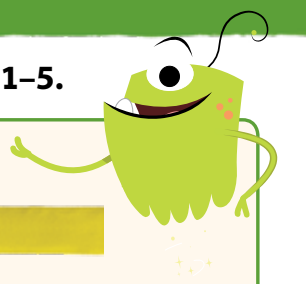
1. Ben is the longest.
Basic

2. Children draw a line that is shorter than the pencil.
Children circle the crayon.
Medium

Name: _____ LESSON 31 SESSION 4

Practice Comparing Lengths

Look at the Example. Then solve problems 1–5.



Example

The yellow ribbon is shorter than the red ribbon.
The red ribbon is shorter than the blue ribbon.
The yellow ribbon is the shortest.

1. Compare lengths.
Then fill in the blank.

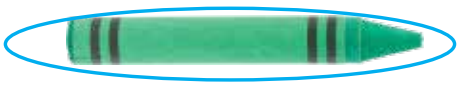
_____Ben_____ is the longest.


Ben


Tad


Zeke

2. Draw a line that is shorter than the pencil.
Circle the longest object. Possible answer:



737

3 Children circle the words *shorter than*.
Medium

4 The blue worm is longer than the gray worm.
Challenge

5 The red crayon is shorter than the blue crayon.
Challenge

3 Compare lengths. Then circle the correct words.

 is longer than / shorter than  .

4 The blue worm is longer than the white worm.
The white worm is longer than the gray worm.

The blue worm is ___longer___ than the gray worm.

5 The red crayon is shorter than the green crayon.
The green crayon is shorter than the blue crayon.

The red crayon is ___shorter___ than the blue crayon.

LESSON 31

SESSION 5 Refine

Purpose In this session, children compare lengths using indirect measurement and a third reference object in a variety of ways.

Start

Develop Fluency

Materials For each child: copy of printed slide

Why Practice applying transitive thinking to solve a problem.

How Children solve the problem and fill in the blank to show the answer.

Compare. Fill in the blank.
The brown cat is longer than the white cat.
The white cat is longer than the gray cat.
The brown cat is _____ than the gray cat.

Solution
The brown cat is longer than the gray cat.

Apply It

1. Children circle the eraser.
   DOK 2

2. Children draw a line that is shorter than the yellow rectangle.
   Children circle the cylinder.
   DOK 2

3. The ant is shorter than the worm.
   DOK 2

4. Children circle the words *longer than*.
   DOK 2

5. Children draw a line shorter than the spoon.
   Children circle the paintbrush.
   DOK 2

6. Yes, I agree with Buzz; See possible answer on the Student Worktext page.
   DOK 3

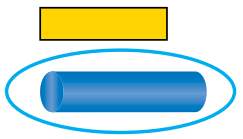
Refine Comparing Lengths

Apply It

Solve problems 1–6.

1. Compare lengths.
   Then circle the shorter object.

2. Draw a line that is shorter than the yellow rectangle.
   Circle the longest shape.



3. The bee is longer than the ant.
   The worm is longer than the bee.

   The ant is **shorter** than the worm.

Differentiated Instruction

RETEACH

Hands-On Activity

Compare the lengths of clay snakes to a cube train.

Children struggling with comparing lengths

Will benefit from additional practice with concrete materials.

Materials For each pair: 10 connecting cubes, 2 index cards (labeled *longer* and *shorter*), modeling clay

- Children work in pairs to build a cube train of any length.
- Each partner takes a card and rolls a clay snake that is longer or shorter than the cube train, according to the word on the card.
- Each child compares his/her clay snake to the train, using comparative language such as: *My snake is longer than the cube train and your snake is shorter than the cube train, so my snake is longer than your snake.*
- Repeat using a different cube-train length and exchanging cards.

Close: Exit Ticket

Math Journal

Materials For each child: string, copy of printed slide

Give each child a piece of string. Have them find 2 objects: one longer and one shorter than the string. Distribute a copy of the Close slide. Have them fill in the blanks to compare their objects using the string.

My string is _____ than the _____.
My string is _____ than the _____.
So, the _____ is _____ than the _____.

Possible Solution
My string is longer than the pencil.
My string is shorter than the book.
So, the book is longer than the pencil.

Error Alert **If** children correctly compare the length of each object to the string but struggle to make an accurate conclusion, **then** have children arrange the two objects and the string in order. Encourage them to talk through different ways of stating comparisons that they can see. Help them recognize that converse true statements can be made using either longer or shorter, depending on the order of the objects stated.

4 Compare lengths. Then circle the correct words.

is (longer than / shorter than)

5 Draw a line that is shorter than the spoon.
Circle the longest object.

6 The pen is longer than the marker.
The pencil is longer than the pen.
Buzz says the marker is shorter than the pencil.
Do you agree? Why or why not?

Possible answer: I agree with Buzz. The marker is shorter than the pen and the pencil is longer than the pen. So the marker must be shorter than the pencil.

EXTEND

Challenge Activity

Compare lengths of longer paths using string.

Children who have achieved proficiency

Will benefit from deepening understanding of comparing lengths.

Materials For each pair: string;
For display: painter's tape

- Use tape to mark three straight paths from various spots in the classroom to the door. Make one path longer than a piece of premeasured string and two paths shorter.
- Give children the string to compare to each path and have them work with a partner to state whether the string is shorter or longer than each path. Ask: *How can you tell?* [When one person holds the string at one end of the tape, the other person can tell if the tape is longer than the string or the string is longer than the tape.]
- Ask: *How can you find the shortest path?* [One way would be to use a shorter string. Another way would be to mark the lengths of the paths on the string.]

PERSONALIZE

i-Ready

Provide children with opportunities to work on their personalized instruction path with *i-Ready* Online Instruction to:

- fill prerequisite gaps
- build up grade-level skills