

Sherman School

Unit Overview

Subject: Mathematics

Grade: 3

Unit: Extending Multiplication and Fractions

Pacing: 20 days/April

Essential Question(s): How can we use what we know about basic multiplication and arrays to begin to multiply large numbers?

Big Idea(s):

- The distributive property can be applied as a strategy for solving multi-digit multiplication.
- Fractions describe not only parts of a whole, but parts of a set where the denominator is the total number within the entire set.

CCSS Priority Standards
3.OA.1: Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5×7 .
3.OA.5: Apply properties of operations as strategies to multiply and divide. Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$ then $15 \times 2 = 30$, or by $5 \times 2 = 10$ then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.) (Students need not use formal terms for these properties.)
3.OA.7: Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of one-digit numbers.
3.OA.8: Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).)
3.NBT.3: Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9×80 , 5×60) using strategies based on place value and properties of operations. (A range of algorithms may be used.)
3.NF.1: Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned

into b equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)

3.NF.2: Understand a fraction as a number on the number line; represent fractions on a number line diagram. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)

3.NF.2a: Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size $1/b$ and that the endpoint of the part based at 0 locates the number $1/b$ on the number line. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)

3.NF.2b: Represent a fraction a/b on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)

3.NF.3: Explain equivalence of fractions (see 3.NF.3a–3.NF.3d) in special cases, and compare fractions by reasoning about their size. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)

3.NF.3a: Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)

3.NF.3b: Recognize and generate simple equivalent fractions (e.g., $\frac{1}{2} = \frac{2}{4}$, $\frac{4}{6} = \frac{2}{3}$), Explain why the fractions are equivalent, e.g., by using a visual fraction model. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)

3.NF.3c: Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form $3 = \frac{3}{1}$; recognize that $\frac{6}{1} = 6$; locate $\frac{4}{4}$ and 1 at the same point of a number line diagram. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)

3.NF.3d: Compare two fractions with the same numerator or the same denominator, by reasoning about their size, Recognize that valid comparisons rely on the two fractions referring to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)

3.MD.7b: Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

3.MD.7c: Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning

3.G.2: Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part is $\frac{1}{4}$ of the area of the shape.

3.MP.6 Model with mathematics.

3.MP.7 Look for and make use of structure.

Skills
(What Students Need to Be Able To Do)

- Interpret products of whole numbers.
- Multiply using the commutative, associative, and distributive properties.
- Fluently multiply with products to 100 using strategies.
- Solve two-step story problems using addition, subtraction, multiplication, and division.
- Write equations with a letter standing for the unknown quantity to represent two-step story problems.
- Assess the reasonableness of answers to story problems using mental computation, rounding, and other estimation strategies.
- Multiply whole numbers from 1 to 9 by multiples of 10 from 10 to 90 using strategies based on place value and properties of operations.
- Demonstrate an understanding of a unit fraction $\frac{1}{b}$ as 1 of b equal parts into which a whole has been partitioned, and of a fraction $\frac{a}{b}$ as a equal parts, each of which is $\frac{1}{b}$ of a whole.
- Place fractions in their correct positions on a number line.
- Show a unit fraction $\frac{1}{b}$ on a number line by defining the interval from 0 to 1 as the whole and then partitioning it into b equal parts.
- Show that if the interval from 0 to 1 on the number line is partitioned into b equal parts, each part is $\frac{1}{b}$ of the whole.
- Locate $\frac{1}{b}$ on the number line after partitioning the interval from 0 to 1 into b equal parts.
- Show a fraction $\frac{a}{b}$ on a number line by marking off, starting at 0, a lengths of $\frac{1}{b}$ each and labeling the resulting interval $\frac{a}{b}$.
- Identify equivalent fractions by comparing their sizes or their locations on a number line.

- Recognize and generate simple equivalent fractions, and explain why they must be equivalent.
- Write a whole number as a fraction; Recognize fractions that are equivalent to whole numbers.
- Compare two fractions with the same numerator or denominator; use the symbols $>$, $=$, and $<$ to record comparisons; explain why one fraction must be greater than or less than another fraction.
- Find the area of a rectangle by multiplying its side lengths; represent the product of two numbers as the area of a rectangle with side lengths equal to those two numbers.
- Use the area model for multiplication to illustrate the distributive property.
- Express the area of each equal part of a whole as a unit fraction of the whole

Research Based Effective Teaching Strategies

Summarizing and note taking

Homework and practice

Non-linguistic representations

Cooperative learning

Productive struggle

Setting objectives and providing feedback

Questions, cues, and advance organizers

Explicit instruction

Assessments:

M1, S1 Unit 7 Pre-Assessment

M4, S2 Fractions Checkpoint

M4, S5 Unit 7 Post-Assessment

7A-7B Workplace Observational Assessments, Bridges

Instructional Resources:

Unit 7 Extending Multiplication & Fractions, Bridges; [The Math Learning Center](#)

April Number Corner; [The Math Learning Center](#)

The Math Forum

Teacher Made Resources