

Operations and Algebraic Thinking: Grade 4

Stage 1 Desired Results

ESTABLISHED GOALS:

Competencies:

- ***Students will demonstrate the ability to solve arithmetic and algebraic problems by utilizing effective strategies and applying properties of operations to multi-digit whole integers and to fractions.***
- ***Students will demonstrate the ability to model operations by utilizing objects, drawings, and equations.***

Content Standards:

- 4.OA.1 Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
- 4.OA.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.
- 4.OA.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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.
- 4.OA.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.
- 4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.
- MP4 Model with mathematics.
- MP6 Attend to precision.
- MP7 Look for and make use of structure.
- MP8 Look for and express regularity in repeated reasoning.

Transfer

Students will be able to independently use their learning to solve arithmetic and algebraic problems, with fluency.

Meaning

ENDURING UNDERSTANDINGS

Students will understand that...

- mathematical operations are used in solving problems in which a new value is produced from one or more values.
- algebraic thinking involves choosing, combining, and applying effective strategies for answering quantitative questions.

ESSENTIAL QUESTIONS

- ***Does order matter?***

Acquisition

Students will know...

- that a multiplication equation can be interpreted as a comparison.
- multi-step word problems may require the use of more than one operation.
- the factor pairs (1-100).

Students will be skilled at...

- write multiplication equations as multiplicative comparisons and vice versa.
- determining when to multiply or divide in word problems.
- solving a multiplication or division word problem involving multiplicative comparisons using drawings and equations.
- writing an equation using a variable to represent the unknown.
- choosing the correct operation to perform at each step of a multi-step word problem.
- interpreting remainders in word problems.
- using mental math or estimation strategies to check for the reasonableness of an answer.
- listing all of the factor pairs for any whole number in the range 1-100 (multiplication facts).
- generating a pattern that follows a given rule.
- identifying and explaining features of a pattern not explicit in the rule generating the pattern.

vocabulary:

multiplicative comparison, additive comparison, pattern, rule, factors, factor pairs, multiples, prime, composite, remainder

		- distinguishing between multiplicative and additive comparisons. - determining in a whole number up to 100 is a multiple of 1-digit whole number. - determining if a whole number up to 100 is prime or composite.
Content Area Literacy Standards		21st Century Skills
not applicable		- solve problems - reason effectively - use and manage information

Stage 2 - Evidence

Evaluative Criteria	Assessment Evidence
	PERFORMANCE TASK(S):
	OTHER EVIDENCE:

Stage 3 – Learning Plan

Summary of Key Learning Events and Instruction

Language Arts Integration	Mathematics Integration
1.OA.1 Use	not applicable
Technology Integration	District Materials
1.OA.1 Use	

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