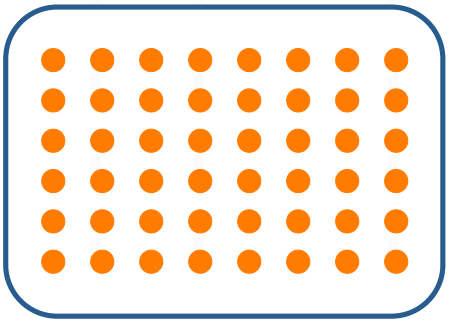
Difficult Multiplication Facts
A Closer Look at the Video

After watching the *Difficult Multiplication Facts* video, make sense of the mathematics by taking a closer look at the problem situations and solutions. Use the comments and questions in bold to help you solve the problems and develop efficient thinking strategies for the most difficult multiplication facts.

Problem 1: A group of drummers is arranged in six rows and eight columns. How many drummers are there?

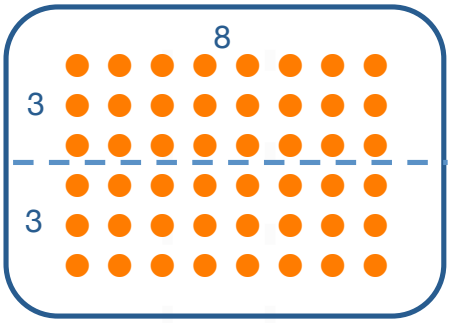
Some people find the answer to 6 x 8 by adding 8, six times. While this way works, it takes a lot of time. There are more efficient ways to find the answer. One way to model more efficient thinking strategies is with an array. Sketch an array to model the drummers in six rows of eight.



Strategy 1: Splitting the array into two equal groups

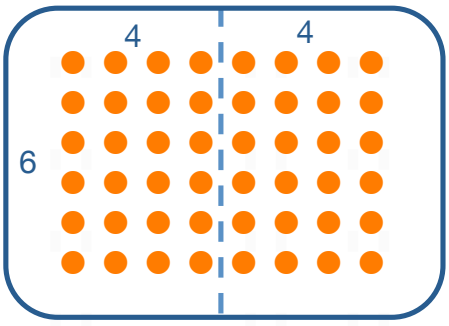
If you don't remember the product of 6 x 8, you can use basic facts you do know to help you quickly determine the answer. Split the array into two equal parts to show two facts you know. Then mentally add the two parts.

Split the array into 3 rows of 8, or 24, and another 3 rows of 8. Then add, 24 + 24 = 48.



3 x 8 = 24
3 x 8 = 24
} 24 + 24 = 48

Split the array into 4 columns of 6, or 24, and another 4 columns of 6. Then add, 24 + 24 = 48.

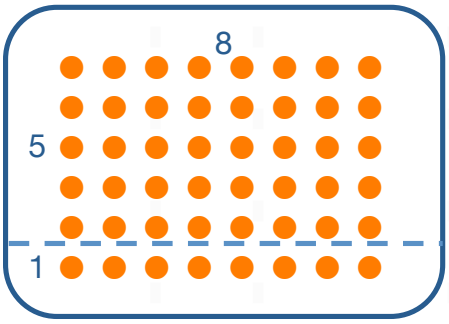


6 x 4 = 24
6 x 4 = 24
} 24 + 24 = 48

Strategy 2: Using five to split the array

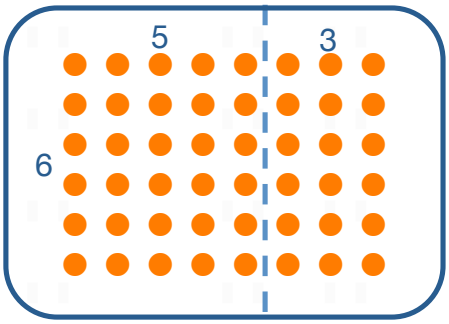
Many people think it is easy to multiply by 5. Split the array into two parts to show two facts you know. One of the parts should represent a basic fact with 5 as a factor. Then mentally add the two parts.

Split the array into 5 rows of 8, or 40, and 1 row of 8, or 8. Then add, 40 + 8 = 48.



5 x 8 = 40
1 x 8 = 8
} 40 + 8 = 48

Split the array into 5 columns of 6, or 30, and 3 columns of 6, or 18. Then add, 30 + 18 = 48.



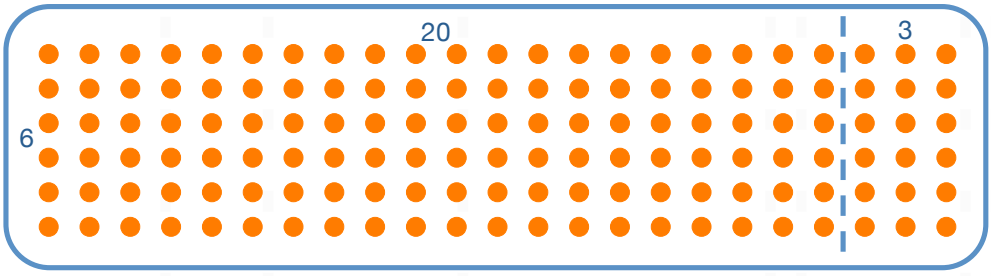
6 x 5 = 30
6 x 3 = 18
} 30 + 18 = 48

All four ways of thinking give the same answer. A group of drummers arranged in six rows and eight columns is equal to 48 drummers.

Problem 2: While watching a half-time performance, you see a band that has six rows of 23 members. How many musicians are in the band?

The splitting the array strategy can help you mentally multiply larger numbers too. When working with larger numbers, use tens to split the array. Sketch an array to represent the 6 rows of 23 musicians in the band. Then use tens to split the array and determine the product.

Split the array into 6 rows of 20, or 120, and 6 rows of 3, or 18. Then add, 120 + 18 = 138. There are 138 musicians in the band.



6 x 20 = 120
6 x 3 = 18
} 138

Use the facts you know and visualize arrays to mentally determine answers to difficult multiplication facts. These strategies are accurate and efficient for the basic facts, and you can use similar thinking to mentally calculate answers to problems with larger numbers.