

Explain Multiplication Patterns



Grade 3 | NC.3.OA.9

Teacher scripts • Original visual tools • 60-item bank
Worked solutions • Individual performance records

Current NC standards for 2026-27 and 2027-28. Select short lessons across several sessions. This reusable bank is not a single 60-item test.

Free sample | Contents

NC.3.OA.9 | Third Grade mathematics

This sample contains 19 complete selected pages from the 92-page resource, plus this sample contents page. Original printed page numbers are retained. Gaps are intentional.

Included original pages: 1-15, 30-31, 60, 75

Representative activities

M01: sample PDF page(s) 16; original page(s) 15

M02: sample PDF page(s) 16; original page(s) 15

O01: sample PDF page(s) 17; original page(s) 30

O02: sample PDF page(s) 18; original page(s) 31

Selected teacher prompts and keys: original page(s) 60, 75

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

Interpret patterns of multiplication on a hundreds board and/or multiplication table.

Learning targets

- Interpret multiplication patterns on a hundreds board and a multiplication table.
- Explain a pattern using equal groups, repeated addition, parity or the commutative property.
- Use a stated pattern to predict and justify another entry.

Mathematical practices: MP2 connects quantities and symbols; MP3 explains and critiques reasoning; MP5 chooses useful tools; MP7 uses mathematical structure. Record actual performances, not only correct choices.

TEACHER GUIDE

Plan, access and materials

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

Prerequisites: equal groups and fact families for operations; rows, columns and skip-counting for patterns; place-value units and exchanges for base-ten work. Check these before increasing complexity.

Materials: pencil, blank paper and the supplied reproducible tools. Optional large blocks support teaching; adults prepare any cut materials. All contexts are invented for instruction.

Read directions neutrally. Allow speech, signing, AAC, dictation and drawing. Enlarge print and offer breaks. Do not score handwriting, spelling or decoding. Record access supports separately from hints that supply a mathematical step.

Vocabulary: factor, product, divisor, quotient, equal groups, unknown, equation, pattern, estimate, expanded form and exchange. Invite learners to point, model and explain in a familiar language.

Fluency includes accuracy, efficiency and flexibility. For products, NC.3.OA.7 also requires memory. Observe initial answers before tools, then assess reasoning afterward. Do not invent a fixed speed cutoff or infer full fluency from multiple-choice recognition.

TEACHER GUIDE

Contents and bank navigation

Following these guide pages: visual models and reproducible tools; seven teaching scripts; choice bank; open performance bank; teacher-only worked keys; scoring and evidence records; source notes. Each page has a footer number; each task has a stable ID.

Warm-up: M01-M04 and O01-O04

I Do: M05-M08 and O05-O08

We Do: M09-M13 and O09-O13

Collaborative practice: M14-M18 and O14-O18

Independent practice: M19-M23 and O19-O23

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

Exit ticket: M28-M30 and O28-O30

Give each learner their own response opportunity during partner work. Print only selected student pages. Keep worked examples, answers and answer-supplying support out of view during independent evidence collection.

REUSABLE STUDENT SUPPORT

Hundreds board

Mark multiples. Describe how the pattern moves and explain what makes it repeat.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

A row moves by ones. The number below is ten greater. Use the actual numbers to check a proposed multiplication pattern.

REUSABLE STUDENT SUPPORT

Multiplication table

Row and column labels are factors; the inside entry is their product. Mark examples to support a rule.

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

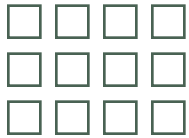
Explain the structure behind the entries. Predict a new example, then verify it.

WORKED TEACHER MODEL

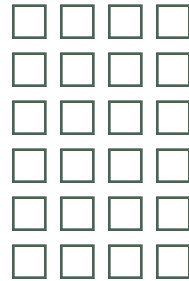
Why the pattern repeats

Row 6 is double row 3: $3 \times 4 = 12$ and $6 \times 4 = 24$.

Three groups of four



Two copies of three groups



Six equal groups can be split into three groups and three more groups. Therefore $6 \times n = (3 \times n) + (3 \times n)$. This explains every matching column, rather than only the two checked entries.

On the hundreds board, multiples of 2 occupy the columns ending in 2, 4, 6, 8 and 0. Ten is also even, so moving down a row keeps the same even/odd status. A visual pattern must be connected to this number relationship.

TEACHER GUIDE

Warm-up teaching script

Select M01 and O01; keep M02-M04 and O02-O04 for later evidence. Times are flexible teaching segments, not test limits.

1-2 minutes | Launch

Locate rows and columns on both charts. Ask learners to distinguish the table factor labels from product entries, and the board values from column numbers.

3-6 minutes | Elicit

Use O01 before the choice item when assessing independent performance. Ask: "What do the quantities mean? What will you show?" During I Do, think aloud; during We Do invite each next step; during independent/exit work remain neutral.

3-5 minutes | Examine evidence

Ask: "How does your representation match your equation? Why does that step work?" Listen for the specific target: Explain a multiplication pattern from a board/table and justify a prediction.

2-4 minutes | Respond

If reasoning is unclear, ask for a new example or a check. After recording the initial response, use the model page to rebuild the relevant structure. Label this later work as supported; do not replace the first record.

1-3 minutes | Close

Record the exact response, strategy, representation, explanation and support. Extension: create a new example that uses the same structure and explain why it fits. Select a fresh item from this section to check transfer on another day.

TEACHER GUIDE

I Do teaching script

Select M05 and O05; keep M06-M08 and O06-O08 for later evidence. Times are flexible teaching segments, not test limits.

1-2 minutes | Launch

Mark multiples of 5 on the hundreds board. Explain alternating ones digits 5, 0 using groups of five completing tens. Do not stop at naming the pattern.

3-6 minutes | Elicit

Use O05 before the choice item when assessing independent performance. Ask: "What do the quantities mean? What will you show?" During I Do, think aloud; during We Do invite each next step; during independent/exit work remain neutral.

3-5 minutes | Examine evidence

Ask: "How does your representation match your equation? Why does that step work?" Listen for the specific target: Explain a multiplication pattern from a board/table and justify a prediction.

2-4 minutes | Respond

If reasoning is unclear, ask for a new example or a check. After recording the initial response, use the model page to rebuild the relevant structure. Label this later work as supported; do not replace the first record.

1-3 minutes | Close

Record the exact response, strategy, representation, explanation and support. Extension: create a new example that uses the same structure and explain why it fits. Select a fresh item from this section to check transfer on another day.

TEACHER GUIDE

We Do teaching script

Select M09 and O09; keep M10-M13 and O10-O13 for later evidence. Times are flexible teaching segments, not test limits.

1-2 minutes | Launch

Compare row 3 with row 6 in the table. Ask: "Why is each product doubled?" Draw three equal groups twice to connect the numbers to structure.

3-6 minutes | Elicit

Use O09 before the choice item when assessing independent performance. Ask: "What do the quantities mean? What will you show?" During I Do, think aloud; during We Do invite each next step; during independent/exit work remain neutral.

3-5 minutes | Examine evidence

Ask: "How does your representation match your equation? Why does that step work?" Listen for the specific target: Explain a multiplication pattern from a board/table and justify a prediction.

2-4 minutes | Respond

If reasoning is unclear, ask for a new example or a check. After recording the initial response, use the model page to rebuild the relevant structure. Label this later work as supported; do not replace the first record.

1-3 minutes | Close

Record the exact response, strategy, representation, explanation and support. Extension: create a new example that uses the same structure and explain why it fits. Select a fresh item from this section to check transfer on another day.

TEACHER GUIDE

Collaborative practice teaching script

Select M14 and O14; keep M15-M18 and O15-O18 for later evidence. Times are flexible teaching segments, not test limits.

1-2 minutes | Launch

Partners each choose two examples and make a prediction. One explains a structural reason; the other tests a new entry and offers a counterexample if needed.

3-6 minutes | Elicit

Use O14 before the choice item when assessing independent performance. Ask: "What do the quantities mean? What will you show?" During I Do, think aloud; during We Do invite each next step; during independent/exit work remain neutral.

3-5 minutes | Examine evidence

Ask: "How does your representation match your equation? Why does that step work?" Listen for the specific target: Explain a multiplication pattern from a board/table and justify a prediction.

2-4 minutes | Respond

If reasoning is unclear, ask for a new example or a check. After recording the initial response, use the model page to rebuild the relevant structure. Label this later work as supported; do not replace the first record.

1-3 minutes | Close

Record the exact response, strategy, representation, explanation and support. Extension: create a new example that uses the same structure and explain why it fits. Select a fresh item from this section to check transfer on another day.

TEACHER GUIDE

Independent practice teaching script

Select M19 and O19; keep M20-M23 and O20-O23 for later evidence. Times are flexible teaching segments, not test limits.

1-2 minutes | Launch

Provide the chart but no highlighting, rule or worked example. Require an explanation and another verified example; chart lookup alone is incomplete evidence.

3-6 minutes | Elicit

Use O19 before the choice item when assessing independent performance. Ask: "What do the quantities mean? What will you show?" During I Do, think aloud; during We Do invite each next step; during independent/exit work remain neutral.

3-5 minutes | Examine evidence

Ask: "How does your representation match your equation? Why does that step work?" Listen for the specific target: Explain a multiplication pattern from a board/table and justify a prediction.

2-4 minutes | Respond

If reasoning is unclear, ask for a new example or a check. After recording the initial response, use the model page to rebuild the relevant structure. Label this later work as supported; do not replace the first record.

1-3 minutes | Close

Record the exact response, strategy, representation, explanation and support. Extension: create a new example that uses the same structure and explain why it fits. Select a fresh item from this section to check transfer on another day.

TEACHER GUIDE

Small-group reteach teaching script

Select M24 and O24; keep M25-M27 and O25-O27 for later evidence. Times are flexible teaching segments, not test limits.

1-2 minutes | Launch

If a learner reports only an entry, ask: "What changes from one entry to the next? What does that change count?" Rebuild two adjacent products as arrays.

3-6 minutes | Elicit

Use O24 before the choice item when assessing independent performance. Ask: "What do the quantities mean? What will you show?" During I Do, think aloud; during We Do invite each next step; during independent/exit work remain neutral.

3-5 minutes | Examine evidence

Ask: "How does your representation match your equation? Why does that step work?" Listen for the specific target: Explain a multiplication pattern from a board/table and justify a prediction.

2-4 minutes | Respond

If reasoning is unclear, ask for a new example or a check. After recording the initial response, use the model page to rebuild the relevant structure. Label this later work as supported; do not replace the first record.

1-3 minutes | Close

Record the exact response, strategy, representation, explanation and support. Extension: create a new example that uses the same structure and explain why it fits. Select a fresh item from this section to check transfer on another day.

TEACHER GUIDE

Exit ticket teaching script

Select M28 and O28; keep M29-M30 and O29-O30 for later evidence. Times are flexible teaching segments, not test limits.

1-2 minutes | Launch

Give a new row or board pattern. Record the observed pattern, structural explanation, prediction and verification separately.

3-6 minutes | Elicit

Use O28 before the choice item when assessing independent performance. Ask: "What do the quantities mean? What will you show?" During I Do, think aloud; during We Do invite each next step; during independent/exit work remain neutral.

3-5 minutes | Examine evidence

Ask: "How does your representation match your equation? Why does that step work?" Listen for the specific target: Explain a multiplication pattern from a board/table and justify a prediction.

2-4 minutes | Respond

If reasoning is unclear, ask for a new example or a check. After recording the initial response, use the model page to rebuild the relevant structure. Label this later work as supported; do not replace the first record.

1-3 minutes | Close

Record the exact response, strategy, representation, explanation and support. Extension: create a new example that uses the same structure and explain why it fits. Select a fresh item from this section to check transfer on another day.

STUDENT BANK

Choice practice 1-2

M01 In row 2 of the multiplication table, move from column 2 to column 3. How much does the product increase?

- | | |
|------|------|
| A. 2 | B. 0 |
| C. 6 | D. 7 |

Choose one. Explain your thinking to your teacher.

M02 In row 3 of the multiplication table, move from column 5 to column 6. How much does the product increase?

- | | |
|------|-------|
| A. 3 | B. 15 |
| C. 1 | D. 5 |

Choose one. Explain your thinking to your teacher.

Use the supplied hundreds board or multiplication table.

STUDENT PERFORMANCE

001 | Warm-up

Compare row 7 and row 8 in column 9 of the table. How much larger is the entry in row 8? Mark at least two examples. Explain why the pattern works, then predict and verify another example.

Use the supplied multiplication table.

Examples: mark on your chart and record here

Why it works / prediction and verification

STUDENT PERFORMANCE

002 | Warm-up

Compare row 2 and row 8 in column 4. What number multiplies the row-2 entry to get the row-8 entry? Mark at least two examples. Explain why the pattern works, then predict and verify another example.

Use the supplied multiplication table.

Examples: mark on your chart and record here

Why it works / prediction and verification

TEACHER ONLY

M keys 1-2

M01: A. 2

$2 \times 2 = 4$ and $2 \times 3 = 6$. The increase is 2. One more group of 2 is added each time a column increases by 1. Another check: row 2, columns 1 and 2, grows from 2 to 4 by 2.

Diagnostic follow-up: 0: Incorrect magnitude; ask the learner to show the calculation and compare it with the required operation or pattern. 6: Incorrect magnitude; ask the learner to show the calculation and compare it with the required operation or pattern. 7: Incorrect magnitude; ask the learner to show the calculation and compare it with the required operation or pattern.

M02: A. 3

$3 \times 5 = 15$ and $3 \times 6 = 18$. The increase is 3. One more group of 3 is added each time a column increases by 1. Another check: row 3, columns 1 and 2, grows from 3 to 6 by 3.

Diagnostic follow-up: 15: Confuses the step, factor, product, or number of pattern columns; request two marked examples and an explanation. 1: Confuses the step, factor, product, or number of pattern columns; request two marked examples and an explanation. 5: Confuses the step, factor, product, or number of pattern columns; request two marked examples and an explanation.

TEACHER ONLY

0 keys 1-2

001: 9

$(8 \times 9) - (7 \times 9) = 9$. There is one additional row containing 9 objects. The difference is the column factor, 9. Another check: in column 1, rows 7 and 8 differ by 1.

Accept equivalent accurate models/equations and explanations. Evaluate the requested reasoning separately from the numerical answer.

002: 4

$2 \times 4 = 8$; $8 \times 4 = 32$. The second product is 4 times the first. The 8 equal groups are 4 copies of two equal groups, so each matching entry has this multiplicative relationship. Another check: in column 10, row 2 is 20 and row 8 is 80, or 4 times 20.

Accept equivalent accurate models/equations and explanations. Evaluate the requested reasoning separately from the numerical answer.