SUMMARY

Students use prior multiplication skills and knowledge of factors to show that multiplication is commutative, associative, and distributive. Using these skills and critical thinking, students learn how to break down more complicated multiplication problems into simpler ones.

COMMON CORE STANDARD(S)

3.OA.B.5 Apply properties of operations as strategies to multiply and divide.

DURATION

Two 45-minute classroom periods

Engage and Explore, Explain, Elaborate page 1—one 45-minute classroom period
Elaborate page 2, Evaluate—second 45-minute classroom period

ENGAGE AND EXPLORE

In order to successfully absorb this lesson, students will need to confidently define factors in relation to multiplication, and to be able to use subtraction and addition to find sums.

To begin, ask the class to find some of the ways that a class of 20 students can be split into two groups. You can start off by saying, “If one of the groups has two people in it, how big is the other group?” Then write on the board “2 + 18 = 20.”

Ask them to find a few different ways that this can be done. At some point you can ask them “If one group has 20 students, how many are in the other one?” Write on the board “20 + 0 = 20.”

Ask the students to share out a few examples and write them on the board. Now choose about 3 of the examples to extend to the next part of the problem.
Now tell the class to imagine that each student gets 8 cookies. Choose one of the examples from the board that includes a large number and a small number, such as $3 + 17$. Ask students to calculate how many cookies each group gets: $3 \times 8 = 24$ and $17 \times 8 = 136$.

Ask the students how many cookies there were in total: $24 + 136 = 160$.

Choose another set of numbers that are a bit closer together, such as 6 and 14. Again, ask students to calculate how many cookies each group gets and record their findings: $6 \times 8 = 48$ and $14 \times 8 = 112$.

Ask the students how many cookies there were in total: $48 + 112 = 160$.

Ask the students to calculate how many cookies each group gets if we have a group of 10 and another group of 10. $10 \times 8 = 80$ and $10 \times 8 = 80$

In total, $80 + 80 = 160$.

Ask students which set of calculations was easiest to perform. They should choose $10 \times 8$ and $10 \times 8$. Let them know that in today’s lesson, they will use their addition and multiplication skills to decide which numbers make calculations easier. Optional: At the end, ask students how many cookies each group gets if one group has 20 students and the other has none.

**EXPLAIN**

**WATCH THE GENERATION GENIUS MULTIPLICATION PROPERTIES (COMMUTATIVE, ASSOCIATIVE, AND DISTRIBUTIVE) VIDEO AS A GROUP**

Facilitate a conversation using the Discussion Questions.

**ELABORATE**

Direct students to use their new understanding to complete the practice problem worksheets. Page 1 contains bare mathematical problems to solidify understanding of the process. Page 2 contains application problems for students to apply the process to solve real-world problems.

**EVALUATE**

Have students gather in groups of 2 or 4 to compare and discuss their answers to the problems. Allow students enough time to communicate with their peers about their process and their thinking. Encourage students to use correct mathematical language when discussing their process. Have each group choose two questions they want more information about, or they want to discuss as a class.

When groups are ready, take questions from students. Encourage groups to answer questions brought up by other groups.

Students can play the online Kahoot! quiz game located below the video. It provides downloadable scores at the end of the quiz game. Alternatively, you can use the paper quiz, or the exit ticket questions. All these resources are located below the video in the assessment section.