Examples for each lesson:

Lesson 3.1

Count Equal Groups

Equal groups have the same number in each group.

There are 3 tulips in each of 4 vases. How many tulips are there in all?

Step 1 Think: there are 4 vases, so draw 4 circles to show 4 equal groups.

Step 2 Think: there are 3 tulips in each vase, so draw 3 dots in each group.

Step 3 Skip count by 3s to find how many in all: 3, 6, 9, 12

There are 4 equal groups with 3 tulips in each group.

So, there are 12 tulips in all.

Lesson 3.2

Algebra • Relate Addition and Multiplication

You can add to find how many in all.

You can also multiply to find how many in all when you have equal groups.

So, $2 + 2 + 2 = 6$ and $3 \times 2 = 6$.

More information on this strategy is available on Animated Math Model #10.
Lesson 3.3

Skip Count on a Number Line

When you have equal groups, you can skip count on a number line to find how many in all.

How many jumps are there? 6
How long is each jump? 4 spaces

Think: 6 jumps of 4 shows 6 groups of 4.

Multiply. 6 \times 4
6 \times 4 = 24

More information on this strategy is available on Animated Math Model #11.

Lesson 3.4

Problem Solving • Model Multiplication

There are 2 rows of flute players in a marching band. Each row has 7 students. How many flute players are there in all?

<table>
<thead>
<tr>
<th>Read the Problem</th>
<th>Solve the Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do I need to find?</td>
<td>Complete the bar model to show the flute players.</td>
</tr>
<tr>
<td>I need to find how many flute players are in the marching band.</td>
<td>Write 7 in each box to show the 7 students in each of the 2 groups.</td>
</tr>
<tr>
<td></td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>What information do I need to use?</td>
<td>Since there are equal groups, I can multiply to find the number of flute players in the band.</td>
</tr>
<tr>
<td>I know there are 2 rows. There are 7 students in each row.</td>
<td>( 2 \times 7 = 14 )</td>
</tr>
<tr>
<td></td>
<td>So, there are 14 flute players in all.</td>
</tr>
<tr>
<td>How will I use the information?</td>
<td></td>
</tr>
</tbody>
</table>
Lesson 3.5

**Model with Arrays**

An **array** is a set of objects arranged in rows and columns.

**Write a multiplication sentence for each array.**

This array has 2 rows and 5 columns. Count by fives.

2 rows of 5 are 10.

The multiplication sentence is

\[ 2 \times 5 = 10. \]

This array has 5 rows and 2 columns. Count by twos.

5 rows of 2 are 10.

The multiplication sentence is

\[ 5 \times 2 = 10. \]

More information on this strategy is available on Animated Math Model #12.

Lesson 3.6

**Algebra • Commutative Property of Multiplication**

The **Commutative Property of Multiplication** states that you can change the order of the factors and the product stays the same.

There are 4 rows of 5 tiles.

Think: 4 equal groups of 5

\[ 5 + 5 + 5 + 5 = 20 \]

Multiply, \( 4 \times 5 = 20 \)

There are 5 rows of 4 tiles.

Think: 5 equal groups of 4

\[ 4 + 4 + 4 + 4 + 4 = 20 \]

Multiply, \( 5 \times 4 = 20 \)

The factors are 4 and 5. The product is 20.
Lesson 3.7

Algebra • Multiply with 1 and 0

Find the product.
4 \times 0 = \square

Model \(4 \times 0\).
Each circle contains 0 counters.

4 circles \(\times 0\) counters = 0 counters

Zero Property of Multiplication
The product of zero and any number is zero.
So, \(4 \times 0 = 0\) and \(0 \times 4 = 0\).

Find the product.
6 \times 1 = \square

Model \(6 \times 1\).
Each circle contains 1 star.

6 circles \(\times 1\) star = 6 stars

Identity Property of Multiplication
The product of any number and 1 is that number.
So, \(6 \times 1 = 6\) and \(1 \times 6 = 6\).

More information on this strategy is available on Animated Math Model #13.

Vocabulary

Array – a set of objects arranged in rows and columns

Commutative Property of Multiplication – the property that states that you can multiply two factors in any order and get the same product

Equal groups – groups that have the same number of objects; for example, \(5 \times 6 = 30\). There are 5 equal groups of 6 in 30.

Factor – a number that is multiplied by another number to find a product

Identity Property of Multiplication – the property that states that the product of any number and 1 is that number

Multiply – when you combine equal groups, you can multiply to find how many in all; the opposite operation of division

Product – the answer in a multiplication problem

Zero Property of Multiplication – the property that states that the product of zero and any number is zero