

Math: Grade 4, Lesson 12, Multiplication

Lesson Focus: Multiply Two-digit Numbers by Multiples of 10

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

Objective: Students will use place value blocks and area models to multiply two-digit numbers by multiples of 10.

Key Vocabulary: multiplication, place value blocks, area model

TN Standards: 4.NBT.B.5

Teacher Materials:

- Whiteboard and markers
- Place value blocks (optional)
- Student Practice Packet

Student Materials:

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

Note: This lesson includes modeling using place value blocks. The teacher can model with actual place value blocks if they have access but please also show how to draw a representation since students will not have this tool at home.

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 twelfth 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 two-digit numbers by 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 12 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 with two-digit numbers.</p> <p>Let's start by looking at this situation:</p> <p>Charlie works 40 hours every week. How many hours will he work in 50 weeks?</p> <p>What information do we know? [Pause – then point to words in the problem as you say.] Yes, Charlie works 40 hours every week for 50 weeks.</p> <p>What are we asked to find? [Pause] Yes, how many hours he worked in all.</p> <p>How can we find how many hours he worked? [pause] Right! Multiplication can be described as combining equal groups. Since Charlie worked an equal number of hours every week, we can multiply the hours worked times the number of weeks.</p> <p>What strategies could we use to get our answer to 40×50? [Pause] I heard someone say to think about place value and basic multiplication facts.</p> <p>We know that 40 is 4 tens and 50 is 5 tens. [Write $40 \times 50 = 4 \text{ tens} \times 5 \text{ tens}$.] Using our basic facts, we also know that 4×5 is what? [Pause] Right! 20. And we know that 10×10 is what? [Pause] Right! 100. So that means we have 20 hundreds or 2,000. [Write “20 hundreds” underneath so it reads: $40 \times 50 = 4 \text{ tens} \times 5 \text{ tens}$ $= 20 \text{ hundreds}$ $= 2,000$] Charlie works 2,000 hours in all. Wow! That's a lot of hours!</p> <p>Place value and basic facts are helpful strategies for multiplication. Today we are going to learn other strategies to multiply with two-digit numbers.</p>	<p>This warm-up will support students' understanding of multiplying with multiples of 10, foreshadowing the work in in the Teacher Model section.</p> <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>
<p><u>Teacher Model</u> (10 mins)</p> <p>Now we are going to explore some situations that will require multiplying a two-digit number by a multiple of 10. Let's look at this situation.</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>

Max's moving company has boxes for packing books. If each box holds 13 books, how many books would fit into 10 boxes?

Since Max is placing 13 books each in 10 boxes, this is similar to the problem about Charlie's work hours. We will need to multiply 10 by 13. We could use place value and basic facts. Can you think of another strategy we can use? [Pause]

I'm hearing some good ideas! We could draw a picture, or make a model to visually see the numbers we want to multiply.

Objective #1:

Teacher will guide students through how to use place value blocks to multiply a two-digit number by a multiple of 10.

Today we are going to use drawings of place value blocks to represent numbers. Let's practice how to draw place value blocks. Draw these with me.

To represent one, draw a single dot. [Draw]

To represent 1 ten, draw a straight line, or a rod. [Draw]

What if we want to draw the number 13? What would that look like with place value blocks? [Pause]

That's right! Draw one straight line and three single dots.

[Draw. Note: teacher does not need to draw the 10 rod showing all the individual ones, teacher can just draw a line.]



Let's think about how we can multiply 10×13 by using place value blocks. [Write 10×13]

We already drew 13 with 1 ten and 3 ones. This represents one group of 13. Because multiplication refers to equal groups, 10×13 means that we need to make 10 groups of 13.

Draw 10 groups of 13. [Pause, then draw.]



What do you notice about the drawing? [Pause]

Great! I see that too! I counted 10 lines which each represent 10. Another way to say this is 10 groups of 10, or 10×10 .

What is 10×10 ? [Pause]

Through following along with the think aloud, students will learn how to reason using place value blocks to multiply a two-digit number by a multiple of 10.

Awesome! 100.

What else do you notice? [Pause]

Right! The ones. We could count one at a time and see that there are 30 ones in the drawing. Could you use multiplication? [Pause]

Great! There are 10 groups of 3 ones, or 10×3 which 30.

Let's put this all together.

10 groups of 10 = 100

10 groups of 3 = 30

What do we have altogether? [Pause]

That's right! 130.

Think back to what the question is asking. [Pause]

Each box holds 13 books. How many books will fit into 10 boxes? We found out that 130 books will fit into 10 boxes.

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

Objective #2:

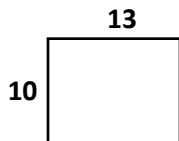
Teacher will guide students through how to draw an area model to multiply a two-digit number by a multiple of 10.

We'll start with 13×10 again. [Write 13×10 .]

Think about the drawing that we created with the place value blocks. When I drew the blocks, I placed them in the shape of a rectangle to help me stay organized and be able to count the total number of blocks.

We can solve this same problem by drawing an area model. An area model is a rectangle that uses the two numbers in the multiplication problem as the dimensions, or length and width of the rectangle.

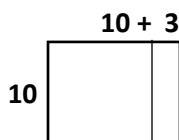
Draw and label a rectangle with me: [Draw]



Just like we did with the place value blocks, think about how to use place value to break apart the number 13. [Pause]

That's right, 13 can be broken into 1 ten and 3 ones.

We can show this in our area model drawing like this: [Draw]



Objective #2:

Through following along with the think aloud, students solve a problem by drawing an area model to multiply a two-digit number by a multiple of 10.

Now our model shows two smaller rectangles. How do you find the area of a rectangle? [Pause]
Very good, length times width!
What are the length and width of one of the smaller rectangles in our model? [Pause]
I see that too! One of the rectangles is 10 x 10, and we know what 10 times 10 is, 100!
What about the length and width of the other smaller rectangle? [Pause]
Great! 10 by 3. What is 10 x 3? [Pause]
It's 30! Very good.

So the areas of the two smaller rectangles in our model are 100 and 30. What does that mean about the area of the original rectangle that we drew? [Pause]
That's right, we would add the smaller areas together. Do this addition problem with me:
 $100 + 30 = 130$.
Our area model shows that $10 \times 13 = 130$.



Is this the same solution that we found using place value blocks? [Pause]
It is! Both strategies tell us that Max's Moving Company can fit 130 books into 10 boxes.

Tying the learning together:
Thank you for sharing your thinking. We can see that there are different strategies we can use model how to multiply two-digit numbers by a multiple of ten. Did you notice any similarities between these strategies? [Pause]

With both strategies, we found the same partial products for 10×13 . A partial product is found when you break apart a number using place value in a multiplication problem, then multiply each of those parts by the other number in the problem.

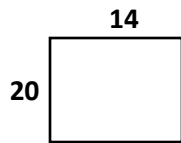
What were the partial products that we found in the problem about Max's Moving Company? [Pause]
Using both the place value blocks and area model strategies, we saw that:
 $10 \times 10 = 100$ and
 $10 \times 3 = 30$.
100 and 30 are our partial products.
What did we do with the partial products to find a solution? [Pause]

Tying the learning together:
Students will review the strategies used in this lesson and consider how they are related.

<p>Great, using both strategies we combined, or added together the partial products. $100 + 30 = 130$! Way to go!</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>Guided Practice (10 mins)</p> <p>[I do]</p> <p>Let's practice three more multiplication problems with two-digit numbers times multiples of 10. We are going to work together to find 20×14. [Write 20×14.]</p> <p>First, we will multiply 20×14 by using place value blocks.</p> <p>Remember that multiplication refers to equal groups, so 20×14 means that we need to make 20 groups of 14.</p> <p>First, draw 14 using place value blocks. [Pause, then draw.]</p>  <p>That's right, 1 ten rod and 4 ones.</p> <p>This is 1 group of 14. How many groups of 14 do we need?</p> <p>[Pause] Right! 20. Keep drawing until you have 20 groups of 14. [Pause, allow students time to draw, and draw the image.]</p>  <p>What do you notice about the drawing? [Pause]</p> <p>Great! I see that too! I counted 20 lines which each represent 10, which is 20×10. What is 20×10? [Pause]</p> <p>Awesome! 200.</p> <p>What else do you notice? [Pause]</p> <p>Great! There are 20 groups of 4 ones, or 20×4 which 80.</p> <p>Let's put this all together.</p> <p>20 groups of 10 = 200</p> <p>20 groups of 4 = 80</p> <p>What do we have altogether? [Pause]</p> <p>That's right! 180.</p>	<p>Students work alongside the teacher as the teacher thinks aloud.</p>

We can solve this same problem by drawing an area model.

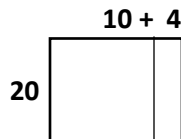
Draw and label a rectangle with me: [Draw]



How can we break 14 apart by place value? [Pause]

That's right, 14 can be broken into 10 and 4.

We can show this in our area model drawing like this: [Draw]



Now our model shows two smaller rectangles. How do you find the area of one of the smaller rectangles? [Pause]

Very good, one of the smaller rectangles is $20 \times 10 = 200$!

What is the area of the other smaller rectangle? [Pause]

I got that too! $20 \times 4 = 80$!

What will we do next to find the area of the original rectangle that we drew? [Pause]

That's right, we would add the smaller areas together. Give it a try! [Pause]

How did you do? I found that $200 + 80 = 280$.

Again, notice how the two strategies are similar. In both strategies, we saw that 14 is made up of 1 ten and 4 ones. We also found the same partial products of $20 \times 10 = 200$ and $20 \times 4 = 80$. Then the partial products combined together give us the solution to our original multiplication problem: $20 \times 14 = 280$

[We do]

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

There are 10 teams in a baseball league. Each team has 25 players. How many players are in the league?

What information do we know? [Pause]

Yes, there are ten teams in a baseball league and each team has 25 players.

What are we asked to find? [Pause]

Yes, how many players are in all.

What equation can you write to solve this problem? [Pause]

Great, 10×25 .

Now try the place value block strategy to solve. Remember that this equation says that there are 10 groups of 25.

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

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.

Does your drawing look something like this?



What is the total of the place value blocks? [Pause]

That's right! $20 \text{ tens} = 200$ and there are 50 ones so $200 + 50 = 250$. There are 250 players in the league.

Try to draw an area model to represent this same problem.

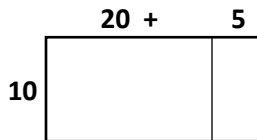
First, draw a rectangle with dimensions 10 by 25. [Pause]

Then, break 25 into tens and ones. [Pause]

Next, find the area of each of the smaller rectangles. [Pause]

Then, combine the partial products to find the total area of the large rectangle. [Pause]

Does your final model look something like this? [Pause, draw the area model and write the equations. Note: Teacher drawing does not need to have the grid inside.]



$$10 \times 20 = 200$$

$$10 \times 5 = 50$$

$$200 + 50 = 250$$

Great job!

[You do]

Now you are going to try a problem on your own. Remember to use place value blocks or an area model! [Write and say aloud] 10×26

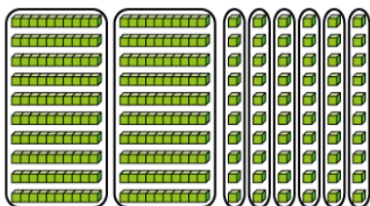
[Pause to allow students time to think and work.]

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

[Write the equations on the board while speaking aloud.]

Strategy 1 uses place value blocks:

10×26 means 10 groups of 26 blocks.




The drawing shows 20 tens and 60 ones.

20 tens can be written as 200, so $200 + 60 = 260$.

Strategy two uses an area model:

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

<p>10 and 26 are the dimensions of the rectangle. Break 26 into tens and ones and find the area of the smaller rectangles.</p> <div style="text-align: center;"> $20 + 6$ </div>  <p>10</p> <p>$10 \times 20 = 200$ $10 \times 6 = 60$ The sum of the partial products is $200 + 60 = 260$. Great job, students!</p> <p><u>Additional Problems (if Needed):</u> Use place value blocks or an area model to find each product.</p> <ol style="list-style-type: none"> 1. 10×15 Answer: 150 2. 10×22 Answer: 220 3. 20×16 Answer: 320 4. 20×25 Answer: 500 	
<p><u>Independent Practice</u> (1 min)</p> <p>Great work, everyone! Today, we practiced multiplying two-digit numbers by multiples of ten. I hope you're seeing that you can use place value blocks and area models 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</u> (1 min)</p> <ul style="list-style-type: none"> • Boys and Girls, I enjoyed learning about multiplying two-digit numbers by 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! 	