Accessible Algorithms for Multiplication

For multi-digit multiplication, first introduce the Rectangle Sections Method presented below. Less advanced students may continue to use the Rectangle Sections Method to organize their multiplying for quite some time, while many students should be able to move towards the Numerical Method that follows. Support students’ use of these accessible algorithms whenever they are working on multi-digit multiplication.

Rectangle Sections Method for Multiplication

As an alternative to using manipulatives or quantity drawings to model multiplication, students may employ area drawings. The model shows each place-value product as a rectangle section. Adding the areas of the sections is known as the Rectangle Sections Method.

Rectangle Sections Method for $13 \times 15 = ?$

```
  10  +  5
  10  100
  10  50
  3  30
  3  3 \times 5 = 15
```

$100 + 50 + 30 + 3 \times 5 = 195$
Expanded Notation Method
Use with Houghton Mifflin Math, Ch 3, Lesson 7.

Students can use the Expanded Notation Method to multiply from left-to-right or right-to-left.

\[
\begin{align*}
67 &= 60 + 7 \\
\times 43 &= 40 + 3 \\
40 \times 7 &= 280 \\
40 \times 60 &= 2,400 \\
3 \times 7 &= 21 \\
3 \times 60 &= 180
\end{align*}
\]

\[
\frac{\text{2,400} + \text{280} + \text{21} + \text{180}}{\text{2,881}}
\]

Algebraic Notation Method
Use with Houghton Mifflin Math, Ch 3, Lesson 7.

For more-advanced students, the Algebraic Notation Method can be used in place of the Expanded Notation Method.

\[
(60 + 7)(40 + 3) = 180 + 280 + 2,400 + 21 = 2,881
\]

Short-Cut (Common) Method
Use with Houghton Mifflin Math, Ch 3, Lesson 7.

The Short-Cut Method is conceptually difficult to understand when students are first learning multiplication. Students can progress to this method from the Expanded Notation Method by collapsing sums.

\[
\begin{array}{cccccc}
\text{Step 1} & \text{Step 2} & \text{Step 3} & \text{Step 4} & \text{Step 5} \\
2 & 2 & 2 & 2 & 2 \\
67 & 67 & 67 & 67 & 67 \\
\times 43 & \times 43 & \times 43 & \times 43 & \times 43 \\
1 & 201 & 201 & 201 & 201 \\
& 0 & 2,680 & 2,680 & 2,881 \\
\end{array}
\]