



**THIRD SPACE
LEARNING**

Math Intervention Pack

Multiplying and dividing
decimals using known
facts

Grade 5

How to use the resources

1. Title Slide

Use this slide to activate prior knowledge needed for lesson. Students should be encouraged to initially attempt the question presented independently.

2. Let's Learn

Use this slide to introduce the concept. Tutors should work with the student to explore the concept together, usually using diagrams to support understanding.

3. Follow Me + Your Turn

The tutor should work through the follow me slide, modeling the process and explaining their thinking out loud.

Students should use the your turn slide as an opportunity to work through a question similar to the follow me questions. They should apply the method modeled by the tutor in the follow me slide. Students should be encouraged to explain their thinking out loud.

4. You Do

Students should work through a range of questions that build in complexity.

Tutors can offer support but students should initially be encouraged to attempt these questions independently.

5. Go Further

Use this slide to allow students to apply their understanding to a more challenging question in an unfamiliar context.

6. Support for Slides

The support slide is used to support students during the lesson. In the tutor notes, there will be guidance as to when to use the support slide.

7. Check Your Understanding

Tutors should use this slide to assess the student's knowledge and whether or not they have mastered the concept within the lesson.

Standard

5.NBT.7 - Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Key Mathematical Ideas

1. To understand multiplication and division of decimals proportionally to well known multiplication and division facts of whole numbers
2. To understand multiplication and division of decimals through scaling

Overview

Terminology

- **Digit:** Any number 0-9 that is used to form other numbers
- **Place Value:** The numerical value that a digit has given its position within a number
- **Scaling:** Multiplying parts by the same factor to keep the same proportionality/ratio
- **Dividend:** The number being divided in a division problem
- **Divisor:** The number dividing the dividend
- **Quotient:** The answer to a division problem
- **Factor:** A number or quantity that when multiplied with another produces a given number
- **Product:** The answer to a multiplication problem
- **Multiple:** The product of two factors

Sentence Stems

- groups of is equal to
- If we make one number times the size, we must make the answer times the size

Overview

Common Misconceptions

Common Misconceptions	Tutoring Strategies	Checks for Understanding
Students may think that scaling means applying the same factor to all parts of the equation.	<p>Discuss with students that working with equations is like maintaining a balance on a scale. Each side of the equation (on either side of the equals sign) represents one side of a scale. If something is done to one side, in order to maintain the balance, the same must be done with the other side. If we were to do that same thing with every part of the equation, then it will happen more on one side than the other, throwing off the balance, and therefore will not be equivalent.</p> <p>The language used on the 'Let's learn' slide can be very useful on other slides as well, and may help students realize their mistake.</p>	<ul style="list-style-type: none"> What is the multiplication or division fact that can help with this problem? What scale of that problem are we working with?
Students may write numbers incorrectly when scaling	<p>Again, language on the 'Let's learn' slide will be very useful for misconceptions such as this, as well as using place value charts and the Let's explore this more support slides</p>	<ul style="list-style-type: none"> Does this number represent the same scaling used on the other number in this equation?

Title Slide

If stuck

- Students may think this is referring to fact families, so emphasize the part that says “using place value” and draw attention to the example
- Read the example out loud as “if $4 \times 2 = 8$, then 4 tenths $\times 2 = 8$ tenths” and follow up with the question: What other problems can we make that are like this one?
- You can also treat “tenths” as the unit used in the example and ask the student what other “units” we can use, i.e. hundred, hundredths, thousand, etc.
- The examples to the left are just a few of the many possibilities on this slide

Answers

- Answers may vary.
- Example answers:
 $40 \times 20 = 800$
 $4 \times 0.02 = 0.08$
 $0.04 \times 20 = 0.8$

Let's Learn

If stuck

- The language and visuals on this slide are so useful if students are stuck. Place a lot of emphasis on these to make parts a and b much easier
- Most likely, the student will struggle with how to place 25 tenths on the place value chart. Thankfully the example on the left already shows 15 hundredths, so if they make the mistake of writing 15 tenths the same way, you can compare it to that. Make sure to show that ten tenths = one whole with the place value disks on this slide to help them recognize that the one goes in the ones place and 5 tenths left over can be written in the tenths place.

Questions

- How can I write 15 tenths in the place value chart?
- How many tenths make one whole? Is 15 tenths greater or less than that amount? What is left over?

Watch out for

- Students writing 15 tenths incorrectly
- Students not knowing how many tenths are in one whole

Answers

a) 15

b)

O	$\frac{1}{10}$	$\frac{1}{100}$
1	5	0

Follow Me

Modeling prompts

- The first Support Slide uses a place value chart to show students how the scaling works on parts a and b of the Follow me slide, in case students are struggling with writing these numbers
- Make sure to go over the yellow bubbles on this slide, reminding students that scaling with equations is a lot like balancing a scale, and whatever we do with one side of the equation, we have to do the same to the other side in order to keep them proportional
- Use the place value chart here in order to show how scaling worked

Answers

a) 1.2

b)

If $12 \div 4 = 3$ then

$\div 100$

$0.12 \div 4 = 0.03$

T	O	$\frac{1}{10}$	$\frac{1}{100}$
	3		
	0	0	3

Your Turn

If stuck

- Use the place value chart and the Support Slide to help with scaling

Questions

- 6 tenths is what size of 6? 48 hundredths is what size of 48?
- If I took one tenth of 6, what should I do with 48?

Watch out for

- Students not writing scaled numbers correctly

Answers

a) 4.8

b) 0.08

T	O	$\frac{1}{10}$	$\frac{1}{100}$
	8		
	0	0	8

You Do

If stuck

- Keep that if, then language going to help students lean on their well known facts
- Use the second Support Slide to help students struggling with writing scaled numbers correctly
- Encourage students to follow the thought process of part c on part d as well, asking them, “What well known fact can I use with whole numbers to help me solve this problem?”

Questions

- What did we scale this number by?
- What well known fact can we use to help us solve this problem?
- How would I write this answer?

Watch out for

- Students incorrectly naming the scale factor
- Students writing the answer incorrectly

Answers

- a) 1.8
- b) 0.6
- c) $4 \times 8 = 32$ so $0.04 \times 8 = 0.32$
- d) 0.03

Go Further

If stuck

- Remind students that this is a multi-step problem and ask them what the steps should be

Questions

- What is the first step in solving this problem? Then what do I need to do?
- What well known facts can help me solve this problem?
- What is the scale factor?

Watch out for

- Students not recognizing that this is a multi-step problem and forgetting to solve part of it
- Students “number plucking” and only operating with 0.4 and 5.
- Students not scaling correctly

Answers

- 4 miles
- $0.4 \text{ miles} \times 2 = 0.8 \text{ miles (per day)}$
- $0.8 \text{ miles} \times 5 = 4 \text{ miles}$

Support for Slide(s)

This supports the Follow me slide.

If stuck

- Help students recognize that this is a pattern we can use when dividing by powers of 10

Questions

- How does the number of spaces I move to the right compare to the number of zeros in the scale factor?

Answers

- 0.3 and 0.12

T	O	$\frac{1}{10}$	$\frac{1}{100}$
	3	•	
	0	•	3
1	2	•	
	0	•	1 2

Diagram illustrating the relationship between place value and decimal fractions. The table shows the following values:

- T (Tenths): 1
- O (Ones): 0
- $\frac{1}{10}$ (Tenths): 3
- $\frac{1}{100}$ (Hundredths): 2

Arrows indicate the movement of digits from the T and O columns to the $\frac{1}{100}$ column, showing the conversion of 0.3 to 0.30 and 0.12 to 0.12.

Support for Slide(s)

This supports any slide where the student struggles with scaling

If stuck

- Use this as a resource whenever students are stuck with scaling, and make sure to show them the Let's explore this more page before this one so they understand how they can use it

Questions

- What is the scale factor?
- How many spaces to the right do I need to move this number?

Check Your Understanding (1)

Correct answer

- b) 7.2
- a) Students may choose a if they thought that the 72 needed to be completely behind the decimal, or misinterpreted 72 tenths.
- b) B is the correct answer. 12 groups of 6 tenths is 72 tenths, or 7.2
- c) Students may choose c if they mistook 72 tenths for 72 thousandths.
- d) Students may choose d if they do not think the answer is affected at all.

Check Your Understanding (2)

Correct answer

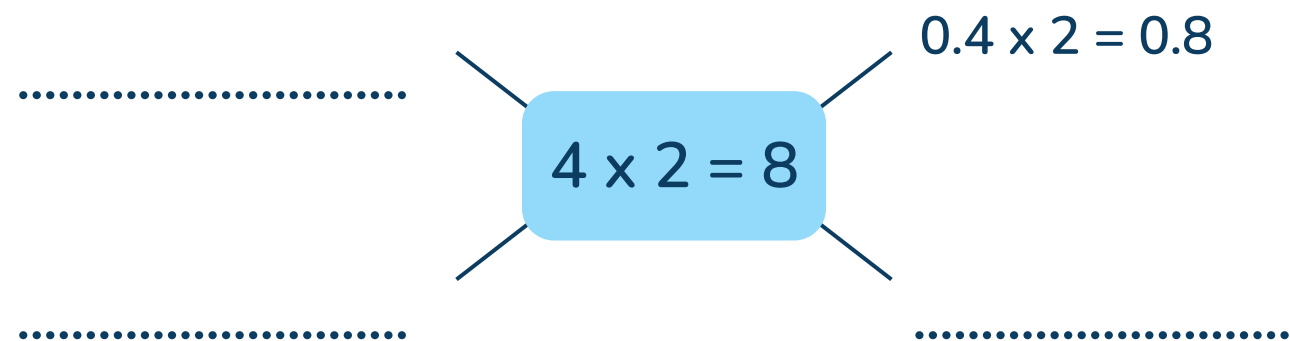
- a) 0.05
- a) A is the correct answer. 35 hundredths divided by 7 is 5 hundredths, or 0.05
- b) Students may choose b if they don't realize that they need a placeholder zero in the tenths place to represent 5 hundredths.
- c) Students may choose c if they do not think the answer is affected at all.
- d) Students may choose d if they mistook 5 hundredths for 5 thousandths.

Today you will learn about

Multiplying and dividing decimals using known facts

Warm-up question

Can you write some facts that are related to
 $4 \times 2 = 8$ using place value?



Let's learn

We can use our known **multiplication and division facts** to solve similar problems using our place value understanding.

If $3 \times 5 = 15 \longrightarrow$ "3 groups of 5 is equal to 15."

then $3 \times 0.05 = 0.15 \longrightarrow$ "3 groups of 5 hundredths is equal to 15 hundredths."

We write 15 hundredths as 0.15

0	$\frac{1}{10}$	$\frac{1}{100}$
0	1	5

10 hundredths are equal to 1 tenth.

3 \times 5 array of 0.01 counters.



a $3 \times 0.5 =$

3 groups of 5 tenths is equal to tenths.

b Write the answer to 3×0.5 in the place value chart.

0	$\frac{1}{10}$	$\frac{1}{100}$

10 tenths are equal to 1 whole.

3 \times 5 array of 0.1 counters.



Follow me



Let's use **scaling** to solve similar problems.

a

If $3 \times 4 = 12$ then
 $\downarrow \div 10 \quad \downarrow$
 $0.3 \times 4 =$

If we make one number **one-tenth** times the size,
 we must make the answer **one-tenth** times the size.

b

dividend divisor
 $\downarrow \quad \downarrow$
 If $12 \div 4 = 3$ then
 $\downarrow \div \quad \downarrow$
 $0.12 \div 4 =$

T	O	$\frac{1}{10}$	$\frac{1}{100}$

If we make the **dividend**
 one-hundredth times the
 size and keep the **divisor** the same,
 we must make the answer
 one-hundredth times the size.

Your turn



a

If $8 \times 6 = 48$ then
 $\downarrow \quad \downarrow$
 $8 \times 0.6 =$

b

If $48 \div 6 = 8$ then
 $\downarrow \quad \downarrow$
 $0.48 \div 6 =$

T	O	$\frac{1}{10}$	$\frac{1}{100}$

You do

a If $3 \times 6 = 18$

$0.3 \times 6 =$
.....

b If $24 \div 4 = 6$

$2.4 \div 4 =$
.....

c Solve 0.04×8 by using your known facts.

..... $\times 8 =$ so

$0.04 \times 8 =$
.....

d What is $0.27 \div 9$?
.....

I live 0.4 miles away from school.
Every day I walk to school in the
morning and home again in the
afternoon.

How far do I walk in 5 days?

.....

Let's explore this more

Let's look at what happens when we **scale** numbers by a tenth or a hundredth.

This is the same as dividing the number by 10 or 100

$$3 \xrightarrow{\div 10} \dots\dots\dots$$

$$12 \xrightarrow{\div 100} \dots\dots\dots$$

When we divide by 10 or 100 the digits move to the right in the place value chart.

T	O	$\frac{1}{10}$	$\frac{1}{100}$
	3		
1	2		

$\div 10$

Each digit moves 1 place to the right.

$\div 100$

Each digit moves 2 places to the right.

Let's explore this more

T	O	$\frac{1}{10}$	$\frac{1}{100}$

Check your understanding

If $12 \times 6 = 72$, then $12 \times 0.6 =$

a

0.72

b

7.2

c

0.072

d

72

Why do I need to try this question on my own first?

- To show your tutor what you understand
- To give you more practice
- To show your teacher how you are doing



Check your understanding

If $35 \div 7 = 5$, then $0.35 \div 7 =$

a

0.05

b

0.5

c

5

d

0.005




Why do I need to try this question on my own first?

- To show your tutor what you understand
- To give you more practice
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-  Differentiated instruction for each student
-  Aligned to your state's standards
-  Scaffolded learning to close gaps

“We just had our first session and it went great! The kids really liked it and felt like they were learning! One even said he finally felt like math was making sense.”



Michelle Craig, Instructional Coach,
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