

Math: Grade 4, Lesson 11, Multiplication

Lesson Focus: Multiply Multiples of 10

Practice Focus: Students will focus on practicing multiplication to multiply two-digit multiples of 10.

Objective: Students will use basic facts, place value and properties of operations to multiply 2-digit multiples of 10 by 2-digit multiples of 10.

Key Vocabulary: product, place value, commutative property, associative property

TN Standards: 4.NBT.B.5

Teacher Materials:

- Whiteboard and markers
- Student Practice Packet

Student Materials:

- Paper and a pencil, and a surface to write on

Teacher Do	Student Do
<p><u>Opening</u> (1 min)</p> <p>Hello! Welcome to Tennessee's At Home Learning Series for math! Today's lesson is for all our 4th graders out there, though all children are welcome to tune in. This lesson is the eleventh in our series.</p> <p>My name is ____ and I'm a ____ grade teacher in Tennessee schools! I'm so excited to be your teacher for this lesson! Welcome to my virtual classroom!</p> <p>If you didn't see our previous lesson, you can find it on the TN Department of Education's website at www.tn.gov/education. You can still tune in to today's lesson if you haven't see any of our others. But, it might be more fun if you first go back and watch our other lessons since we'll be talking about things we learned previously.</p> <p>Today we will be learning about multiplying with multiples of ten in mathematics! Before we get started, to participate fully in our lesson today, you will need:</p> <ul style="list-style-type: none"> • Paper and a pencil, and a surface to write on • The student packet for Math, Grade 4, Lesson 11 which can be found at www.tn.gov/education. <p>Ok, let's begin!</p>	<p>Students get materials ready for the lesson.</p>
<p><u>Intro</u> (5 mins)</p> <p>Today we are going to think about strategies for multiplying multiples of 10.</p> <p>Let's start by looking at this situation:</p>	<p>This warm-up will support students' understanding of multiplying a whole number by 10, foreshadowing the work in in the Teacher Model section.</p>

<p>Voula collected shells on the beach during her summer vacation. If she collected 10 shells each day of her 5-day vacation, how many shells did Voula collect in all?</p> <p>What information do we know? [Pause – then point to words in the problem as you say] Yes, Voula collected 10 shells every day for 5 days.</p> <p>What are we asked to find? [Pause]</p> <p>Yes, how many shells she collected in all.</p> <p>How can we find how many she collected? [pause]</p> <p>If we think about what is happening here, we can consider this model that shows how many shells she collects each day:</p> <table><tr><td><u>Day 1</u></td><td><u>Day 2</u></td><td><u>Day 3</u></td><td><u>Day 4</u></td><td><u>Day 5</u></td></tr><tr><td>10</td><td>10</td><td>10</td><td>10</td><td>10</td></tr></table> <p>What strategies could we use to get our answer? [Pause]</p> <p>I heard someone say that we can add these five 10's, and yes we can. But is there a quicker way? [Pause] Of course! We can multiply! After all, multiplication is repeated addition.</p> <p>So this problem becomes, 10 x 5 for 10 shells collected each day for 5 days.</p> <p>How can we find 10 x 5? [Pause] Good idea! Someone suggested counting by tens. Let's do that together.</p> <p>[Hold up fingers to keep track of tens or point to model as indicated above] 10, 20, 30, 40, 50</p> <p>How many shells did Voula collect in all? [Pause] You got it! 50 shells!</p> <p>Repeated addition and skip counting are helpful strategies for multiplication. Today we are going to learn other strategies to help us multiply with larger numbers.</p>	<u>Day 1</u>	<u>Day 2</u>	<u>Day 3</u>	<u>Day 4</u>	<u>Day 5</u>	10	10	10	10	10	<p>Students will listen to the teacher think aloud modeling the thought process for a problem from the start of the problem through finding the solution. Students will follow along and responding to teacher questioning.</p>
<u>Day 1</u>	<u>Day 2</u>	<u>Day 3</u>	<u>Day 4</u>	<u>Day 5</u>							
10	10	10	10	10							
<p><u>Teacher Model</u> (10 mins)</p> <p>Now we are going to explore some situations that will require multiplying by a multiple of 10. Let's look at this situation.</p> <p>The principal of a school needs to order supplies for 20 new classrooms. Each classroom needs 30 chairs. How many does the principal need to order?</p>	<p>Students will listen to the teacher do a think aloud working a contextual problem modeling the thought process for a problem from the start of the problem through finding the solution.</p>										

The principal must be getting some new classrooms ready for next fall! So he is going to have to buy some chairs for each classroom. It looks like he is going to order the chairs from a store much like you might order food or place an order online.

Since the principal is ordering 30 chairs each for 20 classrooms, this is similar to the problem about Voula's shells. We will need to multiply 30 by 20. We could skip count by 30s, 20 times, but that would take a while. Can you think of another strategy we can use? [pause]

I'm hearing some good ideas! We could draw a picture, or we could break apart some of the numbers to make it easier to multiply. There are several ways we can break apart the numbers.

Objective #1:

Teacher will guide students through how to reason using basic facts and place value to multiply a number by a multiple of 10.

Let's think about how we can multiply 30 x 20 by using basic facts and place value.

We know that 30 is 3 tens and 20 is 2 tens.

[write $30 \times 20 = 3 \text{ tens} \times 2 \text{ tens}$]

Using our basic facts, we also know that 3×2 is what?

[pause] **Right! 6.**

And we know that 10×10 is what? [pause] Right! 100.

So that means we have 6 hundreds or 600.

[write "6 hundreds" underneath so it reads:

$30 \times 20 = 3 \text{ tens} \times 2 \text{ tens}$

$= 6 \text{ hundreds}$

$= 600$]

The principal needs to order 600 chairs in all. Wow! That's a lot of chairs!

Now let's explore another strategy with the same problem and see if we get the same answer.

Objective #2:

Teacher will guide students through how to break apart numbers using the commutative and associative properties to multiply two multiples of 10.

We'll start with 30×20 again. [write 30×20]

We know that 30 is the same as 3×10 and 20 is the same as 2×10 . [Write out from 30×20 so it reads:

$30 \times 20 = (3 \times 10) \times (2 \times 10)$]

Objective #1:

Through following along with the think aloud, students will learn how to reason using basic facts and place value to multiply a number by a multiple of 10.

Objective #2:

Through following along with the think aloud, students solve a problem by breaking apart numbers using the commutative and associative properties to more easily multiply two multiples of 10.

Remember that the commutative property tells us that we can rearrange numbers that are being multiplied. For example, 4×5 equals 20 and 5×4 also equals 20, so we can write them in either order.

Therefore, since all 4 of these numbers are being multiplied, we can move these numbers around in a way that makes them easier to multiply.

Which numbers do we want to move? [pause]

Ok, let's try moving the 2 next to the 3 and the first 10 next to the other 10 by using the commutative property.

[Now it should read:

$$\begin{aligned} 30 \times 20 &= (3 \times 10) \times (2 \times 10) \\ &= 3 \times 2 \times 10 \times 10 \end{aligned}$$

Now using the associative property, we can regroup the 3×2 and the 10×10 using parentheses.

$$\begin{aligned} [30 \times 20 &= (3 \times 10) \times (2 \times 10) \\ &= 3 \times 2 \times 10 \times 10 \\ &= (3 \times 2) \times (10 \times 10) \end{aligned}$$

And using the order of operations, we can now multiply what's inside the parentheses.

3×2 is [pause] 6, and [write 6 below 3×2]

10×10 is [pause] 100. [write 100 below 10×10]

$$\begin{aligned} [30 \times 20 &= (3 \times 10) \times (2 \times 10) \\ &= 3 \times 2 \times 10 \times 10 \\ &= (3 \times 2) \times (10 \times 10) \\ &= 6 \times 100 \end{aligned}$$

Now what is 6×100 ? [pause] Yes, that's just like saying 6 hundreds, which is 600.

Look, we got the same answer as we did with our first strategy! [point to the first answer]

Are there other strategies we can use to solve this problem?

[pause] Some of you may be thinking that if you can rewrite the problem so that you are multiplying by 10, then it will be easier to solve. So let's see if we can try that strategy with this problem.

Objective #3:

Teacher will guide students through how to rewrite a problem when multiplying by a multiple of ten so that it is a number times ten.

Again, we will start with 30×20 .

Consider that 20 is 2 tens, so it can be broken down into 2 times 10. [write $30 \times 20 = 30 \times 2 \times 10$]

Using the associative property, I can multiply 30×2 first.

[put parentheses around 30×2 so it reads:

$$30 \times 20 = (30 \times 2) \times 10]$$

Objective #3:

Through following along with the think aloud, students solve a problem by rewriting it so that it is a number times ten.

<p>Multiplying by 2 is just doubling, so 30×2 is 60. [write 60 underneath the 30×2, so it now reads: $30 \times 20 = (30 \times 2) \times 10$ $= 60 \times 10$]</p> <p>And now we are just multiplying 60 by 10. So what is 60×10? [pause] Remember 60×10 means 60 tens. [pause] Good job, 60×10 is 600.</p> <p>So the principal needs to order 600 chairs for the new classrooms.</p> <p>Tying the learning together: Thank you for sharing your strategies. We can see that there are several strategies we can use to multiply two numbers that are multiples of ten. Did you notice any similarities between these strategies? [pause]</p> <p>The strategies we used today all involve using place value, basic facts, properties of operations and breaking down the numbers into more friendly numbers so they are easier to multiply.</p> <p>Thank you for thinking through these strategies with me today. Now you will get to practice these strategies. So get your paper and pencil ready!</p>	<p>Tying the learning together: Students will review the strategies used in this lesson and consider how they are related.</p>
<p>Guided Practice (9 mins)</p> <p>[I do] Let's practice three more multiplication problems with multiples of 10. We are going to work together to find 50 times 60. [Write 50×60] What is one way we could think about this problem? [Pause] Great, we could use basic facts and place value! How could we name 50 using place value? [Pause] That's right, 5 tens. How could we name 60 using place value? [Pause] Good! 6 tens. That means we can think of 50 times 60 as 5 tens times 6 tens. What is the basic fact 5 times 6? [Pause] Right! 30. What is ten times ten? [Pause] Right again! 100. 5 tens times 6 tens is 30 hundreds.</p>	<p>Students work alongside the teacher as the teacher thinks aloud.</p>

Write 30 hundreds in standard form, which means just using numbers. [Pause]
That's right! 3,000.

Remember that we can also use the properties of operations to multiply. Write 50 as multiplication of a single-digit number and 10. [Pause]

You got it! 5×10 .

Write 60 as multiplication of a single-digit number and 10.

That's right! 6×10 .

We can re-write 50×60 as $5 \times 10 \times 6 \times 10$. [Write the number sentence as you are speaking]

Now try re-writing the numbers begin multiplied using the commutative and associative properties of multiplication.

Remember that these properties say that we can rearrange the numbers in any order and grouping. [Pause]

Did you write $(5 \times 6) \times (10 \times 10)$? Good! We moved our numbers to group the basic facts of 5×6 and 10×10 . Now multiply!

[Pause]

5 times 6 is 30 and 10 times 10 is 100, so our problem now is 30×100 . What is 30 times 100? [Pause]

Right! 3,000.

Finally, we can rewrite the problem so that it is a number times ten.

Again, we will start with 60×50 .

Consider that 50 is 5 tens, so it can be broken down into 5 times 10. [write $60 \times 50 = 60 \times 5 \times 10$]

Using the associative property, I can multiply 60×5 first.

[put parentheses around 60×5 so it reads:

$$60 \times 50 = (60 \times 5) \times 10]$$

Now multiply 60×5 which is 300.

[write 300 underneath the 60×5 , so it now reads:

$$\begin{array}{r} 60 \times 50 = (60 \times 5) \times 10 \\ = 300 \times 10 \end{array}]$$

And now we are just multiplying 300 by 10. So what is 300×10 ? [pause] **Remember 300×10 means 300 tens.** [pause]

Good job, 300×10 is 3,000.

[We do]

Here is another problem for you to try. [Write and say]

60 adults visited a park each day for 30 days. How many total adults visited the park?

Try using basic facts and place value to find the product.

[Pause, allow students time to work, then write and say the work below.]

Students will respond to teacher questions with less scaffolding than the previous example. Students will have more time to think and respond on their own prior to the teacher providing solutions.

Good work! Did you multiply 60 times 30? Using place value, we know that:

60 x 30 = 6 tens times 3 tens.

6 tens times 3 tens equals 24 hundreds.

24 hundreds can be written as 2,400.

We could also solve using the Commutative and Associative Properties of Multiplication. Remember that these properties say that we can rewrite the products in any order and grouping. Think about how you can decomposed 60 times 30 into factors of basic facts and tens and give it a try!

[Pause, allow students time to work, then write and say the work below.]

Did your work look something like this?

Decompose first: $60 \times 30 = 6 \times 10 \times 3 \times 10$

Now regroup the factors and multiply to find a solution.

[Pause, allow students time to work, then write and say the work below.]

Then regroup: $(6 \times 3) \times (10 \times 10)$

Then multiply: $18 \times 100 = 1800$.

Lastly, we could also rewrite the problem so that it is a number times ten. Instead of, 60×30 , 30 can be rewritten as 3×10 . What numbers would you group using the associative property? [Pause]

Good! Try solving $(60 \times 3) \times 10$.

[Pause, allow students time to work, then write and say the work below.]

How did it go? Check your work! [Write and say the equations below]

$(60 \times 3) \times 10$

$180 \times 10 = 1,800$

[You do]

Now you are going to try a problem on your own. Remember to use basic facts, place value or properties of operations!

[Write and say aloud] **50×20**

[Pause to allow students time to think and work.]

Good work! I will show you different ways to solve.

[Write the equations on the board while speaking aloud]

Strategy 1 uses place value:

$50 \times 20 = 5 \text{ tens} \times 2 \text{ tens}$

$= 10 \text{ hundreds}$

$= 1,000$

Strategy two uses properties of operations:

$50 \times 20 = (5 \times 10) \times (2 \times 10)$

$= 5 \times 2 \times 10 \times 10$

$= (5 \times 2) \times (10 \times 10)$

Students are working almost exclusively independently with the teacher providing answers at the end.

$= 10 \times 100$ $= 1,000$ <p>Strategy three uses a number times 10:</p> $50 \times 20 = 50 \times 2 \times 10$ $= (50 \times 2) \times 10$ $= 100 \times 10$ <p>Great job, students!</p> <p><u>Additional Problems (if Needed):</u> Use basic facts and place value or properties of operations to find each product.</p> <ol style="list-style-type: none"> 1. 30×10 Answer: 300 2. 90×40 Answer: 3,600 3. 60×20 Answer: 1,200 4. 80×50 Answer: 4,000 	
<p><u>Independent Practice (1 min)</u></p> <p>Great work, everyone! Today, we practiced multiplying with multiples of ten. I hope you're seeing that you can use place value and properties to multiply! You sure did a great job! After the video, you will have some problems to practice on your own. I will show you the independent practice problems now, or you can find them in the student practice for this lesson posted on our website, www.tn.gov/education. [Teacher shows student practice page under document camera or camera zooms in on student practice page.]</p> <p>Good luck and do your best!</p>	
<p><u>Closing (1 min)</u></p> <ul style="list-style-type: none"> • Boys and Girls, I enjoyed learning about multiplying with multiples of ten with you! Thank you for inviting me into your home. I look forward to seeing you in our next lesson in Tennessee's At Home Learning Series! • Bye! 	

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