Multiplicative thinking extends through place value, percentages, scale, proportions, rate, ratio, arrays, division, fractions, decimals, etc.

What to look for, what might be evidence of understanding?

- Students understand place of a number, but not necessarily the value of the number. For example, in 324, the 2 is in the tens place. If you ask a student how many 10’s are in 324, the correct answer is 32 tens.

Multiplication can often be solved using repeated addition

What to look for, what might be evidence of understanding?

- Students see 3 x 4 as 3 groups of four and that this is different than 4 groups of three.
- Students can explain why 3 x 4 is equal to 4 x 3.
- Students can also provide situations showing 3 x 4 and 4 x 3 are different. For example, 3 dogs with four legs is not the same as 4 dogs with three legs.
- Students see 40 as:
  - 1 forty
  - 2 twenties
  - 4 tens
  - 5 eights
  - 8 fives
  - 10 fours
  - 20 two
  - 40 ones

Warning

Multiplication cannot always be solved using repeated addition. For example, 2.5 x 3.8 and ½ x ¾ cannot be interpreted as repeated addition. However, this concept comes later in grades 7 and up.
**+Big Idea #3**

The distributive property is a powerful strategy for mental math.

**What to look for, what might be evidence of understanding?**

- Students decompose numbers in an advantageous manner such as:
  - \(28 \times 30 = (20 \times 30) + (8 \times 30)\) or \((30 \times 30) - (2 \times 30)\)
  - \(12 \times 45 = (10 + 2) \times (40 + 5) = (10 \times 40) + (10 \times 5) + (2 \times 40) + (2 \times 5)\)
  - \(57 \times 66\)

![Image](Dreambox.com)

- Evidence from top-end students.
  - \(57 \times 66 = (60 - 3) \times (70 - 4)\)

*Watch a useful video* on distributive property.

*Please note that you can demonstrate the distributive property in the same manner as shown on the video using Lego blocks.*

**+Big Idea #4**

Multiplication and division by 1 and 0 have special properties.

**What to look for, what might be evidence of understanding?**

- When asked to build the area model for \(7 \times 1\), student would build a line of 7.

![Image](Dreambox.com)

- When asked to build the area model for \(7 \times 0\), student should say that this is not possible.
Big Idea #5

Multiplication and division are inverse operations.

What to look for, what might be evidence of understanding?

- Given a pair of factors, students can
  - create the 4 multiplication and division statements that result. For example, 3 and 4: 3 x 4 = 12; 4 x 3 = 12; 12 ÷ 4 = 3; 12 ÷ 3 = 4
  - Students understand that commutative property only applies to multiplication but not to division. Example: 3 x 4 = 4 x 3 but 12 ÷ 4 ≠ 4 ÷ 12

Possible Resources
