

WHERE THIS FITS IN YOUR YEAR

Around It, or Across It: Perimeter and Area

Grade 4 · Mathematics · North Dakota

NATURAL UNIT

Grade 4 measurement: distinguishing perimeter and area through concrete, pictorial, and numerical representations.

TEACHER-FACING PLACEMENT

Use this unit during the Grade 4 measurement work on perimeter and area, after students can multiply whole numbers and measure side lengths reliably. Lessons 1–4 deliberately place two measures on the same rectangle. Students trace or walk the boundary, add side lengths to find perimeter, tile the interior, organize tiles in rows, and connect the count to multiplication and an area formula. This sequence is useful when students know procedures but still confuse which measure a question is asking for.

The strongest North Dakota fit is the rectangle work in Lessons 2–4. Students calculate perimeter and area, attach the appropriate linear or square unit, and check a numerical result against a concrete or pictorial model. Lesson 5 then builds four copies of an area and asks students to distinguish four times as much from four more. That makes the unit a useful bridge from measurement into multiplicative-comparison language.

Lessons 6–7 ask students to read the relationship before choosing an operation and to restate a comparison in the reverse direction. Keep those lessons as reinforcement rather than treating shared vocabulary as proof of complete curriculum coverage. Where the North Dakota expectation requires composite figures, unknown dimensions, estimation, construction, conversions, or other representations that the unit does not explicitly require, add that work through the district's core materials and assessment routines.

STRONGEST CURRICULUM CONNECTIONS - OUR SUMMARY

Reinforces: 4.GM.M.5 - Apply the area and perimeter formulas for rectangles, including connected rectangular figures, in problems.

Limitation: Connected rectangular figures extend beyond the unit's single-rectangle core.

Reinforces: 4.AR.OA.5 - Interpret multiplication equations as a comparison. Represent multiplicative comparisons as multiplication equations.

Limitation: Connected rectangular figures extend beyond the unit's single-rectangle core.

TEACHER MUST ADD

Use locally required units, problem types, representations, and assessment conventions alongside this conceptual unit. Add any required work named in a limitation above that is not explicitly required in the TumbleTA core.

Placement note: careful curriculum placement, not a claim that the complete unit fully covers every requirement in a curriculum expectation.

MATH UNIT

Around it, or across it: perimeter and area

Grade 4

7 lessons

7 x 30 minutes

3 source books

THE QUESTION THIS UNIT FOLLOWS

Which measure is the question asking for?

ABOUT THIS UNIT

A student may know how to calculate both perimeter and area and still return the wrong one, because the side lengths alone do not say which measure is wanted. This unit begins with one rectangle, yarn around its edge and squares across its face. It then builds perimeter as a sum of side lengths and area as a count organized by multiplication. The final lessons put close-looking phrases side by side so students must read the relation before choosing an operation.

THE MATHEMATICAL ARC

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

1	One rectangle, two measures, and which question each answers
2	Perimeter from the sides: walk it, then write the sum
3	Tile it, count by rows, and write the multiplication
4	Area from a formula, checked against a count
5	Four times the area: build four copies and find the extra
6	The phrase sets the operation
7	Say a comparison both ways and track the reversed relation

SOURCE BOOKS	
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Zachary Zormer, Shape Transformer: A Math Adventure	3 lessons
Kitchen Math	2 lessons
Ball Game Math	2 lessons

HOW TO USE THIS GUIDE

OPEN THE SOURCE LESSON BEFORE YOU TEACH Each day names a lesson already published under Math lessons. This guide explains its place in the sequence and what to collect; the source lesson carries the full procedure, printables and answers.

THIRTY MINUTES A DAY

Use five minutes to connect, the twenty-minute source lesson for the core, and five minutes to close on visible evidence. If time runs short, protect the core.

TEACH A LESSON ON ITS OWN IF YOU NEED TO Every lesson includes a one-sentence opening for use outside the unit.

STOP AFTER A CHECKPOINT

The unit can pause after either checkpoint without breaking the instructional arc.

WHERE THIS FITS IN YOUR YEAR

WHEN TO TEACH IT

After multiplication facts are secure. Lessons 5 to 7 also require comfortable multiplication of a two-digit or three-digit quantity by a one-digit factor.

WHAT STUDENTS NEED FIRST

Students can multiply within 100, measure whole inches with a ruler, subtract within 10,000, and find half of an even multiple of 100.

WHAT THIS UNIT DEVELOPS

Perimeter and area as distinct measures; correct linear and square units; perimeter as a sum; area by tiling and multiplication; additive and multiplicative comparisons.

WHAT IT PREPARES THEM FOR

Composite area, scale drawings, and later problems in which wording determines whether a comparison is additive or multiplicative.

The verified connection for your region, with the lessons it covers and its stated limitation, is on the regional placement page at the front of this guide. Individual source lessons carry their own classifications on their own pages, checked lesson by lesson.

UNIT AT A GLANCE		
# MATHEMATICAL MOVE	SOURCE LESSON	COLLECT
1 Produce perimeter and area from the same 4-by-6 rectangle.	Zachary Zormer, lesson 1	20 inches and 24 square inches, correctly labelled.
2 Walk all four sides and write perimeter as a four-term sum.	Zachary Zormer, lesson 3	All sides labelled and one perimeter sum.
3 Tile by rows and connect the count to multiplication.	Zachary Zormer, lesson 2	Tiled rectangle, edge labels and equation.
4 Draw two pans, compute two areas, and check each by counting.	Kitchen Math, lesson 4	Two labelled rectangles with two matching methods.
5 Represent an area four times as large with four copies, not by multiplying both side lengths by four.	Ball Game Math, lesson 4	A labelled scale model and computed areas.
6 Contrast four times the area with four more square yards of area.	Ball Game Math, lesson 6	2400 and 604, each tied to its phrase.
7 State area and baking-time comparisons in both directions.	Kitchen Math, lesson 9	Four true sentences about the same two pans.

UNIT VOCABULARY

perimeter	The distance around a figure, measured in linear units such as inches or yards.
area	The amount of surface covered, measured in square units.
square unit	A square with side length 1 unit, used to measure area.
four times the area	An area made from four equal copies of the original area.

four more square	An additive increase of 4 square units, not four copies and not four added to a side length.
units	

MATERIALS

Use each source lesson's own materials list. Add these unit-only items:

- Checkpoint 1 and Checkpoint 2 pages, one per child
- Squared paper, rulers, colored pencils and scissors
- Cut-apart performance-task cards, one per pair
- Culminating-task recording page, one per child

ASSESSMENT PLAN

Daily evidence

Keep the two measures with units from lesson 1, the tiled rectangle and equation from lesson 3, and the two labeled field representations from lesson 6.

Checkpoint 1, after lesson 3: Two measures, two units For a 7-inch by 3-inch rectangle, find perimeter and area and state which question each answers. Look for: 20 inches around and 21 square inches covering the rectangle. A child who writes both in inches has not separated the measures.

Checkpoint 2, after lesson 6: Four times, or four more?

A field is 10 yards by 20 yards, so its area is 200 square yards. Find an area four times as large and an area four square yards greater. Look for: 800 square yards and 204 square yards, each matched to the correct phrase.

Culminating task: Two rectangles, four comparison sentences

Each pair draws the rectangle on its task card, finds area by rows and perimeter by summing all four sides, then builds a larger rectangle from the stated number of equal copies. Students shade the added copies and write multiplicative and additive comparisons in both directions.

LESSON 1	One rectangle, two measures, and which question each answers
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SKILL LESSON	Zachary Zormer, Shape Transformer: A Math Adventure lesson 1, The Same Card, Two Different Numbers - Grade 4 - 20 minutes
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FOCUS	Distinguishing perimeter from area on the same rectangle
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I CAN

I can produce and label two different measures from one rectangle.

BIG IDEA

The same side lengths can produce perimeter and area; the question and the unit tell which measure is wanted.

SUCCESS

The child sorts four questions to the correct measure and identifies the words and units that decide.

CONNECT	5 MIN
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Hold up a 4-inch by 6-inch card and ask, 'How big is it?' Record all defensible answers without choosing one yet.

TAUGHT ON ITS OWN

The book gives the hall pass a perimeter, while its area remains available to be produced from the same dimensions.

SOURCE CORE	20 MIN
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Pairs run yarn around a 4-by-6-inch card, cut the yarn where it meets, and measure its length. They cover an identical card with 1-inch squares and count the covering.

COLLECT

20 inches and 24 square inches, each written with the measure it represents.

CLOSE	5 MIN
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Pairs sort four questions to perimeter or area, underline the deciding words, and explain why one answer uses inches and the other square inches.

FROM THE SOURCE LESSON

Two 4-by-6-inch cards per pair; yarn; inch rulers; 1-inch paper squares; scissors; pencils; question and word cards.

Watch for

A child may label both answers with the same unit. Ask whether the number came from the length of the yarn or the count of covering squares.

LESSON 2	Perimeter from the sides: walk it, then write all four sides as one sum
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SKILL LESSON	Zachary Zormer, Shape Transformer: A Math Adventure - lesson 3, Twenty Inches Around a Hall Pass - Grade 4 - 20 minutes
FOCUS	Finding a rectangle's perimeter from length and width

I CAN

I can find perimeter by moving around every side.

BIG IDEA

A complete trip around a rectangle meets both lengths and both widths.

SUCCESS

All four sides are labeled and the perimeter is written as a four-term sum before any shortcut is used.

CONNECT	5 MIN
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Yesterday one measure came from yarn around the edge. Today students find the same measure from side lengths alone.

TAUGHT ON ITS OWN

The story names a 4-inch by 6-inch card and its perimeter but does not display the calculation.

SOURCE CORE	20 MIN
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Students label all four sides of a 4-by-6 card. They trace around the boundary one side at a time, keeping a running total until returning to the start.

COLLECT

A card labeled 4, 6, 4, 6 and the sum $4 + 6 + 4 + 6 = 20$ inches.

CLOSE	5 MIN
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Students write the four-term sum and a shorter equivalent expression. They choose which representation better shows why each side length appears twice.

FROM THE SOURCE LESSON

4-by-6-inch cards; inch rulers; pencils; lined paper; word cards: length, width, perimeter.

Watch for

Students may label only two adjacent sides. The boundary includes four sides; label each before adding.

LESSON 3	Tile the rectangle, count by rows, and write the multiplication
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SKILL LESSON	Zachary Zormer, Shape Transformer: A Math Adventure - lesson 2, Five Rows of Eight Square Inches - Grade 4 - 20 minutes
FOCUS	Finding rectangle area by tiling and multiplying

I CAN

I can find area by tiling and by multiplying.

BIG IDEA

The area equation describes rows of equal square units already visible in the model.

SUCCESS

The child counts by rows and identifies which factor counts rows and which counts squares in each row.

CONNECT	5 MIN
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Yesterday students traveled around the edge. Today they cover the face and produce a different kind of measure.

TAUGHT ON ITS OWN

The book gives a 5-inch by 8-inch example and the area rule; this lesson makes the 40 square units visible first.

SOURCE CORE	20 MIN
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Pairs tile a 5-by-8-inch rectangle with 1-inch squares, label both edges, count by complete rows, and write $5 \times 8 = 40$ square inches.

COLLECT

The tiled rectangle, edge labels and matching multiplication equation.

CLOSE	5 MIN
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Students find the area of a 3-by-7 rectangle without full tiling, then place one row of 7 tiles to verify what the factors count.

FROM THE SOURCE LESSON

1-inch paper squares; 5-by-8-inch paper rectangles; pencils; lined paper; word cards: area, square inch.

Watch for

Students may count one square at a time. Have them touch a complete row on each count to connect repeated addition with multiplication.

Checkpoint after this lesson

Checkpoint 1 follows: Two measures, two units.

LESSON 4	Area from a formula, checked against a count of squares, and two pans compared
SKILL LESSON	Kitchen Math - lesson 4, Which Pan Spreads the Batter Thinner? - Grade 4 - 20 minutes
FOCUS	Computing and comparing the areas of two rectangles

I CAN

I can compute two areas, verify them and compare them.

BIG IDEA

A pan's dimensions, its grid model and its product are three representations of the same area.

SUCCESS

Each area is produced by counting and multiplying, and the results agree.

CONNECT	5 MIN
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Students can tile and multiply. Today two rectangles arrive only as dimensions in a sentence and must be drawn.

TAUGHT ON ITS OWN

The book supplies two loaf-pan dimensions and links surface area to baking time.

SOURCE CORE	20 MIN
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Pairs draw both pans on inch grid paper, count each by rows, label the side lengths, and multiply to verify each area.

COLLECT

Two labeled rectangles, each with a counted area and a matching product.

CLOSE	5 MIN
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Pairs identify the larger pan, use the story's sentence to predict which bakes faster, overlay the models, and count the 13-square-inch difference.

FROM THE SOURCE LESSON

Inch grid paper; pan-dimension card; pencils; scissors; word cards: length, width, surface area, square inches.

Watch for

Students may multiply and skip the count. Require agreement between model and product before comparing the pans.

LESSON 5	Four times the area: build four copies, find the extra, and halve it
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SKILL LESSON	Ball Game Math - lesson 4, Four Times as Large, and Only Half to Cover - Grade 4 - 20 minutes
FOCUS	Multiplicative comparison of area without multiplying both side lengths

I CAN

I can represent an area four times as large.

BIG IDEA

Four times the area means four equal copies of the original area. It does not mean multiplying both side lengths by four.

SUCCESS

The scale model shows four congruent copies, and the written areas are 600 and 2400 square yards.

CONNECT	5 MIN
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Students can compute area from side lengths. Today one area is described in relation to another.

TAUGHT ON ITS OWN

The book gives last year's field as 20 yards by 30 yards and says the new field has four times the area.

SOURCE CORE	20 MIN
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Compute $20 \times 30 = 600$ square yards. On grid paper, draw a 4-by-6 scale model and label its real dimensions 20 yards by 30 yards; each grid step represents 5 yards. Make four identical copies and arrange them edge to edge.

Label the combined area 2400 square yards. Do not count model squares as square yards.

COLLECT

One labeled scale model, four congruent copies, and both computed areas.

CLOSE	5 MIN
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Remove one copy from the four-copy model to reveal the extra 1800 square yards. Split that extra region into two equal parts and identify 900 square yards as half the extra ground.

FROM THE SOURCE LESSON

Grid paper; rulers; scissors; pencils and colored pencils; field-dimension card; word cards: area, four times, extra, half.

Watch for

A child may multiply both side lengths by 4 and create 16 times the area. The four physical copies establish the intended area factor. Also keep scale-model squares distinct from square yards.

LESSON 6	Four times the area, or four more square yards of area? The phrase sets the operation
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MATH THROUGH THE READING	Ball Game Math - lesson 6, The Word That Sets the Operation - Grade 4 - 20 minutes
FOCUS	Separating multiplicative and additive area comparisons

I CAN

I can tell a multiplicative area phrase from an additive one.

BIG IDEA

The number 4 does not choose the operation; the words around it do.

SUCCESS

The student produces 2400 square yards for four times the area and 604 square yards for four more square yards of area.

CONNECT	5 MIN
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Yesterday four copies produced the larger field. Today two words change, and the same starting area produces a very different answer.

TAUGHT ON ITS OWN

The story carries its operation in a phrase rather than an equation.

SOURCE CORE	20 MIN
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Start with the computed area of 600 square yards. For four times the area, arrange four labeled copies and calculate $4 \times 600 = 2400$. For four more square yards of area, use an area bar labeled 600, add four unit-square tiles, and calculate $600 + 4 = 604$. Do not add 4 to either side length.

COLLECT

Two representations headed by their exact phrases and labeled 2400 square yards and 604 square yards.

CLOSE	5 MIN
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Students write one true sentence about each representation. Partners check the sentence against the model and underline the phrase that selects the operation.

FROM THE SOURCE LESSON

Four scale-model field copies; an area bar labeled 600 square yards; four unit-square tiles; sentence strips; pencils and colored pencils.

Watch for

Students may read four more as four more copies or add 4 to a side length. Keep the 4-square-unit addition on an area bar, not on the field's dimensions.

Checkpoint after this lesson

Checkpoint 2 follows: Four times the area, or four more square yards of area?

LESSON 7	Thirteen square inches said both ways, and a time relation that runs opposite
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MATH THROUGH THE READING	Kitchen Math - lesson 9, Thirteen Squares, Said Both Ways - Grade 4 - 20 minutes
FOCUS	Writing area and baking-time comparisons in both directions

I CAN

I can state a comparison both ways and notice when a related comparison reverses direction.

BIG IDEA

Two sentences can describe one area difference, while a second relation on the same pans can point in the opposite direction.

SUCCESS

Four sentences are true of the same models: two about area and two about baking time.

CONNECT	5 MIN
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Students have built and compared areas. Today they state the same 13-square-inch difference from both starting points and compare the pans' baking times.

TAUGHT ON ITS OWN

The book gives two pan dimensions and states that greater surface area usually means less baking time, but it does not write the comparisons.

SOURCE CORE	20 MIN
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Pairs rebuild both pan rectangles, verify each area, overlay them, and count the 13-square-inch difference. They write one area sentence beginning with each pan.

COLLECT

Two overlaid rectangles and four comparison sentences: two about area and two about baking time.

CLOSE	5 MIN
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Students write the two time comparisons and mark how the comparison direction changes: the pan with more surface area is described as taking less time.

FROM THE SOURCE LESSON

Inch grid paper; scissors; pencils; pan-dimension cards; sentence frames: more area than, less area than, more time than, less time than.

Watch for

Students may copy the direction of the area comparison into the time comparison. Ask which pan the story says bakes faster before the time sentences are written.

CULMINATING PERFORMANCE TASK

Two rectangles, four comparison sentences Draw the original rectangle from the task card at one square per unit. Find its area by rows and its perimeter by adding all four sides. Build the larger rectangle by placing the stated number of identical copies edge to edge.

Shade the added copies and write the multiplicative and additive comparisons in both directions.

COLLECT

Two labeled rectangles, the original perimeter sum, both areas, the shaded difference and four comparison sentences.

WHAT IT ASSESSES

Selecting perimeter or area, using correct units, representing an area multiplier with copies, and stating multiplicative and additive comparisons accurately.

TEACHER KEY AND RUBRIC

Key

- Checkpoint 1: perimeter 20 inches; area 21 square inches.
- Checkpoint 2: starting area 200 square yards; four times the area is 800 square yards; four more square yards of area is 204 square yards.
- Task A: 3 x 4, area 12, perimeter 14, two copies give 24, difference 12. Task B: 2 x 5, area 10, perimeter 14, three copies give 30, difference 20. Task C: 4 x 5, area 20, perimeter 18, two copies give 40, difference 20.

STRAND

SECURE LOOKS LIKE

DEVELOPING	NOT YET
Representation Builds the larger area from the stated number of Builds the copy model after a congruent copies and shades only the added prompt or leaves one label copies. incomplete.	Multiplies both side lengths by the area factor or draws an unrelated shape.

Area, perimeter and difference all match the One arithmetic or unit error is Calculation models and carry correct units. corrected from the model.	Area and perimeter are confused or calculations do not match the drawings.
Meaning Uses linear units for perimeter and square units for Distinguishes the measures but area, and distinguishes times from more. needs a prompt for one comparison phrase.	Treats units or comparison phrases as interchangeable.

Explanation

All four comparison sentences are true and can be justified by pointing to the copies and shaded difference.

Three sentences are true or one Sentences conflict with the model. direction is reversed.

TEACHER PLANNING AND HANDOFF

- If a child labels both Checkpoint 1 answers in inches, return to lesson 1; the distinction between a boundary length and a surface covering is foundational.
- Lessons 5 and 6 now use scale models and area bars. Students calculate the real areas; they do not draw or count 2,400 one-square-yard cells.
- The performance task says 'built from copies' because multiplying every side length by a factor would change area by the square of that factor.
- Ball Game Math's perimeter-to-side lesson remains available as an extension for students ready to add a division step.

Revision status

Second-pass production fixes applied and visually audited. No unit-level standards code has been added.

CHECKPOINT 1 GRADE 4 Two measures, two units	
Name	Date

A rectangle is 7 inches by 3 inches. Find the distance around the outside and the area that covers it. Write each answer with its unit. Which question does each answer?

CHECKPOINT 2 GRADE 4 Four times, or four more?	
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Name	Date
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A field is 10 yards by 20 yards. Find its area. Then find an area four times as large and an area four square yards greater. Match each answer to the phrase that produced it.

CULMINATING TASK | GRADE 4

Rectangle task cards

Cut apart. Give one card to each pair.

CARD A

Original rectangle: 3 units by 4 units. Build a larger rectangle from 2 identical copies.

CARD B

Original rectangle: 2 units by 5 units. Build a larger rectangle from 3 identical copies.

CARD C

Original rectangle: 4 units by 5 units. Build a larger rectangle from 2 identical copies.

CULMINATING TASK | GRADE 4

Two rectangles, four comparison sentences

Name

Date

Draw the original rectangle from your card. Find its area and perimeter. Build the larger rectangle from the stated number of copies and shade the added copies. Complete the four comparison sentences below.

The larger rectangle has _____ times the area of the original rectangle.

The original rectangle has $1/$ _____ the area of the larger rectangle.

The larger rectangle has _____ more square units than the original rectangle.

The original rectangle has _____ fewer square units than the larger rectangle.