

Appendix 1: Implementing Teaching Strategies

CCSS.MATH.CONTENT.4.OA.A.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.*

As students enter fourth grade, many have difficulty with mastering multiplication which foundation for most of the yearly instruction. Students need to be proficient with understanding how numbers are multiplied in groups and how equations can be written and interpreted. The use of beginning level KenKen puzzles will help develop fluency with multiplication. As students become more proficient with multiplying single digit numbers, they will increase their reasoning ability with two-digit by one digit multiplication problems.

CCSS.MATH.CONTENT.4.OA.A.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.*¹

Students have been taught this year, when solving for the unknown variable, the variable can be represented as an alphabet, symbol or even an empty space. KenKen puzzles have empty spaces for students to reason and problem solve using all operations of multiplying, dividing, adding and subtracting.

CCSS.MATH.CONTENT.4.NBT.B.4-*Fluently add and subtract multi-digit whole numbers using the standard algorithm.*

As students transition into fourth grade, the use of standard algorithm is required with adding and subtracting. KenKen puzzles reinforce this standard as students use a variety of conjectures to test while adding and subtracting to complete each puzzle. Depending on the puzzle represented, students may solve puzzles that are one operation or multiple which increases the difficulty to the task.

CCSS.MATH.CONTENT.4.OA.C.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.

CCSS.ELA-LITERACY.W.4.1.B

Provide reasons that are supported by facts and details

Mathematically proficient students need to make viable arguments when justifying their responses. Using math facts and details of math work to reason and solve problems is supported writing math responses.