04. Multiplication Strategies and Exploring Equal Parts

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **4 weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

Students will relate their whole vs. part understanding of fractions to visual and symbolic representations.

Students will develop multiplication strategies through arrays, area models and properties of multiplication.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Essential Questions:

- Why do we need fractions?
- How can patterns be used to solve problems?

Enduring Understandings:

- Other numbers exist in addition to whole numbers
- The number one can be broken down into fractional parts that are also numbers.
- There are strategies to find patterns in a sequence of numbers.
- Equations can model real-world problems.

CONTENT AREA STANDARDS

3.OA

A. Represent and solve problems involving multiplication and division

B. Understand properties of multiplication and the relationship between multiplication and division

C. Multiply and divide within 100

D. Solve problems involving the four operations, and identify and explain patterns in arithmetic

3.NBT

A. Use place value understanding and properties of operations to perform multi-digit arithmetic

MA.3.OA.A.1	Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each.
MA.3.OA.A.2	Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each.
MA.3.OA.A.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
MA.3.OA.A.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
MA.3.OA.B.5	Apply properties of operations as strategies to multiply and divide.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.3.OA.C.7	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
MA.3.OA.D.9	Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.
MA.3.NF.A.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 $1/b$.
MA.3.NF.A.3	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
MA.3.NF.A.3a	Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
MA.3.NF.A.3b	Recognize and generate simple equivalent fractions (e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.
MA.3.NF.A.3c	Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.
MA.3.NF.A.3d	Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer 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.
MA.3.MD.C.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.
MA.3.G.A.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

LA.K-12.NJSLSA.R1	Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
LA.K-12.NJSLSA.SL1	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and

	persuasively.
LA.K-12.NJSLSA.SL4	Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
CS.K-12.3	Recognizing and Defining Computational Problems
CS.K-12.5	Creating Computational Artifacts
CS.K-12.6	Testing and Refining Computational Artifacts
TECH.9.4.5.CT	Critical Thinking and Problem-solving
TECH.9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
TECH.9.4.5.IML.2	Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3).

STUDENT LEARNING TARGETS

- I can compare two fractions with the same numerator or the same denominator by reasoning about their size.
- I can justify the conclusions of fraction comparisons and record the results.
- I can apply properties of operations (Commutative, Associative, and Distributive) as strategies to multiply and divide.
- I can determine the unknown whole number in a multiplication or division equation relating three whole numbers.
- I can explain arithmetic patterns using properties of operations.
- I can explain why the fractions are equivalent.
- I can express the area of each part as a unit fraction of the whole.
- I can express whole numbers as fractions.
- I ccan find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts.
- I can identify arithmetic patterns (including patterns in the addition table or multiplication table).
- I can interpret products of whole numbers.
- I can interpret whole-number quotients of whole numbers.
- I can multiply whole-number side lengths to find areas of rectangles in the context of solving real world and mathematical problems.
- I can partition shapes into parts with equal areas.
- I can recognize and generate simple equivalent fractions.
- I can solve real world area problems by decomposing rectlinear figures and adding the areas of the non-overlapping parts.
- I can solve word problems (using multiplication and division within 100) in situations involving equal groups, arrays, and measurement quantities.
- I can understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts.
- I can understand a fraction a/b as the quantity formed by a parts of size 1/b.
- I can understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
- I can know from memory all products of two one-digit numbers (by the end of third grade).
- I can multiply and divide within 100 fluently.

- I can recognize fractions that are equivalent to whole numbers. *Retrieval*
- I can recognize that comparisons of two fractions are valid only when the two fractions refer to the same whole.

Declarative Knowledge

Students will understand that:

- Apply propersties of operations (Cummutative, Associative, and Distributive) as strategies to multiply and divide
- Determine the unkown whole number in a multiplication or division equation relating three whole numbers
- Express the area of each part as a unit fraction of the whole
- Express whole numbers as fractions
- Interpret products of whole numbers
- Multiply whole number side lengths to find areas of rectangles in the context of solving real world and mathematical problems
- Recognize and generate simple equivalent fractions
- Solve real world problems (using multiplication and division within 1000) in situations involving equal groups, arrays, and measurement quantities
- Understand a fraction as 1/b as the quantitiy formed as 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
- Understand two fractions as equivalent (equal) if they are the same size or the same point on a number line
- Know from memory all products of two one-digit numbers (by the end of third grade)
- Multiply and divide within 100 fluently
- Recognize fractions that are equivalent to whole numbers

Procedural Knowledge

Students will be able to:

- Compare two fractions with the same numerator or the same denominator by reasoning about their size
- Justify conclusions of fraction comparisons and record the results
- Explain arithmetic patterns using properties of operations
- Explain why fractions are equivalent
- Find areas of rectilinear figures by decompsing them into non-overlapping rectangles and adding the areas of non-overlapping parts
- Identify arithmetic patterns (including patterns in the addition table and multiplication table)
- Interpret whole number quotients of whole numbers
- Partition shapes into parts with equal areas
- Solve real world area problems by decomposing rectilinear figures and adding the areas of the non-

overlapping parts
- Recognize that comparisons of two fractions are valid only when the two fractions refer to the same whole

EVIDENCE OF LEARNING

Refer to the 'Formative Assessments, Summative, and Benchmark Assessments' sections.

Alternate Assessments

- Portfolios
- Verbal Assessment (instead of written)
- Multiple choice
- Modified Rubrics
- Performance Based Assessments

Formative Assessments

- Journal Pages
- Math Boxes
- Math Talks
- Oen Response Activities
- Stdent Friendly Proficiency Scales
- Exit/Entrance Tickets
- Performance Tasks
- Teacher Observations

Summative Assessments

- End of Unit Assessment
- Projects

Benchmark Assessments

- IXL Screener / Diagnostic Snapshot BOY
- Interim Assessment 1
- IXL Diagnostic Snapshot MOY
- Interim Assessment 2
- IXL Diagnostic Snapshot EOY

RESOURCES (Instructional, Supplemental, Intervention Materials)

Core Instructional Materials:

- Everyday Math Unit 3 Resources
    - Math Masters
    - Student Journal Volume 1
    - ConnectED

Supplemental Materials:

- IXL
- Illustrative Math Tasks
- EM Games

EM LEssons:

- 5.1
- 5.2
- 5.3
- 5.4
- 5.5
- 5.6
- 5.7
- 5.8
- 5.9
- 5.10
- 5.11

INTERDISCIPLINARY CONNECTIONS

English:
Narrative writing related to story problems

Science:
Data collection

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

- Repeat directions
- Provide scaffolds
- Use graphic organizers
- Use wait time
- Provide manipulatives, grid paper
- Provide additional time

See link to Accommodations & Modifications document in course folder.