

STANDARD 3 (3.NBT.A.3)

Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80 , 5×60) using strategies based on place value and properties of operations.

Students extend their understanding of multiplying two single-digit numbers to multiplying a single-digit number by a multiple of 10. They begin using concrete models and groups of 10, for example, showing 3×10 as 3 bundles of 10 or 30. Using the commutative property, they conclude that 10×3 is also 30. Students discuss patterns linking previous understanding that 30 means 30 ones or 3 tens. Additional representations including number lines and skip counting support their thinking.

They continue with other multiples of 10 within the range of 10 to 90 using models, reasoning, and patterns to generalize a method or algorithm for finding the product of a one-digit number times a multiple of 10.

It is important for students to have many experiences to model, explain, and generalize rather than to be shown tricks about adding zeros. Such tricks and short cuts hinder understanding of place value's role in multiplication, a concept that will become very important as students work with more complex multiplication examples.

What the TEACHER does:

- Begin with examples of multiplying a one-digit factor by 10. Provide opportunities for students to model the examples, explain their reasoning including connecting the meaning of 30 to 30 ones or 3 tens.
- Ask questions that help students to generalize that when they multiply a one-digit number by 10, the product will be that number of tens.
- Extend examples to multiplication by 20, 30, up to 90 using models, skip counting, number lines.
- Ask questions that help students to generalize what happens when they multiply a one-digit number by a multiple of 10.
- Require students to explain their thinking, generalize, and justify their generalizations using a variety of strategies.

What the STUDENTS do:

- Use their understanding of the meaning of multiplication to model examples of multiplying a one-digit number by 10.
- Demonstrate an understanding that a one-digit number multiplied by ten gives a multiple of 10 (for example, $6 \times 10 = 60$), which is the same as that number of ones (60) or that number of tens (6 tens).
- Model multiplication of a one-digit number by a multiple of 10 (from 10 to 90) using concrete materials, number lines, skip counting, and the distributive property.
- Discuss patterns and make generalizations.

Addressing Student Misconceptions and Common Errors

Teaching shortcuts (adding a zero to the product of the two non-zero whole numbers) rather than understanding the relationship between the product and its place value does not establish the underlying importance of place value in multiplication. Understanding that multiplying 4×30 means I have 4 groups of 3 tens and that is 12 tens or 120 (rather than multiply 4×3 and “add a zero at the end”) is fundamental to ongoing work with multiplication and working with partial products. Students who recognize and can explain a pattern rather than following a rule begin to understand the structure of multiplication rather than a meaningless shortcut.

Notes
