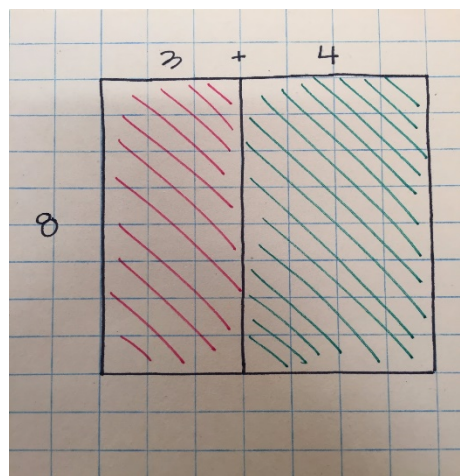


Demonstrate understanding of the properties of multiplication and the relationship between multiplication and division

Standard 3.OA.5 Apply properties of operations as strategies to multiply and divide. For example: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known (commutative property of multiplication). $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$ (associative property of multiplication). Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$ (distributive property). (Third grade students may, but need not, use formal terms for these properties.)

Key Elements of the standard: Using strategies such as the commutative, associative, and distributive properties of multiplication to multiply and divide.

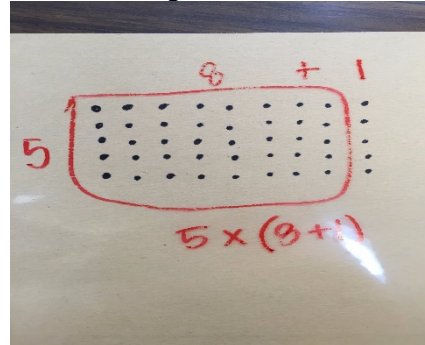
<p>Commutative Property: <i>Changing the order of factors in a multiplication problem does not change the product.</i></p>	<p>“I know that $4 \times 5 = 20$, so 5×4 must equal 20 as well.”</p>
<p>Associative Property: Changing the order of problems with 3 or more factors does not change the product.</p>	<p>“I’m solving $3 \times 2 \times 6$. I know that $3 \times 2 = 6$. $6 \times 6 = 36$. I can also solve $3 \times 6 = 18$, then double 18 to get 36.”</p>
<p>Distributive Property: Factors can be broken into smaller, friendlier numbers.</p>	<p>“I’m solving 8×3. I can break 8 up into $3 + 5$. If $3 \times 5 = 15$, and $5 \times 5 = 25$, and $15 + 25 = 40$, then $8 \times 5 = 40$.”</p>



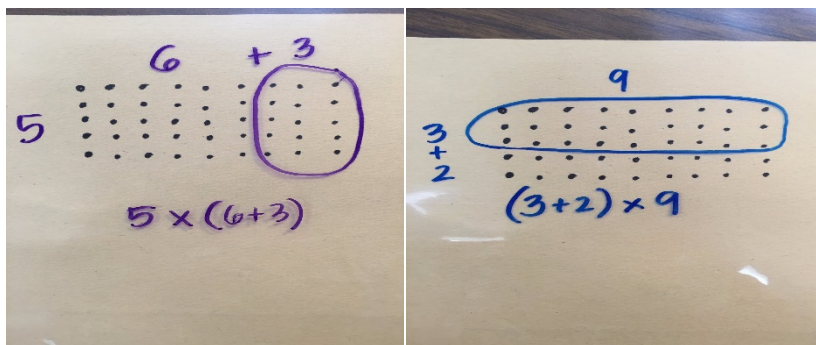
Strategies:

- Use graph paper to create a rectangle. Then break up the rectangle into two parts. It also helps to color each part. Write the expression or equation for each part. This will help make the connection between the parts that are distributed, and the whole. This picture shows $8 \times (3 + 4)$ as an alternative to 8×7 . Repeatedly showing how the equation $8 \times (3 + 4)$ is linked to the picture will help build understanding.

- Use existing arrays to make different multiplication problems using the distributive



property. These pictures show alternatives for 5×9 .



- Give each student a rectangle/square made out of graph paper. They then walk around the room to try to find a partner that they can connect with. They compare their rectangle to see if any of their sides match that of a classmate's. Once they find a "match" they stop where they are in the room and write the equation for the rectangle they create together.