

# Measurement

## Unit 8 Overview: 13 lessons

Students move from cubes and paper clips to rulers: inches and centimeters, then feet, yards and meters and the tool for each, one thing in two units, estimates, and how much longer. Then lengths become numbers to add and subtract in stories, on a number line and in line plots. Lining up the end of a thing with the 0 is the habit the unit rests on, so ask for it every day. Lesson 8.1 and lessons 8.11 to 8.13 are for the states that teach them in 2nd grade.

### THE UNIT, DAY BY DAY

|        |                                                  |                                                                 |
|--------|--------------------------------------------------|-----------------------------------------------------------------|
| Day 1  | <b>Pre-Check</b>                                 | What students already know, before the first lesson.            |
| Day 2  | <b>8.1</b> Bigger unit, fewer units ★            | I can tell that a bigger unit takes fewer to measure.           |
| Day 3  | <b>8.2</b> Measure in inches                     | I can measure to the nearest inch with a ruler.                 |
| Day 4  | <b>8.3</b> Feet, yards and the right tool        | I can use feet and yards and pick the tool.                     |
| Day 5  | <b>8.4</b> Centimeters and meters                | I can measure in centimeters and pick meters for long things.   |
| Day 6  | <b>8.5</b> One thing, two units                  | I can measure one thing in inches and in centimeters.           |
| Day 7  | <b>8.6</b> Estimate lengths                      | I can estimate lengths in inches, feet, centimeters and meters. |
| Day 8  | <b>8.7</b> How much longer?                      | I can find how much longer one thing is than another.           |
| Day 9  | <b>8.8</b> Length story problems                 | I can solve story problems about lengths.                       |
| Day 10 | <b>8.9</b> Sums and differences on a number line | I can show sums and differences on a number line.               |
| Day 11 | <b>8.10</b> Measure, then make a line plot       | I can make a line plot of lengths.                              |
| Day 12 | <b>8.11</b> Pounds and the right tool ★          | I can pick a ruler, scale or measuring cup.                     |
| Day 13 | <b>8.12</b> Cups and pints ★                     | I can change cups to pints and pints to cups.                   |
| Day 14 | <b>8.13</b> Different shapes, same amount ★      | I can tell when two containers hold the same amount.            |
| Day 15 | <b>Unit Review</b>                               | The review, to go over together.                                |
| Day 16 | <b>Unit Test</b>                                 | Form A; Form B (other numbers) is for a retest.                 |

★ Taught in 2nd grade in some states. Skip these lessons if yours teaches them in another grade; [animalmath.com/standards](http://animalmath.com/standards) shows your state's list.

### GET READY FOR THE UNIT

- A ruler with inches and centimeters for each student; a yardstick, a meter stick and a tape measure
- Cubes and paper clips for each pair, and masking tape for start lines and a floor number line
- Crayons, pencils, keys, ribbons and paper strips to measure; print rulers at 100% (actual size)
- For the state lessons: a scale, a measuring cup, a pint carton and containers of many shapes

### HOW EACH LESSON GOES

1. **Warm up** (5 min)
2. **Teach** (10 min)
3. **Try it together** (10 min)
4. **Practice** (15 min)
5. **Exit ticket** (5 min): a quick check on the lesson.

Each lesson page ends with the Animal Math sheets, makers, tools and quizzes for it. "Sheet 3" is the third worksheet of a pack; a color pack prints each sheet again in black and white.

### CHECKING AS YOU GO

|                  |                                             |                    |                                                   |
|------------------|---------------------------------------------|--------------------|---------------------------------------------------|
| <b>PRINTABLE</b> | <b>Pre-Check:</b> Day 1, with a key         | <b>EXIT TICKET</b> | <b>Exit Tickets:</b> one a lesson, four to a page |
| <b>PRINTABLE</b> | <b>Unit Review:</b> the day before the test | <b>PRINTABLE</b>   | <b>Unit Test:</b> Forms A and B, with keys        |



# Measurement

## Lesson 8.1: Bigger unit, fewer units

**GOAL** Students measure one thing with cubes and with paper clips and see that the bigger unit, the clip, takes fewer. Then they lay inch cubes along a ruler and see that it counts them.

About 45 minutes

★ Taught in 2nd grade in some states

**I can tell that a bigger unit takes fewer to measure.**

### THE LESSON

- 1 Warm up** (5 min) Three students walk heel to toe across the rug while the class counts; then you do it. Ask why the grown-up feet took fewer steps.
- 2 Teach** (10 min) On the Measuring Tool with Cubes and Paper Clips, measure a pencil: 10 cubes, then 5 clips. The pencil did not change, so why is 5 smaller? Lay one clip on two cubes: a clip covers two cubes, so it takes half as many. Then switch to Cubes and an Inch Ruler: each cube is one inch, and the ruler counts them for you.  
**Say:** "A bigger unit covers more each time, so I need fewer of them."
- 3 Try it together** (10 min) Pairs measure three strips with cubes, then with clips, and write both counts. Before measuring the last strip with clips, they guess: more or fewer than the cubes? Then they check.
- 4 Practice** (15 min) Students measure two ways and circle the unit they needed more of on sheet 1 of Measuring with Different Units, match the counts on sheet 4 and circle more or fewer on sheet 5. Early finishers do sheet 5 of Inches, Feet, Yards and Meters, where 24 inches is only 2 feet.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 8.1** and circle a face beside the "I can" line. The leaf is 6 cubes and 3 clips. In question 2, a student who circles 8 clips matched the bigger number to the bigger unit.

**Need help?** Measure with sticks of two snapped cubes beside single cubes, so the bigger unit is plainly two small ones.

**Ready for more?** Measure a strip with a third unit (crayons) and put the three units in order from most needed to fewest.

### GET READY

- Linking cubes and paper clips for each pair
- Paper strips 6, 8 and 10 cubes long
- The Measuring Tool on the board

### WORDS TO USE

**unit:** the same-size thing we measure with, like one cube or one paper clip

**bigger unit:** a longer thing to measure with; it covers more each time

**fewer:** not as many

### ASK

- Why did you need more cubes than clips?
- Did the pencil get longer when the count got bigger?
- If we measured with crayons, would we need more or fewer than clips?

### WATCH FOR

**Thinks the bigger number means the thing is longer.** Lay the cube row and the clip row under it: both end at the same place.

**Says the bigger unit needs more.** Hold one clip against two cubes and ask which covers more of the pencil.

**Leaves gaps between the clips, so the count is too small.** Hook the clips together end to end, then count.

### ON ANIMAL MATH

**PRINTABLE** **Measuring with Different Units:** sheets 1, 4 and 5

**PRINTABLE** **Inches, Feet, Yards and Meters:** sheet 5

**TOOL** **Measuring Tool:** Measure With Cubes and Paper Clips, then Cubes and an Inch Ruler

**EXIT TICKET** **2nd Grade Measurement Exit Tickets:** Exit Ticket 8.1

# Measurement

## Lesson 8.2: Measure in inches

**GOAL** Students line up the end of a thing with the 0 of an inch ruler and read its length to the nearest inch. When a thing does not start at 0, they count the inches between its ends.

About 45 minutes

**I can measure to the nearest inch with a ruler.**

### THE LESSON

- 1 Warm up** (5 min) Measure a paper strip with 4 inch cubes, then lay a ruler beside the cubes. Ask: where does the first cube start? Where does the 4th cube end?
- 2 Teach** (10 min) On the Measuring Tool with Inch Ruler, lay a crayon from the 0. It ends just past the 3, so it is about 3 inches. Move it so it ends just before the 4: about 4 inches. Then choose Not Lined Up: the crayon starts at 2 and ends at 5. Count the inch spaces between the ends: 3, or 5 take away 2.  
**Say:** "I line up the end with the 0. If it does not start at 0, I count the inches between the ends."
- 3 Try it together** (10 min) Partners measure four things to the nearest inch and check where each end lines up. Then one partner slides a pencil so it starts at 1 and the other finds its length.
- 4 Practice** (15 min) Students write where each thing starts and ends and how long it is on sheet 2 of Ruler Practice, then draw the inch line and the inch arrows (questions 4 and 6) on sheet 3.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 8.2** and circle a face beside the "I can" line. The leaf ends just past 2, so it is about 2 inches. The caterpillar starts at 1: a student who writes 3 read the number at its end, not the inches between its ends.

**Need help?** Lay inch cubes along the ruler under the thing, so each inch is a cube to count.

**Ready for more?** Measure something longer than the ruler by moving it and adding the two parts, or measure to the nearest half inch.

### GET READY

- An inch ruler for each student
- Things that are not whole inches long (crayons, keys, erasers)
- Ruler Practice printed at actual size (100%)

### WORDS TO USE

**inch:** a unit for length; the space from 0 to 1 on the ruler

**nearest inch:** the whole inch the end is closest to

**about:** close to, not exactly

### ASK

- Where do you line up the end? Why there?
- It ends between 3 and 4. Which is it closer to?
- It starts at 2 and ends at 5. How long is it?

### WATCH FOR

**Lines up the end with the edge of the ruler, not the 0.** Put a finger on the 0 mark and slide the thing to it.

**Reads the number at the end when the thing starts at 2.** Count the inch spaces with a finger, or take away the start: 5 take away 2 is 3.

**Picks the next inch when the end is just past a number.** Look at the half inch mark: before it, keep the smaller number.

### ON ANIMAL MATH

#### PRINTABLE

**Ruler Practice: Measure, Mark, Compare:** sheet 2, and questions 4 and 6 of sheet 3

#### TOOL

**Measuring Tool:** Measure With Inch Ruler, Object Lengths In Between (Nearest Unit); then Place the Ruler Not Lined Up

#### QUIZ

**Inches and Centimeters Quiz:** the Inch Ruler level

#### EXIT TICKET

**2nd Grade Measurement Exit Tickets:** Exit Ticket 8.2

# Measurement

## Lesson 8.3: Feet, yards and the right tool

**GOAL** Students learn that 12 inches make a foot and 3 feet make a yard, and pick a ruler for small things, a yardstick for longer ones and a tape measure for things that bend or go around.

About 45 minutes

**I can use feet and yards and pick the tool.**

### THE LESSON

- 1 Warm up** (5 min) Lay three rulers end to end beside a yardstick. Ask: how many rulers make a yardstick? How many inches is that? Count by 12: 12, 24, 36.
- 2 Teach** (10 min) Hold up each tool and say what it is for. A ruler is 12 inches, 1 foot: good for a book. A yardstick is 3 feet, 36 inches: good for the door or a table. A tape measure bends, so it goes around a ball or a head, and it is long enough for the room. Measure the door with the ruler (it slips and takes a long time), then with the yardstick.  
**Say:** "Small things: a ruler. Longer things: a yardstick. Round or very long things: a tape measure."
- 3 Try it together** (10 min) Name jobs one at a time (a crayon, how wide the door is, around a basketball, how long the hall is). Students point to the tool and tell why. Then fill in a table together: 1 foot is 12 inches, 2 feet is 24, 3 feet is 36, and 3 feet is 1 yard.
- 4 Practice** (15 min) Students circle the best tool on sheet 4 of Inches and Centimeters, then count by 12 and by 3 to fill in the tables on sheets 1 and 2 of Inches, Feet, Yards and Meters.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 8.3** and circle a face beside the "I can" line. The window is 30 inches wide, longer than a ruler and shorter than a yardstick, so the yardstick. In question 2, a student who writes 2 or 3 for 2 yards missed that each yard is 3 feet.

**Need help?** Lay rulers end to end along a yardstick and count by 12 with a finger on each ruler.

**Ready for more?** Find three things in the room for each tool, or tell how many inches are in 2 yards.

### GET READY

- A 12 inch ruler, a yardstick and a tape measure
- A ball, a book, the door and a rug to measure
- Three rulers to lay end to end

### WORDS TO USE

**foot:** 12 inches; a ruler is 1 foot long

**yard:** 3 feet, or 36 inches; a yardstick is 1 yard long

**tape measure:** a long ruler that bends, for round things and very long things

### ASK

- Why not use the ruler to measure the door?
- How many feet are in a yard? How many inches?
- Which tool would you use to measure around your head?

### WATCH FOR

**Picks the ruler for everything.** Measure the door with a ruler together and count how many times it has to move.

**Says a foot is 10 inches.** Count the inch marks on a ruler together: 12.

**Picks the yardstick for a round thing.** Try to wrap a yardstick around a ball: it will not bend.

### ON ANIMAL MATH

PRINTABLE

**Inches and Centimeters:** sheet 4

PRINTABLE

**Inches, Feet, Yards and Meters:** sheets 1-2

TOOL

**Measuring Tool:** Measure With Yardstick, then Tape Measure (Feet)

EXIT TICKET

**2nd Grade Measurement Exit Tickets:** Exit Ticket 8.3

# Measurement

## Lesson 8.4: Centimeters and meters

**GOAL** Students measure in centimeters, learn that 100 centimeters make a meter, and pick a centimeter ruler for small things and a meter stick for long ones.

About 45 minutes

**I can measure in centimeters and pick meters for long things.**

### THE LESSON

- 1 Warm up** (5 min) Students find the centimeter side of their rulers and press a fingertip on it: about 1 centimeter wide. Count the centimeters from 0 to 10 together.
- 2 Teach** (10 min) On the Measuring Tool with Centimeter Ruler, measure a key from the 0: it ends at 5, so 5 centimeters. Then show the Meter Stick: 100 centimeters, numbered by 10s, about as high as a doorknob. Ask which unit fits a key and which fits the classroom.  
**Say:** "Small things in centimeters, with a centimeter ruler. Long things in meters, with a meter stick."
- 3 Try it together** (10 min) Pairs measure three strips in centimeters and write each length with cm. Then the class measures the board or the rug with the meter stick and counts the meters.
- 4 Practice** (15 min) Students measure and compare in centimeters on sheet 4 of Ruler Practice, then circle the tool and the unit on sheet 5 of Inches and Centimeters. Early finishers count by 10s and 100s on sheet 3 of Inches, Feet, Yards and Meters.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 8.4** and circle a face beside the "I can" line. A student who writes 7 for the crayon counted the marks, not the spaces. The hallway needs the meter stick and meters.

**Need help?** Measure strips cut to whole centimeters with centimeter cubes laid along the ruler.

**Ready for more?** Measure the door in centimeters and in meters, or draw lines 8 and 13 centimeters long.

### GET READY

- A ruler with centimeters for each student
- A meter stick
- Paper strips cut to whole centimeters

### WORDS TO USE

**centimeter:** a small unit, about as wide as a fingertip

**meter:** 100 centimeters, as long as a meter stick

**cm and m:** short for centimeter and meter

### ASK

- How many centimeters make a meter?
- Would you measure a pencil in centimeters or meters? Why?
- Where does the first centimeter start?

### WATCH FOR

**Uses the inch side of the ruler.** Find the cm label first.

**Counts the marks, so the answer is one too many.** Count the spaces, like hops on a number line.

**Thinks a meter is 10 centimeters.** Count by 10s along the meter stick: 10 tens make 100.

### ON ANIMAL MATH

**PRINTABLE** **Ruler Practice: Measure, Mark, Compare:** sheet 4

**PRINTABLE** **Inches and Centimeters:** sheet 5

**PRINTABLE** **Inches, Feet, Yards and Meters:** sheet 3 for early finishers

**TOOL**

**Measuring Tool:** Measure With Centimeter Ruler, then Meter Stick

**QUIZ**

**Inches and Centimeters Quiz:** the Centimeter Ruler level

**EXIT TICKET**

**2nd Grade Measurement Exit Tickets:** Exit Ticket 8.4

# Measurement

## Lesson 8.5: One thing, two units

**GOAL** Students measure one thing in inches and in centimeters and explain why there are more centimeters: a centimeter is shorter, so it takes more of them.

About 45 minutes

**I can measure one thing in inches and in centimeters.**

### THE LESSON

- 1 Warm up** (5 min) Show a paper strip and ask: if I measure it in inches and then in centimeters, will I get the same number? Thumbs up or down.
- 2 Teach** (10 min) Measure the strip with both sides of a ruler, or on the Measuring Tool with Inch and Centimeter Rulers: 4 inches, and about 10 centimeters. The strip did not change. Hold an inch beside a centimeter: the inch is longer, so it takes fewer of them. Write 4 inches and 10 centimeters on the chart.  
**Say:** "Centimeters are shorter than inches, so there are more of them."
- 3 Try it together** (10 min) Pairs measure the crayon, the key and the book in both units and add them to the chart. Look at every row: which number is bigger? Ask a pair to guess the centimeters for an 8 inch thing before measuring (about 20).
- 4 Practice** (15 min) Students measure each thing in inches and in centimeters on sheet 1 of Inches and Centimeters, circle the length that makes sense on sheet 2, and measure both and circle the longer one on sheet 3.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 8.5** and circle a face beside the "I can" line. The ribbon is 2 inches and 5 centimeters. A student who circles 3 centimeters for the 6 inch paintbrush thinks the centimeter is the bigger unit.

**Need help?** Measure a strip exactly 2 inches long: about 5 centimeters, so each inch is about 2 and a half centimeters.

**Ready for more?** Guess the centimeters from the inches for three things, then measure to check.

### GET READY

- A ruler with inches and centimeters
- A crayon, a key, a book and a 4 inch strip
- A class chart: thing, inches, centimeters

### WORDS TO USE

**inch:** the longer unit, about 2 and a half centimeters

**centimeter:** the shorter unit

**more and fewer:** a shorter unit takes more; a longer unit takes fewer

### ASK

- Why are there more centimeters than inches?
- A book is 10 inches long. Is it more or fewer than 10 centimeters?
- Did you start each ruler at the same end?

### WATCH FOR

**Thinks the thing is longer in centimeters.** Lay both rulers under it: the ends are in the same place, only the unit changed.

**Writes the inch number for the centimeters.** Point to the in and cm labels first, then read each ruler.

**Starts the second ruler at a different place.** Line up the 0 of each ruler with the same end of the thing.

### ON ANIMAL MATH

**PRINTABLE**

**Inches and Centimeters:** sheets 1-3

**TOOL**

**Measuring Tool:** Measure With Inch and Centimeter Rulers

**QUIZ**

**Inches and Centimeters Quiz:** the Inches or Centimeters level

**EXIT TICKET**

**2nd Grade Measurement Exit Tickets:** Exit Ticket 8.5

# Measurement

## Lesson 8.6: Estimate lengths

**GOAL** Students estimate lengths in inches, feet, centimeters and meters from things they know (a ruler is a foot, a big step about a meter) and pick the unit that fits.

About 45 minutes

**I can estimate lengths in inches, feet, centimeters and meters.**

### THE LESSON

- 1 Warm up** (5 min) Show the top of a thumb (about 1 inch), a ruler (1 foot), a fingertip (about 1 centimeter) and a big step (about 1 meter). Students show each one.
- 2 Teach** (10 min) Hold up a crayon: about 3 inches or 3 feet? Think of the ruler: 3 feet is three rulers, much too long. Then the door: about 2 meters or 2 centimeters? 2 centimeters is two fingertips. Then pick the unit for the classroom: inches would give a huge number, so feet makes sense.  
| **Say:** "I think of something I know, then I ask: does that make sense?"
- 3 Try it together** (10 min) Pairs estimate four things, write each estimate with its unit on a sticky note, then measure. Talk about the closest estimates: close is the goal, not exact.
- 4 Practice** (15 min) Students circle the best estimate on sheet 5 of Comparing Lengths, then circle the better unit and the better guess on sheet 4 of Inches, Feet, Yards and Meters.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 8.6** and circle a face beside the "I can" line. Watch for 7 feet for the banana or 5 centimeters for the giraffe: the student looked at the number and not the unit.

**Need help?** Keep a ruler and a meter stick on the table to hold up beside each thing while estimating.

**Ready for more?** Estimate the hallway in meters and in feet, then measure it with the tape measure.

### GET READY

- A ruler and a meter stick
- Things to estimate: a crayon, a book, a desk, the door
- Sticky notes for each pair

### WORDS TO USE

**estimate:** a careful guess, close to the real length

**benchmark:** something we know the length of, to help us guess

**makes sense:** fits what we know about the thing

### ASK

- What do you think of when you hear foot?
- Is a desk about 2 feet or 2 meters wide? How do you know?
- Why not measure the classroom in inches?

### WATCH FOR

**Picks by the number and skips the unit.** Read each choice aloud with its unit, and picture three rulers or three fingertips.

**Thinks an estimate must be exact.** Praise estimates that are close; a ruler gives the exact length.

**Mixes up feet and meters.** Stand a meter stick beside a ruler: a meter is a bit more than 3 feet.

### ON ANIMAL MATH

PRINTABLE

**Comparing Lengths: How Much Longer?** sheet 5

PRINTABLE

**Inches, Feet, Yards and Meters:** sheet 4

QUIZ

**Inches and Centimeters Quiz:** the Inches or Centimeters level

EXIT TICKET

**2nd Grade Measurement Exit Tickets:** Exit Ticket 8.6

# Measurement

## Lesson 8.7: How much longer?

**GOAL** Students measure two things in the same unit and find how much longer one is, by subtracting or by counting the units past the shorter end.

About 45 minutes

**I can find how much longer one thing is than another.**

### THE LESSON

- 1 Warm up** (5 min) Line up cube trains of 9 and 5. How many more cubes does the long train have? Count the cubes past the end of the short one: 4.
- 2 Teach** (10 min) Lay a pencil (16 centimeters) and a crayon (9 centimeters) from the same 0. The part of the pencil past the crayon is the difference: count from 9 to 16, or take 9 from 16. Write "The pencil is 7 centimeters longer than the crayon."  
**Say:** "Measure both from 0 in the same unit. The difference is how much longer."
- 3 Try it together** (10 min) Pairs measure two things in centimeters, write both lengths and find how much longer. Then show one length in inches and one in centimeters: why can we not compare them?
- 4 Practice** (15 min) Students measure in inches and find how much longer on sheet 1 of Comparing Lengths, then do the same in centimeters on sheet 2. Early finishers measure the lines at the bottom of sheet 5 of Ruler Practice.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 8.7** and circle a face beside the "I can" line. The ribbon is 7 and the eraser 5, so 2 centimeters longer; a student who writes 7 gave the ribbon's length, not the difference.

**Need help?** Use cube trains first, then strips on a ruler, counting the units past the shorter end.

**Ready for more?** Find how much longer in inches and in centimeters for the same pair, and tell why the numbers differ.

### GET READY

- A ruler for each student
- A pencil, a crayon and two ribbons
- Cube trains of 9 and 5, and whiteboards

### WORDS TO USE

**how much longer:** how many more units one thing has

**difference:** the longer length take away the shorter

**same unit:** both in inches, or both in centimeters

### ASK

- What do you do with the two lengths?
- Where is the difference in the picture?
- Why must both be in the same unit?

### WATCH FOR

**Writes the longer length as the answer.** Point to the part past the shorter one: that is the answer.

**Adds the two lengths.** Ask: is the pencil 25 centimeters longer? Look again.

**Measures one of the two from 1.** Start both at 0 on the same ruler.

### ON ANIMAL MATH

PRINTABLE

**Comparing Lengths: How Much Longer?** sheets 1-2

PRINTABLE

**Ruler Practice: Measure, Mark, Compare:** sheet 5

TOOL

**Measuring Tool:** Measure With Centimeter Ruler

QUIZ

**Inches and Centimeters Quiz:** the How Much Longer level

EXIT TICKET

**2nd Grade Measurement Exit Tickets:** Exit Ticket 8.7

# Measurement

## Lesson 8.8: Length story problems

**GOAL** Students solve one-step story problems about lengths within 100 (end to end, cut off, how much longer, longer by), show them with a bar model or a number line, and write the answer with its unit.

About 45 minutes

**I can solve story problems about lengths.**

### THE LESSON

- 1 Warm up** (5 min) Read: a ribbon is 10 inches long, and I cut off 4 inches. Act it out with a real ribbon and a ruler. How long is it now?
- 2 Teach** (10 min) Read: a rope is 54 inches long; Ben cuts off 28 inches. Draw a bar for 54 and mark off 28: the rest is the answer. Jump back 20 to 34, then 8 more to 26: 26 inches. Then a compare story: a blue ribbon is 45 centimeters; a red one is 26 centimeters longer. The red bar is the blue bar and 26 more: 71 centimeters.  
**Say:** "I draw the lengths, then I decide: put together, take away, or compare."
- 3 Try it together** (10 min) Read four stories, one of each kind. Partners draw a bar model on whiteboards, choose plus or minus, solve, and say the answer with its unit. Include a "longer by" story, where longer means add.
- 4 Practice** (15 min) Students read the bar models and solve on sheets 1 and 2 of Length Word Problems. Early finishers show stories as jumps on sheet 3 of Comparing Lengths, or solve and write the units on sheet 4.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 8.8** and circle a face beside the "I can" line. Both answers need units. A student who writes 9 for the red ribbon subtracted because the story says longer.

**Need help?** Act out each story with paper strips cut to the lengths before drawing a bar model.

**Ready for more?** Solve the two step stories on sheet 5 of Length Word Problems, or write a story for 45 inches and 28 inches.

### GET READY

- Whiteboards and markers
- A ribbon, a ruler and scissors to act out a story
- Paper strips for bar models

### WORDS TO USE

**end to end:** put in a line, one after the other; add the lengths

**cut off:** take a part away; subtract

**longer by:** the longer one is the shorter one plus that much

### ASK

- Is the answer longer or shorter than the first length? Why?
- What does your bar model show?
- What unit goes with your answer?

### WATCH FOR

**Subtracts whenever the story says longer.**

Draw both bars: if the red one is longer, it is the blue one and more.

**Leaves off the unit.** Ask "26 what?" and have them say the whole answer.

**Slips when subtracting across a ten.** Use the open number line: jump back the tens, then the ones.

### ON ANIMAL MATH

PRINTABLE

**Length Word Problems:** sheets 1-2, and sheet 5 for more

PRINTABLE

**Comparing Lengths: How Much Longer?** sheets 3-4 for early finishers

QUIZ

**Word Problems Quiz:** the Within 100 level

EXIT TICKET

**2nd Grade Measurement Exit Tickets:** Exit Ticket 8.8



# Measurement

## Lesson 8.9: Sums and differences on a number line

**GOAL** Students show whole numbers as lengths from 0 on a number line, and show a sum or a difference as jumps:  $3 + 8$  is a jump of 3 from 0 and a jump of 8 more.

About 45 minutes

**I can show sums and differences on a number line.**

### THE LESSON

- 1 Warm up** (5 min) Lay a ruler beside the floor number line. Ask how they are alike: both start at 0, and every space is the same length.
- 2 Teach** (10 min) On the Number Line tool in Jump mode, show  $3 + 8$ : from 0 jump 3, then jump 8 more and land on 11. Then show 12 take away 4: jump from 0 to 12, then jump back 4 and land on 8. A student walks both on the floor line.  
**Say:** "Start at 0. Jump the first number. Then jump forward to add, or back to take away."
- 3 Try it together** (10 min) Call out sums and differences within 20. Students show the jumps on their own number lines while a pair walks them on the floor. Add a story: a 9 inch ribbon and a 6 inch ribbon end to end.
- 4 Practice** (15 min) Students show each story as jumps from 0 on the number line from 0 to 20 on sheet 4 of Length Word Problems. Early finishers make up a story for a partner to jump.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 8.9** and circle a face beside the "I can" line. Both questions start at 0. A student who starts the first jump at 1 lands one past the answer.

**Need help?** Walk each jump on the floor number line before drawing it.

**Ready for more?** Show sums and differences within 100 on an open number line, jumping by tens, as on sheet 3 of Length Word Problems.

### GET READY

- A number line 0 to 20 taped on the floor
- A number line 0 to 20 for each student
- A ruler to compare it with

### WORDS TO USE

**number line:** like a ruler: every space is the same length

**jump:** a move along the line; its length is a number

**from 0:** every length starts at 0, as on a ruler

### ASK

- Where does the first jump start? Why?
- Which way do you jump to take away?
- How is the number line like a ruler?

### WATCH FOR

**Starts the first jump at 1.** Point to the 0 on a ruler: lengths start at 0.

**Counts the tick marks, not the spaces.** Count each hop as you make it: 1, 2, 3.

**Jumps forward to take away.** Say "take away means go back" and walk it on the floor line.

### ON ANIMAL MATH

**PRINTABLE**

**Length Word Problems:** sheet 4, and sheet 3 for more

**MAKER**

**Number Line:** Mode Addition on Number Line, then Subtraction on Number Line; Number Range 1-20

**TOOL**

**Number Line:** Start 0, End 20, Mode Jump

**EXIT TICKET**

**2nd Grade Measurement Exit Tickets:** Exit Ticket 8.9

# Measurement

## Lesson 8.10: Measure, then make a line plot

**GOAL** Students measure several things to the nearest whole unit, make a line plot of the lengths with an X for each, and read it: the most common length, and how many are longer than a length.

About 45 minutes

**I can make a line plot of lengths.**

### THE LESSON

- 1 Warm up** (5 min) Read a finished line plot on the board: how many pencils are 5 inches long? Which length has the most X's?
- 2 Teach** (10 min) Measure six crayons to the nearest inch and write each length in a table: 4, 5, 4, 6, 4, 3. Draw a line from 3 to 7 with a mark for every number. Put an X above 4 for the first crayon, cross it off the table, and go on, one X for each, stacked neatly. Count the X's: 6, one for each crayon.  
**| Say:** "One X for each thing I measured, right above its length."
- 3 Try it together** (10 min) Each table measures its ten crayons and writes the lengths. Make one line plot for the class from the tables, then ask: what is the most common length? How many are longer than 4 inches?
- 4 Practice** (15 min) Students plot the lengths in the tables on sheet 2 of Line Plots for 2nd Grade, then measure in inches and make the plot on sheet 3.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 8.10** and circle a face beside the "I can" line. There should be 8 X's, three of them above 3. A plot with 7 or 9 skipped or doubled a length.

**Need help?** Plot a table of five lengths first, saying each length aloud as its X goes on.

**Ready for more?** Measure in centimeters and plot on sheet 4, or number the line and make the plot on sheet 5.

### GET READY

- A ruler for each student
- Ten crayons or pencils of different lengths for each table
- A line plot drawn on the board

### WORDS TO USE

**line plot:** a number line with an X for each thing measured

**data:** the numbers we collected

**most common:** the length with the most X's

### ASK

- How many X's should your plot have? How do you know?
- Which length is the most common?
- How many crayons are longer than 4 inches?

### WATCH FOR

**Puts the X's in a row across instead of stacking them.** Each X goes above its number; a second X goes on top of the first.

**Skips or doubles a length.** Cross off each length in the table as it is plotted, then count the X's.

**Leaves off numbers that no one measured.** Every number gets a mark on the line, even with no X's.

### ON ANIMAL MATH

PRINTABLE

**Line Plots for 2nd Grade:** sheets 2-3, and sheets 4-5 for more

EXIT TICKET

**2nd Grade Measurement Exit Tickets:** Exit Ticket 8.10

# Measurement

## Lesson 8.11: Pounds and the right tool

**GOAL** Students pick the tool and the unit for a job: a ruler and inches for how long, a scale and pounds for how heavy, a measuring cup and cups for how much it holds. They read scales and estimate in pounds.

**About 45 minutes**

★ Taught in 2nd grade in some states

**I can pick a ruler, scale or measuring cup.**

### THE LESSON

- 1 Warm up** (5 min) Hold up the three tools. Students stretch out an arm for the ruler, weigh with both hands for the scale and pour for the cup.
- 2 Teach** (10 min) Read a job card: how heavy is the bag of rice? Heavy means the scale. Put the bag on the scale and read the pounds. Then: how long is the book? Long means the ruler and inches. How much does the pitcher hold? Holds means the measuring cup and cups. Write long, heavy and holds by their tools.  
**Say:** "The question tells the tool: long, a ruler; heavy, a scale; holds, a measuring cup."
- 3 Try it together** (10 min) Pairs take a job card, name the tool and the unit, then weigh, measure or pour to check. Before each weighing, the class estimates: about 5 pounds or 50 pounds?
- 4 Practice** (15 min) Students circle the tool on sheet 1 of Choosing Measuring Tools and read the scales in pounds on sheet 3. Early finishers match the tools and units on sheet 2.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 8.11** and circle a face beside the "I can" line. A student who circles the scale and inches knows the tool but not the unit for how heavy. A teddy bear is light: about 1 pound, not 50.

**Need help?** Start with two tools, the ruler and the scale, and real things to measure and weigh.

**Ready for more?** Circle the better estimates on sheet 5 of Choosing Measuring Tools, or read the pound scales on sheet 1 of Pounds and Ounces.

### GET READY

- A ruler, a scale and a measuring cup
- Things to weigh: a book, a lunch box, a bag of rice
- Job cards: how long, how heavy, how much it holds

### WORDS TO USE

**pound:** a unit for how heavy; a loaf of bread is about 1 pound

**scale:** the tool that tells how heavy

**measuring cup:** the tool that tells how much a container holds

### ASK

- What word in the question tells you the tool?
- Would a ruler tell you how heavy a dog is?
- Is a dog closer to 30 pounds or 300 pounds?

### WATCH FOR

**Picks the ruler for something big.** Big is not the job: ask what the question wants to know, then pick the tool.

**Mixes up the units.** Match each tool to its unit on a chart: ruler and inches, scale and pounds, cup and cups.

**Reads the scale at the wrong mark.** Follow the pointer to the nearest number, then count the small marks.

### ON ANIMAL MATH

**PRINTABLE**

**Choosing Measuring Tools:** sheets 1 and 3, sheet 2 for early finishers, sheet 5 for more

**PRINTABLE**

**Pounds and Ounces:** sheet 1 for more

**EXIT TICKET**

**2nd Grade Measurement Exit Tickets:** Exit Ticket 8.11

# Measurement

## Lesson 8.12: Cups and pints

**GOAL** Students measure how much a container holds in cups, learn that 2 cups fill 1 pint, and change pints to cups and cups to pints.

**I can change cups to pints and pints to cups.**

**About 45 minutes**

★ Taught in 2nd grade in some states

### THE LESSON

- 1 Warm up** (5 min) Fill the pint carton with the measuring cup while the class counts the cups. Ask: how many cups fill 1 pint?
- 2 Teach** (10 min) Pour 2 cups into the pint: full. Write  $1 \text{ pint} = 2 \text{ cups}$ . For 7 pints, count by 2s seven times: 14 cups. Then go the other way: 16 cups fill 8 pints, because each pint takes 2 cups. Circle the cups in pairs to show it.  
**| Say:** “2 cups fill 1 pint. For each pint, count 2 cups.”
- 3 Try it together** (10 min) Pairs fill the large jar with cups, count them, and tell how many pints that is by circling pairs of cups. Include an odd number of cups and ask what is left over.
- 4 Practice** (15 min) Students read the measuring jugs on sheet 1 of Cups and Pints, change cups and pints with the key on sheet 3, and compare cups and pints on sheet 4.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 8.12** and circle a face beside the “I can” line. A student who writes 3 for 6 pints halved instead of doubling: there are always more cups than pints.

**Need help?** Pour water with a real cup and pint carton for each problem before writing it.

**Ready for more?** Solve the story problems on sheet 5 of Cups and Pints, or tell how many cups fill 9 pints and 1 more cup.

### GET READY

- A measuring cup, a pint carton and a large jar
- Water or rice, a funnel and a tray for spills
- A table on the board: pints and cups

### WORDS TO USE

**cup:** a unit for how much a container holds

**pint:** 2 cups

**fill:** pour in until it is full

### ASK

- How many cups fill 1 pint?
- Are there more cups or more pints in the same amount? Why?
- How many pints do 18 cups fill?

### WATCH FOR

**Halves when changing pints to cups.** Pour it: each pint takes 2 cups, so the cups are double.

**Counts one cup for each pint.** Draw 2 cups under each carton, then count.

**Thinks a pint is smaller than a cup.** Pour a full pint into cups and count them: 2.

### ON ANIMAL MATH

**PRINTABLE**

**Cups and Pints:** sheets 1, 3 and 4, and sheet 5 for more

**EXIT TICKET**

**2nd Grade Measurement Exit Tickets:** Exit Ticket 8.12

# Measurement

## Lesson 8.13: Different shapes, same amount

**GOAL** Students count the cups that fill containers of different shapes and see that a tall thin one and a short wide one can hold the same amount.

**I can tell when two containers hold the same amount.**

**About 45 minutes**

★ Taught in 2nd grade in some states

### THE LESSON

- 1 **Warm up** (5 min) Show a tall vase and a short wide bowl. Ask which holds more, and take a vote.
- 2 **Teach** (10 min) Fill the tall vase with cups and count: 3 cups. Pour it into the bowl: the bowl is full too, so the bowl holds 3 cups. They look different but hold the same amount. Fill the jar: 4 cups, more than both. Label each with a sticky note.  
**Say:** "To find out, I fill it with cups and count. Taller does not always mean more."
- 3 **Try it together** (10 min) Pairs guess, then fill the containers with cups and write the number on a sticky note. Line the containers up and find the two that hold the same.
- 4 **Practice** (15 min) Students count the cups and circle the two that hold the same on sheet 1 of Holds the Same Amount, pour from one to the other on sheet 2, and circle the one that holds more, or same, on sheet 3.
- 5 **Exit ticket** (5 min) Students do **Exit Ticket 8.13** and circle a face beside the "I can" line. The tall glass and the bowl both hold 2 cups. A student who circles the bottle in question 2 thinks a taller container holds more.

**Need help?** Compare two containers at a time by pouring one into the other before counting cups.

**Ready for more?** Match the containers that hold the same on sheet 4 of Holds the Same Amount, and put them in order on sheet 5.

### GET READY

- A tall vase, a short wide bowl, a jar and a glass
- A measuring cup, water or rice, and a tray
- Sticky notes to label each container

### WORDS TO USE

**holds:** how much fits inside when it is full

**capacity:** how much a container holds

**the same amount:** the same number of cups

### ASK

- Which looks like it holds more? How can we find out?
- How can two containers that look different hold the same amount?
- Which holds the most? How do you know?

### WATCH FOR

**Thinks the taller one holds more.** Pour the tall one into the wide one and look.

**Counts cups that are not full.** Fill each cup to the line before pouring.

**Thinks a wide one always holds more.** Show a wide, shallow pan that holds less than a tall jar.

### ON ANIMAL MATH

**PRINTABLE**

**Holds the Same Amount:** sheets 1-3, and sheets 4-5 for more

**EXIT TICKET**

**2nd Grade Measurement Exit Tickets:** Exit Ticket 8.13