01. Foundations of Multiplication

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **5 weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

In Grade 3, instructional time will focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes. (NJSLS-Math pg.21)

In this unit, students will use their understanding of addition to build foundational understanding of multiplication. Students will extend their knowledge of equal groups of objects, skip counting, arrays and area models to represent and interpret multiplication and division and their relationship.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Objectives:

- Use number lines to support counting up
- Round numbers to nearest 10, 100
- Represent multiplication in different ways.
- Use addition and multiplication properties to multiply.
- Use models to represent addition and multiplication situations.
- Use skip counting add equal groups

Enduring Understandings:

- Operations create relationships between numbers.
- The relationships among the operations and their properties promote computational fluency
- In certain situations, an estimate is as useful as an exact answer.

Essential Questions:

- How can a problem be simplified?
- What strategies are available to determine how much or how many we have?
- Why would one want to create equal groups of objects?
- Why do I need mathematical operations?
- How do mathematical operations relate to each other?
- How do I know which mathematical operation to use?
- How do I know which computational method (mental math, estimation, paper and pencil, and

calculator) to use?

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.K-12.1	Make sense of problems and persevere in solving them.
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.K-12.4	Model with mathematics.
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-12.8	Look for and express regularity in repeated reasoning.
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.NBT.A.1	Use place value understanding to round whole numbers to the nearest 10 or 100.
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.

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).
	The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.
	Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.

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 products of whole numbers.
- 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 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.
- 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 use place value understanding to round whole numbers to the nearest 10 or 100.

Declarative Knowledge

Students will understand that:

- Interpret products of whole numbers
- Interpret whole number quotients of whole numbers
- Determine the unknown whole number in a multiplication or division equation relating three whole numbers
- Solve word problems (using multiplication and division within 100) in situations involving equal groups, arrays, and measurement quantities
- Identify arithmetic patterns (including patterns in the addition table or multiplication table)
- Know from memory all products of two one-digit numbers (by the end of third grade
- Multuply and divide within 100 fluently

Procedural Knowledge

Students will be able to:

- Assess the reasonableness of answers using mental computation and estimation strategies including rounding
- Apply properties of operations (Commutative, Associative, and Distributive) as strategies to multiply and divide.
- Explain arithmetic patterns using properties of operations
- Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
- Apply properties of operations (Commutative, Associative, and Distributive) as strategies to multiply and divide
- Explain arithmetic patterns using properties of operations
- Use place value understanding to round whole numbers to the nearest 10 or 100

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
- Open Response Activities
- Student 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:

- 1.1
- 1.4
- 1.8
- 1.9
- 1.10
- 1.12 (b and c)
- 2.1
- 2.2
- 2.3
- 2.4
- 2.5
- 2.6
- 2.7
- 2.8
- 2.9
- 2.10
- 2.11
- 2.12 (b)

INTERDISCIPLINARY CONNECTIONS
- Utilize critical thinking to make sense of problems and persevere in solving them
- Consumer/socioeconomics money story problems

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.