

TUMBLETA MATH UNIT | PENNSYLVANIA

Multiplication, Division and Equal Groups

Grade 3 | 10 lessons | 30 minutes each | 4 books

ABOUT THIS UNIT

This unit brings together carefully selected lessons from several TumbleMath books to build one connected mathematical idea. Each book becomes a starting point for modelling, discussion, and visible student work. Teach the sequence as a complete unit, or choose individual lessons to support your existing program. Assessment checkpoints, a culminating task, and a reproducible student page are included.

THE MATHEMATICAL ARC

Students move from skip-counted equal groups to multiplication equations, arrays, and fair division. The final lessons vary which quantity is unknown so students must interpret the situation rather than hunt for a keyword.

Source books

- Count on Pablo
- $2 \times 2 = \text{Boo!}$
- Dinosaur Deals
- The Multiplying Menace Divides

HOW TO USE THIS GUIDE

Each 20-minute daily core comes from the named source lesson. This guide supplies the sequence, five-minute connections, five-minute closes, checkpoints, and culminating task. Open the complete source lesson before teaching and use its listed materials and student product.

Where This Fits in Your Year

Recommended placement	Grade 3, during conceptual multiplication and division work before full fluency practice.
Students arrive knowing	Students can make equal groups, skip-count, and connect a drawing to a total.
This unit develops	Students connect equal groups to multiplication equations and arrays, then interpret division by identifying which grouping quantity is unknown.
This prepares students for	Fluency, area applications, and more complex multiplicative reasoning.

PLACEMENT NOTE

Curriculum maps differ by district, board, division, and school. Place the unit where students have the listed prerequisites and can use the culminating task as evidence of the stated expectations.

STRONGEST CURRICULUM CONNECTIONS - OUR SUMMARY

Pennsylvania Core Standards for Mathematics | Grade 3

FRAMEWORK NOTE

The codes are official. The descriptions below are TumbleTA planning summaries of the Pennsylvania standards, not verbatim state wording.

Direct unit-level expectations

CC.2.2.3.A.1

TumbleTA planning summary (not verbatim curriculum wording): Represent and solve problems involving multiplication and division.

Unit evidence: All ten lessons represent and solve multiplication or division situations.

CC.2.2.3.A.2

TumbleTA planning summary (not verbatim curriculum wording): Understand properties of multiplication and the relationship between multiplication and division.

Unit evidence: Students turn arrays and multiplication equations into related division equations.

Unit at a glance

Teach the lessons in order. Use the complete source lesson for the 20-minute core. The five-minute opening and five-minute close carry the sequence from one day to the next. Each lesson also includes a standalone opening for teachers who use one lesson outside the sequence.

#	Source lesson	Book	Mathematical move
1	Count the Onions by Twos	Count on Pablo	Equal groups and skip counting
2	Five in Each Bag	Count on Pablo	Groups of five
3	Three Scarecrows, Same Parts Each	$2 \times 2 = \text{Boo!}$	Interpret products
4	Two Rows in the Spectacles	$2 \times 2 = \text{Boo!}$	Doubling as multiplication
5	Rows of Four: Drawing What a Trade Costs	Dinosaur Deals	Arrays for multiplication
6	Count the Price: Fours and Threes at Speed	Dinosaur Deals	Fluency from groups
7	Boo Stew for Five	$2 \times 2 = \text{Boo!}$	Multiplication by five
8	Three Sets of Four: What the Spell Does to Twelve	The Multiplying Menace Divides	Interpret division
9	Five Rows of Three: Drawing Peter's Fifteen Holes	The Multiplying Menace Divides	Arrays connect operations
10	How Many Groups Made Four Frogs?	The Multiplying Menace Divides	Unknown number of groups

Unit vocabulary

equal group, groups of, factor, product, array, row, column, divide, quotient, total, number of groups, amount in each group

Materials

Complete source lessons and their named student pages; counters; connecting cubes; small bags or cups; grid paper; row mats; equation cards; the mathematical evidence sheet reproduced in this guide.

Assessment plan

The assessment loop is intentionally light: review student work every day, check the meaning of equal groups after Lesson 3, and check the first division interpretation after Lesson 8. Finish with one performance task.

When	Collect	Decision rule
Every lesson	The source lesson product plus the closing sentence	Move on when most students can make the target representation and explain what its numbers mean.
After lesson 3	Checkpoint A: one fresh, book-free problem using the same structure	Reteach with objects if a student can calculate but cannot label the groups.
After lesson 8	Checkpoint B: one situation shown as equal groups and as an equation, with the quotient named	Reteach the relationship, not a memorized procedure, when the model and equation disagree.
End	Performance task and explanation	Use the four-part rubric; a score below 2 in Representation or Meaning calls for a targeted conference.

Daily evidence to preserve

- A visible model or representation, not an answer alone.
- An equation or comparison that agrees with the model.
- Labels or a sentence identifying what each number counts.
- A correction when the student changes a claim after testing it.

INCLUSION MOVE

Let students explain with objects, drawings, gestures, oral language, or writing. Keep the mathematics constant: the quantities, relationships, and evidence must remain visible.

LESSON 1 • EQUAL GROUPS AND SKIP COUNTING

Count the Onions by Twos

Source book: Count on Pablo | 30 minutes

I CAN	I can count equal groups of two.
BIG IDEA	Skip-counting works because each group has the same size.
SUCCESS	The grouping, count sequence, and total agree.

1. Connect | 5 minutes Put out a loose pile of counters and ask how many. Then ask for a faster way than one at a time. Take the suggestions and write them where everyone can see them. Today tests which of them can be trusted.

Taught on its own: Put out a loose pile of counters and ask students to organize it into equal groups of two, then count the groups to find the total.

2. Source lesson | 20 minutes Organize objects in pairs and skip-count to find the total. Teach the full source lesson as written, including its named materials and student product.
3. Close | 5 minutes Students finish: I made ____ groups of two and counted ____, so the total is _____. Ask what would go wrong in the count if one group held three.

WATCH FOR

A count by twos continuing across a group that only holds one.

LESSON 2 · GROUPS OF FIVE

Five in Each Bag

Source book: Count on Pablo | 30 minutes

I CAN	I can find a total from equal groups of five.
BIG IDEA	Each group must contain the same number.
SUCCESS	The student identifies group size, number of groups, and total.

1. Connect | 5 minutes Yesterday every group held two and the count ran 2, 4, 6. Ask what the count would have been if one group had held three instead.

Today the groups hold five, and the same rule about sameness decides whether the count works.

Taught on its own: Put out three bags holding five, four, and five counters and ask which bag breaks the count.

2. Source lesson | 20 minutes Build equal bags of five and connect the groups to a repeated count. Teach the full source lesson as written, including its named materials and student product.
3. Close | 5 minutes Students finish: I had ____ groups of five, so the total is _____. The number of groups and the number in each group have to be said separately, not folded into one number.

WATCH FOR

A total reported without saying how many groups produced it.

LESSON 3 · INTERPRET PRODUCTS

Three Scarecrows, Same Parts Each

Source book: $2 \times 2 = \text{Boo!}$ | 30 minutes

I CAN	I can write an equation for equal groups.
BIG IDEA	A product describes equal groups: number of groups times amount in each.
SUCCESS	The model and factors match the stated group meanings.

1. Connect | 5 minutes Yesterday's sentence named two different things: how many groups, and how many in each. Ask a student to say both halves of theirs again. Today those two numbers get written as a multiplication equation, and each one keeps its job.

Taught on its own: Build three equal groups of four where everyone can see them and ask for two numbers that describe the arrangement.

- 2. Source lesson | 20 minutes Build three equal groups and write a multiplication equation for repeated features. Teach the full source lesson as written, including its named materials and student product.
- 3. Close | 5 minutes Students finish: ____ groups of ____ is ____ $\times$ ____ = ____ . Ask which factor counts the groups and which counts what is inside them.

WATCH FOR
Factors written in an order the student cannot explain.

CHECKPOINT A
Give one new, book-free problem with the same mathematical structure. Score only: representation, accurate relationship, and explanation. Reteach with objects if a student can calculate but cannot label the groups. Use the result to group tomorrow's opening.

LESSON 4 · DOUBLING AS MULTIPLICATION

Two Rows in the Spectacles

Source book: 2 X 2 = Boo! | 30 minutes

I CAN	I can connect doubling, an array, and a multiplication equation.
BIG IDEA	Two equal rows can be described as a double and as multiplication.
SUCCESS	Both rows are equal and the equation matches the array.

- 1. Connect | 5 minutes Yesterday each factor had a job. Ask a student to point at the group-counting factor in their equation. Today there are exactly two groups, and they get arranged as rows so the doubling can be seen rather than asserted.

Taught on its own: Lay out two equal rows of counters and ask for two different ways to name the total.

- 2. Source lesson | 20 minutes Arrange objects in two equal rows and connect doubling to multiplication by two. Teach the full source lesson as written, including its named materials and student product.
- 3. Close | 5 minutes Students finish: Two rows of ____ is ____, and doubling ____ gives the same ____ . The rows and the doubling both have to appear in the writing.

WATCH FOR
Rows drawn at different lengths and still called a double.

LESSON 5 · ARRAYS FOR MULTIPLICATION

Rows of Four: Drawing What a Trade Costs

Source book: Dinosaur Deals | 30 minutes

I CAN	I can draw an array for a multiplication situation.
BIG IDEA	Rows make both the number of groups and the amount in each group visible.
SUCCESS	Rows, items per row, total, and equation all agree.

1. Connect | 5 minutes Yesterday two equal rows showed a double. Ask what would change if a third row were added, and what would stay the same. Today the rows keep going, and the drawing has to make both factors readable without counting every item.

Taught on its own: Show a loose pile of twelve counters and ask students to arrange it so the total can be seen without counting one at a time.

2. Source lesson | 20 minutes Represent repeated trade costs as equal rows of four. Teach the full source lesson as written, including its named materials and student product.
3. Close | 5 minutes Students finish: My array has ____ rows of ____, so ____ $\times$ ____ = _____. The rows have to be equal on the page, not only in the sentence.

WATCH FOR

A ragged array whose second factor cannot be read off the drawing.

LESSON 6 · FLUENCY FROM GROUPS

Count the Price: Fours and Threes at Speed

Source book: Dinosaur Deals | 30 minutes

I CAN	I can find products of three and four efficiently.
BIG IDEA	Fluent facts can still be explained with groups.
SUCCESS	An accurate fact plus a group or array explanation.

1. Connect | 5 minutes Yesterday an array made both factors readable at a glance. Ask a student how many items their array held and how they knew without counting all of them. Today the facts come faster, and the meaning still has to be available on request.

Taught on its own: Ask for 4×3 , then ask what the four counts and what the three counts.

2. Source lesson | 20 minutes Use equal-group structures to skip-count by threes and fours while preserving meaning. Teach the full source lesson as written, including its named materials and student product.
3. Close | 5 minutes Students finish: ____ $\times$ ____ = ____, and I know it because _____. A student who answers quickly must still be able to name the groups behind the answer.

WATCH FOR

A fast correct answer with no group or array behind it when asked.

LESSON 7 · MULTIPLICATION BY FIVE

Boo Stew for Five

Source book: 2 X 2 = Boo! | 30 minutes

I CAN	I can use equal groups to multiply by five.
BIG IDEA	Multiplying by five counts equal groups of five.
SUCCESS	The sequence 1×5 through 4×5 matches the models.

1. Connect | 5 minutes Yesterday speed was allowed as long as the meaning could be produced on request. Ask one student to produce the meaning behind a fact they said quickly. On lesson 2 the groups of five were already made and waiting to be counted; today they are built one at a time, so the growth between products is visible.

Taught on its own: Build one group of five, then a second, and ask what changes and by how much each time.

- 2. Source lesson | 20 minutes Build one through four equal groups of five and record each product. Teach the full source lesson as written, including its named materials and student product.
- 3. Close | 5 minutes Students finish: ____ groups of five is ____, which is five more than ____ groups of five. Each new group has to add five, and the sentence has to show where.

WATCH FOR

Products of five recited as a chant with no groups underneath them.

LESSON 8 · INTERPRET DIVISION

Three Sets of Four: What the Spell Does to Twelve

Source book: The Multiplying Menace Divides | 30 minutes

I CAN	I can interpret a quotient using equal groups.
BIG IDEA	Division can ask for the number of groups or the amount in each group.
SUCCESS	The student labels total, number of groups, and amount per group.

- 1. Connect | 5 minutes For seven days the groups were known and the total was the thing worked out. Ask what has been given every time so far, and what has been found. Today the total is given first and the groups are what is missing.

Taught on its own: Put out twelve counters and ask students to share them into three equal groups, then say what the three counts and what the four counts.

- 2. Source lesson | 20 minutes Partition 12 as three groups of four and four groups of three, naming what each quotient means. Teach the full source lesson as written, including its named materials and student product.
- 3. Close | 5 minutes Students finish: ____ shared into ____ groups gives ____ in each group. Ask what the quotient counts in their sentence: the groups, or what sits inside one.

WATCH FOR

A quotient read as the number of groups when the problem asked for the amount in each, or the reverse.

CHECKPOINT B

Give one situation and ask for it twice: once as equal groups and once as an equation. Ask the student to name what the quotient counts. Score only: representation, accurate relationship, and explanation. Reteach the relationship, not a memorized procedure, when the model and the equation disagree.

LESSON 9 · ARRAYS CONNECT OPERATIONS

Five Rows of Three: Drawing Peter's Fifteen Holes

Source book: The Multiplying Menace Divides | 30 minutes

I CAN	I can write related equations from an array.
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BIG IDEA	One array can represent related multiplication and division facts.
SUCCESS	A correct array and at least two related equations.

1. Connect | 5 minutes Yesterday a total was split into equal groups. Ask whether yesterday's three numbers could also have been written as a multiplication.

Today one array is asked to produce both kinds of equation without being redrawn.

Taught on its own: Draw an array of five rows of three and ask what division question it could answer.

2. Source lesson | 20 minutes Build an array for a division situation and write the related multiplication and division equations. Teach the full source lesson as written, including its named materials and student product.
3. Close | 5 minutes Students finish: My array shows $___ \times ___ = ___$ and $___ \div ___ = ___$. Both equations have to come off the same drawing: the rows give one, and reading down a column gives the other without a new count.

WATCH FOR

A division equation worked out separately instead of read from the array already drawn.

LESSON 10 · UNKNOWN NUMBER OF GROUPS

How Many Groups Made Four Frogs?

Source book: The Multiplying Menace Divides | 30 minutes

I CAN	I can find a missing number of groups and check it.
BIG IDEA	The total and the amount in each group determine how many groups there are.
SUCCESS	A correct number of groups, a matching model, and a multiplication check.

1. Connect | 5 minutes Yesterday one array carried a multiplication and a division at the same time. Ask which number in that array the division was looking for.

Today that number is missing from the start, and the array has to be built to find it.

Taught on its own: Show twenty counters and bags that hold four each, and ask how many bags will be filled.

2. Source lesson | 20 minutes Use the total and the amount in each group to determine how many groups there are. Teach the full source lesson as written, including its named materials and student product.
3. Close | 5 minutes Students finish: I knew $___$ in all and $___$ in each group, so there were $___$ groups, and I checked by $___$. The check has to be a multiplication, not a second count.

WATCH FOR

The answer recounted as the check instead of multiplied back.

Culminating performance task

A creature keeper has 24 food pieces. Students build or draw two genuinely different multiplication arrays for 24: 3×8 and 4×6 . They write the related multiplication and division equations, then solve: (a) 4 pieces per bowl - how many bowls? (b) 6 bowls - how many pieces per bowl? (c) 3 pieces per bowl - how many bowls? Finally, they explain how the two arrays support the three division answers.

Student directions

- Build or draw both arrays so another student can check them.
- Write the matching multiplication and division equations.
- Label what every number counts.
- Explain one relationship using the model as evidence.

Dimension	3 - Secure	2 - Developing	1 - Beginning
Representation	Complete, accurate, and checkable	Mostly accurate; one small mismatch	Missing or does not match quantities
Calculation	All relationships and results are correct	One minor error with sound structure	Operations or relationships are unclear
Meaning	Every number and unit is interpreted	Most labels are present	Bare numbers or keyword reasoning
Explanation	Uses model evidence to justify claim	States a valid reason with limited evidence	Restates answer without justification

TEACHER KEY

The required arrays are 3×8 and 4×6 . Turning an array does not create a second array. Related equations include $3 \times 8 = 24$, $8 \times 3 = 24$, $24 \div 3 = 8$, $24 \div 8 = 3$, $4 \times 6 = 24$, $6 \times 4 = 24$, $24 \div 4 = 6$, and $24 \div 6 = 4$.

In part (a), 6 counts bowls. In part (b), 4 counts pieces in each bowl. In part (c), 8 counts bowls, so the 3×8 array supplies evidence for a division question. Both required arrays stay within the Grade 3 multiplication range used in this unit.

TumbleTA Math Unit · Launch Collection

Reproducible | Mathematical evidence sheet

Name _____ Date _____

Problem or claim

My model

My equation or comparison

My explanation

Teacher planning and handoff

Before teaching

- Open each named source lesson and print only its listed student pages.

- Prepare the concrete materials named in the source lesson; do not substitute a picture when the proof depends on moving or grouping objects.
- Choose whether the final explanation will be oral, written, or recorded.

If time is tight

- Keep the 20-minute core intact. Shorten the opening to its first question and collect the source product as the close.
- Do not remove the model-building step; it is the evidence base for the unit.

If you teach one lesson on its own

Use the standalone opening printed under Connect instead of the sequenced opening. Everything else in the lesson stands alone.

Using the Pennsylvania expectations

Use CC.2.2.3.A.1, CC.2.2.3.A.2 as the direct unit-level curriculum connections.

TEACHER NOTE

You know your students and what they need today. Use what works, change what does not, and preserve the mathematical evidence: the quantities, equal-group relationships, models, and explanations.