ME1-1
Length

Pages 106–109

VOCABULARY
how long
shorter
longer
shortest
longest
length

PROBLEM SOLVING ↘

Looking for a pattern

AT HOME

Encourage students to help sort socks at home.

ONLINE GUIDE ↘

Questions and prompts for teaching longest and shortest

Goals

Students will compare the lengths of straight objects directly, by lining up the ends.

PRIOR KNOWLEDGE REQUIRED

(none)

MATERIALS

BLM Length (p D-45)
coloured pencils of
        different lengths
2 pieces of curled ribbon of
        different lengths

Introduce length. Make five rectangles of width 1 cm and lengths 8 cm, 10 cm, 12 cm, 14 cm, 16 cm. Colour the rectangles red, then make an identical set, but colour them blue. Repeat with rectangles of width 2 cm and the same lengths. Alternatively, make two copies of **BLM Length** for each student, one on red paper and one on blue paper, and cut out the rectangles. At first, give each student only the 10 rectangles of small width (5 of each colour). Ask students to find the red strip that matches each blue strip. Then have students use the same matching strategy to pair the 5 red rectangles of small width and the 5 blue rectangles of large width. Explain that they matched the rectangles by "how long" they were or by "length". Finally, have students match the 5 red rectangles of large width and the 5 blue rectangles of small width by length.

You have to line things up to compare length. Hold two coloured pencils (say, one red and one blue) in one hand, so that the bottoms are in your fist and not visible. Stagger the pencils so that the longer pencil appears shorter. **ASK:** Which pencil looks longer (or more long)—the red or the blue? Reveal the bottoms of the two pencils and then line them up properly. **ASK:** Now which pencil looks longer—the red or the blue? Why did we get different answers? Which pencil really is longer?

Have several coloured pencils available. Line two up at a time and **ASK:** Which pencil is longer? Line some up facing opposite directions, i.e., line the writing end of one with the non-writing end of the other.

Shorter. SAY: Introduce "shorter" as meaning "not as long as". Then line up two pencils and **ASK:** Which pencil is shorter? Repeat several times.

Longest and Shortest. Demonstrate the meanings of the words longest and shortest (e.g., longest means longer than all the others) using groups of more than 2 coloured pencils.

ACTIVITY

Which pencil? Choose five pencil crayons of different lengths and colours and start by thinking of one of the pencils. Students ask yes/no questions using the words "shorter" and "longer" to determine which pencil you are thinking of. **EXAMPLE:** Is it longer than the yellow pencil? Have the student who asks the question separate the pencils into two piles, according to "longer" or "not longer" than the yellow pencil; the yellow pencil itself belongs in the "not longer" pile. **ASK:** Which pile is my pencil in–this one or that one? How do you know? Set aside the other pile, explaining that we don't need that pile anymore because we know the pencil we're trying to find isn't there. Students continue asking questions and sorting pencils until they find the one you were thinking of. Play several times and then allow students to play in pairs. **VARIATION:** Repeat with ten pencil crayons and demonstrate how ordering the pencils from shortest to longest makes it easier to sort them. Note that the organized list, in this case, is concrete.

PROBLEM SOLVING

Using logical reasoning

ONLINE GUIDE

Detailed instructions for the variation

PROBLEM SOLVING

Make an organized list

Compare when the ends are not lined up. Show two pencils arranged as in Figure 1. **ASK:** Which pencil is longer? How can you tell even though no ends are lined up? (**POSSIBLE ANSWER:** The blue pencil is longer because there is extra blue at both ends.) Repeat with more arrangements.
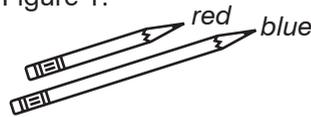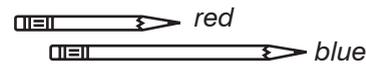
Figure 1:

red *blue*

Figure 2:

red *blue*

PROBLEM SOLVING

Making and investigating conjectures

Now show the arrangement in Figure 2 and ask students to predict which pencil will be longer when they are lined up correctly. **PROMPT:** Is there more extra red at one end or extra blue at the other end? Then line the pencils up correctly to check the prediction. Repeat with pencils that gradually become more similar in length.

The little finger. Ask students to look at their own hands and to decide which finger is longer: the finger furthest from the thumb (wiggle this finger) or the finger next to it (wiggle this one too). The furthest finger starts a little lower, but ends a lot lower, so the furthest finger is shorter. This finger is called the little finger because it is the shortest of all the fingers.

ONLINE GUIDE

Details and **BLMs** for comparing length with ribbons and paper

More direct comparisons. Hold up two pieces of curled ribbon. **ASK:** Which one is longer? Emphasize that we have to straighten the ribbons out. Give students different lengths of ribbon to order from shortest to longest. Students can also fold rectangular sheets of paper to compare the lengths of the top and the side.

Sorting socks. Bring many pairs of socks, adult and child, to class and have students sort the socks by length (longer and shorter) from heel to toe. Which socks belong to children? How can they tell?

ME1-2
Width

VOCABULARY
how long
how wide
longer / shorter
wider / narrower
length
width

Goals

Students will compare widths (the distance across, or from side to side) directly.

PRIOR KNOWLEDGE REQUIRED

Can compare two lengths directly

MATERIALS

an index card for each student
a playing card for each student
a storybook for each student
a stamp for each student
other objects with different widths for each student
a toy car

ONLINE GUIDE

Explore the definition of width in objects with no "front."

PROBLEM SOLVING

Looking for a pattern

Introduce width. Explain to students that the distance across an object, from side to side, is called the width. Illustrate with a **JUMP Math** workbook: hold it up and run your fingers along the front, first up and down and then side to side. **ASK:** Which way is the width? Is it this way (from side to side) or this way (top to bottom)? Explain that when they look at the book so that they can see the writing correctly, the width is the distance across, from side to side. **NOTE:** If an object doesn't have a clear "front," the width is usually said to be the shorter side, although inconsistencies in our language do exist.

Have volunteers walk across the width of various objects: the blackboard, a window, the door, a bookshelf, and so on.

Compare width. Remind students that if one object was more long than another, we said it was longer. **ASK:** What do you think we call an object that is more wide? (wider) Which is wider—the **JUMP Math** workbook or the blackboard? How can we check? Demonstrate placing the **JUMP Math** workbook on the blackboard ledge to see that the workbook is not as wide as the blackboard.

Have students find objects that are wider than their workbook. They should take the workbook with them to check directly. Remind students that they need to check across the front, from side to side.

Narrower and narrowest. Give each student an index card, a playing card, and a storybook. Remind students that "shorter" is the opposite of "longer": if a pencil is longer than a paper clip, the paper clip is shorter than the pencil. **ASK:** What is the opposite of "wider?" If one object is wider, the other one is _____? (narrower) Is the book wider or narrower than

the index card? Is the playing card wider or narrower than the index card? Which object is wider than all the others? What word do we use to say "wider than all the others"? (widest) What word means "narrower than all the others"? (narrowest) Which object is the narrowest? (playing card)

Add a stamp to each student's collection and **ASK:** Is the playing card still the narrowest? (no) Is the book still the widest? (yes) Continue adding objects with an obvious front so that the width is easy to identify.

Finding the width of 3-dimensional objects. Show students a toy car and ask them to identify the front of the car. Have volunteers trace a finger along the car from front to back, side to side, and top to bottom. **ASK:** Which way is the width of the car—from front to back, side to side, or top to bottom? (from side to side) Draw a car on the board viewed from the side (the front should still be visible). **ASK:** Is the side facing us the front of the car or one of the sides? Where is the front of the car? Trace your finger along the car on the board from top to bottom, front to back, and side to side. Ask students to tell you (thumbs up or down) if the distance you're tracing is the width or not. Add lines to the drawing, like those on the second worksheet, to identify each dimension and trace or colour the line that represents the width. Repeat with other drawings of concrete objects, such as a toy train, book, chair, bench, and so on.

ACTIVITIES 1–2

1. I Spy Hold up a regular sheet of paper. Play several games of "I Spy." Tell students that you spy, with your little eye, something that is …
… just as wide as the paper. (say, a **JUMP Math** workbook)
… a little narrower than the paper. (say, the phone)
… a lot wider than the paper (say, your desk)
… narrow than the paper (say, an index card)
… and so on—choose an object whose width can be easily checked against the paper.

Guide the students. For example, to help them find the JUMP Math workbook, give hints such as: it is on someone's desk or you use it almost every day. After each guess, **ASK:** Is it just as wide as the sheet of paper? How can we check? Demonstrate placing the paper alongside the object they guessed or allow the student to check their own guess.

Allow a volunteer to take a turn spying something, but ensure that the first hint uses a measurement word such as wider or narrower and that other students are constantly checking their guesses against that clue.

2. Spinner. (See ME Part 1 Introduction) Use a spinner with four equal areas marked "widest," "wider," "narrowest," and "narrower" and objects: a playing card, two index cards of different sizes, a **JUMP Math** workbook, a stamp, and a soup box.

PROBLEM SOLVING

Looking for a pattern

CONNECTION

Literature—**Super Super Superwords by Bruce McMillan.** Numerous illustrated examples of comparatives and superlatives (e.g., long, longer, longest; yellow, yellower, yellowest)

PROBLEM SOLVING

Reflecting on the reasonableness of the answer

Long or Short, Narrow or Wide

Pages 113–114

CURRICULUM EXPECTATIONS
Ontario: **1m2, 1m7, 1m39**
WNCP: **1SS1, [R, C]**

_____

VOCABULARY
longer / shorter
wider / narrower

Goals

Students will learn that measurement terms, such as long and short, are relative.

PRIOR KNOWLEDGE REQUIRED

can compare lengths and widths directly

MATERIALS

3-cm and 5-cm paper clips (at least one per student)
a short pencil (at least 6 cm long)
a long pencil
short chains (3 cubes) of 2-cm connecting cubes (one per student)
long chains (10 cubes) of 2-cm connecting cubes (one per student)

Long and short are relative. Hold up a short pencil and **ASK:** Is this a long pencil or a short pencil? Is it longer or shorter than most pencils? Then hold up a long paper clip and **ASK:** Is this a long paper clip or a short paper clip? Is it longer or shorter than most paper clips? Which is longer—a long paper clip or a short pencil? Why do we call the pencil short even though it's longer than the paper clip? (Because it's shorter than most pencils.) Why do we call the paper clip long even though it's shorter than the pencil? (Because it's longer than most paper clips.) Explain to students that when we say a pencil is long or short, we mean that it is longer or shorter than most pencils. Ask if anyone has a pencil that is shorter than a long paper clip. Does anyone have a pencil that is shorter than a short paper clip?

Give each student two chains of connecting cubes (one short and one long) and two paper clips (one short and one long). Ask students to show you the long paper clip. Then ask students to show you the short chain of cubes. Have students predict which will be longer, the short chain or the long paper clip, and then compare the two objects directly.

PROBLEM SOLVING ⬊

Making and investigating conjectures

Then ask students to imagine a long mouse's tail and a short cat's tail. **ASK:** Which do you think will be longer? What do we mean when we call the mouse's tail long? What do we mean when we call the cat's tail short?

Put the following statements on the board and have volunteers help you fill in the blanks. Read each sentence aloud for the class and remind students of the two choices for each blank: longer or shorter.

A long mouse's tail is _____ than a short cat's tail. (shorter)
A short worm is _____ than a short snake. (shorter)
A long tree branch is _____ than a long pencil. (longer)

A long paper clip is _____ than a short snake. (shorter)
A long finger is _____ than a short leg. (shorter)

VARIATION: Make up cards with the words "long" and "short" and cards with the names of various objects. Use a pocket chart to create sentences like those above and change only one word at a time, e.g., finger to arm, long to short.

Repeat with more sentences. You could give students cards with the words "longer" and "shorter" and have them hold up the word they think fits into each sentence.

A long paper clip is _____ than a short book.
A short paper clip is _____ than a long book.
A long stapler is _____ than a short car.
A long stapler is _____ than a short paper clip.
A short stapler is _____ than a long paper clip.

Wide and narrow are relative. Provide students with cards that say "wider" or "narrower" and have students hold up the word they think fits into each sentence.

A wide thumb is _____ than a narrow arm.
A narrow thumb is _____ than a wide arm.
A wide room is _____ than a narrow desk.
A narrow desk is _____ than a wide floor.
A narrow room is _____ than a wide desk.
A wide thumb is _____ than a narrow hand.

NOTE: Accept all answers that students can justify. For example, a wide desk might be wider than a narrow washroom or closet

Extension

Arrange two pencils of nearly the same length (less than 1 cm difference) as follows:

shorter
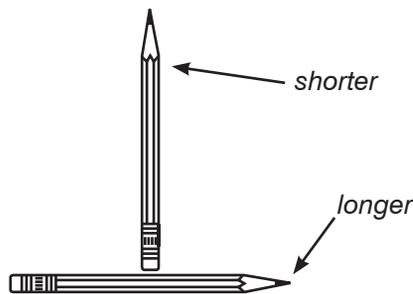
longer

ASK: Which pencil is longer? Take a vote and have a volunteer check. Explain that objects going up and down tend to look longer than objects going across.

ME1-4
Height
Pages 115–116

VOCABULARY
longer / shorter
taller / shorter
wider / narrower
length
width

PROBLEM SOLVING ↘

Reflecting on the reasonableness of the answer

Goals

Students will compare heights directly and further develop their understanding that measurement is relative and depends on perspective.

PRIOR KNOWLEDGE REQUIRED

can compare two lengths directly
knows the concepts of length and width
knows measurement terms are relative

MATERIALS

(none)

Length can be measured in any direction. Tell students that a piece of paper has two dimensions—length and width—but some objects have three dimensions: length, width, and height. Vertical distance, or the distance up and down an object, is called height. Some things are tall and some things are short. Ask a volunteer of about average height to stand up. **ASK:** Who thinks they are taller than — ? How can we check? Have the two volunteers stand back to back. Repeat with volunteers who think they are shorter.

ACTIVITY

Play "I Spy" to compare length and width to height. Hold up a regular sheet of paper and make sure students can identify its length and width before you begin. **EXAMPLES:** I spy something that is a little taller than the paper is long (e.g., one shelf on the bookshelf), taller than the paper is wide but shorter than the paper is long (e.g., a water bottle), wider than the paper is long (e.g., a chair), and so on. Choose objects whose length and width can easily be checked against the paper and invite students to check their own guesses. Give hints and clues as required. **ADVANCED:** Allow a volunteer to be the "spy."

Tall and short are relative. Ask students to help you complete sentences such as:

A tall snowman is _____ than a short giraffe.
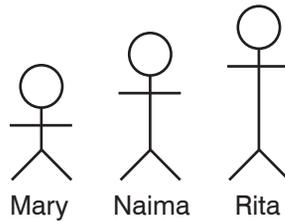
A tall adult is _____ than a tall building.

A short adult is _____ than a tall 2-year-old.

A short 3-year-old is _____ than a short 12-year-old.

A tall 3-year-old is _____ than a short 12-year-old.

A short 8-year-old is _____ than a tall 9-year-old.

Measurement depends on perspective. Draw on the board:

Mary   Naima   Rita

SAY: Mary says, "Naima is tall." Rita says, "Naima is short." **ASK:** Why does Mary say that Naima is tall? (Naima looks tall to Mary because Naima is taller than Mary.) Why does Rita say that Naima is short? Who's right? (They both are!)

Show students a pencil. Tell students that Mary said this is a pencil and Rita said it is an eraser. Who is right? (Mary) **ASK:** How is being tall or short different from being a pencil or an eraser? (A pencil is always a pencil, but something can be tall to one person and short to another person.)

PROBLEM SOLVING

Drawing a picture

Tell students that Rita says Mary has short hair and Naima says Mary has long hair. Ask them to draw what the three girls look like. Repeat with different characters or objects and situations, e.g., people comparing their trees/height of trunk, kites/tails.

Bonus   Draw Anna and Sarah if Sarah says that Anna is tall and Anna says that Sarah has long hair.

Extensions

1. A tall frog is shorter than a short _____.
   A short 6-year-old is taller than a tall _____.

PROBLEM SOLVING

Drawing a picture

2. Draw Sarah, Anna, and Nancy if …

   Sarah says: Anna is short and has short hair.
   Anna says: Nancy is tall and has long hair.
   Nancy says: Sarah is tall and has short hair.

3. Have students cut out the animals on **BLM Height** (p D-46) and order them from shortest to tallest (in real life). Students can paste the pictures, in order, in their journals.

ME1-5
Compared to a Metre Stick

Page 117

Goals

Students will compare to a benchmark: the length of a metre stick.

PRIOR KNOWLEDGE REQUIRED

can compare two lengths directly
knows the concepts of length, width, and height

MATERIALS

several metre sticks
BLM Compare to a Metre Stick (p D-47)

ACTIVITY 1

20 Questions. SAY: I am thinking of something (a metre stick). Can you guess what it is? Students must ask yes/no questions that include the terms longer and shorter. **EXAMPLE:** Is it longer than my hand? Is it shorter than me? Is it shorter than a paper clip? If a student asks if it is longer (or shorter) than something that is about a metre long, **SAY:** I'm not sure, I think it's pretty close to the same length. If a student compares the unknown object to a metre stick, the game ends. Otherwise, let the class make 5 guesses in total and then give them the answer. Record the answers to each question on the board, so that students can check directly when the answer is revealed. After each guess, invite students to check their guesses against the already known information.

PROBLEM SOLVING ↴

Making and investigating
conjectures

PROBLEM SOLVING ↴

Making and investigating
conjectures

Explain to the students that the object they found is called a metre stick. Ask volunteers to identify things that they think are longer than a metre stick and have them check directly. Repeat with objects that are shorter than a metre stick and objects that are about as long as a metre stick.

Invite pairs to find objects that compare to the length of a metre stick in every way, e.g., narrower than a metre stick is long, wider than a metre stick is long, and so on (there are 6 possibilities in total). Then reform the pairs so that each member of a pair had the opposite task. Pairs can work together to make a poster of objects that are "taller or shorter," "longer or shorter," or "wider or narrower" than a metre stick is long.

Give each student a copy of **BLM Compare to a Metre Stick**. Have students guess whether the lengths, widths or heights of the real items pictured are longer than, shorter than, or about as long as a metre stick. Students should record the guesses with a checkmark (✓). Then give each pair a metre stick to check their guesses.

ACTIVITY 2

This is a variation of the game "Hot and Cold." Think of a measurement in the room, such as the width of the door, and have students guess what you're thinking of. Answer each guess by saying whether it is too wide, too narrow, or about right. (Use tall/short or long/short if required.) Record each answer on the board in a chart with headings "Too wide," "Too narrow," and "About right." Encourage students to use what they know to make their next guess. **EXAMPLE:** If we know the object is longer than a pencil, would it make sense for our next guess to be a paper clip? The student who guesses the measurement may choose another for the class to guess.

PROBLEM SOLVING

Guessing, checking and revising

When students are comfortable playing this game, contrast it to a guessing game "Hide and Seek," where each answer eliminates only one guess. Discuss times when they played "Hide and Seek" and it took a long time to find the person hiding. Were there times when they hid and wondered if they would ever be found? Ask students if they think the game they played in class would take longer if, instead of answering their guesses with a clue, you just answered "yes" or "no." Discuss why that might be. Have students list objects they eliminated when you told them the object you were thinking of was longer than — . What objects would they have been able to eliminate if you had only said, No, it is not — ? Which game is more like "Hide and Seek?" Why?

PROBLEM SOLVING

Reflecting on what made the problem easy or hard

Extensions

1. When students are not in the room, draw two lines on the board, both 1 metre stick long, with arrows pointing as shown. Ask students to predict which line is longer without the arrows. Then have a volunteer check by comparing both to a metre stick.
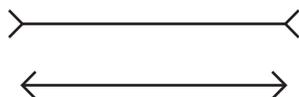
2. Students can make their own metre stick by rolling a newspaper up tightly and taping it with masking tape. Cut the newspaper roll so that it is the same length as a metre stick. As a class, determine how many metre sticks long the classroom is from side to side and from front to back. **ASK:** If we use all our metre sticks, do you think we can measure the distance to the principal's office? Predict the distance in metre sticks and then check it.
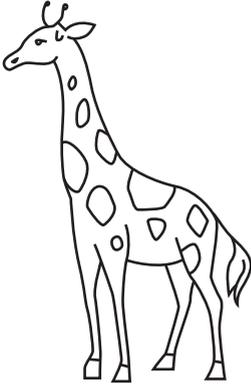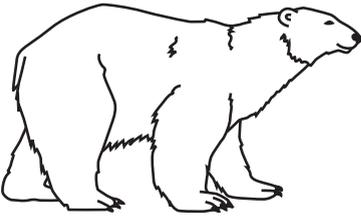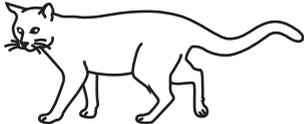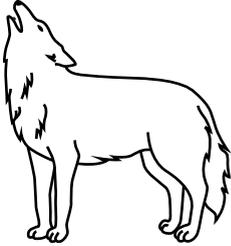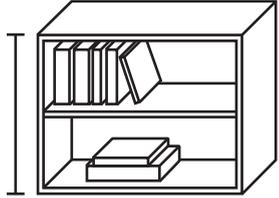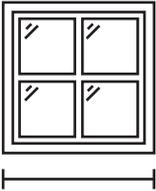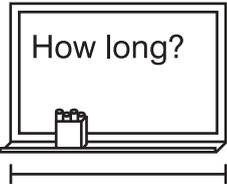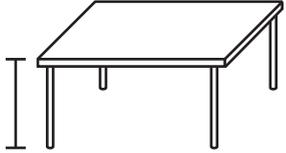
Length

Height

☐ Colour in the pictures.
☐ Cut out the pictures.
☐ Order them from shortest to tallest.
☐ Paste them on a strip of paper vertically.
☐ Give your work a title.

Blackline Master — Measurement — Teacher's Guide for Workbook 1.1

Compare to a Metre Stick

☐ Guess.
☐ Check.
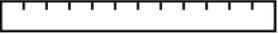
	Longer than 1 metre	Shorter than 1 metre	As long as 1 metre
How long?			

Dear Parent/Guardian,

re: JUMP Math program
            Lesson ME1-1
            Grade 1 Measurement

In mathematics, your child is learning about length. One of the things we are doing in class is lining up objects end to end to determine which is longer. Comparing lengths is something we all do in daily life. Here are some ways you can compare lengths together at home.

Compare lengths directly—socks.
Ask your child to help you sort and match socks after washing. Demonstrate comparing two socks of different lengths by lining up the heel-to-toe parts side by side. Ask: Which one is longer? Which one do you think is mine? Sort the remaining socks into two piles, long and short. (This activity will work best if you have many pairs of plain unpatterned socks or at least two different sizes of the same pattern.) You can finish sorting and matching the socks together. Once you have sorted them by size, match them by colour and pattern.

Compare lengths directly and indirectly—hands and feet.
Ask your child: Whose hand is bigger—yours or mine? How can we check? Hold your hand up to your child's to compare them. Then compare the length of your hands to the length of your mittens or gloves. Ask: Will my hand fit in your mitten? Will your hand fit in mine? Repeat for feet and socks/shoes.

Now ask: What's longer—your foot or my hand? How can we check? Before comparing them directly, compare your child's shoe or sock to your glove. Ask: Which one is longer? Your child might want to revise his/her answer to the first question. Now line your hand up with your child's foot to compare the lengths directly.

Here's another way to compare the lengths of your hands and feet indirectly: Trace your child's foot onto paper and ask your child to trace your hand onto paper. Cut the two tracings out and place them one on top of the other.

Compare and order lengths.
Ask relatives or friends who live far away to trace one hand or paint a handprint onto paper and mail it to you. Compare their hands to yours and your child's. Order the hands from longest to shortest. Who has the longest hand? Who has the shortest hand?