Grade 3 Unit 1: Multiplication and Division within 100

Content Area: **Math**
Course(s): **Math Grade 3**
Time Period: **MP1**
Length: **45**
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NJSLS Math

MATH.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.
MATH.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. For example, describe and/or represent a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.
MATH.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.
MATH.3.OA.A.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
MATH.3.OA.B.5	Apply properties of operations as strategies to multiply and divide.
MATH.3.OA.B.6	Understand division as an unknown-factor problem.
MATH.3.OA.C.7	With accuracy and efficiency, 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.
MATH.3.OA.D.8	Solve two-step word problems, including problems involving money, 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.
MATH.3.OA.D.9	Identify arithmetic patterns (including patterns in the addition table or multiplication table) and explain them using properties of operations.

Unit Focus

- Represent and solve problems involving multiplication and division.
- Understand properties of multiplication and the relationship between multiplication and division.
- Multiply and divide within 100.

Standards for Math Practice

MA.K-12.1	Make sense of problems and persevere in solving them.

MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.

Critical Knowledge & Skills

NJSLS Math	Suggested Math Practices	Critical Knowledge and Skills
3.OA.A.1 (**M**) Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. For example, describe and/or represent a context in which a total number of objects can be expressed as 5 x 7.	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics.	Concepts: • Multiplication is a means to determine the total number of objects when there are a specific number of groups with the same number of objects in each group. • Multiplication gives the same result as repeated addition. • Product of two whole numbers is the total number of objects in a number of equal groups. Students will be able to: • Interpret products of whole numbers as a total number of objects. • Use repeated addition to find the total number of objects arranged in an array and in equal groups and compare to the result of multiplication. • Describe a context in which a total number of objects is represented by a product. • Interpret the product in the

		context of a real-world problem. Learning Goal 1: • Interpret products of whole numbers as repeated addition and as the total number of objects (up to 100) in equal groups or arrays.
3.OA.A.3 (**M**) 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.  Climate Change Example: Students may solve multiplication and division word problems involving measurement quantities related to glacier retreat.	MP.1 Make sense of problems and persevere in solving them. MP.4 Model with mathematics.	Concepts: • No new concepts introduced Students will be able to: • Multiply to solve word problems involving equal groups and arrays. • Divide to solve word problems involving equal groups and arrays. • Represent a word problem with a drawing showing equal groups, arrays, equal shares, and/or total objects. • Represent a word problem with an equation. Learning Goal 2: • Use multiplication and division within 100 to solve word problems by modeling equal groups or arrays and by writing equations to represent equal groups or arrays.

3.OA.B.5 (**M**) Apply properties of operations as strategies to multiply and divide. Examples: If 6 x 4 = 24 is known, then 4 x 6 = 24 is also known. (Commutative property of multiplication.) 3 x 5 x 2 can be found by 3 x 5 = 15, then 15 x 2 = 30, or by 5 x 2 = 10, then 3 x 10 = 30. (Associative property of multiplication.) Knowing that 8 x 5 = 40 and 8 x 2 = 16, one can find 8 x 7 as 8 x (5 + 2) = (8 x 5) + (8 x 2) = 40 + 16 = 56. (Distributive property.) (Clarification: Students need not use formal terms for these properties).	MP.3 Construct viable arguments and critique the reasoning of others. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concepts: • Properties are rules about relationships between numbers. • Changing the order of factors does not change the result of multiplication. • Changing the order of numbers does change the result of division. • Area models can be used to represent the distributive property. Students will be able to: • Multiply whole numbers using the commutative property as a strategy. • Multiply whole numbers using the associative property as a strategy. • Multiply whole numbers using the distributive property as a strategy. Learning Goal 3: • Multiply one-digit whole numbers by applying the properties of operations (commutative, associative, and distributive properties).

3.OA.A.2 (**M**) 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. For example, describe and/or represent a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics.	Concepts: • Division is a means of finding equal groups of objects. • Division gives the same result as repeated subtraction. • Quotient of two whole numbers is the number of objects in each share when objects are grouped equally into shares. • Quotient of two whole numbers is the number of shares when objects are grouped into equal shares of objects. Students will be able to: • Interpret division of whole numbers as a number of equal shares or the number of groups when objects are divided equally. • Use repeated subtraction to find the number of shares or the number of groups and compare to the result of division. • Describe a context in which the number of shares or number of groups is represented with division. Learning Goal 4: • Interpret the quotient as a set of objects (up to 100) partitioned equally into a number of shares and as the number of equal shares.

3.OA.D.9 (**M**) Identify arithmetic patterns (including patterns in the addition table or multiplication table) and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.	MP.3 Construct viable arguments and critique the reasoning of others. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.	Concepts: • Addition and multiplication tables reveal arithmetic patterns. • Patterns may be related to whether a number is even or odd. • Patterns exist in rows, columns and diagonals of addition tables and multiplication tables. • Decomposing numbers into equal addends may reveal patterns. Students will be able to: • Explain arithmetic patterns using properties of operations. Learning Goal 5: • Recognize arithmetic patterns, including patterns in addition or multiplication tables, and explain the patterns using properties of operations.
3.OA.C.7 (**M**) With accuracy and efficiency, multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 x 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.	MP.2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.	Concepts: • No new concept) introduced Students will be able to: • Multiply and divide within 25 with accuracy and efficiency. Learning Goal 6: • Fluently multiply and divide within 25 using strategies such as the relationship between

		multiplication and division.
3.OA.B.6 (**M**) Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.	MP.3 Construct viable arguments and critique the reasoning of others. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concepts: • Division can be represented as a multiplication problem having an unknown factor. • Relationships between factors, products, quotients, divisors and dividends. Students will be able to: • Write division number sentences as unknown factor problems. • Solve division of whole numbers by finding the unknown factor. Learning Goal 7: • Solve division of whole numbers by representing the problem as an unknown factor problem.
3.OA.A.4 (**M**) Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 x ? = 48, 5 = ? ÷ 3, 6 x 6 = ?.	MP.2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure.	Concepts: • Equal sign indicates that the value of the numerical expressions on each side are the same. • Unknown in an equation (4 x __ = 20 and 20 = ? x 4) represents a number. • Unknown can be in

		different positions. • Letters can represent numbers in equations. Students will be able to: • Determine which operation is needed to find the unknown. • Multiply or divide, within 100, to find the unknown whole number in a multiplication or division equation. Learning Goal 8: • Determine the unknown in a division or multiplication equation relating 3 whole numbers (within 100).
3.OA.D.8 (**M**) Solve two-step word problems, including problems involving money, 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. (Clarification: 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)  Climate Change Example: Students may use the four operations to solve two-step word problems related to glacier retreat.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.4 Model with mathematics MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	Concepts: • Letters or symbols in an equation represent an unknown quantity. Students are able to: • Represent the solution to two-step word problems with equations. • Use a symbol to represent an unknown in an equation. • Use rounding as an estimation strategy. • Explain, using an estimation strategy, whether an answer is reasonable. Learning Goal 9: • Write equations when solving two-step word problems, using a symbol

		for an unknown; find the value of an unknown in an equation involving any of the four operations and use estimation strategies to assess the reasonableness of answers.

School/District Formative Assessment Plan

- Topic 1-1 through 1-6 Quick Check (found in Savvas Realize)
- Topic 2-1 through 2-6 Quick Check (found in Savvas Realize)
- Topic 3-1 through 3-7 Quick Check (found in Savvas Realize)
- Topic 4-1 through 4-9 Quick Check (found in Savvas Realize)
- Topic 5-1 through 5-6 Quick Check (found in Savvas Realize)

School/District Summative Assessment Plan

- Topic 1 Assessment
- Topic 2 Assessment
- Topic 3 Assessment
- Topic 4 Assessment
- Topic 5 Assessment

Benchmark & Alternative Assessments

- STAR Renaissance
- LinkIt Benchmarks
- Performance Tasks (found in Savvas Realize)

Focus Mathematical Concepts

Pre-requisite skills

- Use repeated addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns (2.OA.C.4).
- Write an equation to express the total number of objects arranged in a rectangular array as a sum of equal addends (2.OA.C.4).
- Determine whether a group of objects up to 20 is odd or even (e.g., by pairing objects, counting them by 2s) (2.OA.C.3).
- Write an equation to express an even number as a sum of two equal addends (2.OA.C.3).
- Represent a word problem using drawings and equations using a symbol for the unknown (2.OA.A.1).
- Solve one and two-step addition and subtraction word problems within 100 involving situations of adding to, taking from, putting together, taking apart, and comparing (2.OA.A.1).

Common Misconceptions

- Students think a symbol (? or []) is always the place for the answer. This is especially true when the problem is written as 15 ÷ 3 = ? or 15 = ? x 3.
- Students also think that 3 ÷ 15 = 5 and 15 ÷ 3 = 5 are the same equations. The use of models is essential in helping students eliminate this understanding.
- The use of a symbol to represent a number once cannot be used to represent another number in a different problem/situation. Presenting students with multiple situations in which they select the symbol and explain what it represents will counter this misconception.

Number Fluency

- 3.OA.C.7 Multiply and divide within 100; Know single digit products from memory.
- 3.NBT.A.2 Add and subtract within 1000.

District/School Tasks

- Pick A Project (found in Savvas Realize)
- Performance Tasks (found in Savvas Realize)

District/School Primary, Supplemental, & Intervention Resources

- Envisions by Savvas
- STAR Renaissance
- Freckle Math
- Connecting Math Concepts
- Corrective Math

Instructional Best Practices/Open Educational Resources

Illustrative Mathematics

Desmos

Numeracy Tasks

Building Thinking Classrooms Tasks

Open Middle Math Tasks

Resources from Dr. Eric Milou

Career Readiness, Life Literacies, and Key Skills

PFL.9.1.5.CR.1	Compare various ways to give back and relate them to your strengths, interests, and other personal factors.
WRK.9.2.5.CAP.3	Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
WRK.9.2.5.CAP.4	Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.
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.CT.3	Describe how digital tools and technology may be used to solve problems.
TECH.9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).
TECH.9.4.5.TL.2	Sort and filter data in a spreadsheet to analyze findings.

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).
TECH.9.4.5.IML.3	Represent the same data in multiple visual formats in order to tell a story about the data.

Computer Science and Design Thinking

CS.3-5.8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
CS.3-5.8.1.5.DA.2	Compare the amount of storage space required for different types of data.
CS.3-5.8.1.5.DA.3	Organize and present collected data visually to communicate insights gained from different views of the data.
CS.3-5.8.1.5.DA.4	Organize and present climate change data visually to highlight relationships or support a claim.
CS.3-5.8.1.5.DA.5	Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Interdisciplinary Connections

ELA.RI.CR.3.1	Ask and answer questions and make relevant connections to demonstrate understanding of an informational text, referring explicitly to textual evidence as the basis for the answers.
ELA.RI.CI.3.2	Recount in oral and written form the key details from a multi-paragraph informational text and explain how they support the main idea.
ELA.RI.IT.3.3	Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
SCI.3-LS3-1	Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.
ELA.W.AW.3.1	Write opinion texts to present an idea with reasons and information.
ELA.W.IW.3.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
SCI.3-LS3-2	Use evidence to support the explanation that traits can be influenced by the environment.
SCI.3-LS4-2	Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
ELA.SL.PI.3.4	Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.
SCI.3-LS4-3	Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
SCI.3-ESS2-1	Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.