

## Standards for Mathematical Practice

[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.  
[MP.7.](#) Look for and make use of structure.  
[MP.8.](#) Look for and express regularity in repeated reasoning.

## Standard

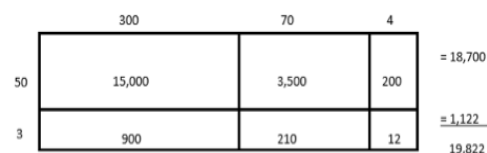
## Clarifications

**KY.5.NBT.5**

Fluently multiply multi-digit whole numbers (not to exceed four-digit by two-digit multiplication) using an algorithm.

**Alternate Assessment Target:**  
*Limit to products within 1000.*

Students make connections from previous work with multiplication, using models/representations to develop an efficient algorithm to multiply multi-digit whole numbers.



$$\begin{array}{r}
 374 \\
 \times 53 \\
 \hline
 12 \ (3 \times 4) \\
 210 \ (3 \times 70) \\
 900 \ (3 \times 300) \\
 200 \ (50 \times 4) \\
 3,500 \ (50 \times 70) \\
 15,000 \ (50 \times 300) \\
 \hline
 19,822
 \end{array}$$

**Alternate Assessment Clarification:**  
 Answers need to stay within 1000.

## Connections to Math Practices

## Coherence/Foundational Understandings

**MP.7** Look for and make use of structure. (Simplify problems by using their structure.\*)  
 Students may stack the two values and use an algorithm. Students recognize a rectangle is an effective model for ensuring all partial products are calculated, for both whole numbers and decimals. Students understand when given a multiplication problem, they have a choice in how they solve it and select a way that makes sense for the values in the problem. For example, for  $1234 \times 12$ , they see the small numbers lend to a break apart strategy and solve the problem this way:  $1234 \times 10 = 12340$   $1234 \times 2 = 2468$   
 Then add the partial products to equal 14,808

**MP.8** Look for and express regularity in repeated reasoning.  
 (Simplify problems by noticing patterns.\*)  
 Notice patterns in calculations or solutions to problems while generalizing methods and shortcuts.

**MP.6** Attend to precision. (Communicate precisely.\*)  
 Students will give a carefully formulated explanation of their thinking and understanding in light of definitions and constraints.

**Key Vocabulary:** Distributive property, product, rectangular arrays, area model

Click here to see more about what teachers and students do to build the math practices:

[Engaging the Math Practices and Question Stems](#)

## Pre-requisite Skills

- Recognize that in a multi-digit whole number, a digit in one place represent 10 that to its place to the right
- Read and Write whole numbers
- Add and subtract multi-digit whole numbers

[KY.3.NBT.3](#)

[KY.4.NBT.5](#)

**Coherence** [KY.4.NBT.6](#) → [KY.5.NBT.6](#) → [KY.6.NS.2](#)

[Kentucky Academic Standards for Mathematics](#)

\*Clarification to the [math practices by Robert Kaplinsky](#).

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## Instructional Considerations

### Possible Areas of Difficulties/Misconceptions

- Students use the procedure learned for addition and apply it to multi digit multiplication.
- Students add the amount that is regrouped to the amount in the multiplicand and then multiply.
- Students think that division is commutative.
- Students multiply correctly by one digit but ignore the value of the digit.
- Students multiply each digit as if it represents a number of ones. Ignores place value completely.

### Suggested Tools/Visual Aids -

- [KY Alternate Assessment Resource Guide](#) (General terms pps 6-11 ; Math terms pps 22-26)
- Rectangular Arrays and Area Models
- Graphic organizers
- Base ten blocks
- Students should have concrete experiences that connect to written expressions