Core Content

Cluster Title: Use place value understanding and properties of operations to perform multi-digit arithmetic. (Note: A range of algorithms may be used.)
Standard 3: Multiply one-digit whole numbers by multiples of 10 in the range 10 - 90 (e.g., 9 x 80, 5 x 60) using strategies based on place value and properties of operations.
MASTERY Patterns of Reasoning:
Conceptual: Students will understand how multiplication of one-digit factors of multiples of 10 connects with multiplication of two one-digit whole numbers. Students will understand multiplication as finding an unknown factor. **Procedural:** Students can multiply one-digit factors by multiples of 10 up to 90. Students can use strategies involving properties of operations to calculate products relating to this standard. Students can use strategies involving place value to calculate products relating to this standard. **Representational:** Students can use manipulatives to demonstrate understanding of multiplication using multiples of 10. Students can use number lines to demonstrate understanding of multiplication using multiples of 10. Students can use hundreds charts to demonstrate understanding of multiplication using multiples of 10.

Supports for Teachers

Critical Background Knowledge
Conceptual: Students will understand place value. Students will understand that multiplication is repeated addition. **Procedural:** Students can count within 1,000; skip-count by 10s or 100s. Students can read and write numbers to 1,000 using base-ten numerals and number names. Students can fluently multiply within 100 (3.OA.7).

Representational:

Students can demonstrate that 100 can be thought of as a bundle of ten tens — called a “hundred.”
Students can use place value blocks to model multiplication.
Students can multiply on a 100’s chart and number line.
Students can manipulate objects to demonstrate properties of operations**.**

Academic Vocabulary and Notation

multiplication, factors, product, array, row, columns, commutative (order) property of multiplication, multiples

Instructional Strategies Used	Resources Used
Help students to connect their understanding of place value to multiples of ten. Help them understand that since 30 is 3 tens and 80 is 8 tens, they are multiples of ten, since a multiple of ten is 10 multiplied by another number. In this standard we work with the multiples of 10 from 10 to 90. Have students use base-ten blocks, number lines, diagrams, or hundreds charts to multiply one-digit numbers by multiples of tens. Have the students share their strategies with each other and explain their reasoning. Discuss the strategies together as a class. For example, students might remember from 3.OA.1 that 3 x 2 can be interpreted as 3 groups of 2 objects each. Through their understanding of place value, students reason that 3 x 20 can be interpreted as 3 groups of 20 objects each or 6 tens and 6 tens is 60. Have students use the same factor and all multiples of ten and look for a pattern in the multiplication. Then try another factor.	http://www.oswego.org/ocsd-web/games/Ghostblasters1/gbcd.html http://www.ictgames.com/fairyfog10s_v2.html (can help low-level students)

Assessment Tasks Used	
Skill-Based Task: 10 x 6 =	**Problem Task:** There are 10 monkeys and each has 6 bananas. How many bananas are there in all? Tami wanted to prove to her little brother Timothy that his 240 toy cars could be grouped in more than one way. How many groupings could she find using multiples of ten up to 90? What are they? Were Tami's groupings accurate? How do you know? What properties of operations did she use?