

Factors, Multiples and Primes



Grade 4 | NC.4.OA.4

Teacher scripts • Visual models and organizers
30 choice + 30 open/performance tasks
Worked keys • Individual evidence records

Current NC standards: 2026-27 and 2027-28. A reusable bank across several sessions, not a single 60-item test.

Free sample | Contents

NC.4.OA.4 | Fourth Grade mathematics

This sample contains 20 complete selected pages from the 93-page resource, plus this sample contents page. Original printed page numbers are retained. Gaps are intentional.

Included original pages: 1-16, 31-32, 61, 76

Representative activities

M01: sample PDF page(s) 17; original page(s) 16

M02: sample PDF page(s) 17; original page(s) 16

O01: sample PDF page(s) 18; original page(s) 31

O02: sample PDF page(s) 19; original page(s) 32

Selected teacher prompts and keys: original page(s) 61, 76

Using this sample

Read the preparation and access guidance before using a selected activity.
Keep teacher keys and private preparation pages separate from student copies.
Use the original resource contents to see the scope of the complete packet.

Complete paid download

The complete resource includes the full PDF task bank and teaching materials.

TEACHER GUIDE

Standard and learning targets

Find all factor pairs for whole numbers up to and including 50 to:

- Recognize that a whole number is a multiple of each of its factors.
- Determine whether a given whole number is a multiple of a given one-digit number.
- Determine if the number is prime or composite.

I can...

- Find all factor pairs of a whole number through 50 and explain why the list is complete.
- Use factor pairs to identify multiples, including multiples of a given one-digit number.
- Classify primes and composites; explain why 1 is neither.

Essential question: How can a model and an equation explain why my answer makes sense? MP2 connects quantities to symbols; MP3 supports explanation and critique; MP5 selects tools; MP7 examines structure.

TEACHER GUIDE

Plan, access and materials

Use four sessions of about 20-30 minutes, adjusted to need. Session 1: warm-up and model (M01, O01, M05, O05). Session 2: shared and partner work (M09, O09, M14, O14). Session 3: independent evidence (M19, O19). Session 4: reteach and exit (M24, O24, M28, O28). Remaining tasks are optional spaced practice and fresh checks.

Prerequisites: Equal-group multiplication and exact whole-number division; distinguish factor from product.

Materials: pencil, paper and the supplied organizers. Optional large square blocks are teaching supports. All required diagrams are printed; no companion file is needed. Adults handle any cutting. Contexts are invented for instruction.

Vocabulary: factor, factor pair, multiple, prime, composite, whole number. Model and gesture before asking for formal language. Invite explanations in a familiar language, then connect the terms.

Allow neutral read-aloud, enlarged print, breaks, AAC, signing and dictated explanations. Do not score handwriting, decoding or accent. Preserve the mathematical task: naming an operation, providing a factor or completing a rule is an answer-supplying cue, not neutral access.

Collect individual evidence even during partner work. Observe models, equations, calculation and interpretation separately. Keep keys and worked examples out of view during independent checks. No fixed speed cutoff or official mastery threshold is claimed.

TEACHER GUIDE

Contents and coverage

Guide and model pages come first, followed by seven teaching scripts, the student choice and performance banks, teacher-only worked keys, scoring, a reusable evidence record and sources. Print only selected student pages.

Warm-up: M01-M04 / O01-O04

I Do: M05-M08 / O05-O08

We Do: M09-M13 / O09-O13

Collaborative practice: M14-M18 / O14-O18

Independent practice: M19-M23 / O19-O23

Small-group reteach: M24-M27 / O24-O27

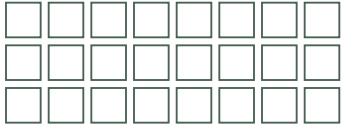
Exit ticket: M28-M30 / O28-O30

Every open task collects the actual performance, not just recognition. Use task IDs to match each page with its key. Targets printed with keys clarify the evidence expected. Revisit with a fresh item rather than treating a corrected response as new independent evidence.

WORKED TEACHER MODEL

All pairs, not just one

$3 \times 8 = 24$



$4 \times 6 = 24$



For 24, test smaller factors in order:

1×24 ; 2×12 ; 3×8 ; 4×6 .

5 is not a factor. At 6, the pair 6×4 reverses a pair already listed. The list is complete.

Factors: 1, 2, 3, 4, 6, 8, 12, 24. Therefore 24 is a multiple of each. It is composite because it has more than two positive factors. In contrast, 13 has only 1 and 13 and is prime. The number 1 has only one positive factor and is neither.

STUDENT VISUAL TOOL

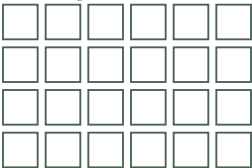
Arrays reveal factor pairs

Both arrays contain the same number of blocks. Count rows and blocks in each row. Turn each array mentally to see why a reversed pair repeats the same factors.

Array A



Array B



Equations for A and B / other pairs / multiple statements

STUDENT TOOL

Reusable reasoning organizer

Name: _____ Date: _____

Use words, drawings, blocks or equations. Label quantities.

Number / trial factor / partner factor**Array for one factor pair****All factor pairs and complete factor list****Classification / multiple check / completeness reason**

REUSABLE STUDENT TOOL

Trial factors and pairs

Try smaller factors in order. A whole-number partner makes a factor pair. Record why you can stop.

Trial factor	Partner / remainder	New pair or repeat?

Complete factor list / why the search is complete

TEACHER GUIDE

Warm-up teaching script

Select M01 and O01. Save the remaining items in this section for later practice. Timing is flexible; the whole bank is never assigned at once.

1-2 minutes | Launch

Ask learners to build 12 as equal rows. Compare 3×4 and 4×3 : same pair reversed, but two orientations.

3-6 minutes | Model or elicit

Use O01 before M01 when collecting independent evidence. During I Do, think aloud and connect each drawing part to its equation. During We Do, pause for learners to suggest the next step. During independent and exit work, remain neutral.

3-5 minutes | Examine

Listen for: Find all factor pairs; connect factors to multiples; justify prime/composite classification. Ask: "What does each quantity mean? How can you check that your model matches?"

2-4 minutes | Respond

After recording the first response, use the worked model or blank organizer to revisit the structure. Ask the learner to locate the first mismatch. Record any supplied step separately; do not overwrite the initial evidence.

1-3 minutes | Close

Ask the learner to create a different example following the same structure and justify it. Record the exact response, support and next teaching step. Use a fresh item from this section on another day to check transfer.

TEACHER GUIDE

I Do teaching script

Select M05 and O05. Save the remaining items in this section for later practice. Timing is flexible; the whole bank is never assigned at once.

1-2 minutes | Launch

Model 24: test 1,2,3,4 to get $1 \times 24, 2 \times 12, 3 \times 8, 4 \times 6$. Test 5: not exact. Once factors cross, pairs would repeat.

3-6 minutes | Model or elicit

Use O05 before M05 when collecting independent evidence. During I Do, think aloud and connect each drawing part to its equation. During We Do, pause for learners to suggest the next step. During independent and exit work, remain neutral.

3-5 minutes | Examine

Listen for: Find all factor pairs; connect factors to multiples; justify prime/composite classification. Ask: "What does each quantity mean? How can you check that your model matches?"

2-4 minutes | Respond

After recording the first response, use the worked model or blank organizer to revisit the structure. Ask the learner to locate the first mismatch. Record any supplied step separately; do not overwrite the initial evidence.

1-3 minutes | Close

Ask the learner to create a different example following the same structure and justify it. Record the exact response, support and next teaching step. Use a fresh item from this section on another day to check transfer.

TEACHER GUIDE

We Do teaching script

Select M09 and O09. Save the remaining items in this section for later practice. Timing is flexible; the whole bank is never assigned at once.

1-2 minutes | Launch

Use 25 to discuss 5×5 counted once. Then 13 has only 1 and 13, so prime; 1 has just one factor and is neither prime nor composite.

3-6 minutes | Model or elicit

Use O09 before M09 when collecting independent evidence. During I Do, think aloud and connect each drawing part to its equation. During We Do, pause for learners to suggest the next step. During independent and exit work, remain neutral.

3-5 minutes | Examine

Listen for: Find all factor pairs; connect factors to multiples; justify prime/composite classification. Ask: "What does each quantity mean? How can you check that your model matches?"

2-4 minutes | Respond

After recording the first response, use the worked model or blank organizer to revisit the structure. Ask the learner to locate the first mismatch. Record any supplied step separately; do not overwrite the initial evidence.

1-3 minutes | Close

Ask the learner to create a different example following the same structure and justify it. Record the exact response, support and next teaching step. Use a fresh item from this section on another day to check transfer.

TEACHER GUIDE

Collaborative practice teaching script

Select M14 and O14. Save the remaining items in this section for later practice. Timing is flexible; the whole bank is never assigned at once.

1-2 minutes | Launch

Partners independently list all pairs, then test each other's completeness claim. Each connects a factor to an exact division and a multiple statement.

3-6 minutes | Model or elicit

Use O14 before M14 when collecting independent evidence. During I Do, think aloud and connect each drawing part to its equation. During We Do, pause for learners to suggest the next step. During independent and exit work, remain neutral.

3-5 minutes | Examine

Listen for: Find all factor pairs; connect factors to multiples; justify prime/composite classification. Ask: "What does each quantity mean? How can you check that your model matches?"

2-4 minutes | Respond

After recording the first response, use the worked model or blank organizer to revisit the structure. Ask the learner to locate the first mismatch. Record any supplied step separately; do not overwrite the initial evidence.

1-3 minutes | Close

Ask the learner to create a different example following the same structure and justify it. Record the exact response, support and next teaching step. Use a fresh item from this section on another day to check transfer.

TEACHER GUIDE

Independent practice teaching script

Select M19 and O19. Save the remaining items in this section for later practice. Timing is flexible; the whole bank is never assigned at once.

1-2 minutes | Launch

Do not supply factor lists. Require all pairs, one drawn array, classification and the one-digit multiple decision.

3-6 minutes | Model or elicit

Use O19 before M19 when collecting independent evidence. During I Do, think aloud and connect each drawing part to its equation. During We Do, pause for learners to suggest the next step. During independent and exit work, remain neutral.

3-5 minutes | Examine

Listen for: Find all factor pairs; connect factors to multiples; justify prime/composite classification. Ask: "What does each quantity mean? How can you check that your model matches?"

2-4 minutes | Respond

After recording the first response, use the worked model or blank organizer to revisit the structure. Ask the learner to locate the first mismatch. Record any supplied step separately; do not overwrite the initial evidence.

1-3 minutes | Close

Ask the learner to create a different example following the same structure and justify it. Record the exact response, support and next teaching step. Use a fresh item from this section on another day to check transfer.

TEACHER GUIDE

Small-group reteach teaching script

Select M24 and O24. Save the remaining items in this section for later practice. Timing is flexible; the whole bank is never assigned at once.

1-2 minutes | Launch

If pairs are missing, use an ordered trial-factor table. If every odd number is called prime, compare 9 and 11 using arrays.

3-6 minutes | Model or elicit

Use O24 before M24 when collecting independent evidence. During I Do, think aloud and connect each drawing part to its equation. During We Do, pause for learners to suggest the next step. During independent and exit work, remain neutral.

3-5 minutes | Examine

Listen for: Find all factor pairs; connect factors to multiples; justify prime/composite classification. Ask: "What does each quantity mean? How can you check that your model matches?"

2-4 minutes | Respond

After recording the first response, use the worked model or blank organizer to revisit the structure. Ask the learner to locate the first mismatch. Record any supplied step separately; do not overwrite the initial evidence.

1-3 minutes | Close

Ask the learner to create a different example following the same structure and justify it. Record the exact response, support and next teaching step. Use a fresh item from this section on another day to check transfer.

TEACHER GUIDE

Exit ticket teaching script

Select M28 and O28. Save the remaining items in this section for later practice. Timing is flexible; the whole bank is never assigned at once.

1-2 minutes | Launch

Use a fresh number through 50. Record the complete list, stopping reason, classification and factor-multiple connection.

3-6 minutes | Model or elicit

Use O28 before M28 when collecting independent evidence. During I Do, think aloud and connect each drawing part to its equation. During We Do, pause for learners to suggest the next step. During independent and exit work, remain neutral.

3-5 minutes | Examine

Listen for: Find all factor pairs; connect factors to multiples; justify prime/composite classification. Ask: "What does each quantity mean? How can you check that your model matches?"

2-4 minutes | Respond

After recording the first response, use the worked model or blank organizer to revisit the structure. Ask the learner to locate the first mismatch. Record any supplied step separately; do not overwrite the initial evidence.

1-3 minutes | Close

Ask the learner to create a different example following the same structure and justify it. Record the exact response, support and next teaching step. Use a fresh item from this section on another day to check transfer.

STUDENT BANK

Choice practice 1-2

M01 $1 \times n = 1$. What value of n completes this factor pair?

A. 0

B. 2

C. 1

D. 11

Choose one. Be ready to explain your reasoning.

M02 $1 \times n = 2$. What value of n completes this factor pair?

A. 12

B. 0

C. 1

D. 2

Choose one. Be ready to explain your reasoning.

STUDENT PERFORMANCE

001 | Warm-up

Find ALL factor pairs of 45. Draw an array for one pair. List every factor and explain why your list is complete. Is 45 prime, composite, or neither? Is it a multiple of 5? Explain both decisions.

Factor pairs / factor list / one array

Completeness / prime or composite / multiple decision

STUDENT PERFORMANCE

002 | Warm-up

Find ALL factor pairs of 16. Draw an array for one pair. List every factor and explain why your list is complete. Is 16 prime, composite, or neither? Is it a multiple of 1? Explain both decisions.

Factor pairs / factor list / one array

Completeness / prime or composite / multiple decision

TEACHER ONLY

M keys 1-2

M01: C. 1

Target: Use factor pairs to identify multiples, including multiples of a given one-digit number.

$1 \div 1 = 1$; $1 \times 1 = 1$. Factor pairs: 1×1 . Factors: 1. Test possible smaller factors through 1; beyond that, a new pair would repeat in reverse. 1 is neither prime nor composite. One has only one positive factor. Every listed factor divides 1 exactly, so 1 is a multiple of each.

Other choices: 0, 2, 11. Each fails the stated calculation or rule. Ask the learner to show the operation/model before attributing a misconception; one choice alone cannot diagnose thinking.

M02: D. 2

Target: Use factor pairs to identify multiples, including multiples of a given one-digit number.

$2 \div 1 = 2$; $1 \times 2 = 2$. Factor pairs: 1×2 . Factors: 1, 2. Test possible smaller factors through 1; beyond that, a new pair would repeat in reverse. 2 is prime. It has exactly two positive factors. Every listed factor divides 2 exactly, so 2 is a multiple of each.

Other choices: 12, 0, 1. Each fails the stated calculation or rule. Ask the learner to show the operation/model before attributing a misconception; one choice alone cannot diagnose thinking.

TEACHER ONLY

0 keys 1-2

001: 45

Target: Find all factor pairs; connect factors to multiples; justify prime/composite classification.

Factor pairs: 1×45 , 3×15 , 5×9 . Factors: 1, 3, 5, 9, 15, 45. Test possible smaller factors through 6; beyond that, a new pair would repeat in reverse. 45 is composite. It has more than two positive factors. Every listed factor divides 45 exactly, so 45 is a multiple of each. Sample array: 5 row(s), each with 9 blocks, makes 45 blocks. $45 \div 5 = 9$ remainder 0; yes, 45 is a multiple of 5.

Accept equivalent correct models and explanations. Score each requested dimension separately; the sample is not required wording.

002: 16

Target: Find all factor pairs; connect factors to multiples; justify prime/composite classification.

Factor pairs: 1×16 , 2×8 , 4×4 . Factors: 1, 2, 4, 8, 16. Test possible smaller factors through 4; beyond that, a new pair would repeat in reverse. 16 is composite. It has more than two positive factors. Every listed factor divides 16 exactly, so 16 is a multiple of each. Sample array: 4 row(s), each with 4 blocks, makes 16 blocks. $16 \div 1 = 16$ remainder 0; yes, 16 is a multiple of 1.

Accept equivalent correct models and explanations. Score each requested dimension separately; the sample is not required wording.