05. More Operations and Algebraic Thinking

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

General Overview, Course Description or Course Philosophy

In this unit, students will use different approaches to problem-solving and reflect on which strategies are most efficient and appropriate. Students will review multiplication fluency. Students will model number stories with more than one equation, and represent unknown quantities with letters.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Essential Questions:

- How are multiplication and division related?
- How can one use properties and strategies to solve problems?
- How can one use multiplication to help solve division problems?

Enduring Understandings:

- Multiplication and division are inverse relationships
- Using properties can make problems easier
- The total number of objects when grouped can be found most efficiently by multiplication.
- When two out of three numbers are known in an equation there is exactly one number represented by the unknown which will make the statement true.

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

3.M

A. Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects

B. Geometric measurement: understand concepts of area and relate area to multiplication and to addition

C. Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
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.3.OA.B.6	Understand division as an unknown-factor problem.
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.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.
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.NBT.A.2	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
MA.3.MD.C.7	Relate area to the operations of multiplication and addition.

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 assess the reasonableness of answers using mental computation and estimation strategies including rounding.
- 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 identify arithmetic patterns (including patterns in the addition table or multiplication table).
- I can interpret whole-number quotients of whole numbers.
- I can solve two-step word problems using equations with a letter standing for the unknown quantity.
- I can solve word problems (using multiplication and division within 100) in situations involving equal groups, arrays, and measurement quantities.
- I can understand division as an unknown-factor problem.
- I can use area models to represent the distributive property in mathematical reasoning.
- I can 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 x b and a x c.
- I can fuently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
- 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.

Declarative Knowledge

Students will understand that:

- Apply properties of operations (Commutative, Associative, and Distributive) as strategies to multiply and divide
- Determine the unknown whole number in a multiplication or division equation relating to three numbers
- Identify arithmetic patterns
- Interpret whole number quotients of whole numbers

- Understand division as an unknown factor problem
- 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

Procedural Knowledge

Students will be able to:

- Assess the reasonableness of answers using mental computation and estimating strategies as well as rounding
- Explain arithmetic patterns using properties of operations
- Solve two step word problems using equations with a letter standing for the unknown quantity
- Use area models to represent the distributive property in mathematical thinking
- I can 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 x b and a x c
- I can fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction

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:

- 6.1

- 6.2
- 6.3
- 6.4
- 6.6
- 6.7
- 6.8
- 6.9
- 6.10
- 6.11

INTERDISCIPLINARY CONNECTIONS

Science:

Compare and contrast the information gained from experiments

Career Readiness:

Utilize critical thinking and persevere in problem solving

Use technology to enhance problem solving

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.