

MATH UNIT

Measuring with a unit you lay end to end

Grade 1

7 lessons

7 × 30 minutes

3 source books

210 minutes in all

THE QUESTION THIS UNIT FOLLOWS

What is a number a number of?

ABOUT THIS UNIT

Grade 1 measurement goes wrong in a particular way: a child produces a number and thinks the job is done. This unit is built so that the number is never enough. Two children measure the same mat with their own feet and get two honest answers. Six mixed sticks give one ribbon two lengths. One order for ten is filled twice and produces two different strips.

The unit opens before any number, on comparisons that a child settles by lining things up at one end, and closes on the word about — the hedge that makes a benchmark sentence true and that a child has to decide for themselves how far to stretch.

THE MATHEMATICAL ARC

Each lesson does one job the lesson before it made possible.

- 1 Settle a comparison with no number at all
- 2 A length is a count of copies of one unit
- 3 Two people measure one mat and get two honest numbers
- 4 A repeated unit must be one size before its count settles anything
- 5 Ten of what? One order filled twice
- 6 Twelve of the small unit fill one of the big one

7 How close is close enough: what the word about does**SOURCE BOOKS**

Every lesson in this unit is already published under Math lessons. Nothing here asks you to teach anything you cannot open today.

**Measure It!**

2 lessons in this unit

**Royal Treasure Measure**

3 lessons in this unit

**Pounds, Feet, and Inches**

2 lessons in this unit

HOW TO USE THIS GUIDE**Open the source lesson before you teach.**

Each day names one lesson that already exists under Math lessons, with its book, its number and its title. This guide says what that lesson is doing in the sequence and what to collect from it; the lesson itself carries the steps, the printables and the answers.

Thirty minutes a day.

Five minutes to connect to yesterday, the twenty-minute source lesson, five minutes to close on something you can see. A day that runs long should lose the close, never the core.

Teach a lesson on its own if you need to.

Every day carries a one-sentence opening for a teacher who is using that lesson outside the sequence.

Stop after a checkpoint.

The unit holds together if you stop after either checkpoint and come back to it. Stopping between a checkpoint and the next one leaves a lesson without the evidence it was built on.

WHERE THIS FITS IN YOUR YEAR

When to teach it

Any term, once the class can count reliably to twenty. It pairs well with a science unit on comparing materials.

What students need first

Children can count to twenty accurately and can lay objects end to end without gaps.

What this unit develops

Direct comparison; the comparative against the superlative; unit iteration; the requirement that a unit be uniform; naming the unit with the number; the relation between a small unit and a larger one; benchmark reasoning.

What it prepares them for

Grade 2 measurement with a ruler and a stated unit, and the later idea that a measurement is a number, a unit and a procedure.

CURRICULUM CONNECTIONS

None claimed. The lessons in this unit carry their own standards classifications on their own pages, checked lesson by lesson. A unit-level expectation is a different claim, and none has been verified for this unit, so none is printed here. Use the placement guide above to site the unit in your year, and the individual lesson pages for the codes.

UNIT AT A GLANCE

#	MATHEMATICAL MOVE	SOURCE LESSON	COLLECT
1	Settle a comparison with no number at all; longer picks one of two, shortest needs all three	Measure It! lesson 3, Longer, Shorter, Shortest	Three feathers in order from a common line, and the two snakes with both sentences said about them.
2	A length is a count of copies of one unit — move the unit, mark, keep track, rename the count	Measure It! lesson 1, Six Rulers Tall	The counting strip with one box filled per ruler length, and the height said twice, once in rulers and once in the book's word.
3	Two people measure one mat with their own feet and get two honest numbers <i>Checkpoint after this lesson</i>	Royal Treasure Measure lesson 1, Heel to Toe, and Count	One mat carrying two different numbers, and each child's sentence naming the object, the number and the unit.
4	Reproduce the failure: a repeated unit must be one size before its count settles anything	Royal Treasure Measure lesson 3, Why the Swords Lost	Four numbers on one page, two from the mixed sticks and two from the matching set.
5	Ten of what? One order filled twice with the unit word changed <i>Checkpoint after this lesson</i>	Royal Treasure Measure lesson 6, Ten of What?	Two cut strips per child, both made by counting to ten, held up side by side.
6	Twelve of the small unit fill one of the big one; then choose which unit to speak in	Pounds, Feet, and Inches lesson 2, Twelve Clips Make a Foot	A row of clips filling one foot with the count said aloud, and the number checked against the book's.
7	What the hedge word does to a benchmark claim — how close is close enough	Pounds, Feet, and Inches lesson 4, About a Pound, About a Foot	Three labelled areas holding six objects, each placed after its sentence was said aloud.

UNIT VOCABULARY

Words students say, not words they are taught to define.

unit	The thing you lay down again and again. Children name theirs before they count it.
longer, shortest	Lesson 1 separates the two: the superlative needs every object in the set.
measure	Used only for laying a unit end to end and counting, not for looking.
about	Lesson 7: the word that makes a benchmark sentence true.

MATERIALS

From the source lessons

Each day's materials are listed on that day's page below and on the source lesson itself. Nothing is duplicated here.

New for this unit

- Checkpoint 1 page, one per child
- Checkpoint 2 page, one per child
- Performance task set: one paper strip per child cut to exactly six paperclip lengths, a pot of paperclips, a pot of mixed sticks, and one benchmark object per pair
- Performance task page, one per child

ASSESSMENT PLAN

Daily evidence

Keep the counting strip from lesson 2, the two numbers for one mat from lesson 3, and the two cut strips from lesson 5. Each one is a record that a number belongs to a unit.

Checkpoint 1, after lesson 3: How long, and how do you know?

A paper strip and a pot of identical paperclips. The child measures the strip by laying clips end to end and counting, then says the length in a full sentence.

Book-free. Plain strips and clips; no book.

Look for. No gaps and no overlaps, one number word per clip, and a sentence naming the number and the unit. A bare number is an incomplete answer.

Checkpoint 2, after lesson 5: Two numbers, one strip

The same strip measured again with a longer unit. The child gives the second number and says why one unchanged strip has two numbers.

Book-free. Plain strips and two sizes of unit.

Look for. A reason that names both units. "Because they are different" is not yet an answer.

Culminating task: Give an order nobody can get wrong

Each child measures a paper strip twice, once with paperclips and once with sticks, and writes or says both numbers with their unit words. They then give a partner a measuring order of their own for a named object, and the partner has to fill it without asking anything. Any order that produces the wrong thing is said again with the missing word put in.

Collect. The two measurements with their units, and the finished object the partner produced from the spoken order.

What it assesses. Iteration, the effect of changing the unit, and naming the unit with the number — everything the unit built. No ruler and no standard unit is required.

DAILY LESSON PAGES

Lesson 1

Settle a comparison with no number at all; longer picks one of two, shortest needs all three**SKILL LESSON****Measure It!** (</math-library/478.html>) · lesson 3, Longer, Shorter, Shortest · Grade 1 ·

20 minutes

Comparing two lengths directly and ordering three to find the shortest

I CAN

I can line things up to see which is longer.

BIG IDEA

A comparison can be settled by lining up at one end and looking at the other, and the word longer needs two things while shortest needs all of them.

SUCCESS

The child covers one feather and says why the shortest can no longer be named.

CONNECT | 5 MIN

First lesson. Hold two strips up at different heights and ask which is longer. Take the answers, then lay them on the desk from one line and ask again.

TAUGHT ON ITS OWN

The book asks which snake is longer and, four sentences later, which feather is the shortest, and the two are not the same question.

SOURCE CORE | 20 MIN

Pairs lay two snake strips with both left ends on one line and say which is longer and which is shorter without moving either, then line up three feathers from the same end and order them to name the shortest.

COLLECT

Three feathers in order from a common line, and the two snakes with both sentences said about them.

CLOSE | 5 MIN

One child covers a feather with a hand and asks whether the shortest can still be named, then uncovers it and says why all three were needed and only two snakes were.

From the source lesson: A long strip of blank paper per pair to lay objects along with one end lined up; Three paper feathers per pair, cut to clearly different lengths, in one envelope; The sentence frame card: The ____ is longer than the ____.; Word cards: longer, shorter, shortest, than

Watch for: Strips compared without a common start line. Rule one line down the paper and make every near end touch it.

Lesson 2

A length is a count of copies of one unit — move the unit, mark, keep track, rename the count

SKILL LESSON **Measure It!** (/math-library/478.html) · lesson 1, Six Rulers Tall · Grade 1 · 20 minutes

Measuring a length by iterating one unit and counting the iterations

I CAN	I can measure by moving one unit along and counting.
BIG IDEA	A length is produced, not read: you move one unit, keep track of every move, and the count is the answer.
SUCCESS	The counting strip has one box filled for every ruler length, and the number matches the book's.
CONNECT 5 MIN	Yesterday you settled which was longer without any number. Today you need a number, and one ruler is going to have to do all the work.
TAUGHT ON ITS OWN	The book hands over its own unit and its own conversion in one printed line and then prints the ostrich at six feet without ever showing the six rulers.
SOURCE CORE 20 MIN	Pairs lay the ruler along the ostrich strip starting flush, mark where it stops, move it to the mark and go again, filling one box on the counting strip for every move and saying the number aloud.
COLLECT	The counting strip with one box filled per ruler length, and the height said twice, once in rulers and once in the book's word.
CLOSE 5 MIN	Pairs measure the paper snake the same way and say how many rulers long it is, then say it again in feet, and say why the snake needed so many fewer.

From the source lesson: A one-foot ruler for every pair, all of them the same length and unmarked on one edge; A paper ostrich strip cut to exactly six ruler lengths, one per pair, rolled to carry; Low-tack tape and a pencil for marking where each ruler-length ends; A counting strip of six blank boxes per pair, one box to be filled per ruler length; A paper snake strip cut to exactly one ruler length, one per pair; Word cards: ruler, foot, feet, length

Watch for: The ruler creeps forward and leaves a gap. Make the mark before the ruler is lifted, every single time.

Lesson 3**Two people measure one mat with their own feet and get two honest numbers****SKILL LESSON** **Royal Treasure Measure** (/math-library/543.html) · lesson 1, Heel to Toe, and Count ·

Grade 1 · 20 minutes

Measuring a length by laying one unit end to end and counting the units

I CAN

I can say what my number is a number of.

BIG IDEA

Two people can measure the same mat honestly and get two different numbers, because the count is a count of somebody's unit.

SUCCESS

The child says a full sentence naming the object, the number and the unit, and hears a different number for the same mat without deciding either is wrong.

CONNECT | 5 MIN

Yesterday everybody's ruler was the same length and everybody got six. Today the unit is your own foot, so hold on to your number.

TAUGHT ON ITS OWN

Arzo has no sword and no cow, and he wins the contest by putting one foot in front of the other and counting.

SOURCE CORE | 20 MIN

Each child lays paper copies of their own foot end to end along the mat, then walks the mat heel to toe counting aloud; partners measure the same mat with their own feet and both numbers go on it side by side.

COLLECT

One mat carrying two different numbers, and each child's sentence naming the object, the number and the unit.

CLOSE | 5 MIN

Each child says the sentence about the mat, hears a partner's sentence with a different number in it, and says whether both can be true at once.

From the source lesson: Foot cards, paper cut-outs of one child's own foot, six identical copies per child; Measuring mat, a paper strip marked START at one end; Word cards: foot, long, measure, same, step**Watch for:** Children conclude somebody miscounted. Ask them to measure each other's feet

against one another before saying anything about the mat.

Checkpoint after this lesson: How long, and how do you know?. The page is at the end of this guide.

Lesson 4**Reproduce the failure: a repeated unit must be one size before its count settles anything****SKILL LESSON** **Royal Treasure Measure** (/math-library/543.html) · lesson 3, Why the Swords Lost ·

Grade 1 · 20 minutes

Showing that a repeated unit must be one size before a count of it settles a length

I CAN

I can show why the sticks have to match.

BIG IDEA

A count only settles a length when every unit is the same size, and a mixed set can be made to give two answers for one ribbon.

SUCCESS

The child has four numbers on the page and can say which pair of them can be trusted.

CONNECT | 5 MIN

Yesterday two people got two numbers with two different feet. Today one person gets two numbers with one set of sticks, and that is a different problem.

TAUGHT ON ITS OWN

The contestants measure with swords and sickles and goats, and a watching voice says the flaw out loud: those swords are all different sizes.

SOURCE CORE | 20 MIN

Pairs measure one ribbon twice with six mixed sticks, rearranging between the goes, and write both numbers; then measure the same ribbon twice with six matching sticks and write those two.

COLLECT

Four numbers on one page, two from the mixed sticks and two from the matching set.

CLOSE | 5 MIN

Each child tells a partner which set can be trusted to settle the length, and the reason has to name all four of their own numbers.

From the source lesson: Mixed sticks, six per pair, deliberately different lengths; Ribbon lengths, one per pair, all pairs the same length; Matching sticks, six per pair, all cut to one length; Word cards: different, measure, same, settle**Watch for:** A pair gets the same number twice with the mixed sticks by laying them in the same order. Ask them to rearrange before the second go, and say why.

Lesson 5 **Ten of what? One order filled twice with the unit word changed**

MATH THROUGH THE READING **Royal Treasure Measure** (/math-library/543.html) · lesson 6, Ten of What? · Grade 1 · 20 minutes

Students fill the same order twice, changing only the unit word, and end holding two lengths that were both built by counting to ten.

I CAN	I can hear which unit the order is asking for.
BIG IDEA	Counting to ten twice can produce two different lengths, so the number is only half the answer.
SUCCESS	The child holds two cut strips both made by counting to ten and names the word that made them different.
CONNECT 5 MIN	Yesterday the sticks had to match. Today they match, and the trouble is that the order does not say which stick.
TAUGHT ON ITS OWN	Drapes are ordered ten spoons long and a door fourteen sausages high, and nothing fits; the tailor's failure is not a failure of arithmetic.
SOURCE CORE 20 MIN	Each child hears the drape order and lays ten spoons end to end along a paper strip, cutting where the tenth ends; then hears the same order with one word changed and does it again with ten paper sausages.
COLLECT	Two cut strips per child, both made by counting to ten, held up side by side.
CLOSE 5 MIN	Each child gives a partner a measuring order of their own for a named object; the partner must fill it without asking anything, and any order that fails is said again with the missing word put in.

From the source lesson: Plastic spoons, twelve per child; Paper sausage strips, twelve per child, each three times the length of a spoon; Paper strips for cutting, two per child; Scissors; The drape order and the door order, written large on two cards

Watch for: A child cuts before the tenth unit lands. Count the units on the strip against the cut before either strip is held up.

Checkpoint after this lesson: Two numbers, one strip. The page is at the end of this guide.

Lesson 6

Twelve of the small unit fill one of the big one; then choose which unit to speak in

SKILL LESSON

Pounds, Feet, and Inches (/math-library/484.html) · lesson 2, Twelve Clips Make a Foot · Grade 1 · 20 minutes

Filling one foot with inch-long units and counting them, and choosing between the two units

I CAN	I can fill one foot with inches and count them.
BIG IDEA	A big unit is made of a countable number of small ones, and which unit to speak in is a judgement about the object.
SUCCESS	The count lands on twelve, and any pair that got eleven or thirteen has found the gap and closed it.
CONNECT 5 MIN	Yesterday two units gave two lengths. Today the two units are related, and you can find out by how much.
TAUGHT ON ITS OWN	The book prints the question and its own answer in the same breath, so the number twelve is given and nothing about it is done.
SOURCE CORE 20 MIN	Pairs lay paperclips end to end along a measuring tape from the very beginning, counting each aloud, and stop when the clips reach the end of one foot.
COLLECT	A row of clips filling one foot with the count said aloud, and the number checked against the book's.
CLOSE 5 MIN	Pairs take three paper strips one at a time and decide out loud whether to give each length in inches or in feet, laying the strip against the football to check before committing.

From the source lesson: Paperclip per student; One-foot benchmark object per pair: a football, or a card cut to the length of one; Twelve-inch measuring tape or ruler per pair; Three paper strips per pair, cut well under, near and well over one foot; Word cards: inch, foot, smaller, longer

Watch for: Clips overlapping at the joints, giving thirteen. Send the pair looking for the overlap rather than telling them the number.

Lesson 7

What the hedge word does to a benchmark claim — how close is close enough

MATH THROUGH THE READING **Pounds, Feet, and Inches** (/math-library/484.html) · lesson 4, About a Pound, About a Foot · Grade 1 · 20 minutes

Students test the book's three benchmark objects against real ones and discover that the word about is what makes the book's sentences true.

I CAN	I can say how close is close enough.
BIG IDEA	About is not vagueness; it is the word that makes a benchmark sentence true, and deciding whether it applies takes an object in each hand.
SUCCESS	The child says a whole sentence about each object with about, more than or less than, and names what the pans did.
CONNECT 5 MIN	Yesterday twelve clips filled one foot exactly. Today nothing is going to come out exactly, and the sentence is going to be true anyway.
TAUGHT ON ITS OWN	A loaf of bread is about a pound, a football is about a foot long, a paperclip is about an inch long — and that one word is what makes all three true.
SOURCE CORE 20 MIN	Pairs weigh the loaf against a one-pound weight and watch the pans tip, then hear the sentence with about removed and say whether the shortened version is true; then sort six objects into about, more than and less than, saying the whole sentence as each lands.
COLLECT	Three labelled areas holding six objects, each placed after its sentence was said aloud.
CLOSE 5 MIN	Each pair chooses the object they found hardest to place, says to another pair why it went where it did, and the two pairs settle it on the balance rather than by talking.

From the source lesson: Simple pan balance per pair; One-pound weight per pair; Wrapped loaf of bread per pair; Six classroom objects per pair, spread across clearly under, near and clearly over a pound; Three area labels reading about a pound, more than a pound and less than a pound; The book's benchmark sentence written out twice, once whole and once with the hedging word removed

Watch for: An object placed without being weighed. Nothing lands in an area until the pans have been read.

CULMINATING PERFORMANCE TASK

Give an order nobody can get wrong

Each child measures a paper strip twice, once with paperclips and once with sticks, and writes or says both numbers with their unit words. They then give a partner a measuring order of their own for a named object, and the partner has to fill it without asking anything. Any order that produces the wrong thing is said again with the missing word put in.

Collect. The two measurements with their units, and the finished object the partner produced from the spoken order.

What it assesses. Iteration, the effect of changing the unit, and naming the unit with the number — everything the unit built. No ruler and no standard unit is required.

TEACHER KEY AND RUBRIC

Key

- Checkpoint 1: six paperclips for a strip cut to six clip lengths. A child who reports five or seven has left a gap or an overlap; send them back to the strip.
- Checkpoint 2: fewer of the longer unit. The exact number depends on the sticks you cut; make the stick two clips long so the answer is three.
- Task: no fixed answer. An order passes when it carries a number and a unit, and the partner's finished object matches what the giver meant.

Rubric

STRAND	SECURE LOOKS LIKE	DEVELOPING	NOT YET
Representation	Units are laid end to end with no gap and no overlap, starting flush at one end.	Does it with the arrangement in front of them.	Produces an answer without the arrangement or the reason.
Calculation	One number word per unit laid, and the count is repeatable by a partner.	Does it with the arrangement in front of them.	Produces an answer without the arrangement or the reason.
Meaning	Every number is said with the unit it counted.	Does it with the arrangement in front of them.	Produces an answer without the arrangement or the reason.
Explanation	The child can say why one object gave two different numbers.	Does it with the arrangement in front of them.	Produces an answer without the arrangement or the reason.

PRINT-READY STUDENT PAGES

CHECKPOINT 1 · GRADE 1

How long, and how do you know?

Name

Date

Measure the strip with the paperclips. Lay them end to end with no gaps. How long is the strip? Say the number and the unit.

CHECKPOINT 2 • GRADE 1

Two numbers, one strip

Name

Date

Measure the same strip again with the sticks. What is the number this time? Why did one strip give you two numbers?

CULMINATING TASK • GRADE 1**Give an order nobody can get wrong**

Name _____

Date _____

Measure your strip with paperclips and then with sticks. Write both numbers and both unit words. Now give your partner a measuring order of your own for something in the room. They must be able to do it without asking you anything.

TEACHER PLANNING AND HANDOFF

- Children who gave a bare number in the task will need lesson 5 again before Grade 2, where the unit word is the whole difficulty.
- Lesson 7 is the only weight work here; if the class is going on to weighing, that is the lesson to build from.
- Royal Treasure Measure supplies three of these seven lessons because it is the only Grade 1 book that separates iteration, unit uniformity and unit naming.

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