5.NBT.B.5 Progression

This artifact showcases my progressions when teaching multiplication using the standard algorithm and how a rubric was used to provide feedback on students' quality of work. Throughout the progressions, students were able to connect their conceptual understanding of multiplication in the area model and place value from 5.NBT.A.1 to the standard algorithm.

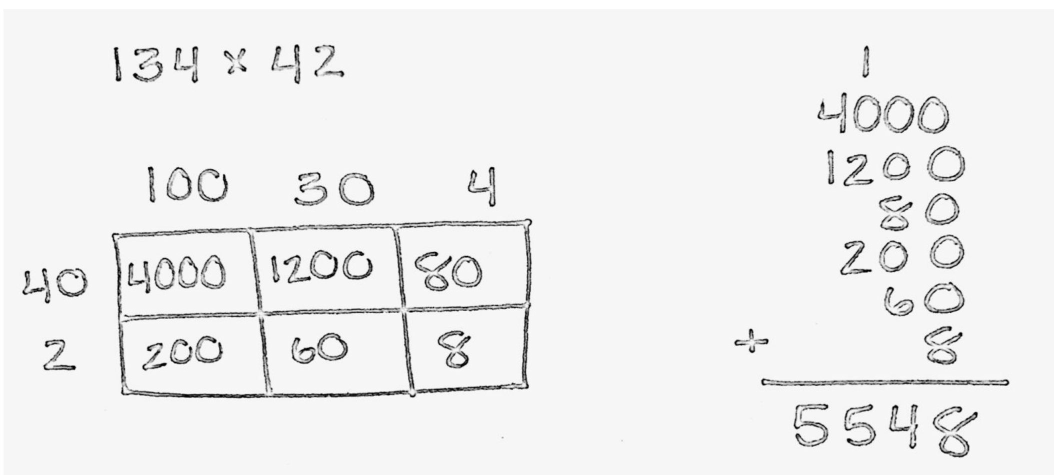
5.NBT.B.5: Fluently multiply multi-digit whole numbers using the standard algorithm

September 2018

- **Multiplication using area model**

  In this step, students reviewed their current skills of multiplication. They did this by using a strategy of decomposing up to three-digit numbers by place value in order to multiply, shown below, from fourth grade. This strategy helps students correlate place value and partial products in order to multiply larger numbers.

  EXAMPLE:

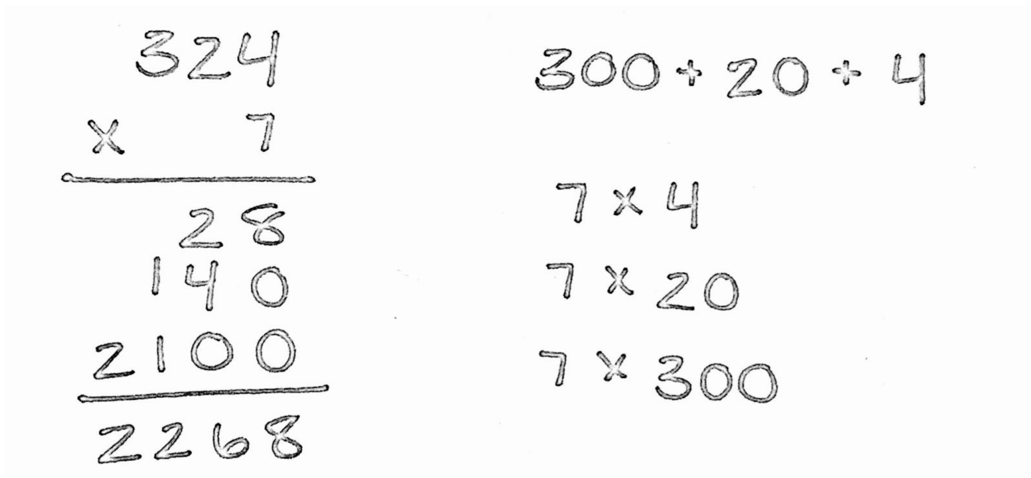


November 2018

- **Multiplication using partial products**

  In this step, students are taught how to set up the standard algorithm while following the same procedure of the area model. Students write each of their partial products below the line in order to add them; similar to the area model. Many students were able to build their confidence by doing the area model and partial product side by side.

EXAMPLE:



December 2018

- **Multiplication using the standard algorithm**

  As a final progression, students do not progress to using the standard algorithm until they have mastered the conceptualization of the area model and partial products. When students were taught this skill they were excited to find a more efficient method to multiply multi-digit numbers. Now, this is the preferred method to multiply multi-digit numbers.

  EXAMPLE:

MULTIPLICATION RUBRIC

	3	**2**	**1**
Efficiency of Strategy	Strategy chosen is efficient.	Strategy chosen will led to correct product but not quickly.	Strategy will not lead to correct product.
Demonstration of Conceptualization	Student uses estimation and second method to gauge rationalization of product.	Student uses estimation to gauge rationalization of the product but not a second method grounded in initial progressions.	One of the following may apply: - Student is missing a partial product - Student does not use a check step (estimation and/or second method) - Product is smaller than either factor
Computational Errors	Student made no computational error.	Student made one computational error.	Student made more than one computational error.

This rubric was created in order to assess students' conceptual and procedural understanding of multiplication throughout the year. The rubric was used throughout the year to provide students feedback on their mastery of the standard. The rationale for each component of the rubric is outlined below.

Efficiency of Strategy

- *Many students enter fifth grade with high confidence in the area model- and for that reason, often revert back to it when perceiving challenge. This row on the rubric encourages students to attempt new skills regardless of their proficiency. It is important to demonstrate this to students to make a statement of efficiency. As students progress to multi-step real-world problems this is a critical skill and expectation for fifth-grade mastery.*

Demonstration of Conceptualization

- *When focusing on summative skills, it could be easy to read the standard for simply performing the procedure of the standard algorithm. However, this would be a disservice for students. In order to build their mathematical competencies, students need to have a strong number sense. This will ultimately allow students to develop their critical thinking skills in later topics. Additionally, by asking students to demonstrate their conceptualization, I am able to identify misconceptions. With a clear understanding of misconceptions, a reteach lesson can be more strategic and effective.*

Computational Errors

- *Computational errors are small errors that affect the accuracy of an answer. They do not necessarily indicate a conceptualization gap but rather a miscalculation. This category is key to help students understand if they made a conceptual or computational error.*