

MATH UNIT

All the way round, and what it covers

Grade 3

8 lessons

8 × 30 minutes

4 source books

240 minutes in all

THE QUESTION THIS UNIT FOLLOWS

**Two figures can spend the same fence and still not be the same coop.
So what does a total round the outside actually tell you?**

ABOUT THIS UNIT

The unit begins with the trip. A coop outline is taped on the floor and a finger walks it from one corner back to the same corner, saying each side aloud as it passes — one side, one number — so that the figure decides how many numbers get added and the child does not. The same trip is then walked on a coop made from a closed chain of twenty-four paper links. The next lesson turns that into arithmetic on six figures whose rows run three, four and five numbers long, and a character's claim that all six come to twenty-four feet has to be settled figure by figure with the adding sentence as the reason.

Then comes the finding the unit is named for. One roll of fence is laid out four ways — nine by three, eight by four, a six-square, and a three-sided coop — and every laying spends the same twenty-four links. Children say what changed and what did not with a number in every sentence, and end by naming the two things a grandfather told only the total still cannot know. After that the measuring itself is put on trial: children knot their own strip into eight equal lengths, check two lengths against each other before trusting the strip, and measure a triangle and a rectangle in whole lengths — writing between 2 and 3 when a side ends between knots rather than rounding it quietly.

The second half is covering. Four sides are measured on six cardboard figures before any of them is called a square, which makes a name the outcome of measurements rather than of a glance across the room. Squares are then built out of rows of tiles and counted by rows in both directions, so a row that runs one tile long is caught by the two counts disagreeing. Nine tiles

and sixteen tiles are added and checked against a separate count of twenty-five. The unit closes on a covering with a unit that is not one inch: a two-and-a-half-inch square is slid around a five-inch square until it is covered, and the coverings are counted.

THE MATHEMATICAL ARC

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

- 1 One closed trip, every side touched once
- 2 Settle a claim with the adding sentence as the reason
- 3 One fence, four coops: the total does not fix the shape
- 4 Make the unit yourself, and check it before you trust it
- 5 The name is the outcome of four measurements
- 6 Build the covering out of rows, and count it twice
- 7 A number reached two ways is worth more than a number reached once
- 8 Cover it with a unit that is not one inch

SOURCE BOOKS

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



Chickens on the Move

3 lessons in this unit



What's Your Angle, Pythagoras? A Math Adventure

3 lessons in this unit



The Book Bandit

1 lesson in this unit



Exploring Pyramids Around the World

1 lesson 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

After children can add three or four two-digit numbers and use an inch ruler. It pairs well with any unit on multiplication, because the row counting in lessons 6 and 7 rehearses it.

What students need first

Children can add a column of small numbers, measure in whole inches, and count a set of twenty-five without losing their place.

What this unit develops

Perimeter as one closed trip with every side counted once; adding three, four and five side lengths; that one perimeter fits many shapes; making and checking a unit of your own; deciding a figure's name by measuring all four sides; building and counting a covering by rows; checking a total against a separate count; covering with a unit larger than one inch.

What it prepares them for

Area as a multiplication in Grade 4, and any later work where a measurement has to be defended by the way it was taken.

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	One closed trip, every side touched once	Chickens on the Move lesson 1, One Side, One Number	Two coops walked, the taped one and one built from a chain of twenty-four links, with four numbers and a total written for each.
2	Settle a claim with the adding sentence as the reason	Chickens on the Move lesson 2, Is Gordon Right?	Six adding sentences with their totals, and a yes or no for each figure with the sentence pointed at as the reason.
3	One fence, four coops: the total does not fix the shape <i>Checkpoint after this lesson</i>	Chickens on the Move lesson 3, Same Fence, Four Coops	Four coops built from one chain with an adding sentence recorded for each, including the three-sided coop whose sentence holds only three numbers.
4	Make the unit yourself, and check it before you trust it	What's Your Angle, Pythagoras? A Math Adventure lesson 2, Knots for Measuring	Three side counts for the triangle, recorded and with the largest circled, and every pair's three numbers the same if every strip was knotted the same way.
5	The name is the outcome of four measurements	The Book Bandit lesson 1, Only If All the Sides Match	Six figures measured all round with both mats filled, and the near-square that differs by one inch set beside a real square.
6	Build the covering out of rows, and count it twice <i>Checkpoint after this lesson</i>	What's Your Angle, Pythagoras? A Math Adventure lesson 1, Rows That Make a Square	Three squares built and each recorded three ways — the tiles on one side, the rows and what each row holds, and the total.
7	A number reached two ways is worth more than a number reached once	What's Your Angle, Pythagoras? A Math Adventure lesson 4, Do the Two Numbers Agree?	Three counts and one sum, with the decision written down about whether the sum and the separate count agree.

#	MATHEMATICAL MOVE	SOURCE LESSON	COLLECT
8	Cover it with a unit that is not one inch	Exploring Pyramids Around the World lesson 5, Two Bases, Two Sizes	The uncovered strip measured and named, the covering count reached by sliding the small square round, and the big square marked into that many parts.

UNIT VOCABULARY

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

perimeter	The distance all the way round. Lesson 1 walks it before anybody writes it down.
side	One straight piece of the outline, touched once on the trip. The number of sides decides how many numbers get added.
closed figure	An outline that comes back to where it started. Until it closes, there is nothing to measure round.
unit	The length or the tile you chose to count with. Lesson 4 makes one, and it is only good if every one of them matches.
cover	To lay a unit down again and again with no gaps and no overlaps. Lessons 6 to 8 count coverings.
row	One line of tiles. Every row in a square has to be the same length, which is what counting twice catches.

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: a cardboard rectangle eight inches by five inches, a closed chain of paper links one inch to a link, a tub of one-inch square tiles, an inch ruler, and a recording sheet with a row of side lengths, an adding sentence, a covering count and two labelled answer boxes, one set per pair
- Performance task page, one per child

ASSESSMENT PLAN

Daily evidence

Keep the record sheet from lesson 3, the one with four coops built from the same chain and four different rows of sides. Put it back on the desk whenever a child says a bigger shape must go further round; their own four rows, all totalling twenty-four, answer it faster than any explanation.

Checkpoint 1, after lesson 3: Round the outside, once each

Two figures drawn on grid paper, one with four sides and one with five, with the side lengths printed along the sides. The child writes the row of numbers, writes the adding sentence, and gives the total for each.

Book-free. Two printed figures and a pencil, no book.

Look for. Five numbers in the sentence for the five-sided figure. A child who writes four numbers has stopped counting at the shape they expected rather than the shape in front of them.

Checkpoint 2, after lesson 6: How many tiles cover it?

A rectangle six inches by four inches drawn on paper and a tub of one-inch square tiles. The child covers it, counts the covering by rows, and counts it a second way to check.

Book-free. A drawn rectangle and a tub of tiles, no book.

Look for. Two counts that agree, reached by rows in both directions. A child who counts twenty-four tiles one at a time has the right number and not yet the method the next grade needs.

Culminating task: One rectangle, two numbers, and neither one is the other

Each pair is given a cardboard rectangle eight inches by five inches and has to produce both of its measurements. They lay the paper chain round the outside link by link, write the row of four side lengths, write the adding sentence and give the total. Then they cover the same rectangle with one-inch tiles, no gaps and no overlaps, count the covering by rows and check it by counting the rows the other way. They write both answers in their own labelled boxes and say out loud which question each number answers — and then say what would happen to each of the two numbers if the rectangle were laid out as ten inches by four instead.

Collect. The row of four side lengths with its adding sentence and total, the covering count reached twice, both numbers written in the right labelled boxes, and a spoken answer about the ten-by-four rectangle.

What it assesses. Both measurements taken on one figure and kept apart, with the child able to say which question each answers — and to say that changing the shape moves one of the two numbers and not the other.

DAILY LESSON PAGES

Lesson 1 One closed trip, every side touched once

SKILL LESSON Chickens on the Move (/math-library/374.html) · lesson 1, One Side, One Number · Grade 3 · 20 minutes

Finding a perimeter by going all the way around a figure and adding every side once

I CAN	I can go all the way round a figure and say every side once.
BIG IDEA	A perimeter is a trip, not a formula. The figure decides how many numbers get added, because every side gets said once and the trip ends where it started.
SUCCESS	The child walks both coops saying each side aloud, writes exactly as many numbers as the coop has sides, and can state the rule with the words around and every side in it.
CONNECT 5 MIN	First lesson. Tape a coop on the floor before the class arrives and ask how much fence it would take. Take the guesses, then walk it.
TAUGHT ON ITS OWN	The book gives the rule twice at the back — the distance around a figure is called its perimeter, and you add the lengths of its sides to find it — and then acts it out four times with one roll of fence.
SOURCE CORE 20 MIN	Children stand at one corner of the taped coop, walk a finger all the way round the tape and stop only on returning to the same corner, saying the length of each side aloud as they pass it while a partner taps the floor once for every side named — then write the four numbers in the order the finger passed them and read the strip as an adding sentence.
COLLECT	Two coops walked, the taped one and one built from a chain of twenty-four links, with four numbers and a total written for each.

CLOSE | 5 MIN

Children tell a partner what they did both times using the words around and every side, then say the rule as an instruction another pair could carry out with a chain and a grid — and name the part of their rule that stops a side being counted twice.

From the source lesson: A coop outline 9 feet by 3 feet taped on the floor, with a numeral card laid at each of the four sides; A length of yarn per pair, long enough to lay along the longest side; A record strip per pair, ruled with four boxes and a total box; A closed chain of twenty-four paper links per pair, each link one grid square long; A sheet of one-inch grid paper per pair; Word cards: perimeter, around, sides, plus

Watch for: Three numbers said for a four-sided coop. Walk it again with the partner tapping; the taps and the numbers have to come out equal.

Lesson 2**Settle a claim with the adding sentence as the reason****SKILL LESSON****Chickens on the Move** (/math-library/374.html) · lesson 2, Is Gordon Right? · Grade 3 ·

20 minutes

Adding three, four and five side lengths to find a perimeter

I CAN

I can add three, four or five side lengths and answer a claim about a figure with the sentence that settles it.

BIG IDEA

The number of sides is read off the figure before any adding starts. A claim about a total is answered by the adding sentence, not by remembering what the story said.

SUCCESS

The child counts the sides of each figure before adding, writes the full adding sentence for all six rows, and gives a yes or no with the sentence as the reason.

CONNECT | 5 MIN

Yesterday two coops both came to twenty-four. Show the six-figure chart and read the claim that every one of them does, then hand out the cards.

TAUGHT ON ITS OWN

The chart at the back prints six figures as bare rows of side lengths, a claim that each has a perimeter of twenty-four feet, and two questions: is he right, and how do you know.

SOURCE CORE | 20 MIN

Children read the numbers on each figure card aloud and write how many sides that figure has before adding anything, then add each row and write the whole adding sentence in the book's own words, with plus between the numbers and equals before the total — all six rows, including the one with five numbers.

COLLECT

Six adding sentences with their totals, and a yes or no for each figure with the sentence pointed at as the reason.

CLOSE | 5 MIN

Children add the five-number row again in a different order, say the new order aloud, say whether the total changed, and say which two numbers they put together to reach ten fastest.

From the source lesson: Six figure cards per pair, one per chart row, each carrying that row's side lengths in order and that figure's outline drawn on grid squares; An answer sheet per pair, ruled with six lines headed figure, adding sentence and total; Word cards: figure, perimeter, plus, equals, total

Watch for: Two of the six figures never appear in the story, so a remembered answer fails. If a pair answers without adding, cover the totals and ask for the sentence.

Lesson 3 **One fence, four coops: the total does not fix the shape**

SKILL LESSON **Chickens on the Move** (</math-library/374.html>) · lesson 3, Same Fence, Four Coops ·

Grade 3 · 20 minutes

Explaining why one length of fence makes coops of different shapes

I CAN	I can build several different coops from one chain and say what changed and what did not.
BIG IDEA	A total round the outside says nothing about the shape. Two coops can spend exactly the same fence and not be the same coop, and only the list of sides tells them apart.
SUCCESS	The child builds all four coops from a single chain, writes the adding sentence for each, and puts a number in every sentence about what changed.
CONNECT 5 MIN	Six figures all came to twenty-four yesterday. Ask whether they were all the same shape, and hand each pair one chain to settle it.
TAUGHT ON ITS OWN	One roll of fence is carried to four places and laid out a different way in each, and the book prints the total after every laying: twenty-four feet, four times over.
SOURCE CORE 20 MIN	Children lay the chain of twenty-four links as a coop nine by three and say the four numbers, then — without adding or removing a link — lay the same chain as eight by four, say the four numbers again, and say how many links were used both times.
COLLECT	Four coops built from one chain with an adding sentence recorded for each, including the three-sided coop whose sentence holds only three numbers.
CLOSE 5 MIN	The grandfather is told the coop is twenty-four feet round and nothing else. Children say aloud the two things he still cannot know and what they would have to tell him to let him build the right coop, using the numbers off their own record sheet.

From the source lesson: A closed chain of twenty-four paper links per pair, each link one grid square long; A sheet of one-inch grid paper per pair; A record sheet per pair, ruled with four rows headed coop, sides and total; Word cards: same, changed, wider, shape

Watch for: A sentence with no number in it — it got wider. Ask by how much, and send them to count the links along that side.

Checkpoint after this lesson: Round the outside, once each. The page is at the end of this guide.

Lesson 4 **Make the unit yourself, and check it before you trust it**

SKILL LESSON **What's Your Angle, Pythagoras? A Math Adventure** (</math-library/97.html>) · lesson

2, Knots for Measuring · Grade 3 · 20 minutes

Measuring side lengths with a unit students make

I CAN	I can make a measuring strip of equal lengths and measure with it.
BIG IDEA	A count of lengths means nothing unless every length is the same. The unit is a choice, and checking it against itself is part of measuring.
SUCCESS	The child folds and marks eight equal lengths, checks two of them against each other before measuring, measures every side twice, and writes between 2 and 3 for a side that ends between knots.
CONNECT 5 MIN	The chain gave every coop its unit for free. Take the chain away and ask how a figure could be measured with a plain strip of paper.
TAUGHT ON ITS OWN	Nef will not say how long to make each side, so Pythagoras finds an old piece of rope and ties knots in it, and the triangle that finally works has three lengths on one side, four on another and five on the longest.
SOURCE CORE 20 MIN	Children fold a paper strip in half three times, mark every fold, and check two lengths by folding one onto the next — a strip whose lengths do not match is no good for measuring — then lay it along each side of the large triangle with a knot mark exactly at the corner and count whole lengths, measuring every side twice.
COLLECT	Three side counts for the triangle, recorded and with the largest circled, and every pair's three numbers the same if every strip was knotted the same way.
CLOSE 5 MIN	Children measure the rectangle with the same strip and record the counts, saying out loud when a side ends between two knots and writing between 2 and 3 rather than rounding it quietly to the nearer knot.

From the source lesson: A paper strip about 60 cm long per pair; A marker; A large paper triangle per table with sides of 3, 4, and 5 strip-lengths; A record card with three blanks; A paper rectangle per table, 2 strip-lengths by 6 strip-lengths; Word cards: length, longest

Watch for: A strip started short of the corner. When two counts of one side disagree, look first at where the strip began.

Lesson 5 The name is the outcome of four measurements

SKILL LESSON **The Book Bandit** (/math-library/469.html) · lesson 1, Only If All the Sides Match ·

Grade 3 · 20 minutes

Deciding whether a four-sided figure is a square by measuring all four sides

I CAN	I can measure all four sides before I say what a figure is.
BIG IDEA	A figure's name is decided by measuring, not by how it looks from across the room. All four sides have to match, and a figure whose sides have not all been measured cannot be filed at all.
SUCCESS	The child measures all four sides of every figure, writes each measure on the side it belongs to, and identifies the near-square by naming the two measures that gave it away.
CONNECT 5 MIN	Measuring has been trusted twice now. Hold up a near-square and ask the class what it is. Take the votes, then hand out the rulers.
TAUGHT ON ITS OWN	A child in the book stops the others from calling something a square and states the rule they have to test it against: all the sides must be exactly the same length.
SOURCE CORE 20 MIN	Children measure every side of each cardboard figure in whole inches and write each measure on the side they measured — all four even when the first two match — then file each figure on the square mat or the not-a-square mat, writing on the mat the measures that decided it.
COLLECT	Six figures measured all round with both mats filled, and the near-square that differs by one inch set beside a real square.
CLOSE 5 MIN	Children use the corner tester on all four corners of one figure from each mat and say what was the same about the corners of both figures even though one is a square and one is not.

From the source lesson: Six cardboard four-sided figures per group, two of them squares and two of them near-squares differing by one inch; A ruler marked in inches, per child; A pencil; Two mats per group, one marked square and one marked not a square; A corner tester per group: a card with one true right angle; Word cards: side, length, square, rectangle, right angle

Watch for: Two sides measured and the rest assumed. A figure with unmeasured sides may not go on either mat; send it back.

Lesson 6 **Build the covering out of rows, and count it twice**

SKILL LESSON **What's Your Angle, Pythagoras? A Math Adventure** (</math-library/97.html>) · lesson

1, Rows That Make a Square · Grade 3 · 20 minutes

Building squares from rows of unit tiles

I CAN	I can build a square from rows of tiles and count the tiles by rows in both directions.
BIG IDEA	A covering is counted by rows rather than one tile at a time. Counting the same square both ways is what catches a row that came out the wrong length.
SUCCESS	The child builds all three squares with every row the same length, counts each one across and down, and records each square as a side length, as rows with tiles in each, and as a total.
CONNECT 5 MIN	Everything so far has been measured round the outside. Put a square of tiles on the desk and ask what question the outside trip does not answer.
TAUGHT ON ITS OWN	The book gives the exact tile counts from the courtyard: a square with three tiles on each side holds nine, one with four on each side holds sixteen, one with five on each side holds twenty-five.
SOURCE CORE 20 MIN	Children lay a row of three tiles along the marked edge of the mat and add rows of the same length until the shape is as tall as it is wide, counting by rows with a touch per number, then build the four-square and the five-square the same way.
COLLECT	Three squares built and each recorded three ways — the tiles on one side, the rows and what each row holds, and the total.
CLOSE 5 MIN	Children count each square twice, once by the rows going across and once by the rows going down, saying both counts aloud — and when two counts of one square disagree, find the row that is the wrong length and fix it before recording anything.

From the source lesson: Square tiles in two colors, 60 per pair; A build mat with one marked corner; A record sheet with three lines and three columns; Word cards: row, square, total

Watch for: A row one tile long. It is the fastest way to lose a square, and the two counts are what expose it.

Checkpoint after this lesson: How many tiles cover it?. The page is at the end of this guide.

Lesson 7

A number reached two ways is worth more than a number reached once

SKILL LESSON

 What's Your Angle, Pythagoras? A Math Adventure (/math-library/97.html) · lesson

4, Do the Two Numbers Agree? · Grade 3 · 20 minutes

Checking a sum against a separate count

I CAN

I can add two counts and check the total against a separate count.

BIG IDEA

A check is a second route to the same number. Saying two totals agree is not the check; naming all three numbers and where each came from is.

SUCCESS

The child adds the two smaller counts without looking at the third, counts the big square again separately, and decides whether the two numbers agree while naming nine, sixteen and twenty-five.

CONNECT | 5 MIN

Yesterday every square got counted twice and the two counts had to agree. Today two different squares get added and checked against a third.

TAUGHT ON ITS OWN

In the courtyard Pythagoras counts three arrangements and says what he found: the nine tiles in the red square plus the sixteen in the blue square equal twenty-five, and there are exactly twenty-five tiles in the big square.

SOURCE CORE | 20 MIN

Children rebuild the three squares, count each one by rows, then add the two smaller counts with the big square covered and write the sum before uncovering it and counting the big square again from the beginning.

COLLECT

Three counts and one sum, with the decision written down about whether the sum and the separate count agree.

CLOSE | 5 MIN

Children say the check out loud with all three numbers in it and say where each number came from; agreeing without naming the three numbers does not count as having made the check.

From the source lesson: Square tiles in red and blue, 60 per pair; A build mat with one marked corner; A record card with three blanks; A pencil; Word cards: agree, total

Watch for: The big square counted first and the sum written to match it. Cover the big square while the sum is being written.

Lesson 8 Cover it with a unit that is not one inch

SKILL LESSON Exploring Pyramids Around the World (/math-library/443.html) · lesson 5, Two

Bases, Two Sizes · Grade 3 · 20 minutes

Measuring, comparing and covering two square bases given in inches and half inches

I CAN	I can cover a square with a smaller square and count the layings.
BIG IDEA	A covering can be counted in any unit that tiles the shape with no gaps and no overlaps. The count changes when the unit changes, and the shape does not.
SUCCESS	The child cuts both squares to the stated sizes, measures the uncovered strip, counts how many layings of the small square cover the large one, and orders three bases while naming each gap.
CONNECT 5 MIN	Tiles have been one inch every time. Cut a square two and a half inches on a side and ask how many of those it takes to cover a five-inch square.
TAUGHT ON ITS OWN	Two of the book's models have stated base squares: at least five inches on each side for the great pyramid, about two and a half inches on each side for the Nubian one.
SOURCE CORE 20 MIN	Children measure and cut a five-inch square and a two-and-a-half-inch square, writing the side length on each as it is cut, then set the small square into one corner of the large one with two sides lined up exactly and measure the piece of the big side left uncovered.
COLLECT	The uncovered strip measured and named, the covering count reached by sliding the small square round, and the big square marked into that many parts.
CLOSE 5 MIN	Children add the step pyramid's four-inch square, put all three in order from widest to narrowest, and say each gap out loud — five to four is one inch, four to two and a half is one and a half inches.

From the source lesson: Heavy paper, two sheets per pair; Ruler marked in inches; Safety scissors; Pencil; Paper square four inches on each side, one per pair; Word cards: base, inches, smaller

Watch for: Overlapping layings. Mark the big square as each laying is counted so the same strip is not counted twice.

CULMINATING PERFORMANCE TASK

One rectangle, two numbers, and neither one is the other

Each pair is given a cardboard rectangle eight inches by five inches and has to produce both of its measurements. They lay the paper chain round the outside link by link, write the row of four side lengths, write the adding sentence and give the total. Then they cover the same rectangle with one-inch tiles, no gaps and no overlaps, count the covering by rows and check it by counting the rows the other way. They write both answers in their own labelled boxes and say out loud which question each number answers — and then say what would happen to each of the two numbers if the rectangle were laid out as ten inches by four instead.

Collect. The row of four side lengths with its adding sentence and total, the covering count reached twice, both numbers written in the right labelled boxes, and a spoken answer about the ten-by-four rectangle.

What it assesses. Both measurements taken on one figure and kept apart, with the child able to say which question each answers — and to say that changing the shape moves one of the two numbers and not the other.

TEACHER KEY AND RUBRIC

Key

- Checkpoint 1: the four-sided figure takes four numbers, the five-sided one takes five. Give the five-sided figure sides of 8, 2, 5, 5 and 4 so the total is twenty-four and matches the unit's fence.
- Checkpoint 2: twenty-four tiles, as six rows of four and as four rows of six.
- Task: eight by five is twenty-six inches round and forty tiles. Ten by four is twenty-eight inches round and still forty tiles — the covering does not move and the trip round does, which is the opposite of what most children predict. Do not give the answer away; let the tiles settle it.

Rubric

STRAND	SECURE LOOKS LIKE	DEVELOPING	NOT YET
Representation	The trip round is taken with a chain, a finger or a ruler with every side touched once, and a covering is laid with no gaps and no overlaps before anything is counted.	Does it with the arrangement in front of them.	Produces an answer without the arrangement or the reason.
Calculation	The side lengths are added correctly with as many numbers as the figure has sides, and the covering count is reached twice by rows and the two counts agree.	Does it with the arrangement in front of them.	Produces an answer without the arrangement or the reason.
Meaning	The distance round and the amount covered are named as answers to different questions, and a total round the outside is not treated as a description of the shape.	Does it with the arrangement in front of them.	Produces an answer without the arrangement or the reason.
Explanation	A measurement is defended by how it was taken — the unit checked against itself, the side counted once, the rows the same length — and a claim about a figure carries a number.	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 3

Round the outside, once each

Name

Date

Go round each of these and write down every side as you pass it. Now write the adding sentence and the total. How many numbers should be in each sentence, and what told you?

CHECKPOINT 2 • GRADE 3

How many tiles cover it?

Name

Date

Cover this with tiles, no gaps and no overlaps. Count them by rows. Now count them the other way. Do your two numbers agree?

CULMINATING TASK • GRADE 3**One rectangle, two numbers, and neither one is the other**

Name _____

Date _____

This rectangle needs two different numbers from you. First go all the way round it with the chain and write every side, then the adding sentence and the total. Next cover it with tiles and count them by rows, then count them the other way to check. Put each answer in its own box and tell me which question it answers. Last: if this were ten inches by four instead, which of your two numbers would change?

**TEACHER PLANNING AND HANDOFF**

- The error this unit exists to prevent is the belief that a bigger number round the outside means more room inside. Lesson 3's four coops and the task's ten-by-four question are the two places it can be caught.
- Chickens on the Move has a fourth lesson in which children build a figure from a bare row of numbers and then hand their own row to another pair. It was left out because the book already gives three lessons, and the performance task makes the same move. It is the right lesson to add if the task is used as practice instead.

- Watch for a knotted strip whose lengths are not equal. A child measuring with a bad unit gets numbers that look like measurements, and lesson 4's check — fold one length onto the next — is the only thing that catches it.
- Counting a covering one tile at a time is not wrong, but it does not carry into Grade 4. Insist on the rows both ways every time, because that is what becomes the multiplication.

Known gaps in this unit

- Both measurements on one figure. Every candidate does one or the other: the fence book never covers anything and the tile lessons never go round the outside. Nothing on this shelf puts the two numbers side by side on a single rectangle, which is exactly where children confuse them, so the performance task has to do it.
- Covering counted as a multiplication. Lesson 6 counts by rows and lesson 8 counts layings of a larger square, but no candidate writes the covering of a rectangle as one side times the other.

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