CITYTUTOR DC

Fifth Grade Math Lesson Materials

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G5 Unit 1:

Place Value with Decimals

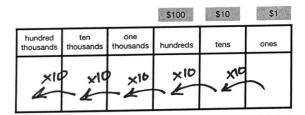# G5 U1 Lesson 1
Explain the relationships between the place values

CITYTUTOR

G1 U1 Lesson 1 - Today we will explain the relationships between the place values.

Tutor choice

Today we will explain the relationships between place values. This is the foundation of working with decimals. So it might not seem like we are going to learn something you need in real life. But you do need it in order to add, subtract, multiply and divide decimals.

Let's review what we already know about whole number place value by discussing this question: What do we see when we build each place value to the left? Don't answer the question yet. Let's first imagine counting it out with dollar bills. This is the ones place. *Point to the ones place.* We can take 10 one dollar bills and trade it for a ten dollar bill. Then this is the tens place. *Point.* We can take 10 ten dollar bills and trade it for a hundred dollar bill. Then this is the hundreds place. *Point.* And we can keep going. So, now I'll take your answers. What do we see when we build each place value to the left? Possible Student Answers, Key Points:
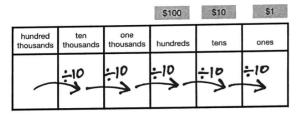- The numbers get bigger.
- It always takes ten of the place value to make the next place value.
- The place on the left is always ten times the place to the left.

We will show that idea with arrows like this. This same relationship is going to be true for decimal place values.

So, how do we describe that same pattern as we move to the right. Here's a hint: We are going the opposite direction! So it would be the opposite of x10. Possible Student Answers, Key Points:
- The numbers get smaller.
- It always made up of ten of the place over.
- The place on the right is always a tenth of the place to the left.
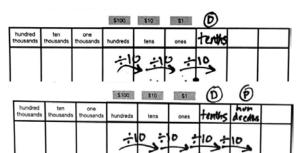- The place of the left divide by ten makes the place to the right.

We will show that idea with arrows like this. This same relationship is going to be true for decimal place values.

Let's explore what happens when we continue the pattern. We will need the decimal point to show when we go from whole numbers to pieces just like we go from dollars to coins.
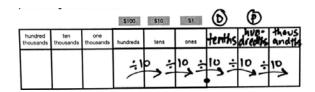

We can start at the hundreds then divide by ten to get to the tens. We can take the tens and divide by ten to get to the ones.

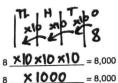Now, here's the key understanding of today. We can keep dividing by ten. The ones divided by ten means one whole cut into ten pieces. We call those tenths. It is like taking a dollar and splitting it into dimes.

The tenths can also get divided by ten. That makes a hundred pieces called hundredths. That is like taking a dime and splitting it into pennies. Just like there's 100 pennies in a dollar, these are 100 pieces in one whole.

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths

And if we wanted to get really really small, we would keep dividing by ten. That makes a thousand pieces called thousandths. That is like pieces of a penny. They are that tiny.
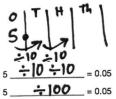
Let's Think (Slide 6): These relationships can be shown with an equation. Let's use a place value chart to see the operation and factors that would show the relationship between two numbers. Then we will rewrite them as one factor. Watch me.

$$8 \times 10 \times 10 \times 10 = 8{,}000$$
$$8 \times 1000 = 8{,}000$$

First, I am going to draw a place value chart. I can just put the first letter of the place value names. Second, I am going to put the first number on the chart. Third, I am going to draw arrows that would get us to the second number. I want to label them with x10 or ÷10. Since we're getting bigger, it's x10.

We can write the equation with all those factors written out. Or we can put them together to show it as one factor.

$$5 \div 10 \div 10 = 0.05$$
$$5 \div 100 = 0.05$$

Let's do it for the next number. We follow the same steps. First, I am going to draw a place value chart. I can just put the first letter of the place value names. Second, I am going to put the first number on the chart. Third, I am going to draw arrows that would get us to the second number. I want to label them with x10 or ÷10. This time, we're going the opposite way so it's ÷10.

We can write the equation with all those factors written out. Or we can put them together to show it as one factor.

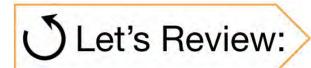Let's Try it (Slides 7): Let's work on writing these kinds of equations together. The most important thing is to always show your work on a place value chart.

WARM WELCOME

Today we will explain the relationships between the place values.

Let's Review:

What pattern do we see when we build each place value to the LEFT?

Let's imagine counting it out with dollar bills.
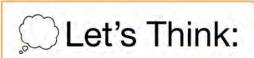
			$100	$10	$1
hundred thousands	ten thousands	one thousands	hundreds	tens	ones

Let's Talk:

How do we describe that same pattern as we move to the RIGHT?

Hint: We are going the opposite direction! So it would be the opposite of x10!

			$100	$10	$1
hundred thousands	ten thousands	one thousands	hundreds	tens	ones

Let's Think: Let's explore what happens when we continue the pattern.

We will need the decimal point to show when we go from whole numbers to pieces just like we go from dollars to coins.

			$100	$10	$1			
hundred thousands	ten thousands	one thousands	hundreds	tens	ones			
						●		
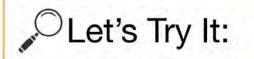
Let's Think: These relationships can be shown with an equation.

Let's use a place value chart to see the operation and factors that would show the relationship between two numbers. Then we will rewrite them as one factor.

8 _____ = 8,000   5 _____ = 0.05

8 _____ = 8,000   5 _____ = 0.05

Let's Try It:

Let's practice writing equations to show these place value relationships.

Name: _____   G5 U1 Lesson 1 – Let's Try It

What is the relationship between 500 and 50,000?

1. First, we can think about which number is smaller and which is bigger. Choose the true statement.

      (a) 500 can be multiplied to make 50,000.
               OR
      (b) 500 can be divided to make 50,000.

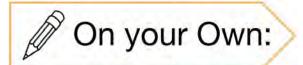2. This can also be written in a different order. Choose the statement that is true.

      (a) 50,000 can be multiplied to make 500.
               OR
      (b) 50,000 can be divided to make 500.

3. Let's get more specific by drawing a place value chart with the first number on it.

4. Let's draw arrows from place to place to create the second number, labeling the arrows with x10 or ÷10 based on the direction of the arrows.

5. Now we can make an equation to show the relationship between the numbers.

On your Own:

Now it's time for you to write equations to show the place value relationships.

Name: _____   G5 U1 Lesson 1 – Independent Work

Remember: Each place value is ten times the place to the right.

Show your work on a place value chart.

1. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.	2. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.
60 _____ = 6,000	500 _____ = 50,000
60 _____ = 6,000	500 _____ = 50,000
3. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.	4. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.

What is the relationship between 500 and 50,000?

1. First, we can think about which number is smaller and which is bigger. Choose the true statement.

(a) 500 can be multiplied to make 50,000.

OR

(b) 500 can be divided to make 50,000.

2. This can also be written in a different order. Choose the statement that is true.

(a) 50,000 can be multiplied to make 500.

OR

(b) 50,000 can be divided to make 500.

3. Let's get more specific by drawing a place value chart with the first number on it.

4. Let's draw arrows from place to place to create the second number, labeling the arrows with x10 or ÷10 based on the direction of the arrows.

5. Now we can make an equation to show the relationship between the numbers.

500 _____ = 50,000

6. We can rewrite our factors as a single factor by also thinking about the place value chart.

500 _____ = 50,000

7. We can also write the equations in a different order.

50,000 _____ = 500

50,000 _____ = 500

8. Let's put this relationship into words.

_____
_____

_____
_____

What is the relationship between 400 and 0.04?

9. First, we can think about which number is smaller and which is bigger. Choose the true statement.

(c) 400 can be multiplied to make 0.04.

<div align="center">OR</div>

(d) 400 can be divided to make 0.04.

10. This can also be written in a different order. Choose the statement that is true.

<div align="center">(c) 0.04 can be multiplied to make 400.</div>
<div align="center">OR</div>
<div align="center">(d) 0.04 can be divided to make 400.</div>

11. Let's get more specific by drawing a place value chart with the first number on it.

12. Let's draw arrows from place to place to create the second number, labeling the arrows with x10 or ÷10 based on the direction of the arrows.

13. Now we can make an equation to show the relationship between the numbers.

400 _____ = 0.04

14. We can rewrite our factors as a single factor by also thinking about the place value chart.

400 _____ = 0.04

15. We can also write the equations in a different order.

0.04 _____ = 400

0.04 _____ = 400

16. Let's put this relationship into words.

_____
_____

_____
_____

Remember: Each place value is ten times the place to the right.

Show your work on a place value chart.

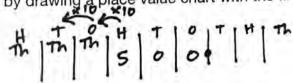| 1. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor. 60 _____ = 6,000 60 _____ = 6,000	2. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor. 500 _____ = 50,000 500 _____ = 50,000
3. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor. 900 _____ = 0.09 900 _____ = 0.09	4. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor. 4 _____ = 0.004 4 _____ = 0.004

Show your work on a place value chart.

5. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.

300 _____ = 3,000

300 _____ = 3,000

6. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.

20 _____ = 0.02

20 _____ = 0.02

7. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.

0.4 _____ = 0.004

0.4 _____ = 0.004

8. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.

700 _____ = 700,000

700 _____ = 700,000

What is the relationship between 500 and 50,000?

1. First, we can think about which number is smaller and which is bigger. Choose the true statement.

(a) 500 can be multiplied to make 50,000.

OR

(b) 500 can be divided to make 50,000.

2. This can also be written in a different order. Choose the statement that is true.

(a) 50,000 can be multiplied to make 500.

OR

(b) 50,000 can be divided to make 500.

3. Let's get more specific by drawing a place value chart with the first number on it.

4. Let's draw arrows from place to place to create the second number, labeling the arrows with x10 or ÷10 based on the direction of the arrows.

5. Now we can make an equation to show the relationship between the numbers.

500 ___×10 ×10___ = 50,000

6. We can rewrite our factors as a single factor by also thinking about the place value chart.

500 ___× 100___ = 50,000

7. We can also write the equations in a different order.

50,000 ___÷10 ÷10___ = 500

50,000 ___÷ 100___ = 500

8. Let's put this relationship into words.

___50,000 is a hundred times as much as 500.___

___500 is a hundredth of 50,000.___

What is the relationship between 400 and 0.04?

9. First, we can think about which number is smaller and which is bigger. Choose the true statement.

(c) 400 can be multiplied to make 0.04.

OR

(d) 400 can be divided to make 0.04.

10. This can also be written in a different order. Choose the statement that is true.

(c) 0.04 can be multiplied to make 400.

OR

(d) 0.04 can be divided to make 400.

11. Let's get more specific by drawing a place value chart with the first number on it.

12. Let's draw arrows from place to place to create the second number, labeling the arrows with x10 or ÷10 based on the direction of the arrows.

13. Now we can make an equation to show the relationship between the numbers.

400 $\div 10 \div 10 \div 10 \div 10$ = 0.04

14. We can rewrite our factors as a single factor by also thinking about the place value chart.

400 $\div 10,000$ = 0.04

15. We can also write the equations in a different order.

0.04 $\times 10 \times 10 \times 10 \times 10$ = 400

0.04 $\times 10,000$ = 400

16. Let's put this relationship into words.

400 is ten thousand times as much as 0.04

0.04 is a ten thousandth of 400.

Name: **ANSWER KEY**

Remember: Each place value is ten times the place to the right.

Show your work on a place value chart.

1. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.	2. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.
60 ___×10 ×10___ = 6,000	500 ___× 10 × 10___ = 50,000
60 ___× 100___ = 6,000	500 ___× 100___ = 50,000

$$60 \times 10 \times 10 = 6,000$$
$$60 \times 100 = 6,000$$

$$500 \times 10 \times 10 = 50,000$$
$$500 \times 100 = 50,000$$

3. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.	4. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.
900 ___÷ 10 ÷ 10 ÷ 10 ÷ 10___ = 0.09	4 ___÷ 10 ÷ 10 ÷ 10___ = 0.004
900 ___÷ 10,000___ = 0.09	4 ___÷ 1,000___ = 0.004

Show your work on a place value chart.

5. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.	6. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.
300 $\times 10$ = 3,000	20 $\div 10 \div 10 \div 10$ = 0.02
300 $\times 10$ = 3,000	20 $\div 1,000$ = 0.02

7. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.	8. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.
0.4 $\div 10 \div 10$ = 0.004	700 $\times 10 \times 10 \times 10$ = 700,000
0.4 $\div 100$ = 0.004	700 $\times 1,000$ = 700,000

G5 U1 Lesson 2

Write numbers in scientific notation using place value

G1 U1 Lesson 2 - Today we will write numbers in scientific notation using place value.

Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we are going to write numbers in scientific notation using place value. This might seem like a new idea but really it is just showing the size of a number like we were working on in our last lesson. Scientists use scientific notation as a shortcut for writing numbers so they don't have to write all the zeros for really big numbers.

Let's Review (Slide 3): First, let's review what we already know. How do we fill in the place value chart? Possible Student Answers, Key Points:
- Ones, Tens, Hundreds, One Thousands, Ten Thousands, Hundred Thousands then on the other side of the decimal: Tenths, Hundredths, Thousandths
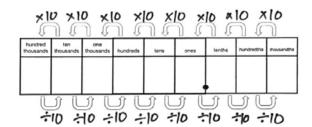
I will write O for ones, T for tens, H for hundreds, OTh for one thousands, TTh for ten thousands, HTh for hundred thousands. Then on the other side of the decimal, we will have T for tenths, H for hundredths and Th for thousandths.

Let's Talk (Slide 4): What relationships did we see on our place value chart last time? How did we label the arrows. Possible Student Answers, Key Points:
- The arrows going left are x10 and the arrows going right are ÷10.
- The place on the left is always ten times the place to the left. The place on the right is always a tenth of the place to the left.
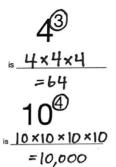
That's a lot of the same number getting multiplied over and over! Since that is so much to write, we are going to use a special math notation called an exponent.
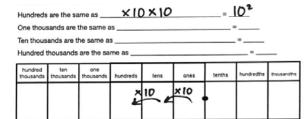
Let's Think (Slide 5): We will review what an exponent is so we can use it to show place values. You should have learned what an exponent is but just in case, I want to tell you again. *Circle the exponent.* The exponent is the small number that tells the big number how many times to multiply itself.

This is four to the third power. The three is the exponent and it is telling the four to multiply itself three times. That's 4 x 4 x 4. Then I do 4 x 4 is 16. I happen to know 16 x 4 is 64 but you might have to do some scratch work on the side. Notice that this is not the same as 4 x 3 which is 12. This is some big multiplication. Luckily the tens we're going to do later are way easier to multiply.

This is ten to the fourth power. The four is the exponent and it is telling the ten to multiply itself four times. That's 10 x 10 x 10 x 10. We can do 10 x 10 is 100. Then 100 x 10 is 1000. Notice that this is not the same as 10 x 4 which is 40. And I bet you heard those place value words. These exponents are going to be helpful for showing place values.
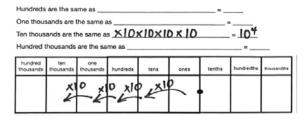
Let's Think (Slide 6): Now let's use exponents on the place value chart. Keep your eye out for a pattern!

First, we want to represent hundreds. If we start in the ones place, I can draw one x10 arrow and another x10 arrow. Let's fill in the sentence: Hundreds are

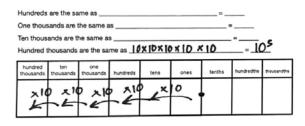the same as 10 x 10. We write this as 10^2 because the 2 will tell the ten to multiply itself two times.

Let's represent thousands. If we start in the ones place, I already have one x10 arrow and another x10 arrow. I need another x10 arrow. Let's fill in the sentence: Thousands are the same as 10 x 10 x 10 = 10^3.

Hundreds are the same as _____ = _____
One thousands are the same as _____ = _____
Ten thousands are the same as X10x10x10 x 10 = 10^4
Hundred thousands are the same as _____ = _____

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
	x10	x10	x10	x10				

Let's represent ten thousands. I already have one x10 arrow and another x10 arrow and another x10 arrow. I need another x10 arrow. Let's fill in the sentence: Ten thousands are the same as 10 x 10 x 10 x 10 = 10^4.

Do you see a pattern? Possible Student Answers, Key Points:
● Each place value is another x10.
● The exponent keeps going up.
● Because each place value is x10, the exponent keeps going up by 1 for each place value.
● The number of zeros is also the number of x10 arrows which is also the number of the exponent.
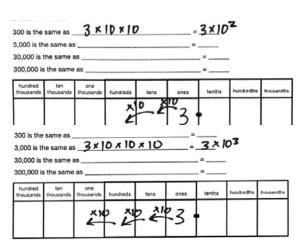
Hundreds are the same as _____ = _____
One thousands are the same as _____ = _____
Ten thousands are the same as _____ = _____
Hundred thousands are the same as 10x10x10 x 10 x 10 = 10^5

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
x10	x10	x10	x10	x10				

there is a digit to think about too. Watch me.

Let's represent hundred thousands. I already have one x10 arrow and another x10 arrow and another x10 arrow and another x10 arrow. I need another x10 arrow. Let's fill in the sentence: Hundred thousands are the same as 10 x 10 x 10 x 10 x 10 = 10^5.

Let's Think (Slide 7): Now we can use exponents to write numbers in scientific notation. We are going to have the same place value ideas we just did but now

300 is the same as 3 x 10 x 10 = 3×10^2
3,000 is the same as _____ = _____
30,000 is the same as _____ = _____
300,000 is the same as _____ = _____

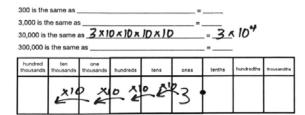| hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
			x10	x10	3			

300 starts with 3 so I am going to put a 3 on my place value chart. Just like we drew the arrows on the last slide, I am going to draw the arrows to 300. I see 3 x 10 x 10. That's the same as 3×10^2 because the 2 tells the 10 to multiply itself two times.

300 is the same as _____ = _____
3,000 is the same as 3 x 10 x 10 x 10 = 3×10^3
30,000 is the same as _____ = _____
300,000 is the same as _____ = _____

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
		x10	x10	x10	3			

Let's keep going! 3000 starts with 3 so it begins the same way only now I need another arrow to get to 3000. I see 3 x 10 x 10 x 10. That's the same as 3×10^3 because the 3 tells the 10 to multiply itself three times.

Do you see a pattern? Possible Student Answers, Key Points:
● It's the same as last time.
● Each number is another x10.
● The exponent keeps going up.
● The number of zeros is the same as the number in the exponent.
● The number of zeros is also the number of x10 arrows which is also the number of the exponent.

300 is the same as _____ = _____
3,000 is the same as _____ = _____
30,000 is the same as 3 X 10 x 10 x 10 x 10 = 3×10^4
300,000 is the same as _____ = _____

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
	x10	x10	x10	x10	3			

Let's keep going! 30,000 starts with 3 so it begins the same way only now I need another arrow to get to 3000. I see 3 x 10 x 10 x 10 x 10. That's the same as 3×10^4.

300 is the same as _____ = _____

3,000 is the same as _____ = _____

30,000 is the same as _____ = _____

300,000 is the same as $3 \times 10 \times 10 \times 10 \times 10 \times 10$ = 3×10^5

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
$\times 10$	$\times 10$	$\times 10$	$\times 10$	$\times 10$	3 .			

Let's keep going! 300,000 starts with 3 so it begins the same way only now I need another arrow to get to 3000. I see 3 x 10 x 10 x 10 x 10 x 10. That's the same as 3×10^5.

<mark>Let's Try it (Slides 7):</mark> Let's work on writing some more numbers in scientific notation. I will walk through the process with you step by step. Remember, we can't try to take a short cut and skip drawing our place value charts.

WARM WELCOME
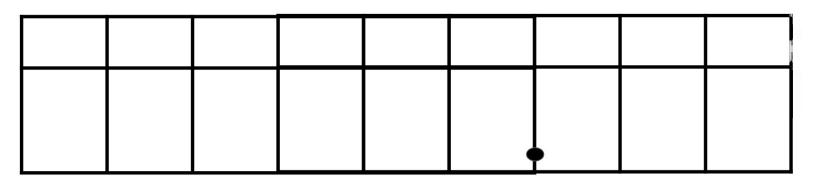
Today we will write numbers in scientific notation using place value.

How do we fill in the place value chart?

						●		

What relationships did we see on our place value chart last time?

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
					●			

Let's Think:
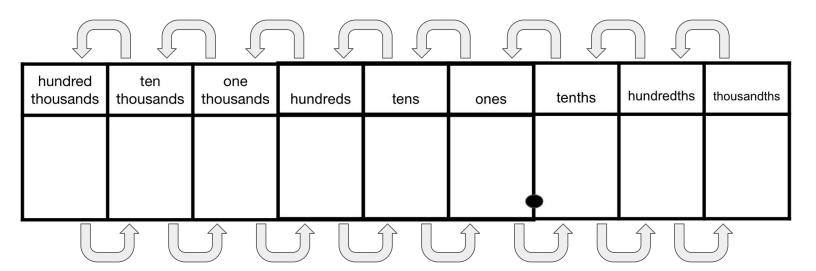
We will review what an exponent is so we can use it to show place values.

The exponent is the small number that tells the big number how many times to multiply itself.

$$4^3$$
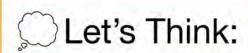
is _____

$$10^4$$

is _____

Let's Think:

Now let's use exponents on the place value chart. Look for a pattern!

Hundreds are the same as _____ = _____

One thousands are the same as _____ = _____

Ten thousands are the same as _____ = _____

Hundred thousands are the same as _____ = _____

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
						•		

Let's Think:
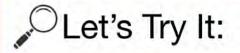
Now we can use exponents to write numbers in scientific notation.

300 is the same as _____ = _____

3,000 is the same as _____ = _____

30,000 is the same as _____ = _____

300,000 is the same as _____ = _____

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
						●		

Let's Try It:
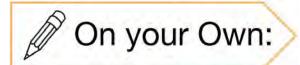
Let's practice writing numbers in scientific notation.

Name: _____   G5 U1 Lesson 2 – Let's Try It

Write 70,000 in scientific notation.

1. What do you notice about the number?

_____

_____

2. Since we can see all those zeros, we will put the first digit in a place value chart and draw arrows to see how to make it.

3. Let's write an expression to represent our work. _____

4. Let's rewrite the expression with exponents. _____

Write 8×10^5 in standard form.

1. The exponent tells the _____ to multiply itself _____ time.

On your Own:

Now it's time to for you to write numbers in scientific notation.

Remember: Each place value is ten times the place to the right.

Show your work on a place value chart.

1. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.	2. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.
60 _____ = 6,000	500 _____ = 50,000
60 _____ = 6,000	500 _____ = 50,000
3. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.	4. Fill in the operation and factors that would make a true equation. Then rewrite them as one factor.

Write 70,000 in scientific notation.

1. What do you notice about the number?

_____
_____

_____
_____

2. Since we can see all those zeros, we will put the first digit in a place value chart and draw arrows to see how to make it.

3. Let's write an expression to represent our work. _____

4. Let's rewrite the expression with exponents. _____

Write 8×10^5 in standard form.

1. The exponent tells the _____ to multiply itself _____ time.

2. Since we have x10 repeating, we will use a place value chart with arrows.

3. Let's write an expression to represent our work. _____

4. Let's rewrite the expression as just a normal number. _____

Remember: The exponent tells the base to multiply itself that many times.

Show your work on a place value chart.

1. Write 400,000 in scientific notation. _____	2. Write 9×10^3 in standard form. _____
3. Write 8×10^2 in standard form. _____	4. Write 50,000 in scientific notation. _____

Show your work on a place value chart.

5. Write 60,000 in scientific notation.

_____

6. Write 8×10^5 in standard form.

_____

7. Write 400 in scientific notation.
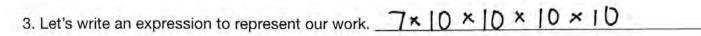
_____

8. Write 2×10^4 in standard form.

_____

Write 70,000 in scientific notation.

1. What do you notice about the number?

There is a digit followed by lots of zeroes.

2. Since we can see all those zeros, we will put the first digit in a place value chart and draw arrows to see how to make it.

3. Let's write an expression to represent our work. $7 \times 10 \times 10 \times 10 \times 10$

4. Let's rewrite the expression with exponents. 7×10^4

Write 8×10^5 in standard form.

1. The exponent tells the __10__ to multiply itself __5__ time.

2. Since we have x10 repeating, we will use a place value chart with arrows.

3. Let's write an expression to represent our work. $8 \times 10 \times 10 \times 10 \times 10 \times 10$

4. Let's rewrite the expression as just a normal number. $800,000$

Remember: The exponent tells the base to multiply itself that many times.

Show your work on a place value chart.

1. Write 400,000 in scientific notation.	2. Write 9×10^3 in standard form.
4×10^5	$9,000$

3. Write 8×10^2 in standard form.	4. Write 50,000 in scientific notation.
800	5

Show your work on a place value chart.

5. Write 60,000 in scientific notation.	6. Write 8×10^5 in standard form.
6×10^4	$800,000$

7. Write 400 in scientific notation.	8. Write 2×10^4 in standard form.
4×10^2	$20,000$

G5 U1 Lesson 3
Name decimal fractions in different forms

CITYTUTOR

G1 U1 Lesson 3 - Today we will name decimals in different forms.

Tutor choice

Today we are going to write decimals in different forms using place value. This is helpful because it will let us think of numbers in pieces, and that will help us add, subtract, multiply and divide them.
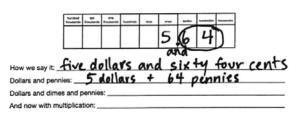
For the next few lessons, money is going to be a really helpful way to understand decimals. So let's imagine I had $5.64. What place are the digits in that amount of money? Possible Student Answers, Key Points:
- 5 is dollars. 6 is dimes. 4 is pennies.
- 5 is in the ones place. 6 is in the tenths place. 4 is in the hundredths place.

Let's fill in the names we already know on the place value chart. Now we can use the location of the decimal to write the number in the correct place on the chart. 5 is in the ones place. That's like one dollar bills. We have 5 one dollar bills. 6 is in the tenths place. That's the dimes. We have 6 dimes. 4 is in the hundredths place. That's the pennies. We have 4 pennies.
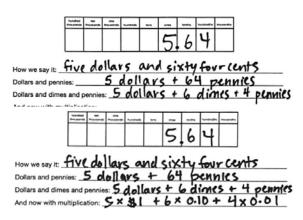
Understanding how this amount of money is put together helps us write the amount is lots of different ways. How do we say this amount of money? *Take a few ideas.* The proper way to say it is five dollars and sixty four cents.

The place value chart helps me understand how we say the amount in words. I say everything before the decimal. Then I say "and" for the decimal. *Write the word "and" under the decimal point.* I say everything after the decimal and then I say cents. *Circle the 64 cents as one amount.* Anytime we have a number to read in words, the decimals is always the word "and."

If we were to write this amount as dollars and pennies, it would be very similar to how we say it, right? I'll use a plus sign though to help us see how to do the next part. I'll write 5 dollars plus 64 pennies.
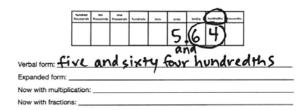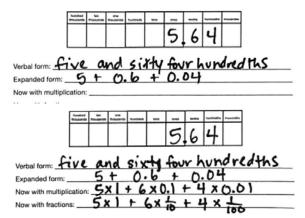
We can think of this same amount as dollars and dimes and pennies. Then I would write 5 dollars for the 5 in the ones place plus 6 dimes for the 6 in the tenths place plus 4 pennies for the 4 in the hundredths place. This is how we thought about it at the beginning of class. This is going to help us write expanded form in a minute.

Now this is a super duper challenge! To write this with multiplication, we have to think about the value of each part. 5 dollars is really one dollar five times so we can write 5 x 1. Plus 6 dimes is one dime six times so we can write 6 x 0.1. That is the way a dime gets written in the tenths place. Plus 4 pennies is one penny four times so we can write 4 x 0.01. That is the way a penny gets written in the hundredths place.

I told you that money can help us do our decimals work. Now we are going to see how. Because just like there are lots of ways to make $5.64, there are lots of ways to represent 5.64 as a decimal. And we are going to use our place value chart to help us like always.

Just like we said everything before the decimal and then everything after the decimals, that is how we write a number in verbal form. The decimal says "and." *Write "and" under the decimal.* I write five and... Now I say the whole amount after the decimal. *Circle the whole 64 in one circle.* I write sixty four. But this time instead of cents, I say the place name, "hundredths." This is five and sixty four hundredths. You say it.

For expanded form, we write out each part with plus signs. Just like we did for dollars and dimes and pennies! I write 5 plus 0.6 because the 6 is in the tenths place. Plus 0.04 because the 4 is in the hundredths place. I hope you notice that every time I write a digit, I check that it has stayed in the same place as when we started.

Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
					5	6	4	

Verbal form: *five and sixty four hundredths*

Expanded form: 5 + 0.6 + 0.04

Now with multiplication: _____

Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
					5	6	4	

Verbal form: *five and sixty four hundredths*

Expanded form: 5 + 0.6 + 0.04

Now with multiplication: $5 \times 1 + 6 \times 0.1 + 4 \times 0.01$

Now with fractions: $5 \times 1 + 6 \times \frac{1}{10} + 4 \times \frac{1}{100}$

Now multiplication is the super duper challenge. We think of each place repeating lots of times. Like we had dollars many times and dimes many times and pennies many times. So 5 is 5 x 1. Plus 0.6 is 6 x 0.1. This amount still means six tenths. Plus 0.04 is 4 x 0.01. This amount still means four hundredths.

If you get that super duper challenge then the last part is easy because we just write the decimal how it sounds as a fraction. 0.1 is one tenth so we can write one over ten. 0.01 is one hundredth so we can write one over one hundred.

<mark>Let's Try it (Slides 6):</mark> Let's work on writing all these forms altogether. This page is going to take us through step by step.

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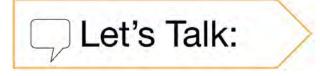
Today we will name decimals in different forms.

Imagine I had $5.64. What place are the digits in my number?

						●		

💬 Let's Talk:

What are the different ways we can make $5.64?

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
					●			

How we say it: _____

Dollars and pennies: _____

Dollars and dimes and pennies: _____

And now with multiplication: _____
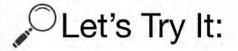
Let's Think:

Just like there are lots of ways to make $5.64, there are lots of ways to represent 5.64 as a decimal.

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
					•			

Verbal form: _____

Expanded form: _____

Now with multiplication: _____

Now with fractions: _____

Let's Try It:
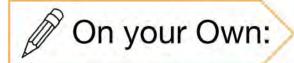
Let's practice naming decimals in different forms using the place value chart.

Name: _____   G5 U1 Lesson 3 - Let's Try It

Write 15.46 in four different forms.

Verbal form: _____

15.46

Circle the whole number before the decimal. We say it the usual way.

and

Circle the digits after the decimal. We say them and then we say the last place value.

Expanded form: _____

Put the number on a place value chart to be sure we keep each digit in the right place.

Write each digit as if it is alone in its correct place with addition signs in between.

Now with multiplication: _____

On your Own:

Now it's time for you to write the numbers in different forms independently.

Name: _____ G5 U1 Lesson 3 - Independent Work

Remember: The value of each digit depends on its place based on the location of the decimal.

Show your work on a place value chart.

1. Write 5.46 in three different forms.

Verbal form: _____

Expanded form: _____

Now with multiplication: _____

2. Write 920.7 in three different forms.

Verbal form: _____

Expanded form:

Write 15.46 in four different forms.

Verbal form: _____

15.46

Circle the whole number before the decimal. We say it the usual way.

and

Circle the digits after the decimal. We say them and then we say the last place value.

Expanded form: _____

Put the number on a place value chart to be sure we keep each digit in the right place.

Write each digit as if it is alone in its correct place with addition signs in between.

Now with multiplication: _____

Use your expanded form. Write each digit as if it is alone without a place.

Multiply it by the correct value with just a 1 in that place.

Now with fractions: _____

Use the form you just wrote. Rewrite each decimal as a fraction.

Write 3.027 in four different forms.

Verbal form: _____

Circle the digits

Circle the whole
number before the
decimal. We say it   and
the usual way.

3.027

Expanded form: _____

Put the number on a place value chart to be sure we keep each digit in the right place.

Write each digit as if it is alone in its correct place with addition signs in between.

Now with multiplication: _____

Use your expanded form. Write each digit as if it is alone without a place.

Multiply it by the correct value with just a 1 in that place.

Now with fractions: _____

Use the form you just wrote. Rewrite each decimal as a fraction.

Remember: The value of each digit depends on its place based on the location of the decimal.

Show your work on a place value chart.

1. Write 5.46 in three different forms.

Verbal form:
_____

Expanded form:
_____

Now with multiplication: _____

2. Write 920.7 in three different forms.

Verbal form:
_____

Expanded form:
_____

Now with multiplication: _____

3. Write 0.853 in three different forms.

Verbal form:
_____

Expanded form:
_____

Now with multiplication: _____

---

4. Write 23.8 in four different forms.

Verbal form:
_____

Expanded form:
_____

Now with multiplication: _____

Now with fractions: _____

---

5. Write 9.067 in four different forms.

Verbal form:
_____

Expanded form:
_____

Now with multiplication: _____

Now with fractions: _____

---

6. Write 51.403 in four different forms.

Verbal form:

_____

Expanded form:

_____

Now with multiplication: _____

Now with fractions: _____

Write 15.46 in four different forms.

Verbal form: fifteen and forty six hundredths

TO TH
15 46

Circle the whole number before the decimal. We say it the usual way.

and

Circle the digits after the decimal. We say them and then we say the last place value.

Expanded form: $10 + 5 + 0.4 + 0.06$

Put the number on a place value chart to be sure we keep each digit in the right place.

H | T | O | T | H
  | 1 | 5 . 4 | 6

Write each digit as if it is alone in its correct place with addition signs in between.

Now with multiplication: $1 \times 10 + 5 \times 1 + 4 \times 0.1 + 6 \times 0.01$

Use your expanded form. Write each digit as if it is alone without a place.

Multiply it by the correct value with just a 1 in that place.

Now with fractions: $1 \times 10 + 5 \times 1 + 4 \times \frac{1}{10} + 6 \times \frac{1}{100}$

Use the form you just wrote. Rewrite each decimal as a fraction.

Write 3.027 in four different forms.

Verbal form: three and twenty seven thousandths

Circle the whole number before the decimal. We say it the usual way.

and

Circle the digits after the decimal. We say them and then we say the last place value.

Expanded form: $3 + 0.02 + 0.007$

Put the number on a place value chart to be sure we keep each digit in the right place.

O	T	H	Th
3	0	2	7

Write each digit as if it is alone in its correct place with addition signs in between.

Now with multiplication: $3 \times 1 + 2 \times 0.01 + 7 \times 0.001$

Use your expanded form. Write each digit as if it is alone without a place.

Multiply it by the correct value with just a 1 in that place.

Now with fractions: $3 \times 1 + 2 \times \frac{1}{100} + 7 \times \frac{1}{1000}$

Use the form you just wrote. Rewrite each decimal as a fraction.

Remember: The value of each digit depends on its place based on the location of the decimal.

Show your work on a place value chart.

1. Write 5.46 in three different forms.

$$5 \overset{O}{.} \overset{T}{4} \overset{H}{6}$$

Verbal form: _five and forty six hundredths_

Expanded form: _5 + 0.4 + 0.06_

Now with multiplication: _5 × 1 + 4 × 0.1 + 6 × 0.01_

2. Write 920.7 in three different forms.

$$\overset{H}{9} \overset{T}{2} \overset{O}{0} . \overset{T}{7}$$

Verbal form: _nine hundred twenty and seven tenths_

Expanded form: _900 + 20 + 0.7_

Now with multiplication: _9 × 100 + 2 × 10 + 7 × 0.1_

3. Write 0.853 in three different forms.

$$0 . \overset{T}{8} \overset{H}{5} \overset{Th}{3}$$

Verbal form: _eight hundred fifty three thousandths_

Expanded form: _0.8 + 0.05 + 0.003_

Now with multiplication: _8 × 0.1 + 5 × 0.01 + 3 × 0.001_

4. Write 23.8 in three different forms.

$$2 \mid 3 \mid 8$$

Verbal form: __twenty three and eight tenths__

Expanded form: __20 + 3 + 0.8__

Now with multiplication: __2 × 10 + 3 × 1 + 8 × 0.1__

Now with fractions: __2 × 10 + 3 × 1 + 8 × $\frac{1}{10}$__

5. Write 9.067 in three different forms.

$$9 \mid 0 \mid 6 \mid 7$$

Verbal form: nine and sixty seven thousandths

Expanded form: __9 + 0.06 + 0.007__

Now with multiplication: __9 × 1 + 6 × 0.01 + 7 × 0.001__

Now with fractions: __9 × 1 + 6 × $\frac{1}{100}$ + 7 × $\frac{1}{1000}$__

6. Write 51.403 in three different forms.

$$5 \mid 1 \mid 4 \mid 0 \mid 3$$

Verbal form: fifty one and four hundred three thousandths

Expanded form: __50 + 1 + 0.4 + 0.003__

Now with multiplication: __5 × 10 + 1 × 1 + 4 × 0.1 + 3 × 0.001__

Now with fractions: __5 × 10 + 1 × 1 + 4 × $\frac{1}{10}$ + 3 × $\frac{1}{1000}$__

G5 U1 Lesson 4
Compare decimals

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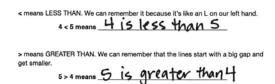
G1 U1 Lesson 4 - Today we will compare decimals.

Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we are going to compare decimals. This is something that comes up a lot in real life. Medicine is often measured in decimals. Distances are often measured in decimals. Time is often measured in decimals. And there are so many instances in real life when you will want to know when something is more or less. You definitely want to get this lesson today.

Let's Review (Slide 3): The first thing we want to review is the meaning of the symbols. Some people might have learned a trick about the alligator mouth eating the bigger number. That is an okay trick but we really need to be able to read the comparison like a sentence from left to right. So we want to memorize what the symbol means and translate it into words. One trick that you can use to remember the less than symbol is that it looks like a scrunched-up L. Your left hand can reach out and make the shape. Then the right hand symbol must be greater than. So if you remember "left hand is less than" that can really help you.
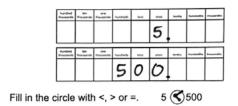
This symbol is like my left hand. *Put left hand along the symbol.* That means 4 is less than 5. This next symbol is like my right hand. *Put right hand along the symbol.* That means 5 is greater than 4.

Let's Review (Slide 4): Now we need to think about how we can tell when a number is bigger so we can choose the correct symbol. Think for ten seconds about this question and then I will call on someone. How does the place value chart help someone compare 5 and 500? Possible Student Answers, Key Points:
- 500 has hundreds but 5 only has ones.
- The zeros mean that the 5 is in a bigger place.

Note: "500 has more digits" is NOT a correct answer. When we start working with decimals, numbers with more digits won't necessarily be larger (such as 0.124 compared to 0.9). So, if someone says that 500 is bigger because it has more digits, you will need to say, it is true that 500 has more digits but that's not what makes it bigger. It is really about the place of the digits.

Fill in the circle with <, > or =.   5 (<) 500

If I put both digits on the place value chart, their decimals are in line and all the place values are in line. Now it is clear that 500 has digits in the larger values. 5 is less than 500 so I put the less than symbol. I have a trick for remembering which way it goes by saying "Left Hand Less Than."

Let's Talk (Slide 5): Lining up the place values is super useful because we know that anything on the right - even if it's just a 1 - is going to be bigger than anything on the left.
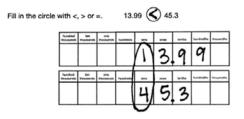

That's because the highest amount that can be in any place is a 9. And we know that each place on the right has 10 of the smaller place. So even 1 of a place to the right is bigger than 9 to the left.
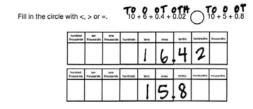
Let's Think (Slides 6): So then anytime we compare, we want to line up the place values and look in the biggest place first.

Fill in the circle with <, > or =.   13.99 (<) 45.3

Sometimes people call this "lining up the decimals" because when the decimals are in line then the place values are in line. I am going to write 13.99 and 45.3. If it helps, I can put place value letters above the numbers. The most important thing is that if 13 is before the decimal, it stays before the decimal. 99 is after the decimal so it has to stay after the decimal. The same with the next number. 45 is before the decimal. The 3 is after the decimal. Now I look in the tens place. 13.99 has 1 ten. 45.3 has 4 tens. *Circle the tens.* The rest of the numbers don't matter because they are smaller values. They are just pieces of the bigger place value. So, 13.99 is less than 45.3. Less than is my left hand so I draw the symbol like this.

Let's Think (Slides 7): If our numbers are written in different forms, we still use a place value chart, of course. We have to make sure that the place value of all these pieces doesn't change.

Fill in the circle with <, > or =.

To.o.oT.oTH ◯ To.o.oT
10 + 6 + 0.4 + 0.02   10 + 5 + 0.8

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
				1	6	4	2	

hundred thousands	thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
				1	5	8		

If I need to, I can write the place value above these numbers. The 1 is in the tens place so I have to keep it in the tens place. The 6 is in the ones place. The 4 is in the tenths place. The 2 is in the hundredths place. Now for our next number, the 1 is in the tens place. The 5 is in the ones place. The 8 is in the tenths place. Now I am going to look in the biggest place first, which is the tens place. The digits in the tens place are the same. So I am going to look in the next biggest place, which is the ones place. 6 ones is more than 5 ones. It doesn't matter what the smaller digits are. So 16.42 is greater than 15.8. I know left hand is less than. I need my right hand symbol.

Let's Try it (Slides 8): Now let's go through the steps of comparing decimals together. Remember we are always going to put the numbers on a place value chart and look at the biggest place that's not the same.

WARM WELCOME

Today we will compare decimals.

↻ Let's Review: **Today we will need to use < and >.**

< means LESS THAN. We can remember it because it's like an L on our left hand.

4 < 5 means _____

> means GREATER THAN. We can remember that the lines start with a big gap and get smaller.

5 > 4 means _____

↻ Let's Review: **How does the place value chart help someone compare 5 and 500?**

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths

Fill in the circle with <, > or =.   5 ◯ 500

Let's Talk:

Because of regrouping, we know that a digit will always be bigger than any other digit in a place value to its left.

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
					1			

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths

Let's Think:

I can compare any numbers by lining up the place values.

Fill in the circle with <, > or =.   13.99 ◯ 45.3

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths

Let's Think:
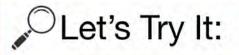
If our numbers are written in different forms, we still use a place value chart.

Fill in the circle with <, > or =.

$10 + 6 + 0.4 + 0.02$ $\bigcirc$ $10 + 5 + 0.8$

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths

Let's Try It:

Let's practice comparing decimals with place value charts.

Name: _____   G5 U1 Lesson 4 - Let's Try It

< means _____   > means _____

Jesse has 3 dollar bills, 6 dimes and 9 pennies. Lisa has 3 dollar bills and 8 dimes. Who has the most money?

Jesse's money is <u>draw</u> for us below. Let's draw Lisa's money to solve the story problem.

| $1 | $1 | $1 | D D D D D D   P P P P P P P P P

What do we notice about the number of coins?

_____

What do we notice about the value of the coins?

_____

This problem is the same as asking:

On your Own:

Now it's time to compare decimals on your own!

Remember: We start by looking at the biggest place value to compare.

Show your work on a place value chart.

1. Fill in the comparison with words. Then fill in the circle with <, > or =.	2. Fill in the comparison with words. Then fill in the circle with <, > or =.
3.45 is _____ than 6.1 3.45 ◯ 6.1	8.211 is _____ than 3.999 8.211 ◯ 3.999
3. Fill in the comparison with words. Then fill in the circle with <, > or =.	4. Fill in the comparison with words. Then fill in the circle with <, > or =.

< means _____   > means _____

Jesse has 3 dollar bills, 6 dimes and 9 pennies. Lisa has 3 dollar bills and 8 dimes. Who has the most money?

Jesse's money is draw for us below. Let's draw Lisa's money to solve the story problem.

| $1 | $1 | $1 | Ⓓ Ⓓ Ⓓ Ⓓ Ⓓ Ⓓ   Ⓟ Ⓟ Ⓟ Ⓟ Ⓟ Ⓟ Ⓟ Ⓟ Ⓟ

What do we notice about the number of coins?

_____
_____

What do we notice about the value of the coins?

_____
_____

This problem is the same as asking:

_____◯_____

Let's represent the problem with numbers on the place value chart.

Which place helped us determine which number was larger? Why?

_____
_____

_____
_____

Fill in the blank with <, > or =.

$$0.2 + 0.\,03 + 0.004 \bigcirc 229 \text{ thousands}$$

Step #1: Put each number on a place value chart.

Step #2:   Look in the biggest place. If it is the same then look at the next biggest place.

        What place did you look in to compare? _____

Step #3:   Write the words that would make the comparison true.

        0.2 + 0. 03 + 0.004 is _____ 229 thousands

Step #4:   Fill in the matching symbol.

Fill in the blank with <, > or =.

Seventy eight hundredths ( ) x 0.1 + 2 x 0.01 + 3 x 0.001

Step #1: Put each number on a place value chart.

Step #2:   Look in the biggest place. If it is the same then look at the next biggest place.

        What place did you look in to compare? _____

Step #3:   Write the words that would make the comparison true.

    Seventy eight hundredths is _____ than 7 x 0.1 + 2 x 0.01 + 3 x 0.001

Step #4:   Fill in the matching symbol.

Remember: We start by looking at the biggest place value to compare.

Show your work on a place value chart.

1. Fill in the comparison with words. Then fill in the circle with <, > or =. 3.45 is _____ than 6.1 3.45 ◯ 6.1	2. Fill in the comparison with words. Then fill in the circle with <, > or =. 8.211 is _____ than 3.999 8.211 ◯ 3.999
3. Fill in the comparison with words. Then fill in the circle with <, > or =. 7.8 is _____ than 7.80 7.8 ◯ 7.80	4. Fill in the comparison with words. Then fill in the circle with <, > or =. 16.5 is _____ than 7.802 16.5 ◯ 7.802

Show your work on a place value chart.

5. Fill in the comparison with words.
Then fill in the circle with <, > or =.

3 x 0.1 + 4 x 0.01 is _____
than 6 x 0.01 + 8 x 0.001

3 x 0.1 + 4 x 0.01 ◯ 6 x 0.01 + 8 x 0.001

6. Fill in the comparison with words.
Then fill in the circle with <, > or =.

9 + 0.3 + 0.007 is

_____
than 9 + 0.3 + 0.07

9 + 0.3 + 0.007 ◯ 9 + 0.3 + 0.07

7. Fill in the comparison with words.
Then fill in the circle with <, > or =.

8.9 is _____than Sixteen

8.9 ◯ Sixteen

8. Fill in the comparison with words.
Then fill in the circle with <, > or =.

Fifty four hundredths is _____
than 0.6 + 0.01 + 0.002

Fifty four hundredths ◯ 6 + 0.01 + 0.002
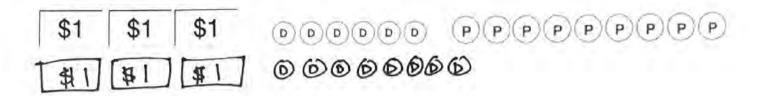
< means _less than_   > means _greater than_

Jesse has 3 dollar bills, 6 dimes and 9 pennies. Lisa has 3 dollar bills and 8 dimes. Who has the most money?

Jesse's money is draw for us below. Let's draw Lisa's money to solve the story problem.

$1	$1	$1

Ⓓ Ⓓ Ⓓ Ⓓ Ⓓ Ⓓ   Ⓟ Ⓟ Ⓟ Ⓟ Ⓟ Ⓟ Ⓟ Ⓟ Ⓟ

$1	$1	$1

Ⓓ Ⓓ Ⓓ Ⓓ Ⓓ Ⓓ Ⓓ Ⓓ

What do we notice about the number of coins?
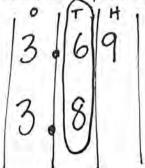
Jesse has more coins.

What do we notice about the value of the coins?

Jesse has $3.69. Lisa has $3.80. Lisa's value is higher.

This problem is the same as asking:

$$3.69 < 3.8$$

Let's represent the problem with numbers on the place value chart.

O	T	H
3.	6	9
3.	8	
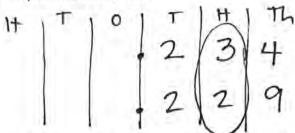
Which place helped us determine which number was larger? Why?

The ones were the same so I looked in the tenths because those are bigger than hundredths.

Fill in the blank with <, > or =.

$$0.2 + 0.03 + 0.004 \enspace \left(\;>\;\right) \enspace 229 \text{ thousands}$$

Step #1: Put each number on a place value chart.

Ht	T	O	T	H	Th
		.	2	3	4
		.	2	2	9

Step #2: Look in the biggest place. If it is the same then look at the next biggest place.

What place did you look in to compare? __hundredths__

Step #3: Write the words that would make the comparison true.

$0.2 + 0.03 + 0.004$ is ___greater than___ 229 thousands

Step #4: Fill in the matching symbol.

Fill in the blank with <, > or =.

$$\text{Seventy eight hundredths} \enspace \left(\;>\;\right) \enspace 7 \times 0.1 + 2 \times 0.01 + 3 \times 0.001$$

Step #1: Put each number on a place value chart.

Ht	T	O	T	H	Th
		.	7	8	
		.	7	2	3

Step #2: Look in the biggest place. If it is the same then look at the next biggest place.

What place did you look in to compare? __hundredths__

Step #3: Write the words that would make the comparison true.

Seventy eight hundredths is ___greater___ than $7 \times 0.1 + 2 \times 0.01 + 3 \times 0.001$

Step #4: Fill in the matching symbol.

Name: **ANSWER KEY**

Remember: We start by looking at the biggest place value to compare.

Show your work on a place value chart.

1. Fill in the comparison with words. Then fill in the circle with <, > or =.

3.45 is __less__ than 6.1

3.45 $<$ 6.1

O	T	H
③	4	5
⑥	1	

2. Fill in the comparison with words. Then fill in the circle with <, > or =.

8.211 is __greater__ than 3.999

8.211 $>$ 3.999

O	T	H	Th
⑧	2	1	1
③	9	9	9

3. Fill in the comparison with words. Then fill in the circle with <, > or =.

7.8 is __equal to__ than 7.80

7.8 $=$ 7.80

O	T	H
7	8	○
7	8	0

4. Fill in the comparison with words. Then fill in the circle with <, > or =.

16.5 is __greater__ than 7.802

16.5 $>$ 7.802

T	O	T	H	Th
1	6	5		
○	7	8	0	2

Show your work on a place value chart.

5. Fill in the comparison with words.
Then fill in the circle with <, > or =.

$3 \times 0.1 + 4 \times 0.01$ is ___greater___ than $6 \times 0.01 + 8 \times 0.001$

$3 \times 0.1 + 4 \times 0.01$ ⓥ $6 \times 0.01 + 8 \times 0.001$

O	T	H	Th
③	4		
⓪	6	8	

6. Fill in the comparison with words.
Then fill in the circle with <, > or =.

$9 + 0.3 + 0.007$ is ___less___ than $9 + 0.3 + 0.07$

$9 + 0.3 + 0.007$ ⓒ $9 + 0.3 + 0.07$

O	T	H	Th
9	3	⓪	7
9	3	⑦	

7. Fill in the comparison with words.
Then fill in the circle with <, > or =.

8.9 is ___less___ than Sixteen

8.9 ⓒ Sixteen

+	O	T
ⓞ	8	9
1	6	

8. Fill in the comparison with words.
Then fill in the circle with <, > or =.

Fifty four hundredths is ___less___ than $0.6 + 0.01 + 0.002$

Fifty four hundredths ⓒ $0.6 + 0.01 + 0.002$

O	T	H	Th
⑤	4		
⑥	1	2	

G5 U1 Lesson 5
Round decimals

CITYTUTOR

G1 U1 Lesson 5 - Today we will round decimals.

Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we are going to round decimals. That will be really important to helping us estimate when we're adding, subtracting, multiplying and dividing.

Let's Review (Slide 3): What have you learned about rounding whole numbers? *You can accept any answer because you are just getting a sense of what students already know about rounding. If they say anything that is correct, you can refer to it when you do your explanation.* Rounding means finding out what a number is close to.
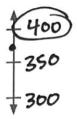
Round 364 to the nearest ten.

The first step is to find which benchmarks your number is between. I can label the place values about the number to know which place we are talking about. *Write O, T and H above the digits.* If we are rounding to the nearest ten then the ones place is too small to be part of my rounding. That place becomes a zero. That's the lower benchmark and then the next ten is the higher benchmark. 364 is between 360 and 370. *Write those numbers on the number line.*

Halfway between the numbers is 5 in the ones place, which is 365. *Write that number in.* Our number is less than the halfway mark. *Draw a point to represent it.* It is on this side of halfway, which means our number is closer to 360. *Circle 360.*
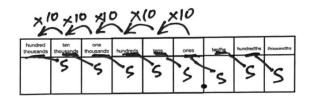
Now we have the same number but it is being rounded to a different place. We will follow the same steps for a different place. I can label the place values about the number to know which place we are talking about. *Write O, T and H above the digits.* The first step is to find which benchmarks your number is between. If we are rounding to the nearest hundred then the tens and ones are too small to be part of my rounding. Those places become zeros. That's the lower benchmark and then the next hundred is the higher benchmark. 364 is between 300 and 400. *Write those numbers on the number line.*

Round 364 to the nearest hundred.

Halfway between the numbers is 5 in the tens place, which is 350. *Write that number in.* Our number is bigger than the halfway mark. *Draw a point to represent it.* It is on this side of the halfway mark, which means that our number is closer to 400. *Circle 400.*

Let's Review (Slide 4): We always use a 5 to find the halfway mark. Why is that? I'll give you a hint. It has something to do with those x10 relationships we've been talking about in all the previous lessons. Possible Student Answers, Key Points:
- 5 is half of 10. 50 is half of 100. 500 is half of 1,000.
- The arrows we've been drawing are x10 and half of that is 5.
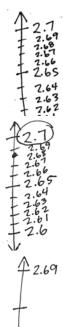- Each place value is 10 of the place to the left so half would be 5.

This means that if I am rounding between hundreds, my halfway mark is 50. If I am rounding between thousands, my halfway mark is 500. We can keep going with that pattern for any place. *Draw the corresponding arrows as you are talking.*

Let's Talk (Slide 5): We will follow the same steps for decimals that we do for whole numbers. Step 1- low and high benchmarks. Step 2 - halfway mark. Step 3 - see what your number is closest to. Watch me.

The first step is to find which benchmarks your number is between. I can label the place values above the number to know which place we are talking about. If we are rounding to the nearest tenth then the hundredths and thousandths place is too small to be part of my rounding. Those places become zeros. That's the lower benchmark and then the next tenth is the higher benchmark. 2.681 is between 2.6 and 2.7.

We already talked about how halfway between the numbers is 5 in the next smallest place, which is 2.65. But if you are having trouble you can count up from the bottom number. From 2.6, we say 2.61, 2.62, 2.63, 2.64, 2.65, 2.66, 2.67, 2.67, 2.68, 2.69. Now we really see the halfway mark is 2.65.

Our number is greater than the halfway mark. I am going to mark a point about where it goes. It is on this side of the halfway mark, which means that our number is closer to 2.7.

Now we have the same number but it is being rounded to a different place. We will follow the same steps for the different place. Again, I can label the place values about the number to know which place we are talking about.The first step is to find which benchmarks your number is between. If we are rounding to the nearest hundredth then the thousandths are too small to be part of my rounding. That place becomes a zero. That's the lower benchmark and then the next hundredth is the higher benchmark. 2.681 is between 2.68 and 2.69.

We already talked about how halfway between the numbers is 5 in the next smallest place. So halfway between the numbers is 5 in the thousandths place, which is 2.685. But if this is tricky, we can just count up from the low number. 2.68 then 2.681, 2.682, 2.683, 2.684, 2.685, 2.686, 2.687, 2.688, 2.689. There is the halfway mark.

Our number is less than the halfway mark. I am going to mark a point about where it goes. It is on this side of the halfway mark, which means that our number is closer to 2.69.

<mark>Let's Try It (Slides 6):</mark> Let's work together through the same steps now. Step 1- low and high benchmarks. Step 2 - halfway mark. Step 3 - see what your number is closest to.

WARM WELCOME

Today we will round decimals.

What have you learned about rounding whole numbers?

Round 364 to the nearest ten.

Round 364 to the nearest hundred.

Let's Talk:

We always use a 5 to find the halfway mark. Why is that?

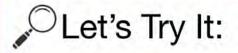| hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths

Let's use that idea to round decimals.

Round 2.681 to the nearest tenth.
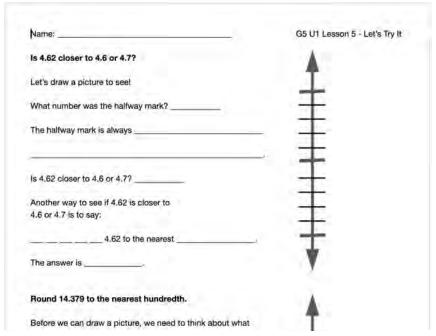
Round 2.681 to the nearest hundredth.
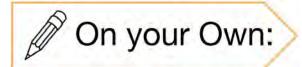
Let's Try It:
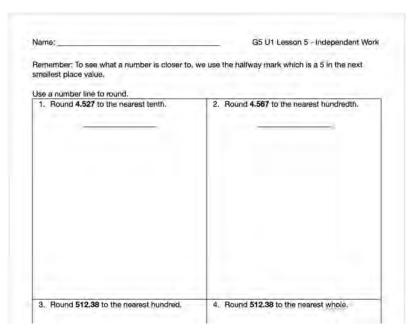
Let's practice rounding decimals together.

Name: _____   G5 U1 Lesson 5 - Let's Try It

Is 4.62 closer to 4.6 or 4.7?

Let's draw a picture to see!

What number was the halfway mark? _____

The halfway mark is always _____

_____

Is 4.62 closer to 4.6 or 4.7? _____

Another way to see if 4.62 is closer to 4.6 or 4.7 is to say:

_____ _____ _____ 4.62 to the nearest _____.

The answer is _____.

Round 14.379 to the nearest hundredth.

Before we can draw a picture, we need to think about what

On your Own: Now it's time to for you to round decimals independently!

Remember: To see what a number is closer to, we use the halfway mark which is a 5 in the next smallest place value.

Use a number line to round.

1. Round **4.527** to the nearest tenth. _____	2. Round **4.567** to the nearest hundredth. _____
3. Round **512.38** to the nearest hundred.	4. Round **512.38** to the nearest whole.

Is 4.62 closer to 4.6 or 4.7?

Let's draw a picture to see!

What number was the halfway mark? _____

The halfway mark is always _____

_____.

Is 4.62 closer to 4.6 or 4.7? _____

Another way to see if 4.62 is closer to
4.6 or 4.7 is to say:

___ ___ ___ ___ ___ 4.62 to the nearest _____.

The answer is _____.

Round 14.379 to the nearest hundredth.

Before we can draw a picture, we need to think about what
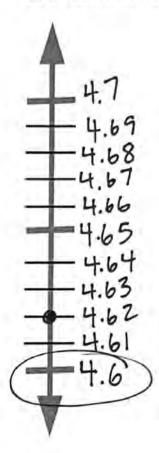hundredths our number is between.
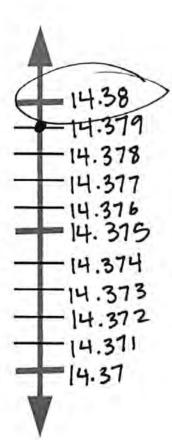
_____ and _____

Now let's draw a picture to see!

What number was the halfway mark? _____

The halfway mark is always _____

_____.

The answer is _____.

Round 8.34 to the nearest tenth.

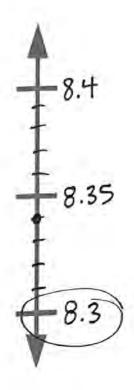Before we can draw a picture, we need to think about what
tenths our number is between.

_____ and _____

Now let's draw a picture to see! This time you don't need to fill in all the numbers.

The halfway mark is always _____

_____.

What number is the halfway mark? _____

The answer is _____.

Round 8.725 to the nearest whole.

Before we can draw a picture, we need to think about what whole numbers our number is between.

_____ and _____

Now let's draw a picture to see! This time you will need to do the whole picture on your own.

The halfway mark is always _____

_____.

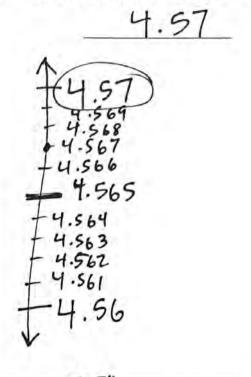What number is the halfway mark? _____

The answer is _____.

Remember: To see what a number is closer to, we use the halfway mark which is a 5 in the next smallest place value.
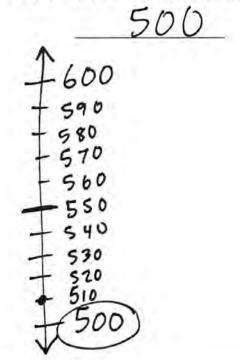
Use a number line to round.

1. Round 4.527 to the nearest tenth. _____	2. Round 4.567 to the nearest hundredth. _____
3. Round 512.38 to the nearest hundred. _____	4. Round 512.38 to the nearest whole. _____

Use a number line to round.

5. Round 164.817 to the nearest ten.

_____

6. Round 9.817 to the nearest tenth.

_____

7. Round 6.734 to the nearest whole.

_____

8. Round 6.734 to the nearest hundredth.

_____

Is 4.62 closer to 4.6 or 4.7?

Let's draw a picture to see!

What number was the halfway mark? __4.65__

The halfway mark is always __5 in the place to the left.__

Is 4.62 closer to 4.6 or 4.7? __4.6__

Another way to see if 4.62 is closer to 4.6 or 4.7 is to say:

__Round__ 4.62 to the nearest __tenth__.

The answer is __4.6__.

Round 14.379 to the nearest hundredth. (To THE)

Before we can draw a picture, we need to think about what hundredths our number is between.

__14.37__ and __14.38__

Now let's draw a picture to see!

What number was the halfway mark? __14.375__

The halfway mark is always __5 in the place to the left__.

The answer is __14.38__.

Round ^o ᴛᴴ 8.34 to the nearest tenth.

Before we can draw a picture, we need to think about what tenths our number is between.

_____8.3_____ and _____8.4_____

Now let's draw a picture to see! This time you don't need to fill in all the numbers.

The halfway mark is always _____5 in the place_____
_____to the left_____.

What number is the halfway mark? ____8.35____

The answer is ____8.3____.

Round ^o ᴛᴴᴛ 8.725 to the nearest whole.

Before we can draw a picture, we need to think about what whole numbers our number is between.

_____8._____ and _____9._____

Now let's draw a picture to see! This time you will need to do the whole picture on your own.

The halfway mark is always _____5 in the place_____
_____to the left_____.

What number is the halfway mark? ____8.5____

The answer is ____9____.

Name: **ANSWER KEY**

Remember: To see what a number is closer to, we use the halfway mark which is a 5 in the next smallest place value.

Use a number line to round.

1. Round 4.527 to the nearest tenth.	2. Round 4.567 to the nearest hundredth.
4.5	**4.57**
4.6	4.57
4.59	4.569
4.58	4.568
4.57	4.567
4.56	4.566
4.55	4.565
4.54	4.564
4.53	4.563
4.52	4.562
4.51	4.561
4.5	4.56

3. Round 512.38 to the nearest hundred.	4. Round 512.38 to the nearest whole.
500	**512**
600	513
590	512.9
580	512.8
570	512.7
560	512.6
550	512.5
540	512.4
530	512.3
520	512.2
510	512.1
500	**512**

Use a number line to round.

5. Round 164.817 to the nearest ten.

_160_

170
169
168
167
166
165
164
163
162
161
(160)

6. Round 9.817 to the nearest tenth.

_9.8_

9.9
9.89
9.88
9.87
9.86
9.85
9.84
9.83
9.82
9.81
(9.8)

7. Round 6.734 to the nearest whole.

_7_

(7)
6.9
6.8
6.7
6.6
6.5
6.4
6.3
6.2
6.1
6.

8. Round 6.734 to the nearest hundredth.

_6.73_

6.74
6.739
6.738
6.737
6.736
6.735
6.734
6.733
6.732
6.731
(6.73)

G5 U1 Lesson 6
Add decimals

G1 U1 Lesson 6 - Today we will add decimals.

Tutor choice
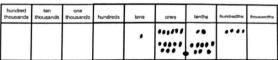
Frame the Learning/Connect to Prior Learning (Slide 2): Today we are going to add decimals. It is going to work exactly the same way as it does with whole numbers. So you are going to do great!

Let's Review (Slide 3): How do we add the numbers below? *You can accept any answer because you are just getting a sense of what students already know about adding. If they say anything that is correct, you can refer to it when you do your explanation.* I heard you say a lot of good things. Now it's time to watch me.
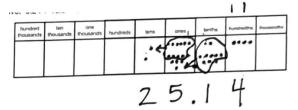
The first step is to line up the numbers. We do this like we are putting together money in a cash register drawer. We want the ones to go with the ones and the tens to go with the tens. Then we start on the right side because if we have too much in any place, we can regroup to the bigger places on the left. I add 8 + 5. *It is great for kids to count on their fingers no matter how old they are. Model counting on from 8.* 8, 9, 10, 11, 12, 13. 8 + 5 is 13. That's too much for that place. So I keep 3 ones but the rest go to the next place.

Now I add: 1+ 7 makes 8. 8 plus 9 is 8, 9, 10, 11, 12, 13, 14, 15, 16, 17. That's too much for that place. So I keep 7 but the rest go to the next place. Now I add 1 + 3 makes 4. My answer is 473. There are two keys steps. We always line up the same place values. We always have to regroup to the bigger place if we have too much.

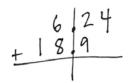Let's Talk (Slide 4): Let's use the picture to add decimals.

We have 6 ones, 2 tenths and 4 hundredths. When I draw the next number, you can see how the same places end up together. I have 1 ten, 8 ones and 9 tenths.

There's nothing to add in the hundredths. Let's count up the tenths. There are 11 tenths. I am going to circle ten of them to make the next place. That's like taking 10 dimes and making a dollar. 1 stays in the tenths place.

Now we can count up the ones place. There are 15 ones. I am going to circle ten of them to make the next place. That's like taking 10 one dollars and making a ten dollar bill. 5 stays in the ones place. And now we can count 2 ten dollar bills. Make sure you notice the two keys steps. We always line up the same place values. We always have to regroup to the bigger place if we have too much.

Let's Think (Slide 5): We will need to use the same ideas from the model when we use numbers. It is easy to put the first number on the place value chart. We've been doing that for many lessons. When we put the second number on the place value chart, we can't get distracted by lining up the numbers on the left or the right. The ones in 6.24 have to be with the ones in 18.9. The tenths in 6.24 have to be with the tenths in 18.9. What helps me see where the ones and the tens are?
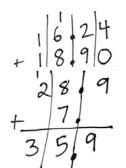Possible Student Answers, Key Points:
- The place value chart
- The decimal point.

To line up the place values, we have to line up the decimals points in both numbers. Watch me. In 6.24, the 6 is right before the decimal point so it has to stay right before the decimal point. 24 is after the decimal point so it has to stay right after the decimal point. The decimal point can't suddenly be between the 2 and the 4. For

18.9, the 18 has to be before the decimal point. The 9 has to be after the decimal point. Now my numbers are properly lined up and I can add.

If it makes it easier, you can add zeros in the empty spaces. I start in the hundredths place. 4 + 0 is 4. Now tenths. 2 + 9 is 11. Just like I circled ten and moved them to the bigger place, I will keep the 1 but the 1 in the tens place moves over. Now ones. 1 + 6 + 8 is 14. I will keep the 4 but the 1 moves over. 1 + 1 = 2

Lining up decimals was the key first step. That is a little bit harder if one number has a decimal and the other one doesn't. For whole numbers, we still need to line up matching place values.

I'm going to draw the decimal line and put that first number because that's like what we just did. 28 goes before the decimal. 9 goes after the decimal. Now we look at the number 7, what place is a plain old seven? Hint: It is like if I said plain old seven dollars. Possible Student Answers, Key Points:
● The seven is seven one dollar bills.
● The seven is in the ones place.
The 7 is 7 ones. So that would mean there is an imaginary decimal right here. *Put a decimal point after the 7 in the numerical expression.* The 7 goes before the decimal in the ones place like this. *Put the 7 on the place value chart you've drawn.* Then we can add like usual.
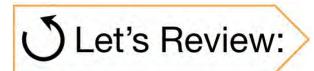
<mark>Let's Try It (Slides 7):</mark> Now we're ready to work through the steps together. I know you know how to add so we're going to focus on how we line things up on the place value chart. We'll think about it with money and then we'll practice with digits.

WARM WELCOME

Today we will add decimals.

Solve. $378 + $95 = ?
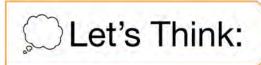
💬 Let's Talk: **Let's use the picture to add decimals.**

Solve. 6.24 + 18.9 = ?

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths

> **Let's Think:** We will need to use the same ideas from the model when we use numbers.

Solve. 6.24 + 18.9 = ?
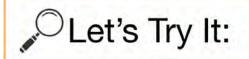
> **Let's Think:** For whole numbers, we still need to line up matching place values.

Solve. 28.9 + 7 = ?

Let's Try It:
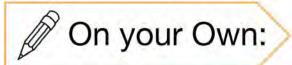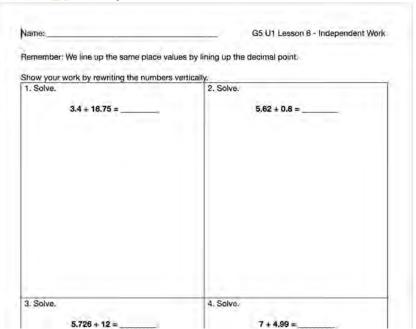
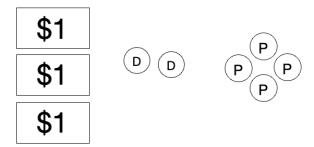Let's practice adding decimals together using a place value chart.

Joe has 3 dollar bills, 2 dimes and 4 pennies. Malcolm has 1 dollar bills and 3 dimes. Imagine they put their money together. How much money would they have altogether?

Joe's money is drawn for us. Now let's add Malcolm's money to the drawing.

$1
$1
$1

How did we decide where to draw the parts of Malcolm's money?

_____

_____

Now let's represent the problem on a place value chart.

ones	tenths	hundredths

On your Own:

Now it's time to add decimals on a place value chart.

Remember: We line up the same place values by lining up the decimal point.

Show your work by rewriting the numbers vertically.

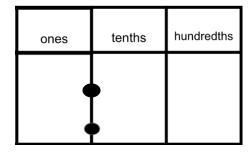| 1. Solve.	2. Solve.
$3.4 + 18.75 = $ _____	$5.62 + 0.8 = $ _____
3. Solve.	4. Solve.
$5.726 + 12 = $ _____	$7 + 4.99 = $ _____

Joe has 3 dollar bills, 2 dimes and 4 pennies. Malcolm has 1 dollar bills and 3 dimes. Imagine they put their money together. How much money would they have altogether?

Joe's money is drawn for us. Now let's add Malcolm's money to the drawing.

$1

$1

$1

D   D

P
P   P
P

How did we decide where to draw the parts of Malcolm's money?

_____
_____

_____
_____

Now let's represent the problem on a place value chart.

ones	tenths	hundredths

This same problem could be written as _____ + _____.

Let's practice writing the problem vertically without the chart drawn for us:

Solve. $56.4 + 2.987 = ?$

Let's represent the problem on a place value chart.

one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
			•	•		

Let's practice writing the problem vertically without the chart drawn for us:

Solve.

$$42.78 + 9 = ?$$

What place is the 9 in? _____

What digit has the same place in the number 42.78? _____ It has to be lined up with the 9!

Now let's represent the problem on a place value chart.

one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
			•	•		

Let's practice writing the problem vertically without the chart drawn for us:

Remember: We line up the same place values by lining up the decimal point.

Show your work by rewriting the numbers vertically.

1. Solve. $3.4 + 18.75 =$ _____	2. Solve. $5.62 + 0.8 =$ _____
3. Solve. $5.726 + 12 =$ _____	4. Solve. $7 + 4.99 =$ _____

Show your work by rewriting the numbers vertically.

5. Solve.

$$1.9 + 13 = \underline{\hspace{2cm}}$$

6. Solve.

$$6.5 + 4.27 = \underline{\hspace{2cm}}$$

7. Solve.

$$876 + 42.3 = \underline{\hspace{2cm}}$$

8. Solve.

$$7.8 + 1.39 + 12 = \underline{\hspace{2cm}}$$

Joe has 3 dollar bills, 2 dimes and 4 pennies. Malcolm has 1 dollar bills and 3 dimes. Imagine they put their money together. How much money would they have altogether?

Joe's money is drawn for us. Now let's add Malcolm's money to the drawing.

$1

$1

$1

D D   P P P P

$ 1 4   D D D 5   4

$4.54

How did we decide where to draw the parts of Malcolm's money?

We put the dollars with the dollars and the dimes with the dimes

Now let's represent the problem on a place value chart.

ones	tenths	hundredths
3 . 2		4
1 . 3		

This same problem could be written as ___3.24___ + ___1.3___.

Let's practice writing the problem vertically without the chart drawn for us:

$$3.24$$
$$+ 1.3$$
$$4.54$$

Solve.   56.4 + 2.987 = ?

Let's represent the problem on a place value chart.

one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
		5	6 . 4			
			2 . 9	8	7	

Let's practice writing the problem vertically without the chart drawn for us:

$$\begin{array}{r} 5\,6\,.\,4 \\ +\ 2\,.\,9\,8\,7 \\ \hline 5\,9\,.\,3\,8\,7 \end{array}$$

Solve.   42.78 + 9. = ?

What place is the 9 in? __the ones__

What digit has the same place in the number 42.78? __2__ It has to be lined up with the 9!

Now let's represent the problem on a place value chart.

one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
		4	2 .	7	8	
			9 .			

Let's practice writing the problem vertically without the chart drawn for us:

$$\begin{array}{r} 4\,2\,.\,7\,8 \\ +\ 9\,. \\ \hline 5\,1\,.\,7\,8 \end{array}$$

Name: <u>ANSWER KEY</u>

Remember: We line up the same place values by lining up the decimal point.

Show your work by rewriting the numbers vertically.

1. Solve.

$$3.4 + 18.75 = \underline{22.15}$$

$$\begin{array}{r} \overset{1}{3}.4 \\ + 1\overset{1}{8}.75 \\ \hline 22.15 \end{array}$$

2. Solve.

$$5.62 + 0.8 = \underline{6.42}$$

$$\begin{array}{r} \overset{1}{5}.62 \\ + 0.8 \\ \hline 6.42 \end{array}$$

3. Solve.

$$5.726 + 12. = \underline{17.726}$$

$$\begin{array}{r} 5.726 \\ + 12. \\ \hline 17.726 \end{array}$$

4. Solve.

$$7. + 4.99 = \underline{11.99}$$

$$\begin{array}{r} 7. \\ + 4.99 \\ \hline 11.99 \end{array}$$

Show your work by rewriting the numbers vertically.

5. Solve.

1.9 + 13.= __14.9__

$$
\begin{array}{r}
1.9 \\
13. \\
\hline
14.9
\end{array}
$$

6. Solve.

6.5 + 4.27 = __10.77__

$$
\begin{array}{r}
6.5 \\
+ 4.27 \\
\hline
10.77
\end{array}
$$

7. Solve.

876.+ 42.3 = __918.3__

$$
\begin{array}{r}
876. \\
42.3 \\
\hline
918.3
\end{array}
$$

8. Solve.

7.8 + 1.39 + 12.= __21.19__

$$
\begin{array}{r}
7.8 \\
1.39 \\
12. \\
\hline
21.19
\end{array}
$$
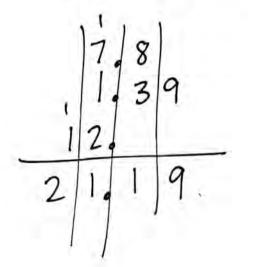
G5 U1 Lesson 7
Subtract decimals
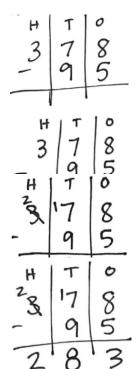
G1 U1 Lesson 7 - Today we will subtract decimals.

Tutor choice

Today we are going to subtract decimals. It is going to work exactly the same way as it does with whole numbers. So you are going to do great!

Let's Review (Slide 3): How do we subtract the numbers below? *You can accept any answer because you are just getting a sense of what students already know about subtracting. If they say anything that is correct, you can refer to it when you do your explanation.* I heard you say a lot of good things. Now it's time to watch me.
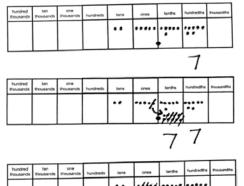
The first step is to line up the numbers. We do this like we are taking money out of a cash register drawer. We want the ones from the ones and the tens from the tens. Then we start on the right side because if we don't have enough in any place, we can regroup from the bigger places on the left. The key question we will need to ask ourselves is "Do I have enough?" If I don't have enough, I have to do something special.

Let's start with the ones place. I say, "I have 8 and they want 5. Do I have enough?" *Point to the 8 and the 5 as you talk.* Say it after me, "I have 8 and they want 5. Do I have enough?" If the answer is yes, then I can just take away like normal. If the answer is no, I have to borrow. So, what do you think? Do I have enough? Yes! 8 - 5 = 3.

Now let's go to the next place. I say, "I have 7 and they want 9. Do I have enough?" Say it after me, "I have 7 and they want 9. Do I have enough?" What do you think? No! I don't have enough because 9 is more than 5. I am going to go to the bigger place and take one. That gives me ten in the smaller place. Now I can say, "I have 17 and they want 9, do I have enough?" Now the answer is yes! 17 - 9 is 8.

Now let's go to the next place. There's nothing there to subtract. It's like, "I have 2 and they want 0. Do I have enough?" I do. 2 - 0 = 2. My final answer is 283.

Let's Talk (Slide 4): Let's use the picture to subtract decimals.

We have 2 tens, 5 ones, 6 tenths and 7 hundredths. There aren't any hundredths to subtract so that stays 7. Now it's time for tenths. I have to cross out 9 tenths. But I only have 6. This is why we ask, "I have 6 and they want 9. Do I have enough? The answer is no. When the answer is no, I have to do something special.

I can take from the bigger place. I scratch it out and move it over to the smaller place. It has ten inside. How many do I have now? Let's count! *Count.* Now, I have 16 and they want 9. Do I have enough? Yes! Let's cross out 9. Now there are 7 left.
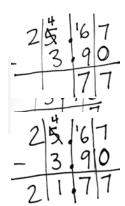
Now we look at the ones place. I have 4 and they want 3. Do I have enough? Yes. Let's cross out 3. Now there is 1 left. In the tens place, I have 2 and they want 0. Do I have enough? Yes. There is 2 left. We always do the same key steps. The first step is to put our number in a place value chart. Then every time we ask ourselves, "Do I have enough?" Then we can either regroup or subtract.

Let's Think (Slide 5): Let's show these same ideas with digits.

Step one is to put our numbers on a place value chart. In 25.67, the 25 is before the decimal point and it has to stay before the decimal point. The 67 is after the decimal point and it has to stay after the decimal point. In 3.9, the 3 is before the decimal point and it has to stay before the decimal point. The 9 is after the decimal point and it has to stay after the decimal point. It is super duper useful to put zeros because they can help us when we ask,

"Do I have enough?" It might not seem like a big deal for this problem but it will be a really big deal for the next problem.

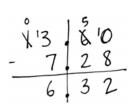Now, in the hundredths place, we ask, "I have 7 and they want 0. Do I have enough?" Yes! 7 - 0 is 7.

In the tenths place, we ask, "I have 6 and they want 9. Do I have enough?" No! This is when I regroup. Just like we scratch out from the ones and draw an arrow to move over ten in the smaller place, we have to scratch out the 5. It is one less. It is 4. And the 6 is 16. Now I can ask my question again. I have 16 and they want 9. Do I have enough? Yes! 16 - 9 is 7.

In the ones place, we ask, "I have 4 and they want 3. Do I have enough?" Yes! 4 - 3 is 1. In the tens place, we ask, "I have 2 and they want 0. Do I have enough?" Yes! 2 - 0 is 2. We get the same answer that we did with the picture!

Here's another problem. It might look the same but something tricky is going to happen. See if you can figure out where the tricky part is that we have to pay attention to.

Step one is to put our numbers on a place value chart. In 13.6, the 13 is before the decimal point and it has to stay before the decimal point. The 6 is after the decimal point and it has to stay after the decimal point. In 7.28, the 7 is before the decimal point and it has to stay before the decimal point. The 28 is after the decimal point and it has to stay after the decimal point.

Now do you remember when I said it was super duper useful to put zeros? This is where it becomes super duper important. Some kids will see a number all by itself and they will just bring it down. That is wrong. That 8 is supposed to be subtracted from something. Just because nothing is there, doesn't mean we can skip it. There is a number there! It is a zero! We have to ask, "I have 0 and they want 8. Do I have enough?" Since the answer is no, we know to scratch out and get ten. If we hadn't put the zero, we wouldn't have known to subtract! So putting zero is super duper important. Now we can say, " I have 10 and they want 8. Do I have enough?" Yes! 10 - 8 is 2. When we take away 8, we get a 2. We don't just drop the 8.

Let's keep going! Now, "I have 5 and they want 2. Do I have enough?" Yes! 5 - 2 is 3. Next place! We say, "I have 3 and they want 7. Do I have enough?" No! I have to borrow. I scratch out the bigger place and get ten. Now, "I have 13 and they want 7. Do I have enough?" Yes! 13 - 7 is 6. And there is nothing left in the next place.

Now we're ready to work through the steps together. I know you know how to subtract but there are two tricky spots - lining up our numbers and putting zeros when we need to. We'll think about it with money and then we'll practice with digits.

WARM WELCOME

Today we will subtract decimals.

Let's Review: Let's review subtraction.

Solve. $378 - $95 = ?
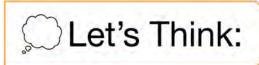
Let's Talk: Let's use the picture to subtract decimals.

Solve. 25.67 - 3.9 = ?

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths

We will need to use the same ideas from the model when we use numbers.
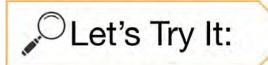
Solve. 25.67 - 3.9 = ?

Let's Think:

The biggest challenge is when there is nothing in a place value because we still have to subtract all the values.

Solve. 13.6 - 7.28 = ?

Let's Try It:
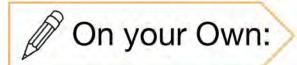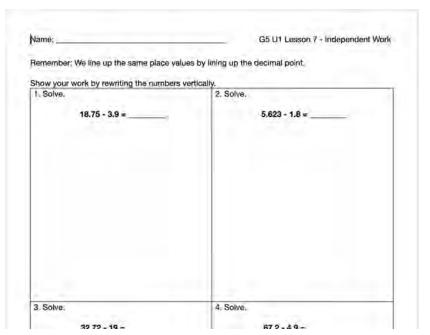
Let's practice subtracting decimals together!

Name: _____   G5 U1 Lesson 7 - Let's Try It
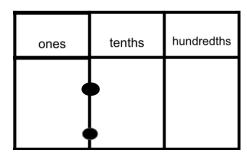
Jazmine had 3 dollar bills, 2 dimes and 4 pennies in her pocket. But there was a hole in her pocket and 1 dime fell out! How much money does Jazmine have now?

Jazmine's money is drawn for us. How can we mark up the picture to represent the story problem?

| $1 |
| $1 |
| $1 |

(D) (D)   (P)(P)(P)(P)

How did we decide where to draw the parts of Malcolm's money?

_____

_____

Now let's represent the problem on a place value chart.

ones	tenths	hundredths

On your Own:
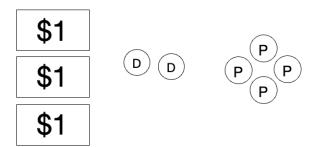
Now it's time to subtract decimals on our own place value charts.

Name: _____   G5 U1 Lesson 7 - Independent Work

Remember: We line up the same place values by lining up the decimal point.

Show your work by rewriting the numbers vertically.

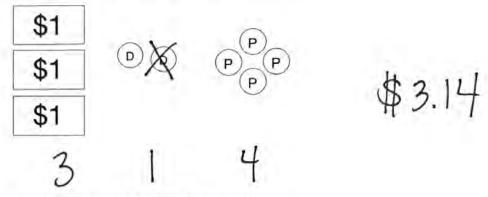| 1. Solve.	2. Solve.
18.75 - 3.9 = _____	5.623 - 1.8 = _____
3. Solve.	4. Solve.
32.72 - 19 =	57.2 - 4.9 =

Jazmine had 3 dollar bills, 2 dimes and 4 pennies in her pocket. But there was a hole in her pocket and 1 dime fell out! How much money does Jazmine have now?

Jazmine's money is drawn for us. How can we mark up the picture to represent the story problem?

$1

$1   D   D   P

$1   P   P

                              P

How did we decide where to draw the parts of Malcolm's money?

_____
_____

_____
_____

Now let's represent the problem on a place value chart.

ones	tenths	hundredths
	●	
	●	

This same problem could be written as _____ - _____.

Let's practice writing the problem vertically without the chart drawn for us:

Solve.   56.42 - 2.9 = ?

Let's represent the problem on a place value chart.

one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
			● ●			

Let's practice writing the problem vertically without the chart drawn for us:

Solve.   2.6 - 0.78 = ?

Let's set up the problem on a place value chart.

one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
			● ●			

We want to take away 8 hundredths but there is nothing there. Write in a digit that will show what we are really subtracting from.

Let's practice writing the problem vertically without the chart drawn for us:

Remember: We line up the same place values by lining up the decimal point.

Show your work by rewriting the numbers vertically.

1. Solve.	2. Solve.
$18.75 - 3.9 =$ _____	$5.623 - 1.8 =$ _____
3. Solve.	4. Solve.
$32.72 - 19 =$ _____	$67.2 - 4.9 =$ _____

Show your work by rewriting the numbers vertically.

5. Solve.

$$32.7 - 0.48 = \underline{\hspace{2cm}}$$

6. Solve.

$$63 - 1.9 = \underline{\hspace{2cm}}$$

7. Solve.

$$9.11 - 7.6 = \underline{\hspace{2cm}}$$

8. Solve.

$$32.7 - 0.152 = \underline{\hspace{2cm}}$$

Jazmine had 3 dollar bills, 2 dimes and 4 pennies in her pocket. But there was a hole in her pocket and 1 dime fell out! How much money does Jazmine have now?

Jazmine's money is drawn for us. How can we mark up the picture to represent the story problem?

$1

$1   D ⊗   P P P P

$1

3   1   4 $3.14

How did we decide where to draw the parts of Malcolm's money?

We had to take away the dime from the dimes place.

Now let's represent the problem on a place value chart.

ones	tenths	hundredths
3.	2	4
− 0.	1	

This same problem could be written as __3.24__ - __0.1__.

Let's practice writing the problem vertically without the chart drawn for us:

$$
\begin{array}{r}
3.24 \\
-\ 0.1 \\
\hline
3.14
\end{array}
$$

Solve.   **56.42 - 2.9 = ?**

Let's represent the problem on a place value chart.

one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
		5	6 . 2	4 . 9	2 0	

Let's practice writing the problem vertically without the chart drawn for us:

$$
\begin{array}{r}
5\,\overset{\text{s}}{\cancel{6}}.\,\overset{1}{4}\,2 \\
-\ \ 2.\,9\,0 \\
\hline
5\,3.\,5\,2
\end{array}
$$

Solve.   **2.6 - 0.78 = ?**

Let's set up the problem on a place value chart.

one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
			2 . 0	6 . 7	0 8	

We want to take away 8 hundredths but there is nothing there. Write in a digit that will show what we are really subtracting from.

Let's practice writing the problem vertically without the chart drawn for us:

$$
\begin{array}{r}
\overset{1}{\cancel{2}}.\,\overset{15}{\cancel{6}}\,\overset{1}{0} \\
-\ \ 0.\,7\,8 \\
\hline
1.\,8\,2
\end{array}
$$

Remember: We line up the same place values by lining up the decimal point.

Show your work by rewriting the numbers vertically.

1. Solve.	2. Solve.

1. Solve.

18.75 - 3.9 = __14.85__

$$\begin{array}{r} 1\ 8.\overset{7}{\cancel{8}}\ ^17\ 5 \\ -\ 3.\ 9\ 0 \\ \hline 1\ 4.\ 8\ 5 \end{array}$$

2. Solve.

5.623 - 1.8 = __3.823__

$$\begin{array}{r} \overset{4}{\cancel{5}}.\ ^16\ 2\ 3 \\ -\ 1.\ 8\ 0\ 0 \\ \hline 3.\ 8\ 2\ 3 \end{array}$$

3. Solve.

32.72 - 19. = __13.72__

$$\begin{array}{r} \overset{2}{\cancel{3}}\ 12.\ 7\ 2 \\ -\ 1\ 9.\ 0\ 0 \\ \hline 1\ 3.\ 7\ 2 \end{array}$$

4. Solve.

67.2 - 4.9 = __62.3__

$$\begin{array}{r} 6\ \overset{6}{\cancel{7}}.\ ^12 \\ -\ 4.\ 9 \\ \hline 6\ 2.\ 3 \end{array}$$

Show your work by rewriting the numbers vertically.

5. Solve.	6. Solve.
32.7 - 0.48 = __32.22__	63,- 1.9 = __61.1__

$$
\begin{array}{r}
3\,2\,.\,\overset{6}{\cancel{7}}\,^{1}0 \\
-\ \ 0\,.\,4\,8 \\
\hline
3\,2\,.\,2\,2
\end{array}
$$

$$
\begin{array}{r}
6\,\overset{2}{\cancel{3}}\,.\,^{1}0 \\
-\ \ \ 1\,.\,9 \\
\hline
6\,1\,.\,1
\end{array}
$$

7. Solve.	8. Solve.
9.11 - 7.6 = __1.51__	32.7 - 0.152 = __32.548__

$$
\begin{array}{r}
\overset{8}{\cancel{9}}\,.\,^{1}1\,1 \\
-\ 7\,.\,6\,0 \\
\hline
1\,.\,5\,1
\end{array}
$$

$$
\begin{array}{r}
3\,2\,.\,\overset{6}{\cancel{7}}\,\overset{9}{\cancel{\overset{1}{0}}}\,^{1}0 \\
0\,.\,1\,5\,2 \\
\hline
3\,2\,.\,5\,4\,8
\end{array}
$$

G5 U1 Lesson 8
Multiply decimals by whole numbers

G1 U1 Lesson 8 - Today we will multiply decimals by whole numbers.

Tutor choice
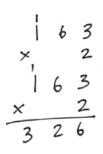
Frame the Learning/Connect to Prior Learning (Slide 2): Today we are going to multiply decimals. It is going to work exactly the same way as it does with whole numbers so you are going to do great!

Let's Review (Slide 3): In the past, you might have learned to multiply with the area model or you might have learned to multiply with digits. Let's review.

In the area model, we multiply length times width. This picture helps us think about how to break up the numbers to do the math in smaller pieces.

The number 163 is really 100 + 60 + 3. When we draw the model like this we can see that instead of multiplying the whole number at once, we can multiply 3 x 2, which is 6. *Use your fingers to point to each number getting multiplied together and where the answer goes.* We can multiply 60 x 2, which is 120. We can multiply 100 x 2, which is 200. Then we add all the pieces together. 200 + 120 + 6 is 326.

When we write our digits, it really works the same way. We multiply each piece of the number. But when we do it this way, we have to make sure we put things in their correct place. We don't have all those zeroes to help us. I'm going to draw some lines to help us. And if there is too much in any place, we regroup it to the bigger place. *Use your fingers to show what is getting multiplied each time and where the answer is going.* 2 x 3 ones is 6 in the ones place.
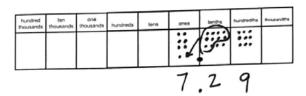
Next we move to the tens place. 2 x 6 tens is 12 tens. Now that's too much so I am going to keep the 2 and put the 1 in the bigger place.

Next we move to the hundreds place. 2 x 1 hundred is 2 hundred. But we have to remember to add the 1 we regrouped. That's 3 hundreds. Look! We got the same answer.

Let's Talk (Slide 4): Let's use the picture to multiply decimals. Just like with whole numbers, we are going to keep multiplying each piece of the number by place value. And we are going to regroup if we have too much in any place.

There are 2 ones, 4 tenths and 3 hundredths. Now we can multiply each of these pieces by 3.

I draw the 3 hundredths, 3 times. Now I see there are 9 hundredths. I draw the 4 tenths, 3 times. Wow! That's a lot! What do you think I should do with all those pieces? Possible Student Answers, Key Points:
● Regroup.
● Circle ten and move them to the bigger place.
I am going to circle ten and move them to the bigger place. We have 2 stay and there is one more getting added to the ones place. Now when I draw the 2 ones, 3 times. I will get 6. But there is an extra that I added so I get 7. My answer needs a decimal point to show all these place values. We multiplied hundredths so my answer needs to be hundredths too.
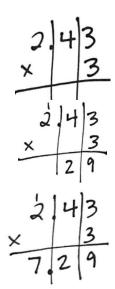
Let's Think (Slide 5): Let's show these same ideas with the area model and digits. Remember we are going to multiply each piece of the number by place value. And we are going to regroup if we have too much in any place. I am not going to go through the whole area model here because it starts to be too many digits floating around. But we can still notice something important. What do you notice?
Possible Student Answers, Key Points:
● The 2.43 is broken up into pieces.
● We will multiply 2 x 3 and 0.4 x 3 and 0.03 x 3.

Now let's work with the digits. First let's set up the problem. I don't have to worry about lining up the decimals or lining up the place values like I did for addition and subtraction because I am going to multiply each place value anyway. We just put the 3 down here so we can use it. But I will put lines because when I start multiplying, I want to keep all my answers in their correct place.

I am going to start by multiplying hundredths. I do 3 x 3. That's 9 in the hundredths place. Now I am going to multiply the tenths. I do 4 x 3. That's 12. Just like in our picture, we have too much and we have to regroup. I am going to keep the 2 in the tenths place and regroup the 1 to the next biggest place.

Now I am going to multiply the ones. I do 2 x 3. That's 6. But I have to remember to add the 1 that I regrouped. That's 7 in the ones place. Don't forget the decimal. We multiplied hundredths so my answer should be hundredths. The decimal goes straight down for now. And look! We got the same answer as in our picture!
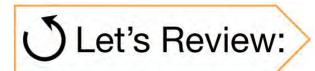
Let's Try It (Slides 6): Now we're ready to work through the steps together. Remember we are going to multiply each piece of the number by place value. And we are going to regroup if we have too much in any place.

WARM WELCOME

Today we will multiply decimals by whole numbers.

Let's review multiplication with an area model and numbers.

Solve. 163 x 2 = ?

Area model: Numbers:
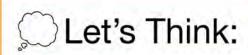
Let's use the place value chart to multiply decimals.

Solve. 2.43 x 3 = ?

hundred thousands	ten thousands	one thousands	hundreds	tens	ones	tenths	hundredths	thousandths

Let's use the area model to multiply decimals.
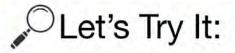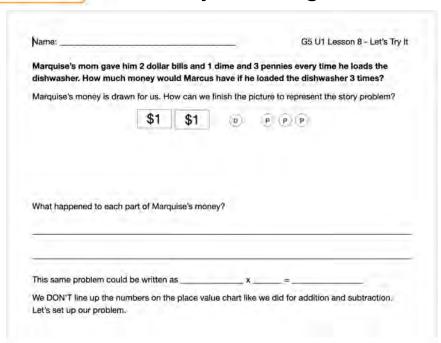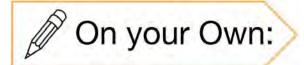
Solve. 2.43 x 3 = ?

Area model: Numbers:

2.43

3

2 | 0.4 | 0.03

3

Let's Try It:
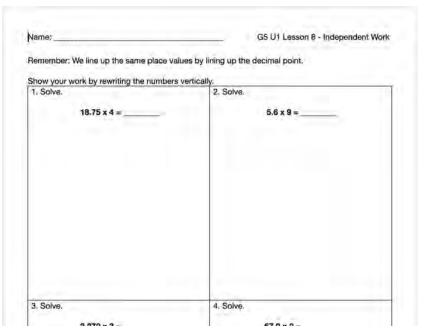
Let's practice multiplying decimals with money then digits!

Name: _____   G5 U1 Lesson 8 – Let's Try It

Marquise's mom gave him 2 dollar bills and 1 dime and 3 pennies every time he loads the dishwasher. How much money would Marcus have if he loaded the dishwasher 3 times?

Marquise's money is drawn for us. How can we finish the picture to represent the story problem?

$1 $1   (D)   (P)(P)(P)

What happened to each part of Marquise's money?

_____

_____

This same problem could be written as _____ x _____ = _____

We DON'T line up the numbers on the place value chart like we did for addition and subtraction. Let's set up our problem.

On your Own:

Now it's time to for you to multiply decimals independently!

Remember: We line up the same place values by lining up the decimal point.

Show your work by rewriting the numbers vertically.

1. Solve.	2. Solve.
18.75 x 4 = _____	5.6 x 9 = _____
3. Solve.	4. Solve.

Marquise's mom gave him 2 dollar bills and 1 dime and 3 pennies every time he loads the dishwasher. How much money would Marcus have if he loaded the dishwasher 3 times?

Marquise's money is drawn for us. How can we finish the picture to represent the story problem?

$1 $1   (D)   (P) (P) (P)

What happened to each part of Marquise's money?

_____
_____

_____
_____

This same problem could be written as _____ x _____ = _____

We DON'T line up the numbers on the place value chart like we did for addition and subtraction. Let's set up our problem.

We don't want to forget the decimal in our answer because it helps us keep the place values we started with!

Fill in the value: 2.13 is 213 _____.

Fill in with numbers and values: 213 _____ x 3 = _____ _____

Fill in with decimals: _____ x _____ = _____

Solve.   56.02 x 4 = ?

Let's represent the problem on a place value chart.

one thousands	hundreds	tens	ones	tenths	hundredths	thousandths
				●		

Let's practice writing the problem vertically without the chart drawn for us:

We can make a chart to compare how we work with each operation.

	Addition	Subtraction	Multiplication
Do we line up the place values and decimal points in both numbers?			
Which way do we need to regroup?			
Show an example with the same numbers.	34.1 + 8 = ?	34.1 - 8 = ?	34.1 x 8 = ?

Remember: We line up the same place values by lining up the decimal point.

Show your work by rewriting the numbers vertically.

1. Solve. 18.75 x 4 = _____	2. Solve. 5.6 x 9 = _____
3. Solve. 3.272 x 3 = _____	4. Solve. 67.2 x 2 = _____

Show your work by rewriting the numbers vertically.

5. Solve.

$$32.47 \times 5 = \underline{\hspace{2cm}}$$

6. Solve.

$$63.9 \times 7 = \underline{\hspace{2cm}}$$

7. Solve.

$$9.11 \times 6 = \underline{\hspace{2cm}}$$

8. Solve.

$$6.327 \times 8 = \underline{\hspace{2cm}}$$

Marquise's mom gave him 2 dollar bills and 1 dime and 3 pennies every time he loads the dishwasher. How much money would Marcus have if he loaded the dishwasher 3 times?

Marquise's money is drawn for us. How can we finish the picture to represent the story problem?

$1	$1	D	P	P	P
$1	$1	D	P	P	P
$1	$1	P	P	P	P

$6.39

6 . 3 9

What happened to each part of Marquise's money?

The dollars repeated three times. The dime repeated three times. The pennies repeated three times.

This same problem could be written as ___2.13___ x ___3___ = ___6.39___

We DON'T line up the numbers on the place value chart like we did for addition and subtraction. Let's set up our problem.

$$\begin{array}{r} 2.1\,3 \\ \times \quad 3 \\ \hline 6.3\,9 \end{array}$$

We don't want to forget the decimal in our answer because it helps us keep the place values we started with!

Fill in the value: 2.13 is 213 ___hundredths___

Fill in with numbers and values: 213 ___hundredths___ x 3 = ___639___ ___hundredths___

Fill in with decimals: ___2.13___ x ___3___ = ___6.39___

Solve.

56.02 x 4 = ?

Let's represent the problem on a place value chart.

one thousands	hundreds	tens	ones	tenths	hundredths	thousandths

2 2 4 . 0 8

Let's practice writing the problem vertically without the chart drawn for us:

$$\begin{array}{r} \overset{2}{5}6.02 \\ \times\ \ \ \ \ 4 \\ \hline 224.08 \end{array}$$

We can make a chart to compare how we work with each operation.

	Addition	Subtraction	Multiplication
Do we line up the place values and decimal points in both numbers?	yes	yes	no
Which way do we need to regroup?	↙	↘	↙
Show an example with the same numbers.	34.1 + 8. = ? $\begin{array}{r}\overset{1}{3}4.1\\+\ \ 8.0\\\hline 42.1\end{array}$	34.1 - 8 = ? $\begin{array}{r}\overset{2}{\cancel{3}}{}^{1}4.1\\-\ \ 8.0\\\hline 26.1\end{array}$	34.1 x 8 = ? $\begin{array}{r}\overset{3}{3}4.1\\\times\ \ \ \ 8\\\hline 272.8\end{array}$

Remember: We line up the same place values by lining up the decimal point.

Show your work by rewriting the numbers vertically.

1. Solve.

18.75 x 4 = __75__

$$\overset{3}{1}\overset{3}{8}.\overset{2}{7}5$$
$$\times \qquad 4$$
$$75.00$$

2. Solve.

5.6 x 9 = __50.4__

$$\overset{5}{5}.6$$
$$\times \quad 9$$
$$50.4$$

3. Solve.

3.272 x 3 = __9.816__

$$3.\overset{2}{2}72$$
$$\times \qquad 3$$
$$9.816$$

4. Solve.

67.2 x 2 = __74.4__

$$\overset{1}{6}7.2$$
$$\times \quad 2$$
$$74.4$$

Show your work by rewriting the numbers vertically.

5. Solve.

$32.47 \times 5 =$ __162.35__

```
    1  2  3
  3  2 . 4  7
×           5
1 6  2 . 3  5
```

6. Solve.

$63.9 \times 7 =$ __447.3__

```
   2  6
 6  3 . 9
×        7
4 4  7 . 3
```

7. Solve.

$9.11 \times 6 =$ __54.66__

```
9 . 1  1
×      6
5 4 . 6  6
```

8. Solve.

$6.327 \times 8 =$ __50.616__

```
   2  2  5
 6 . 3  2  7
×          8
5 0 . 6  1  6
```

G5 U1 Lesson 9

Check multiplication answers with estimation

CITYTUTOR

G1 U1 Lesson 9 - Today we will check multiplication answers with estimation.

Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we are going to estimate decimal multiplication. This is going to be super helpful because it will allow us to check if our exact multiplication answer is reasonable or close to what we expect the answer to be.

Let's Review (Slide 3): What did we learn about multiplication in our last lesson? Possible Student Answers, Key Points:
- We learned to multiply.
- We learned that we don't need to line up our place values for multiplication.
- We learned that we multiply each piece.
- We learned that we have to regroup if we have too much in one place.
- We learned that we need to put the decimal in our answer.
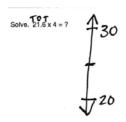
We're still going to keep practicing all of those important things! Watch me do this problem.

Let's Talk (Slide 4): Instead of saying "solve," this problem says "estimate." That means we will round our numbers before we multiply. How would we round 21.6 and what kind of work do we show? Possible Student Answers, Key Points:
- We have to turn smaller place values to zeros.
- We have to look at a 5 in the smaller place.
- We have to draw a number line.
- We have to put a halfway mark.
- We have to see what our number is closer to.

Let's draw a number line for 21.6 and round it to the biggest place. I am going to mark the place values of 21.6 above the number. All the smaller place values become zeros. 21.6 is between 20 and then next ten up, 30.
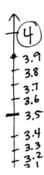
Now we can count up from 20. 21, 22, 23, 24, 25, 26, 27, 28, 29, 30! The halfway mark is 25. That has a 5 in the next smallest space. I can put a dot where 21.6 would be and now I see my number is closer to 20.
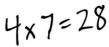
Now that we rounded, it is so easy to multiply. Instead of multiplying all of 21.6 x 4, we can estimate the answer is close to 20 x 4, which is 80. I would expect my number to be near 80, which it was. On the last slide I got 86.4! If I had gotten an answer near 8 or 800 then I would know I made a mistake with putting my decimal point in the right spot.

Let's Think (Slide 5): Let's do it again but this time we'll find an exact answer too.

I am going to draw my regular rounding number line and round to the biggest place. I am going to mark the place values of 3.95 above the number. All the small place values become zeros. 3.95 is between 3 and the next one up, 4.

Hopefully you remember the pattern to find the halfway mark, which is a 5 in the next smallest place. But if we need to, we can count up from 3 to 4 in the next smallest place value. 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 4! I can put a dot where 3.95 would be. Now I see it is closer to 4.

Now I can multiply my rounded number to get an estimate. 4 x 7 = 28. My number needs to be close to 28 or I've made a mistake.

Let's set up 3.95 x 7 like we learned yesterday. 7 x 5 is 35. I keep the 5 and regroup the 3. 9 x 7 is 63 plus 3 is 68. I keep the 8 and regroup the 6. 7 x 3 is 21 plus 6 is 27. My problem has hundredths so I need hundredths in my answer. I get 27.83. Now here's the most fun part. I ask myself, "Is my exact answer close to my estimate?" Yes! 27 is pretty close to 28.

<mark>Let's Try It (Slides 6):</mark> Now we will practice together. I will take you through each step so you know what to do when you have to work on your own.

WARM WELCOME

Today we will check multiplication answers with estimation.

Let's Review:
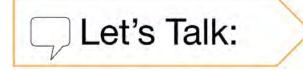
What did we learn about multiplication in our last lesson?

Solve. 21.6 x 4 = ?

Let's Talk:

How would we round our number to estimate an answer instead?

Estimate. 21.6 x 4 = ?
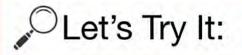
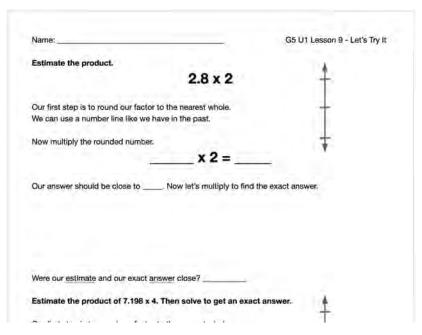**When we estimate, we can make sure our exact answer is reasonable.**

Solve. 3.95 x 7 = ?

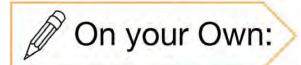Estimate: Exact answer:

Let's Try It:

Let's practice estimating multiplication together!

Name: _____   G5 U1 Lesson 9 - Let's Try It

Estimate the product.

2.8 x 2

Our first step is to round our factor to the nearest whole. We can use a number line like we have in the past.

Now multiply the rounded number.

_____ x 2 = _____

Our answer should be close to _____. Now let's multiply to find the exact answer.

Were our estimate and our exact answer close? _____

Estimate the product of 7.198 x 4. Then solve to get an exact answer.

On your Own:

Now it's time to estimate decimals and find an exact answer.

Name: _____   G5 U1 Lesson 9 - Independent Work

Remember: Our estimate should help us check if the place value in our exact answer is correct.

Be sure to follow the directions to estimate or solve for an exact answer.

1. Estimate.	2. Solve.
9.23 x 4 = _____	9.23 x 4 = _____
3. Estimate.	4. Solve.

Estimate the product.

$$2.8 \times 2$$

Our first step is to round our factor to the nearest whole.
We can use a number line like we have in the past.

Now multiply the rounded number.

$$\rule{2cm}{0.4pt} \; x \; 2 = \rule{2cm}{0.4pt}$$

Our answer should be close to _____. Now let's multiply to find the exact answer.
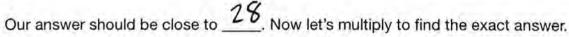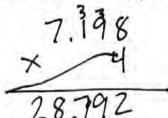
Were our estimate and our exact answer close? _____

Estimate the product of 7.198 x 4. Then solve to get an exact answer.

Our first step is to round our factor to the nearest whole.
We can use a number line like we have in the past.
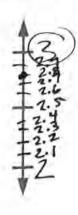
Now multiply the rounded number.

$$\rule{2cm}{0.4pt} \; x \; 4 = \rule{2cm}{0.4pt}$$

Our answer should be close to _____. Now let's multiply to find the exact answer.

Were our estimate and our exact answer close? _____

Remember: Our estimate should help us check if the place value in our exact answer is correct.

Be sure to follow the directions to estimate or solve for an exact answer.

1. Estimate. $9.23 \times 4 = $ _____	2. Solve. $9.23 \times 4 = $ _____
3. Estimate. $679.2 \times 7 = $ _____	4. Solve. $679.2 \times 7 = $ _____

Be sure to follow the directions to estimate or solve for an exact answer.

5. Estimate.

$$32.47 \times 9 = \text{_____}$$

6. Solve.

$$32.47 \times 9 = \text{_____}$$

7. Estimate.

$$9.141 \times 6 = \text{_____}$$

8. Solve.

$$9.141 \times 6 = \text{_____}$$

Name: <u>ANSWER KEY</u>

Estimate the product.

$$2.8 \times 2$$

(o T above the 2.8)

Our first step is to round our factor to the nearest whole.
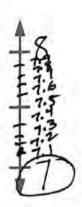We can use a number line like we have in the past.

Now multiply the rounded number.

<u>   3   </u> **x 2 =** <u> 6   </u>

Our answer should be close to <u> 6 </u>. Now let's multiply to find the exact answer.

$$2.8$$
$$\underline{2}$$
$$5.6$$

Were our estimate and our exact answer close? <u>Yes!</u>

Estimate the product of 7.198 x 4. Then solve to get an exact answer.

(o THTh above the text)

Our first step is to round our factor to the nearest whole.
We can use a number line like we have in the past.

Now multiply the rounded number.

<u>   7   </u> **x 4 =** <u> 28 </u>

Our answer should be close to <u> 28 </u>. Now let's multiply to find the exact answer.

$$7.198$$
$$\underline{\times 4}$$
$$28.792$$

Were our estimate and our exact answer close? <u>Yes!</u>

Name: __ANSWER KEY__   G5 U1 Lesson 9 - Independent Work

Remember: Our estimate should help us check if the place value in our exact answer is correct.

Be sure to follow the directions to estimate or solve for an exact answer.

1. Estimate.	2. Solve.
O TH 9.23 x 4 = __36__	9.23 x 4 = __36.92__

1.
O TH
9.23 x 4 = __36__

$9 \times 4 = 36$

(number line from 10 down to 9, marked 9.9, 9.8, 9.7, 9.6, 9.5, 9.4, 9.3, 9.2, 9.1, with 9 circled)

2.
9.23 x 4 = __36.92__

$$9.\overset{1}{2}3 \\ \times \quad 4 \\ \hline 36.92$$

3. Estimate.	4. Solve.
H T O T 679.2 x 7 = __4,900__	679.2 x 7 = __4,654.4__

3.
H T O T
679.2 x 7 = __4,900__

$700 \times 7 = 4,900$

(number line with 700 circled at top, then 690, 680, 670, 660, 650, 640, 630, 620, 610, 600)

4.
679.2 x 7 = __4,654.4__

$$\overset{4\;6\;1}{679.2} \\ \times \qquad 7 \\ \hline 4654.4$$

Be sure to follow the directions to estimate or solve for an exact answer.

5. Estimate.

T O TH
32.47 x 9 = ~~630~~ 270

40
39
38
37
36
35
34
33
32
31
(30)

30 x 9 = ~~270~~
270

6. Solve.

32.47 x 9 = 292.23

$$\overset{2}{3}\overset{4}{2}.\overset{6}{4}7$$
$$\times \qquad 9$$
$$\overline{292.23}$$

7. Estimate.

O TH TH
9.141 x 6 = 54

10
9.9
9.8
9.7
9.6
9.5
9.4
9.3
9.2
9.1
(9)

9 x 6 = 54

8. Solve.

9.141 x 6 = 54.846

$$9.\overset{2}{1}41$$
$$\times \qquad 6$$
$$\overline{54.846}$$

G5 U1 Lesson 10

Divide decimals using the place value chart
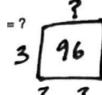
G1 U1 Lesson 10 - Today we will divide decimals using the place value chart.

Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we are going to divide decimals. It will be great because mostly we're just reviewing division, which is something you've seen before. And the decimal part of it will come.

Let's Review (Slide 3): Division is the opposite of multiplication so we can use some of the same ideas we used for multiplication.

In the area model, we multiply length times width to get the total area. But in division we know the area, and we trying to figure out "3 times what makes 96?"

But just like multiplication, it is hard to figure out a whole big number. It is easy to break the number into pieces.
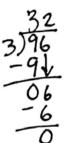
Then we can ask, "3 times what makes 90?" That's 30. 3 x 30 makes 90. And we ask, "3 times what makes 6?" That's 2. 2 x 3 makes 6. So our answer is 30 + 6 which is 36. What we really did was divide each piece of 96.

We're really doing the exact same thing when we draw out the long division. We look at each digit and ask ourselves, "3 times what makes each piece of the number?" If this is tricky to figure out, I can write out my 3s on the side of my paper. 3, 6, 9, 12, 15, 18, 21, 24, 27.

Let's do it. 3 times what makes 9? I can look here. *Pointing to each number on the list, you can say, "3 x 1 is 3 and 3 x 2 is 6 and 3 x 3 is 9."* 3 x 3 makes 9. I put the 3 on top and subtract what it makes. Now we can see the 6 is up next. But in future lessons we might have remainders so we'll draw an arrow to pull that number down next to the leftovers.
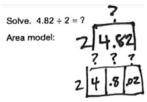
Now we ask, "3 times what makes 6?" 3 x 2 makes 6. I put the 2 on top and subtract what it makes. Look! We got the same answer that we did with the area model.

Let's Talk (Slide 4): We do things the exact same way with decimals as we do with whole numbers. Help me fill in the blanks, we are asking, "___ times what makes _____?" Possible Student Answers, Key Points:
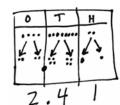● 2 times what makes 4.82?

We can draw an area model with the whole 4.82 inside. Or we can break it up into 4 and 0.8 and 0.02.

Then we can ask ourselves easier questions like, "2 times what makes 4?" The answer is 2! And 2 times what makes 8 tenths? The answer is 4 tenths. Of course if we're dividing tenths then the answer will be tenths. The place of the digit next to the decimal is the same as the place of the answer, right next to the decimal. Then we ask, "2 times what makes 2 hundredths?" The answer is 1 hundredth. Again, if we're dividing hundredths then our answer is hundredths.

We see the same breakdown if we draw a picture. I am going to put 4 dots for 4 ones. I am going to put 8 dots for 8 tenths. I am going to put 2 dots for 2 hundredths.
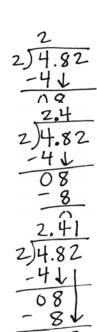
I can draw two arrows to show splitting the 4 ones. I get 2 ones. I can draw two arrows to show splitting 8 tenths. I get 4 tenths. I can draw two arrows to show splitting 2 hundredths. I get 1 hundredth. In order for each of these digits to keep the right value. I need to keep my decimal in my answer. It's super duper important I don't forget that.

==Let's Think (Slide 5):== Let's do it again but this time we'll find an exact answer too.

It is even easier to keep track of place values if we just keep the places during long division. Let's do it. If you want, you can list the twos out of the side of your paper. 2, 4, 6, 8, 10, 12, 14, 16, 18.

You're going to notice that we ask the exact same questions. 2 times what makes 4? *Point to the list, 2 x 1 makes 2, 2 x 2 makes 4.* 2 times 2 makes 4. 2 goes on the top and then we subtract what it makes. Pull down the next number.

Now we ask, "2 times what makes 8?" *Point to the list, 2 x 1 makes 2, 2 x 2 makes 4, 2 x 3 makes 6, 2 x 4 makes 8.* 2 times 4 makes 8. The 4 goes on the top and then we subtract what it makes. Pull down the next number.

Now we ask, "2 times what makes 2?" *Point to the list, 2 x 1 makes 2.* 2 times 1 makes 2. The 1 goes on the top and then we subtract what it makes. We got the same answer that we did with our area model. We just can't forget to keep that decimal point in the same place as it always is.
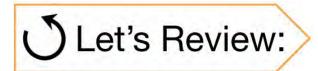
==Let's Try It (Slides 6):== Now we will practice together. I will take you through each step so you know what to do when you have to work on your own.

WARM WELCOME

Today we will divide decimals using the place value chart.

What does each model show about how we divide place values?

Solve. 96 ÷ 3 = ?

Area model: Long division:

Let's Talk:

Can we divide each place value for decimal division models as well?

Solve. 4.82 ÷ 2 = ?

Area model: Place value chart:

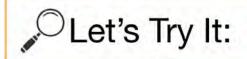## How can we divide each place value when we use the long division set up?

Solve. 4.82 ÷ 2 = ?
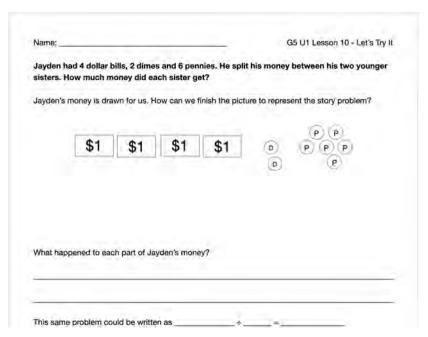
What do we do if there is a zero in a place value?

Solve. 6.08 ÷ 2 = ?

Let's Try It:
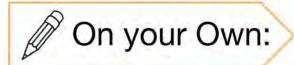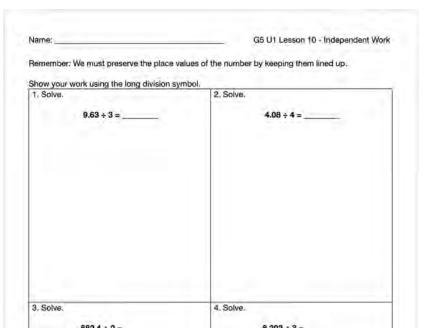
Let's practice dividing decimals together! We'll go through step by step.

Name: _____   G5 U1 Lesson 10 - Let's Try It

Jayden had 4 dollar bills, 2 dimes and 6 pennies. He split his money between his two younger sisters. How much money did each sister get?

Jayden's money is drawn for us. How can we finish the picture to represent the story problem?

$1 $1 $1 $1   Ⓓ   Ⓟ Ⓟ
                          Ⓓ Ⓟ Ⓟ Ⓟ
                              Ⓟ

What happened to each part of Jayden's money?

_____

_____

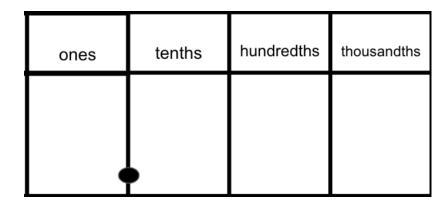This same problem could be written as _____ ÷ _____ = _____

On your Own:

Now it's time to divide decimals with remainders on your own!

Name: _____   G5 U1 Lesson 10 - Independent Work

Remember: We must preserve the place values of the number by keeping them lined up.

Show your work using the long division symbol.

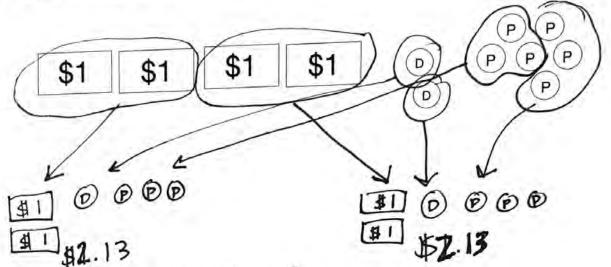| 1. Solve.	2. Solve.
9.63 ÷ 3 = _____	4.08 ÷ 4 = _____
3. Solve.	4. Solve.

Jayden had 4 dollar bills, 2 dimes and 6 pennies. He split his money between his two younger sisters. How much money did each sister get?

Jayden's money is drawn for us. How can we finish the picture to represent the story problem?

| $1 | $1 | $1 | $1 |

D
D

P P
P P P
P

What happened to each part of Jayden's money?

_____
_____

_____
_____

This same problem could be written as _____ ÷ _____ = _____

We DON'T line up the numbers on the place value chart like we did for addition and subtraction. Let's set up our problem.

We don't want to forget the decimal in our answer because it helps us keep the place values we started with!

Solve. $9.069 \div 3 = ?$

Let's represent the problem on a place value chart.

ones	tenths	hundredths	thousandths
	●		

Let's practice writing the problem with the long division symbol:

Can we just skip over the zero? Why or why not?

_____
_____

_____
_____

We can make a chart to compare how we work with each operation.

	Addition	Subtraction	Multiplication	Division
Which way do we need to regroup?				

Remember: We must preserve the place values of the number by keeping them lined up.

Show your work using the long division symbol.

1. Solve.	2. Solve.
9.63 ÷ 3 = _____	4.08 ÷ 4 = _____
3. Solve.	4. Solve.
682.4 ÷ 2 = _____	6.393 ÷ 3 = _____

Be sure to follow the directions to estimate or solve for an exact answer.

5. Solve.

$$80.48 \div 4 = \underline{\hspace{2cm}}$$

6. Solve.

$$62.408 \div 2 = \underline{\hspace{2cm}}$$

7. Solve.

$$396.6 \div 3 = \underline{\hspace{2cm}}$$

8. Solve.

$$6.088 \div 2 = \underline{\hspace{2cm}}$$

Jayden had 4 dollar bills, 2 dimes and 6 pennies. He split his money between his two younger sisters. How much money did each sister get?

Jayden's money is drawn for us. How can we finish the picture to represent the story problem?

What happened to each part of Jayden's money?

We divided each place.

This same problem could be written as ___4.26___ ÷ __2__ = __2.13__

We DON'T line up the numbers on the place value chart like we did for addition and subtraction. Let's set up our problem.

We don't want to forget the decimal in our answer because it helps us keep the place values we started with!

Solve.

$$9.069 \div 3 = ?$$

Let's represent the problem on a place value chart.

ones	tenths	hundredths	thousandths
•••• ••• ••• ↙ ↓ ↘		••• ••• ↙ ↓ ↘	•••• •••• ↙ ↓ ↘
3 ●	0	2	3

Let's practice writing the problem with the long division symbol:

$$
\begin{array}{r}
3.023 \\
3\overline{)9.069} \\
-9 \\
\hline
006 \\
-6 \\
\hline
09 \\
-9 \\
\hline
0
\end{array}
$$

Can we just skip over the zero? Why or why not?

No, it holds the place for the thousandths.

We can make a chart to compare how we work with each operation.

	Addition	Subtraction	Multiplication	Division
Which way do we need to regroup?	←	→	←	→

Name: **ANSWER KEY**   G5 U1 Lesson 10 - Independent Work

Remember: We must preserve the place values of the number by keeping them lined up.

Show your work using the long division symbol.

1. Solve.

$9.63 \div 3 =$ ___3.21___

$$3\overline{)9.63} = 3.21$$

```
    3.21
 3)9.63
  -9↓
   ‾‾‾
   0 6
    -6↓
    ‾‾‾
    0 3
     -3
     ‾‾
      0
```

2. Solve.

$4.08 \div 4 =$ ___1.02___

```
    1.02
 4)4.08
  -4↓↓
  ‾‾‾‾
  0 08
    -8
    ‾‾
     0
```

3. Solve.

$682.4 \div 2 =$ _____

```
   341.2
 2)682.4
  -6↓
  ‾‾
  08
  -8↓
  ‾‾
   02
   -2↓
   ‾‾
    04
    -4
    ‾‾
     0
```

4. Solve.

$6.393 \div 3 =$ ___2.131___

```
   2.131
 3)6.393
  -6↓
  ‾‾
  03
  -3↓
  ‾‾
   09
   -9↓
   ‾‾
    03
    -3
    ‾‾
     0
```

Be sure to follow the directions to estimate or solve for an exact answer.

5. Solve.

$80.48 \div 4 = \underline{20.22}$

```
        20.22
    4)80.48
     -8↓↓
     ────
      004
       -4↓
       ────
        08
        -8
       ────
         0
```

6. Solve.

$62.408 \div 2 = \underline{31.204}$

```
        31.204
    2)62.408
     -6↓
     ────
      02
      -2↓
      ────
       04
       -4↓↓
       ────
        008
         -8
        ────
          0
```

7. Solve.

$396.6 \div 3 = \underline{132.2}$

```
        132.2
    3)396.6
     -3↓
     ────
      09
      -9↓
      ────
       06
       -6↓
       ────
        06
        -6
       ────
         0
```

8. Solve.

$6.088 \div 2 = \underline{3.044}$

```
        3.044
    2)6.088
     -6↓↓
     ────
      008
       -8↓
       ────
        08
        -8
       ────
         0
```

G5 U1 Lesson 11
Divide decimals with remainders

G1 U1 Lesson 11 - Today we will divide decimals with remainders.
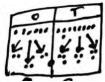
Tutor choice

Today we are going to divide decimals with remainders. And guess what? None of our steps are going to change. It will be exactly the same steps we already did. It will just help to understand why they still work so let's explore together.
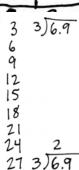
In our last lesson, we learned how to divide decimals. Let's review.

I am going to put 6 dots for 6 ones. I am going to put 9 dots for 9 tenths.

I can draw three arrows to show splitting the 6 ones. I get 2 ones each. I can draw three arrows to show splitting 9 tenths. I get 3 tenths each. In order for each of these digits to keep the right value. I need to keep my decimal in my answer. It's super duper important I don't forget that.

We know the numbers are going to match the pictures. We set up the long division. We can make a list of the threes to help us if we need to. 3, 6, 9, 12, 15, 18, 21, 24, 27. Now we have to ask ourselves a question, "___ times what makes ____?" Who can tell me what question we ask for this first digit. Possible Student Answers, Key Points:
● 3 times what makes 6?

I can see the answer in my list. 3 times 1 makes 3, 3 times 2 makes 6. My answer is 2. It goes on top. I subtract what it makes. I pull down the next number.
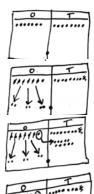
What question do I ask for the next digit? Possible Student Answers, Key Points:
● 3 times what makes 9?
I can see the answer in my list. 3 times 1 makes 3, 3 times 2 makes 6, 3 times 3 makes 9. My answer is 3. It goes on top. I subtract what it makes. I have to make sure I put the decimal in my answer. And it matches what we got when we drew a picture.

This next problem is the same except I am going to have a remainder. Let's see what we can do to divide that too.

We're going to start with a picture. I am going to put 7 dots for 7 ones and 8 dots for 8 tenths.

I want to divide this by 3. If I draw 3 arrows, the most I can give each arrow is 2. That leaves 1 leftover.

Now here is the super duper important part. I can't divide that 1. So, I am going to regroup it by turning it into tenths. 1 whole makes 10 tenths. Now I have 18 tenths.

I am going to divide 18 tenths by 3 which is 6 tenths. When I write this as digits, I get 2.6.

$$3\overline{)7.8}$$

3
6
9
12
15
18
21
24
27

Now let's see how the long division matches exactly what we did. We just need to follow the exact same steps we did yesterday, and it will automatically regroup for us. That's cool, right? First, it helps to set up my threes next to my problem.

What question am I going to ask myself for this first digit, "_____ times what makes _____?" Possible Student Answers, Key Points:
● 3 times what makes 7?

I am going to ask, "3 times what makes 7?" But here's the thing - there's not an answer! 3 times nothing makes 7. If I look at my chart, I see 3 x 1 makes 3 and 3 x 2 makes 6. If I go higher, I go past 7 with 3 x 3 makes 9. I am going to have to stop at 3 x 2 makes 6 and then there will be a remainder. Watch me. I put the 2 on top like always and I subtract what it makes. I have 1 left. This is just like in our picture when we had one left and we had to regroup it.

$$3\overline{)7.8}\quad^{2}$$
$$-6$$
$$1$$

But here comes the cool part - when I pull down the next number, like I usually do, it automatically goes next to the one and regroups it. Now we can ask ourselves, "3 times what makes 18?" Let's look at the chart, 3 x 1 is 3, 3 x 2 is 6, 3 x 3 is 9, 3 x 4 is 12, 3 x 5 is 15, 3 x 6 is 18. We put the 6 up top and subtract what it makes. Let's check to make sure I remembered the decimal and look! We have the same answer that we got with the picture.

$$3\overline{)7.8}\quad^{2.6}$$
$$-6\downarrow$$
$$18$$
$$-18$$
$$00$$

<mark>Let's Think (Slide 5):</mark> Watch how if I do the normal long division on another problem, the regrouping happens automatically.

2
4
6
8
10
12
14
16
18

First, we can list the twos out of the side of our paper. 2, 4, 6, 8, 10, 12, 14, 16, 18. Now we ask ourselves, 2 times what makes 4? *Point to the list, 2 x 1 makes 2, 2 x 2 makes 4.* 2 times 2 makes 4. 2 goes on the top and then we subtract what it makes. Pull down the next number.

$$2\overline{)4.92}\quad^{2}$$
$$-4\downarrow$$
$$09$$

Now we ask, "2 times what makes 9?" We go down the list, 2 x 1 makes 2, 2 x 2 makes 4, 2 x 3 makes 6, 2 x 4 makes 8, 2 x 5 makes 10. Uh-oh! We passed up 9! We're going to have to go with 2 x 4 makes 8. The 4 goes on top and we subtract what it makes, the 8. We get a remainder of 1. It is okay because we are going to pull down the next number and it will automatically regroup.

$$2\overline{)4.92}\quad^{2.4}$$
$$-4\downarrow$$
$$09$$

Now we ask, "2 times what makes 12?" We go down the list, 2 x 1 makes 2, 2 x 2 makes 4, 2 x 3 makes 6, 2 x 4 makes 8, 2 x 5 makes 10, 2 x 6 makes 12. That's our answer! The 6 goes on the top and then we subtract what it makes. We have to make sure we put the decimal point and then we have our answer.

$$2\overline{)4.92}\quad^{2.46}$$
$$-4\downarrow$$
$$09$$
$$-8\downarrow$$
$$12$$
$$-12$$
$$00$$

<mark>Let's Try It (Slides 6):</mark> Now we will practice together. I will take you through each step so you know what to do when you have to work on your own.
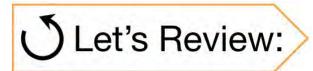
WARM WELCOME

Today we will divide decimals with remainders.
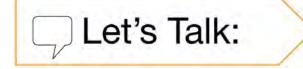
In our last lesson, we learned how to divide decimals.

Solve. 6.9 ÷ 3 = ?

Place value chart: Numbers:
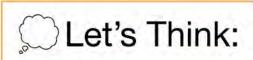
Let's Talk:

Now let's think about what happens when there is a remainder in a place.

Solve. 7.8 ÷ 3 = ?

Place value chart: Numbers:

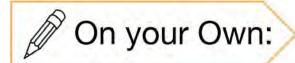**Anytime we have a remainder, we can use the next place value to regroup.**

Solve. 4.92 ÷ 2 = ?

Let's Try It:

Let's practice dividing decimals with remainders together!

Name: _____   G5 U1 Lesson 11 - Let's Try It

Aurora had 2 dollar bills, 3 dimes and 2 pennies. She split his money between her two younger sisters. How much money did each sister get?

Aurora's money is drawn for us. How can we finish the picture to represent the story problem?

$1 $1   D D   P P
                  D

Something special happened with the dimes! What was it?

_____

_____
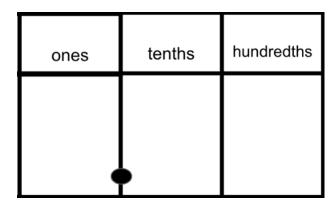
This same problem could be written as _____ ÷ _____ = _____

We DON'T line up the numbers on the place value chart like we did for addition and subtraction.

On your Own:

Now it's time to divide decimals. Remember to keep things in line!

Name: _____ G5 U1 Lesson 11 - Independent Work

Remember: If we have a remainder, we will need to regroup it with the next digit.

Show your work using the long division symbol.

1. Solve.	2. Solve.
$9.75 \div 3 =$ _____	$7.28 \div 4 =$ _____
3. Solve.	4. Solve.

Aurora had 2 dollar bills, 3 dimes and 2 pennies. She split his money between her two younger sisters. How much money did each sister get?

Aurora's money is drawn for us. How can we finish the picture to represent the story problem?

$1 $1   D D   P P
                    D

Something special happened with the dimes! What was it?

_____
_____

_____
_____

This same problem could be written as _____ ÷ _____ = _____

We DON'T line up the numbers on the place value chart like we did for addition and subtraction. Let's set up our problem.

We don't want to forget the decimal in our answer because it helps us keep the place values we started with!

Solve. $8.46 \div 3 = ?$

Let's represent the problem on a place value chart.

ones	tenths	hundredths
	●	

Let's practice writing the problem with the long division symbol:

Where did we have a remainder and what did we do with it?

_____
_____

_____
_____

We can make a chart to compare how we work with each operation.

	Addition	Subtraction	Multiplication	Division
Do we line up the place values and decimal points in both numbers?				

Remember: If we have a remainder, we will need to regroup it with the next digit.

Show your work using the long division symbol.

1. Solve. $9.75 \div 3 = $ _____	2. Solve. $7.28 \div 4 = $ _____
3. Solve. $683.4 \div 2 = $ _____	4. Solve. $6.005 \div 5 = $ _____

Be sure to follow the directions to estimate or solve for an exact answer.

5. Solve.

$$81.68 \div 4 = \text{_____}$$

6. Solve.

$$60.508 \div 2 = \text{_____}$$

7. Solve.

$$909.6 \div 6 = \text{_____}$$

8. Solve.

$$8.532 \div 3 = \text{_____}$$

Aurora had 2 dollar bills, 3 dimes and 2 pennies. She split his money between her two younger sisters. How much money did each sister get?

Aurora's money is drawn for us. How can we finish the picture to represent the story problem?

$1.16

$1.16

Something special happened with the dimes! What was it?

We had a leftover dime so we turned it into ten pennies.

This same problem could be written as ___2.32___ ÷ __2__ = __1.16__

We DON'T line up the numbers on the place value chart like we did for addition and subtraction. Let's set up our problem.

$$\begin{array}{r} 1.16 \\ 2\overline{)2.32} \\ -2\downarrow \\ \hline 03| \\ -2\downarrow \\ \hline 12 \\ -12 \\ \hline 00 \end{array}$$

We don't want to forget the decimal in our answer because it helps us keep the place values we started with!

Solve.

$$8.46 \div 3 = ?$$

Let's represent the problem on a place value chart.

ones	tenths	hundredths

2 . 8   2

Let's practice writing the problem with the long division symbol:


```
      2.82
   _____
 3 ) 8.46
    -6 ↓
    ____
     24
    -24 ↓
    ____
     0 06
      -6
      ___
       0
```

Where did we have a remainder and what did we do with it?

We had a remainder of 2 in the ones place and we turned it into 20 tenths.

We can make a chart to compare how we work with each operation.

	Addition	Subtraction	Multiplication	Division
Do we line up the place values and decimal points in both numbers?	yes	yes	no	no

Remember: If we have a remainder, we will need to regroup it with the next digit.

Show your work using the long division symbol.

1. Solve.

$9.75 \div 3 =$ __3.25__

```
    3.25
3 ) 9.75
   -9 ↓
    07
   -6 ↓
    15
   -15
    00
```

2. Solve.

$7.28 \div 4 =$ __1.82__

```
    1.82
4 ) 7.28
   -4 ↓
    3 2
   -3 2 ↓
    008
    -8
     0
```

3. Solve.

$683.4 \div 2 =$ __341.7__

```
    341.7
2 ) 683.4
   -6 ↓
    08
   -8 ↓
    03
   -2 ↓
    14
   -14
    00
```

4. Solve.

$6.005 \div 5 =$ __1.201__

```
    1.201
5 ) 6.005
   -5 ↓
    10
   -10 ↓
    0005
    -5
     0
```

Be sure to follow the directions to estimate or solve for an exact answer.

5. Solve.

81.68 ÷ 4 = _20.42_

$$
\begin{array}{r}
20.42 \\
4\overline{)81.68} \\
-8 \\
\hline
01 \\
-0 \\
\hline
16 \\
-16 \\
\hline
008 \\
-8 \\
\hline
0
\end{array}
$$

6. Solve.

60.508 ÷ 2 = _30.254_

$$
\begin{array}{r}
30.254 \\
2\overline{)60.508} \\
-6 \\
\hline
005 \\
-4 \\
\hline
10 \\
-10 \\
\hline
008 \\
-8 \\
\hline
0
\end{array}
$$

7. Solve.

909.6 ÷ 6 = _151.6_

$$
\begin{array}{r}
151.6 \\
6\overline{)909.6} \\
-6 \\
\hline
30 \\
-30 \\
\hline
009 \\
-6 \\
\hline
36 \\
-36 \\
\hline
00
\end{array}
$$

8. Solve.

8.532 ÷ 3 = _2.844_

$$
\begin{array}{r}
2.844 \\
3\overline{)8.532} \\
-6 \\
\hline
25 \\
-24 \\
\hline
13 \\
-12 \\
\hline
12 \\
-12 \\
\hline
00
\end{array}
$$

G5 U1 Lesson 12

Divide decimals with remainders in the smallest place

CITYTUTOR

G1 U1 Lesson 12 - Today we will divide decimals with remainders in the smallest place.

Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we are going to divide decimals with remainders in the smallest place value. The numbers are trickier but none of our steps are going to change. It will be exactly the same steps we already did. We just need to understand why they still work so let's explore together.
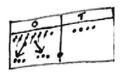
Let's Review (Slide 3): Let's review what we've learned so far. Let's talk through the steps as a class.

Call on students to tell you what to do first and what to do next while you write it out. If a student says to do something incorrect, just say, "That's not quite right. Who came help them out?" and get through one quick sample problem with the work shown here. Now that we've finished the problem, let's look back at our work. There was a remainder. What place was the remainder in and what did we do with it? Possible Student Answers, Key Points:
● The remainder was 1 and it became 14.
● There was a remainder in the ones place and it was regrouped into tenths.
● There was a remainder in the ones place and it was regrouped with the 4.

Let's Talk (Slide 4): Let's use a picture to understand what happened to the remainder because in our next problem the remainder is going to be in our last place and it will be a little bit trickier.

I am going to draw 7 dots for 7 ones and 4 dots for 4 tenths. I draw two arrows to split the 7 but I can only give 3 dots to each arrow. There is one left.
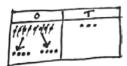
I can turn that 1 into 10 tenths just like I would turn a dollar into 10 dimes. It is just like if I were regrouping to subtract.
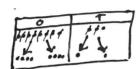
Now I have 14. I draw two arrows to split the twelve and I can give 7 dots to each arrow. We get the same answer as in our review.

Let's Think (Slide 5): The same ideas are going to show up in this next problem but the remainder will be the last number in the division. Hopefully you will see what we should do by looking at the picture on the place value chart. See if you can figure it out before I get to the number side of this slide.
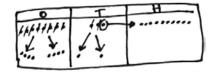
I am going to draw 8 dots for 8 ones and 3 dots for 3 tenths. I draw two arrows to split the 8 and I can give 4 dots to each arrow. No remainder there.
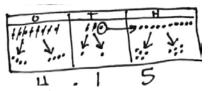
Now I need to split the 3. I can draw two arrows and give 1 to each arrow but I will have 1 left. Here's where we have to think. What did we do in the earlier problem that would help us keep dividing here. Possible Student Answers, Key Points:
● We can regroup that 1.
● We can turn the 1 into 10.
● We can go from tenths to hundredths.

We can regroup the 1 tenth into 10 hundredths. In other words, regroup the remainder into the next smallest place and divide that instead.

I split 10 with two arrows and give 5 to each arrow and my final answer is 4.15. The most importantly thing to realize is that even when our remainder was in the smallest place value, we could still regroup it to the next smallest place value.

Let's see what that will mean with our long division. We know we can list our twos. We ask ourselves, "2 times what makes 8?" We get 4 and subtract what it makes. Then we ask ourselves, "2 times what makes 3?" We can't make 3. We can only do 2 x 1 makes 2. So 1 goes on top and we subtract what it makes. Here is that remainder!

Now this is a really important part so watch me. We know from our picture that we want to regroup that remainder. Before regrouping, I had zero hundredths so let's put a zero in that hundredths spot. I didn't change the value of the number. I just put a zero when there was already nothing there. It's empty anyway!

But here is why our place value system is so cool. Now that I wrote in the zero that was already secretly there, I can pull it down. And now I don't have 1 tenth. I have 10 hundredths. Just like we drew in the picture. I have regrouped and I can divide. I ask, "2 times what makes 10?" It's 5. Now I have the same answer that we got with our picture.
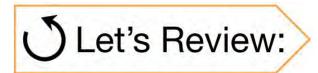
Now we will practice together. I will take you through each step so you know what to do when you have to work on your own. Remember: If you have a remainder, you can put a zero in the next place and it will automatically regroup so you can divide it.
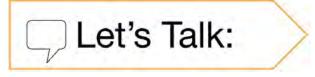
WARM WELCOME

Today we will divide decimals with remainders in the smallest place.

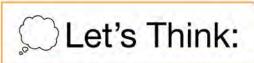**In our last lesson, we learned how to divide decimals with remainders.**

Solve. 7.4 ÷ 2 = ?

What happens when there is a remainder in any place?

Show 7.4 ÷ 2 in a place value chart.

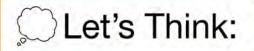**Let's Think:** **If we have a remainder in the smallest place, we can add a zero to regroup.**

Solve. 8.3 ÷ 2 = ?

Place value chart: Numbers:
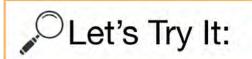
Let's Think: **Sometimes we need to add more than one zero.**

Solve. 8.3 ÷ 4 = ?

Place value chart: Numbers:

Let's Try It:

Let's practice dividing decimals with remainders in the smallest place!

Rosa had 2 dollar bills and 5 dimes. She split her money between her two younger sisters. How much money did each sister get?

Rosa's money is drawn for us. How can we finish the picture to represent the story problem?

$1 $1   (D) (D) (D)
                   (D) (D)

We had a remainder in the dimes. What did we have to do to keep dividing?

_____

_____

This same problem could be written as _____ ÷ _____ = _____

On your Own:

Now it's time to divide decimals with remainders on your own!

Remember: If we have a remainder in the last place, we will need to add a zero to regroup.

Show your work using the long division symbol.

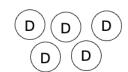| 1. Solve.	2. Solve.
5.57 ÷ 5 = _____	48.06 ÷ 4 = _____
3. Solve.	4. Solve.
60?.5 ÷ ? =	9.6?4 ÷ ? =

Rosa had 2 dollar bills and 5 dimes. She split her money between her two younger sisters. How much money did each sister get?

Rosa's money is drawn for us. How can we finish the picture to represent the story problem?

$1 $1   D D D
                  D D

We had a remainder in the dimes. What did we have to do to keep dividing?

_____
____

_____
____

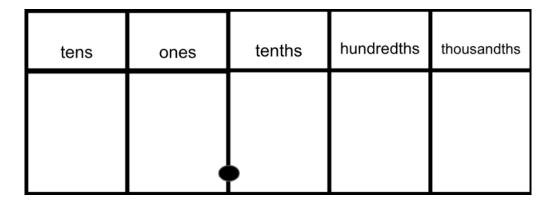This same problem could be written as _____ ÷ _____ = _____

We DON'T line up the numbers on the place value chart like we did for addition and subtraction. Let's set up our problem.

We don't want to forget the decimal in our answer because it helps us keep the place values we started with!

Solve.   84.06 ÷ 4 = ?

Let's represent the problem on a place value chart.

tens	ones	tenths	hundredths	thousandths
		●		

Let's practice writing the problem with the long division symbol:

Where did we have a remainder and what did we do with it?

_____
_____

_____
_____

We can make a chart to compare how we work with each operation.

	Addition	Subtraction	Multiplication	Division
Do we line up the place values and decimal points in both numbers?				
Which way do we need to regroup?				

Remember: If we have a remainder in the last place, we will need to add a zero to regroup.

Show your work using the long division symbol.

1. Solve. $$5.57 \div 5 = \underline{\hspace{2cm}}$$	2. Solve. $$48.06 \div 4 = \underline{\hspace{2cm}}$$
3. Solve. $$692.5 \div 2 = \underline{\hspace{2cm}}$$	4. Solve. $$9.684 \div 8 = \underline{\hspace{2cm}}$$

Be sure to follow the directions to estimate or solve for an exact answer.

5. Solve.

$6.042 \div 4 =$ _____

6. Solve.

$84.9 \div 6 =$ _____

7. Solve.

$379.03 \div 2 =$ _____

8. Solve.

$84.7 \div 6 =$ _____

Rosa had 2 dollar bills and 5 dimes. She split her money between her two younger sisters. How much money did each sister get?

Rosa's money is drawn for us. How can we finish the picture to represent the story problem?

$1.25 $1.25

We had a remainder in the dimes. What did we have to do to keep dividing?

We had to change the 1 dime into 10 pennies.

This same problem could be written as ___2.5___ ÷ ___2___ = ___1.25___

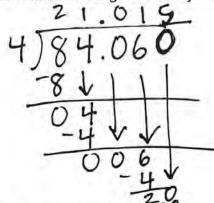We DON'T line up the numbers on the place value chart like we did for addition and subtraction. Let's set up our problem.

We don't want to forget the decimal in our answer because it helps us keep the place values we started with!

Solve.

$$84.06 \div 4 = ?$$

Let's represent the problem on a place value chart.

tens	ones	tenths	hundredths	thousandths
2	1	● 0	1	5

Let's practice writing the problem with the long division symbol:

```
        2 1 . 0 1 5
      _____
   4 ) 8 4 . 0 6 0
      -8 ↓
      _____
       0 4 ↓ ↓
        -4 ↓ ↓
      _____
       0 0 6 ↓
          -4 ↓
      _____
         2 0
         2 0
```

Where did we have a remainder and what did we do with it?

We had a remainder in the hundredths so we turned 2 hundredths into 20 thousandths.

We can make a chart to compare how we work with each operation.

	Addition	Subtraction	Multiplication	Division
Do we line up the place values and decimal points in both numbers?	yes	yes	no	no
Which way do we need to regroup?	←	→	←	→

Remember: If we have a remainder in the last place, we will need to add a zero to regroup.

Show your work using the long division symbol.

1. Solve.

$5.57 \div 5 = \underline{1.114}$

```
      1.114
   5)5.570
    -5↓
    ‾‾‾
     05
    -5↓
    ‾‾‾
      07
     -5↓
     ‾‾‾
      20
     -20
     ‾‾‾
       0
```

2. Solve.

$48.06 \div 4 = \underline{12.015}$

```
      12.015
   4)48.060
    -4↓
    ‾‾‾
     08
    -8↓↓
    ‾‾‾
     006↓
     -4↓
     ‾‾‾
      20
     -20
     ‾‾‾
      00
```

3. Solve.

$692.5 \div 2 = \underline{346.25}$

```
        346.25
   2)692.50
    -6↓
    ‾‾‾
     09
    -8↓
    ‾‾‾
     12
    -12↓
    ‾‾‾
      05
     -4↓
     ‾‾‾
      10
     -10
     ‾‾‾
      00
```

4. Solve.

$9.684 \div 8 = \underline{1.8105}$

```
      1.8105
   8)9.6840
    -8↓
    ‾‾‾
     16
    -16↓
    ‾‾‾
     008↓
     -8↓
     ‾‾‾
     040
     -40
     ‾‾‾
      00
```

Be sure to follow the directions to estimate or solve for an exact answer.

5. Solve.

$6.042 \div 4 =$ __1.5105__

```
   1.5105
4)6.0420
 -4↓
  20
 -20↓
   04
  -4↓↓
    020
   -20
     00
```

6. Solve.

$84.9 \div 6 =$ __14.15__

```
   14.15
6)84.90
 -6↓
  24
 -24↓
   009
    -6↓
     30
    -30
      00
```

7. Solve.

$379.03 \div 2 =$ __189.515__

```
    189.515
2)379.030
 -2↓
  17
 -16↓
   19
  -18↓
    10
   -10↓↓
     003
     -2↓
      10
     -10
       00
```

8. Solve.

$84.7 \div 6 =$ __14.1166...__

```
   14.1166...
6)84.7000
 -6↓
  24
 -24↓
   007
    -6↓
     10
     -6↓
      40
     -36
       4
```