CITYTUTOR DC

Third Grade Math Lesson Materials

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Identification of the copyrighted work claimed to have been infringed, or, if multiple copyrighted works allegedly have been infringed, then a representative list of such copyrighted works;

Identification of the material that is claimed to be infringing and that is to be removed or access to which is to be disabled, and information reasonably sufficient to permit us to locate the allegedly infringing material, e.g., the specific web page address on the Platform;

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CITYTUTOR DC

G3 Unit 1:

Foundations of Multiplication and Division

G3 U1 Lesson 1
Model equal groups and use groups of language

G3 U1 Lesson 1 - Students will model equal groups and use "groups of" language.

<mark>Warm Welcome (Slide 1):</mark> Tutor choice

<mark>Frame the Learning/Connect to Prior Learning (Slide 2):</mark> Today we will begin our unit on multiplication and division. The most important thing to know about multiplication and division is that they both use "equal groups." You've been learning about the meaning of the word "equal" since kindergarten. So today may seem like a review of some math that you already know. That's okay though, because if you get really good at using equal groups, you'll be really good at multiplication and division.

<mark>Let's Talk (Slide 3):</mark> So, let's start with a question…**what does it mean to have equal groups? Can you give an example of equal groups in real life?** Possible Student Answers/Key Points:
- Equal groups are groups that are the same.
- Equal groups have the same amount of items/stuff/objects/things in every group.

Correct! Equal groups are when every group has the same amount inside. Now that we know that equal groups are when every group has the same amount in each group, can you draw me an example of equal groups? Yes! Those are equal groups because every group has the same amount.

<mark>Let's Think (Slide 4):</mark> Let's just make absolutely sure you know what equal groups are. Take a look at the model on this page. Are these groups equal? Why or why not? No, the groups are not equal. One group has more objects in it than the other group. **Right, so how would we make the groups equal?** Possible Student Answers/Key Points:
- Add three more squares to the second group.
- Take three squares away from the first group.

Why does that make the groups equal? Now both groups have 4/1 square(s) inside. Great job, the groups did not start off equal. However you added squares to the group that had less/took squares away from the group that had more. Now both groups are equal because both groups have the same amount of square(s). Let's point and count, we have 1 group of 4 and 2 groups of 4.

<mark>Let's Think (Slide 5):</mark> Let's use what we know about equal groups to solve the problem on this slide. It says model 2 groups, with 3 in each group. Let's pause. What does it mean to model? Draw a picture! Correct, so we need to draw a picture of 2 groups, with 3 in each group. How should we begin our drawing/what should we do first? Draw 2 groups.
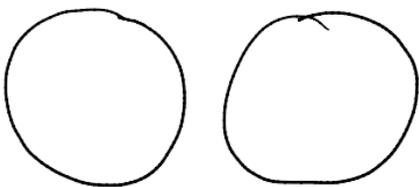
Correct, we need to draw two large groups. You can hear "two groups" when you read that sentence. Listen, "TWO GROUPS of three." So that tells me how many groups to draw. Watch me, I'm going to draw 1 group (*draw a circle*) and another group (*draw another circle*). These groups are going to have things in them so I'm going to make them big enough, like baskets to hold things!
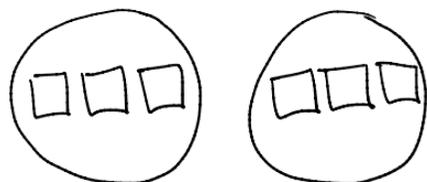
Hmm, so let's go back and read that sentence, "TWO GROUPS, we did that (*point to each group*) WITH THREE IN EACH GROUP." So what should we do? Draw 3 circles/stars/squares/swirls in each group! That's right, we need to put 3 objects or items into each group. So I need to draw three here (*draw three in the first group*) and another three here (*draw three in the second group*). Now look, I have two groups with three

in each. Here's 1 group with 3 in it and here's another group with 3 in it so that makes 2 groups of 3.

There's one more question that says, "What's the total?" Do you know what the word total means? The total means "how many there are altogether."
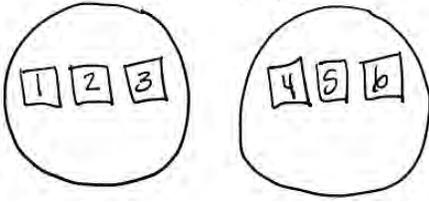
Correct, total means, "in all." So how would we find the total circles/squares/swirls/stars? Count them all up! That's right! If we want to know the total we can count them all up. We just count the items that are in the groups, not the groups. Just like if I was counting the total amount of skittles in a bag, I wouldn't count the bag, just the skittles IN the bag. So, for today let's count them all up by ones. It's slow, but we will make fewer mistakes. Let's count out loud. As we count, I'll label each square. Ready, 1, 2, 3, 4, 5, 6. So, what's the total? 6!

Let's Think (Slide 7):   Let's try another. This one says "model 3 groups of 2." This one looks a little different than the last one. I see a 3 and 2 but it looks a little different so let me look carefully. It says, "3 groups of 2." Well, 3 groups of 2 means the same things as 3 groups with 2 in each group. It's just a shorter way of saying it.
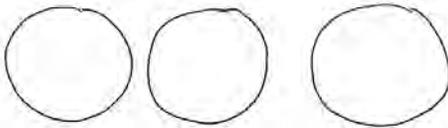
What should we do first? Draw 3 groups! That's right, it says "3 groups" so we'll draw 3 big groups, like bags or baskets. That way we have room to put things in them! Count with me…1 group, 2 groups, 3 groups, now we have 3 groups.
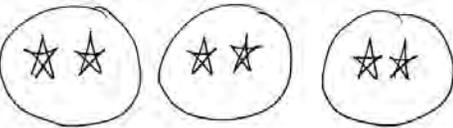
What do we do next? Draw 2 in each group! So, I'm going to put 2 in this group, another 2 in this group, and another 2 in this group (*draw 2 in each group as you narrate*). There, I have three groups…1, 2, 3 (*point to each group*)…there are 2 in EACH group..1, 2…1, 2…1, 2 (*point to each star*).

Now we need to find the total. What can we do? Count by ones, count them all! Count with me as I point…1, 2, 3, 4, 5, 6. So, what's the total? 6!

Let's Talk (Slide 8):   Now we just drew two different models. Ours looks similar to the ones on this slide. First we drew 2 groups of 3 and then we drew 3 groups of 2. Let's compare them. **What's different about the two models?** Possible Student Answers/Key Points:
- The first model has 2 groups but the second model has 3 groups.
- The first group has 3 in each group but the second group has 2 in each group.

What's the same about the models? Possible Student Answers/Key Points:
- Both have the numbers 2 and 3 (but in different ways/places).
- Both have a total of 6.
- The numbers (2 and 3) are just switched, but the total is the same.

Correct, the models do look different, the number of groups are different and the amount in each group is different. We switched the number of groups and amount in each group. But even though we switched the numbers, the total stayed the same. That's going to be really important to remember later on as we learn more

about multiplication and division. You can switch the number or groups and number in each group, but still get the same total.

Now let's work on modeling more groups together. Remember our groups need to be equal every single time.

WARM WELCOME

Today we will model groups using, "groups of" language.

What does it mean to have equal groups?

Can you give an example of equal groups in real life?

Let's Think:

Make the groups equal.
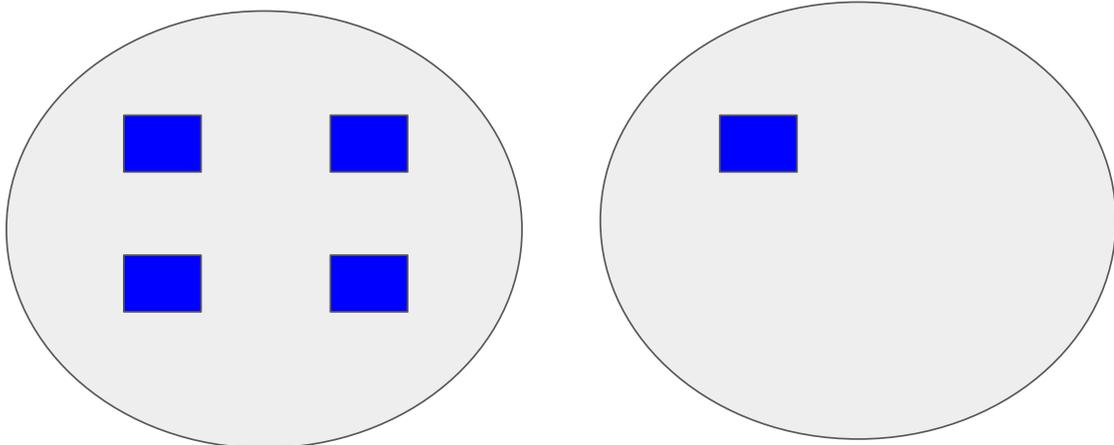
How would I model 2 groups, with 3 in each group?

What's the total?

How would I model 3 groups of 2?

What's the total?

How are the two models different?
How are the two models the same?
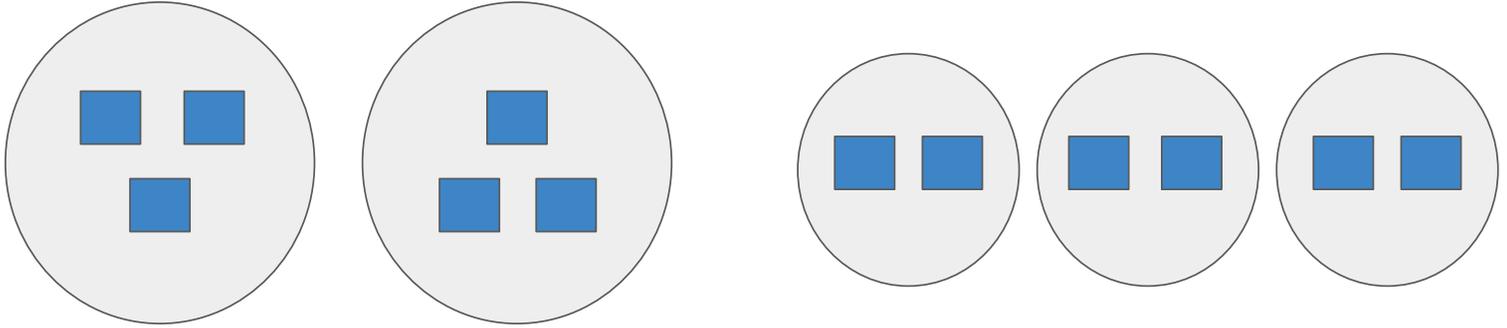
Let's Try It:

Name: _____ G3 U1 1-1 Let's Try It

Directions: Draw the model that matches the words and find the total.

1. 4 groups, with 5 in each group

2. 3 groups, with 3 in each group

   Total: _____

3. 8 groups of 2

   Total: _____

4. 3 groups of 6

   Total: _____

   Total: _____

Directions: Write the words that match the model and find the total.

5.

Words: _____ Total: _____

6.

Words: _____ Total: _____

7.

Words: _____ Total: _____

Directions: Solve each word problem by drawing a model.

8. The bus has 10 rows. Each row has 4 seats. How many total seats does the bus have?

   Total: _____

9. Each table has 6 chairs. There are 5 tables. How many chairs are there in all?

   Total: _____

Bonus: What happens to the **total** when you switch the number of groups and the number in each group? (Ex. **3 groups of 5** vs. **5 groups of 3**)

_____

![On your Own:](pencil icon)

On your Own:

Remember: Draw models of equal groups to help you solve.

1. Draw a picture and find the total. **3 groups of 5** Total: _____	2. Draw a picture and find the total. **8 groups of 2** Total: _____
3. Write the words and find the total. Words: _____ Total: _____	4. Solve. The class ordered 8 small pizzas. Each pizza has 7 pepperonis on it. How many pepperonis do they have in all? Total: _____

Directions: Draw the model that matches the words and find the total.

1. 4 groups, with 5 in each group

Total: _____

2. 3 groups, with 3 in each group

Total: _____

3. 8 groups of 2

Total: _____

4. 3 groups of 6

Total: _____

Directions: Write the words that match the model and find the total.
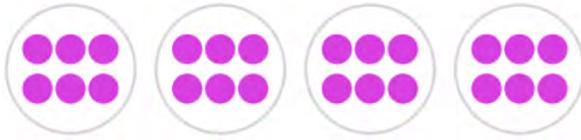
5.

Words: _____   Total: _____

6.

Words: _____ Total: _____

7.

Words: _____ Total: _____

Directions: Solve each word problem by drawing a model.

8. The bus has 10 rows. Each row has 4 seats. How many total seats does the bus have?

Total: _____

9. Each table has 6 chairs. There are 5 tables. How many chairs are there in all?

Total: _____

Bonus: What happens to the **total** when you switch the number of groups and the number in each group? (Ex. **3 groups of 5** vs. **5 groups of 3**)

Remember: Draw models of equal groups to help you solve.

1. Draw a picture and find the total. **3 groups of 5** **Total:** _____	**2.** Draw a picture and find the total. **8 groups of 2** **Total:** _____
3. Write the words and find the total. **Words:** _____ **Total:** _____	**4.** Solve. The class ordered 6 small pizzas. Each pizza has 7 pepperonis on it. How many pepperonis do they have in all? **Total:** _____
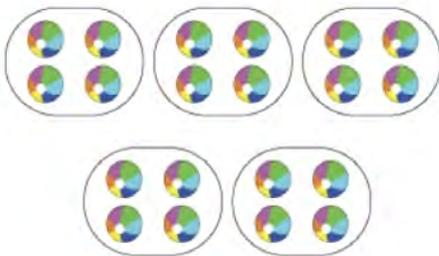
Directions: Draw the model that matches the words and find the total.

1. 4 groups, with 5 in each group
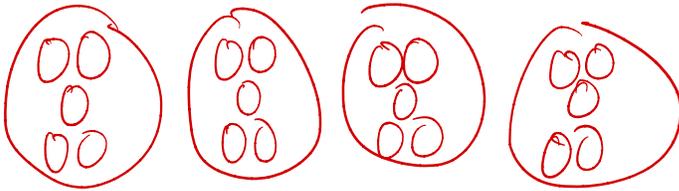
Total: 20

2. 3 groups, with 3 in each group
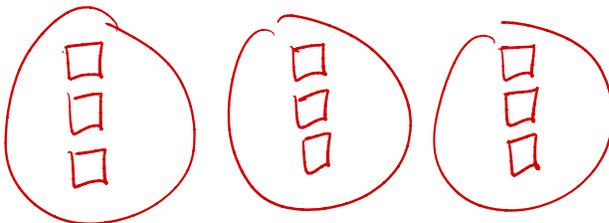
Total: 9

3. 8 groups of 2
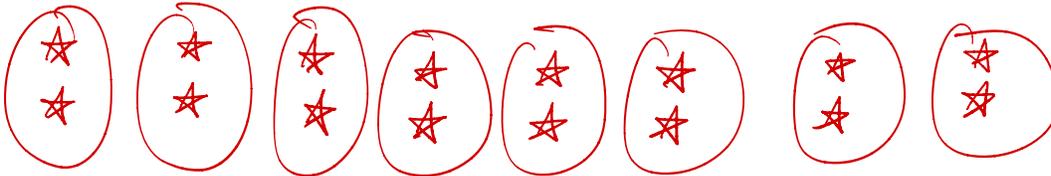
Total: 16

4. 3 groups of 6
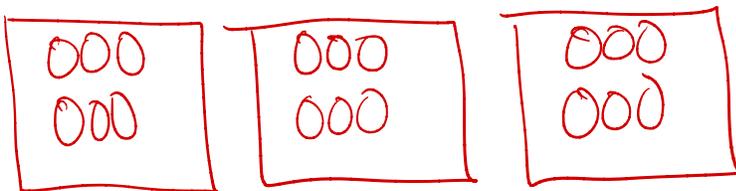
Total: 18

Directions: Write the words that match the model and find the total.

5.

Words: 4 groups of 3   Total: 12

6.
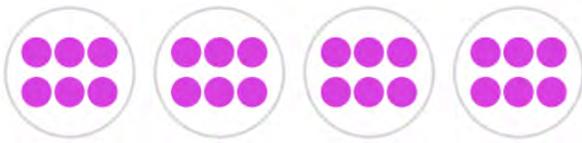
Words: _____4 groups of 6_____ Total: __24__

7.

Words: _____3 groups of 7_____ Total: __21__

Directions: Solve each word problem by drawing a model.

8. The bus has 10 rows. Each row has 4 seats. How many total seats does the bus have?
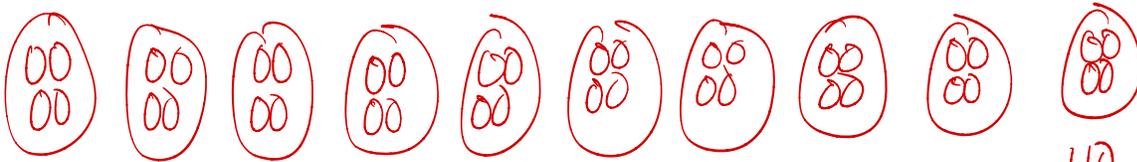
Total: __40__

9. Each table has 6 chairs. There are 5 tables. How many chairs are there in all?
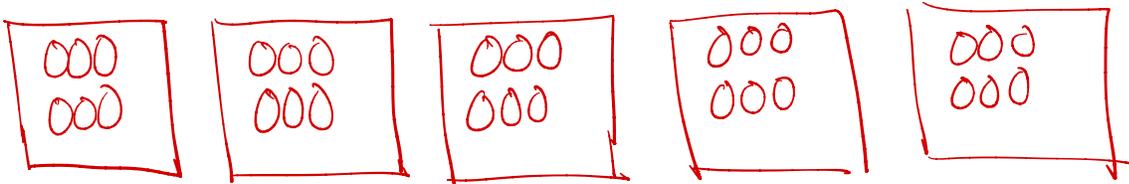
Total: __30__

Bonus: What happens to the **total** when you switch the number of groups and the number in each group? (Ex. **3 groups of 5** vs. **5 groups of 3**)

_____The total stays the same._____

Remember: Draw models of equal groups to help you solve.
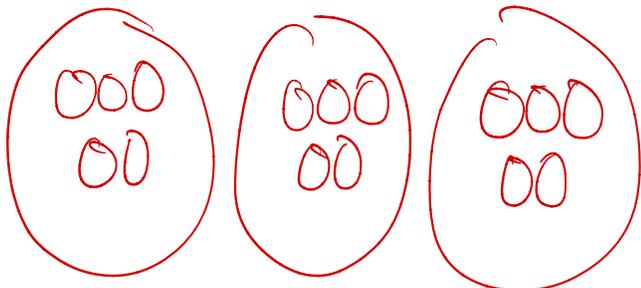
|	
1. Draw a picture and find the total. **3 groups of 5** **Total:** 15	**2.** Draw a picture and find the total. **8 groups of 2** **Total:** 16
3. Write the words and find the total. **Words:** 5 groups of 4 **Total:** 20	**4.** Solve. The class ordered 6 small pizzas. Each pizza has 7 pepperonis on it. How many pepperonis do they have in all? **Total:** 42
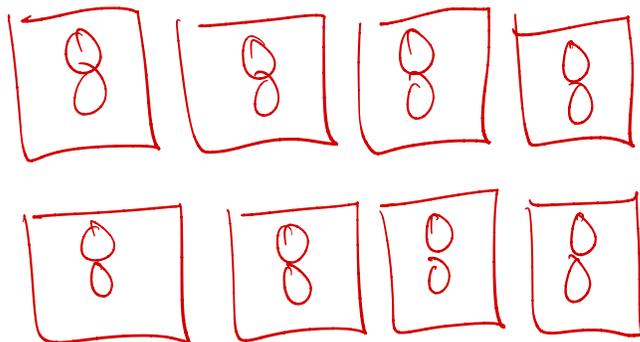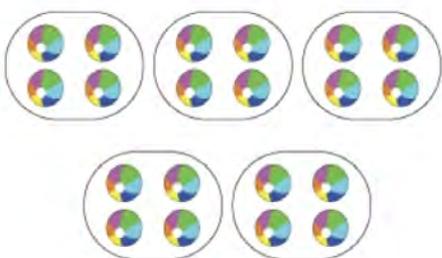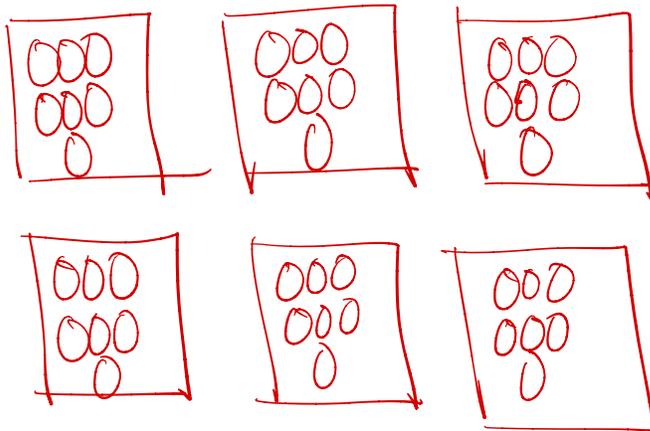
G3 U1 Lesson 2
Relate repeated addition to groups of language

G3 U1 Lesson 2 - Students will relate repeated addition to groups of language

<mark>Warm Welcome (Slide 1):</mark> Tutor choice

<mark>Frame the Learning/Connect to Prior Learning (Slide 2):</mark> Today we will continue our multiplication and division unit by learning about repeated addition. Yesterday we learned about equal groups and "groups of" language. Today we'll use what we learned about equal groups and "groups of" language to learn about repeated addition.

<mark>Let's Review (Slide 3):</mark> Let's quickly review what we went over yesterday. You see the figure below showing 3 groups of 2. What did we do yesterday to find the total squares? Count up all the squares. Correct! Let's quickly count all the squares together out loud: 1, 2, 3, 4, 5, 6. Correct, there are 6 total squares and we found the total by counting. More specifically, when we count "normally," we're actually counting by ones.

<mark>Let's Talk (Slide 4):</mark> Counting by ones is always a good way to find the total. However it might take a long time when we have more groups and more in each group. Imagine trying to count 10 groups of 9, it would take forever! Let's look at the model below. **Are there other ways to find the total?** Possible Student Answers/Key Points:
- Skip count by 2s … 2, 4, 6, 8. 8
- Add two groups together to get 4. Add 4 and 4 to get 8.
- Add each group together.

Guess what? You just did repeated addition without even knowing it! Repeated addition is when we add the same number over and over again. The number repeats itself…2 and then another 2 and then another 2 and then another 2. Today we're going to explore repeated addition as another way to represent equal groups like these…2 and 2 and 2 and 2! I'm going to show you how we write repeated addition to show equal groups and use it to find the total.

<mark>Let's Think (Slide 5):</mark> Today we're going to build on what we know about "groups of" with repeated addition. But first, let's start with what we learned yesterday. Let's draw a model to show 3 groups of 4.

 I'm going to draw 3 large groups because the sentence says THREE GROUPS. Next I'm going to put 4 in each group because the sentence says "three groups OF FOUR." Count with me as I put 4 in each group…1, 2, 3, 4… 1, 2, 3, 4… 1, 2, 3, 4. We have 4 and 4 and 4 (*point to each group*).

Now that we have a clear picture we can find the total. Yesterday we learned that we could count to find the total. But today we are going to use repeated addition to show the total.
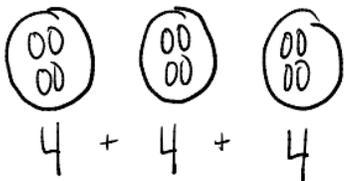
 So I know that I have 4 (*point*) and 4 (*point*) and 4 (*point*). I'm going to write that as a repeated addition sentence below. I know the plus sign means the same as the word "and." So, 4 and 4 and 4 (*point to model*) is the same as 4 + 4 + 4 (*write*). Read our number sentence out loud: 4 + 4 + 4 = ___. **What do you notice about our number sentence and our model?** Possible Student Answers/Key Points:
- The numbers that we're adding, match our picture above.
- Both show 3 groups with 4 in each group.
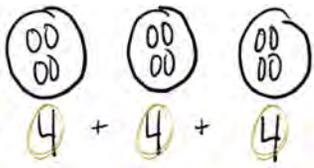
That's exactly right–repeated addition is another way to represent equal groups! Our number sentence represents, or matches, our picture. When I look at my number sentence I see that there are 3 fours! Here's 1 four, 2 fours, 3 fours (*circle each four as you count*).
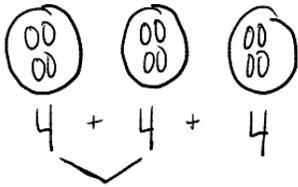
But guess what? We're not done after writing our number sentence. Remember, the repeated addition is just another way for us to find our total. We still need to find the total! Let's start to add. Let's only add two numbers at a time. We'll start by adding the first 2 fours! There's one 4 left over that we'll come back to.
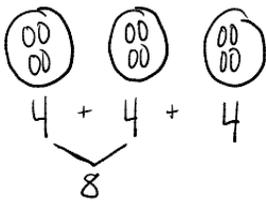
So we're adding 4 and 4, our doubles facts will help us. What does 4 + 4 equal? 8! Correct, 8! Now all we have to do is add our 8 to the 4 that is left. We need to solve 8 + 4.

Let's stack and add just to show our work. What is 8 + 4? 12. Correct! Our total is 12. So, 3 groups of 4 equals 12 total.

Let's Think (Slide 6): Let's try another one. This time we need to find the total of 6 groups of 3 using repeated addition. Again let's start with our model. Since we know how to draw models, I'm going to draw this one fast.
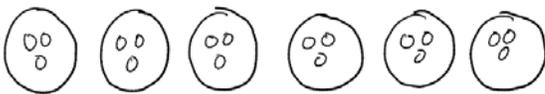
I'm going to draw 6 large groups, because it says 6 GROUPS: 1, group, 2, groups, 3, groups, 4, groups, 5 groups, 6 groups. Next I'm going to put 3 in each group. Count as I put three in each group…1, 2, 3…1, 2, 3…1, 2, 3… 1, 2, 3… 1, 2, 3… 1, 2, 3. Good, we have 6 groups with 3 in each group.
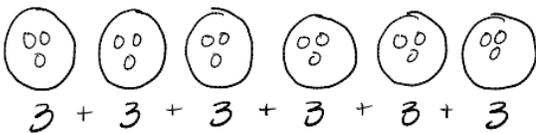
Now that we have a clear picture we can write our repeated addition number sentence. What's the number we're going to be adding over and over again? 3. Correct, we're going to be adding 3 over and over again because there are 3 in each group over and over again…three here and here and here (*point as you narrate*). So we're going to write 3 + 3 + 3 + 3 + 3 + 3 = _____.

Now let's go back and reread the number sentence. I want you to point to the figure as you say out loud what we're adding: 3 + 3 + 3 + 3 + 3 + 3. Correct, our repeated addition sentence matches our picture perfectly! We see 6 groups of 3! Remember, the repeated addition is another way for us to represent equal groups and find the total. Our picture shows 6 groups of 3 but our repeated addition also shows 6 groups of 3. Let's start adding.

Let's only add two numbers at a time. We'll add these two 3s, then these two 3s, then these two 3s. Our doubles facts will help us. What does 3 + 3 equal? 6. Correct, 3 + 3 is 6! So these 2 threes make 6 and these 2 threes make 6 and these 2 threes make 6! But we're not done adding, now we have all these 6s to add! Let's continue adding only 2 numbers at a time.

$$3 + 3 + 3 + 3 + 3 + 3$$

We'll add the first two 6s. We'll come back to the last 6 later. Now, what does 6 + 6 =? 12. Correct, 12. Now all we have to do is add 12 to our last 6. You pick your strategy to find the total!

So, what's 3 + 3 + 3 + 3 + 3 + 3? 18! Yes! 6 groups of 3 is 18 total!

Let's Try It (Slide 7-8): Now let's work on using repeated addition to represent our "groups of" language together. Remember, with repeated addition, the number that we're adding is the amount that's in each group.

WARM WELCOME

Today we will relate repeated addition to "groups of" language.

How would I find the total of these equal groups?
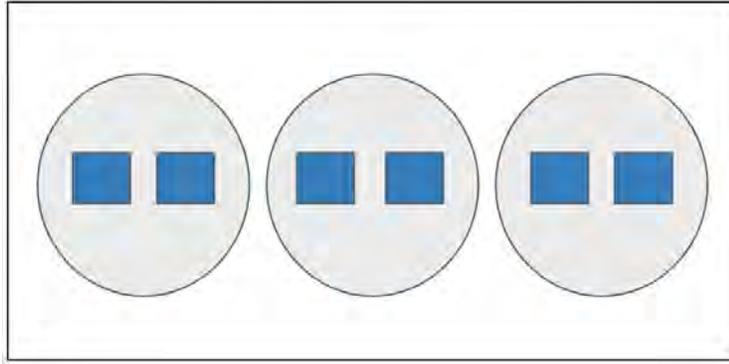
💬 Let's Talk:

What are some other ways to find the total?
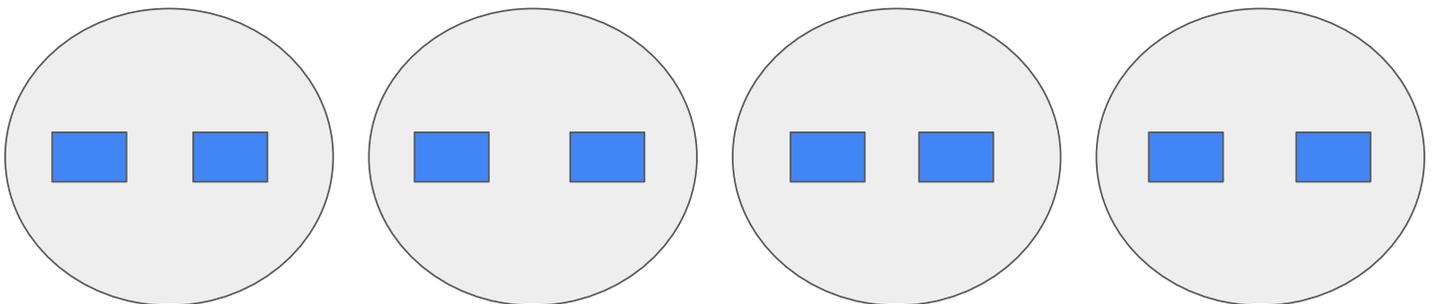
3 groups of 4

Find the total using repeated addition.

6 groups of 3

Find the total using repeated addition.

Let's Try It:

Directions: Write the repeated addition sentence that matches the words and find the total.

1. 3 groups, with 6 in each group

   Repeated Addition: _____   Total: _____

2. 7 groups, with 2 in each group

   Repeated Addition: _____   Total: _____

3. 5 groups of 4

   Repeated Addition: _____   Total: _____

4. 4 groups of 11

   Repeated Addition: _____   Total: _____

Directions: Write the words that match the repeated addition sentence and find the total.

5. 10 + 10 + 10 + 10 + 10 + 10

   Words: _____   Total: _____

6. 9 + 9 + 9

   Words: _____   Total: _____

7. 8 + 8

   Words: _____   Total: _____

Directions: Solve each word problem by using repeated addition.

a. Kim bought 3 bags of cookies. There are 10 cookies in each bag. How many cookies did Kim buy?

   Total: _____

b. There are 10 party bags. Each bag has 4 treats inside. How many treats are there for the party?

   Total: _____

Bonus: Counting and repeated addition are two different ways of finding the same thing. What do they help you find?

_____

On your Own:

Remember: You can use a model to help you with your repeated addition.

1. Write a repeated addition sentence and find the total.	2. Write a repeated addition sentence and find the total.
4 groups of 2	6 groups of 5
Repeated Addition:	**Repeated Addition:**
Total: _____	**Total:** _____
3. Use words to represent the repeated addition sentence and find the total.	4. Solve. Shawn put 8 cookies on each plate. There are 3 plates. How many cookies did she serve?
3 + 3 + 3 + 3 + 3 + 3 + 3	
Words: _____	
Total: _____	**Total:** _____

Directions: Write the repeated addition sentence that matches the words and find the total.

1. **3 groups, with 6 in each group**

   Repeated Addition: _____   Total: _____

2. **7 groups, with 2 in each group**

   Repeated Addition: _____   Total: _____

3. **5 groups of 4**

   Repeated Addition: _____   Total: _____

Directions: Write the words that match the repeated addition sentence and find the total.

4.   **10 + 10 + 10 + 10 + 10 + 10**

Words: _____   Total: _____

5.   **9 + 9 + 9**

Words: _____   Total: _____

Directions: Solve each word problem by using repeated addition.

6. Kim bought 3 bags of cookies. There are 10 cookies in each bag. How many cookies did Kim buy?

Total: _____

Bonus: Counting and repeated addition are two different ways of finding the same thing. What do they help you find?

Remember: You can use a model to help you with your repeated addition.

---

1. Write a repeated addition sentence and find the total.

   4 groups of 2

   Repeated Addition:

   _____

   Total: _____

2. Write a repeated addition sentence and find the total.

   6 groups of 5

   Repeated Addition:

   _____

   Total: _____

3. Use words to represent the repeated addition sentence and find the total.

   $$3 + 3 + 3 + 3 + 3 + 3 + 3$$

   Words: _____

   Total: _____

4. Solve. Shawn put 8 cookies on each plate. There are 3 plates. How many cookies did she serve?

   Total: _____

Directions: Write the repeated addition sentence that matches the words and find the total.

1. **3 groups, with 6 in each group**

⑥ + ⑥ + ⑥   12
       12   + 6
                            18

Repeated Addition: __6 + 6 + 6__   Total: __18__

2. **7 groups, with 2 in each group**

② + ② + ② + ② + ② + ② + ②   8
   4   4   4   + 6
      8   6   14

Repeated Addition: __2 + 2 + 2 + 2 + 2 + 2 + 2__   Total: __14__

3. **5 groups of 4**

④ ④   ④ ④   ④   16
   8   8   + 4
      16   20

Repeated Addition: __4 + 4 + 4 + 4 + 4__   Total: __20__

Directions: Write the words that match the repeated addition sentence and find the total.

4. $(10) + (10) + (10) + (10) + (10) + (10)$

20   20   20

40 ⌣ 60
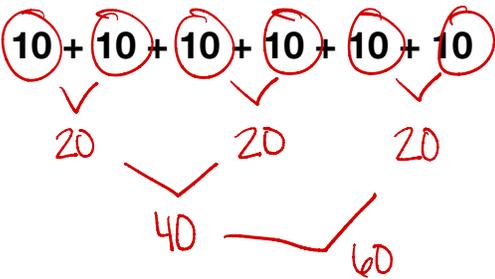
Words: _____6 groups of 10_____   Total: _60_

5. $(9) + (9) + (9)$

18 ⌣

18
+ 9

27
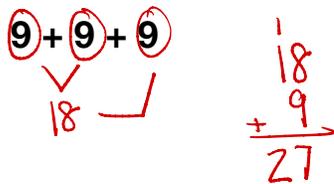
Words: _____3 groups of 9_____   Total: _27_

Directions: Solve each word problem by using repeated addition.

6. Kim bought 3 bags of cookies. There are 10 cookies in each bag. How many cookies did Kim buy?

$(10) + (10) + (10)$

20 ⌣
30
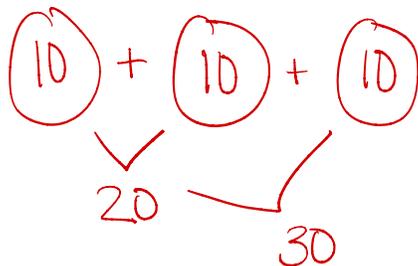
Total: _30_

Bonus: Counting and repeated addition are two different ways of finding the same thing. What do they help you find?

_____The total_____

Remember: You can use a model to help you with your repeated addition.

---

1. Write a repeated addition sentence and find the total.

4 groups of 2

$$(2) + (2) + (2) + (2)$$

4   4

8
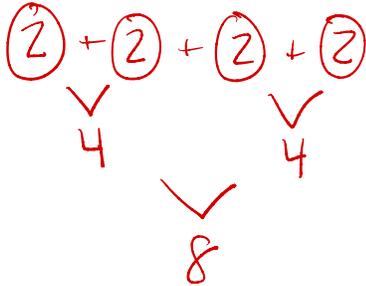
Repeated Addition:

$$2 + 2 + 2 + 2$$

Total: ___8___

---

2. Write a repeated addition sentence and find the total.

6 groups of 5

$$(5)(5)(5)(5)(5)(5)$$

10   10   10

20

30
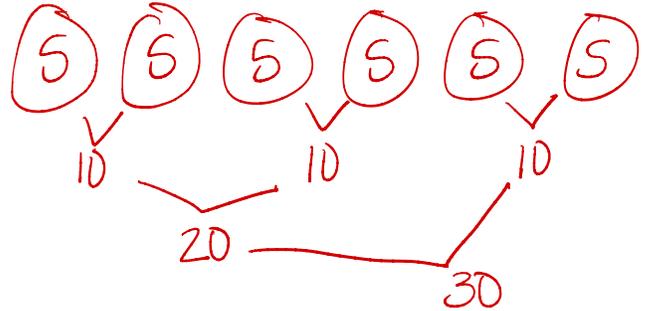
Repeated Addition:

6 groups of 5

Total: ___30___

---

3. Use words to represent the repeated addition sentence and find the total.

$$(3)+(3)+(3)+(3)+(3)+(3)+(3)$$

6   6   6   9

12

$$\begin{array}{r} 12 \\ 9 \\ + \\ \hline 21 \end{array}$$
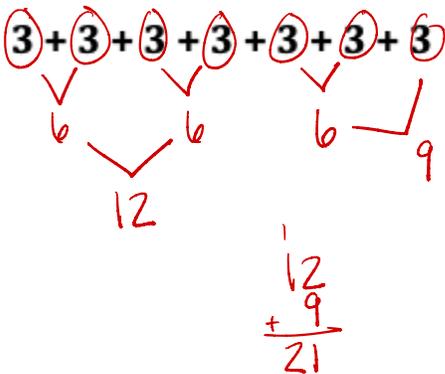
Words: ___7 groups of 3___

Total: ___21___

---

4. Solve. Shawn put 8 cookies on each plate. There are 3 plates. How many cookies did she serve?

$$(8)\quad(8)\quad(8)$$

16

$$\begin{array}{r} 16 \\ + 8 \\ \hline 24 \end{array}$$
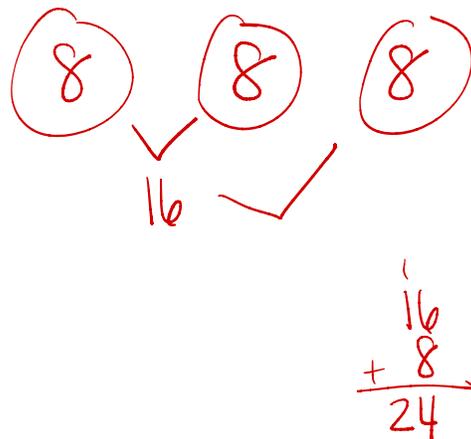
Total: ___24___

G3 U1 Lesson 3

Understand groups of language as multiplication

G3 U1 Lesson 3 - Students will understand groups of language as multiplication

Warm Welcome (Slide 1): Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): We're two days into learning about multiplication but we haven't actually used the word multiplication or seen the multiplication symbol. I'm sure you've been wondering how everything we've been doing is connected to multiplication. Well today we're finally going to put it all together. You're going to see just how much you already know about multiplying.

Let's Talk (Slide 3): In math, each symbol has a name and meaning. You already know two math symbols really well. What is the name of this first symbol? Plus sign! Correct, this is called the "plus" symbol or plus sign. What does the plus symbol mean? If I couldn't say "plus," what would I say instead if I read "3 + 4?" *(Write out 3 + 4)* Or how would I read it to someone who does not know what plus means? 3 and 4! That's right, the plus sign means we're joining two things. I would draw 3 circles and 4 more.

What is the name of this next symbol? Minus sign! And what does the minus sign mean? If I couldn't say "minus," what would I say instead if I read "4 - 3?" *(Write out 4 - 3)* Or how would I read it to someone who doesn't know what the minus symbol means? 4 take away 3! That's right, when we're subtracting we're taking away. If we draw out 4-3 we would draw 4 circles, then take away 3 of them. The minus sign means "take away."

Let's Talk (Slide 4): You've probably seen this sign before. **What do you know about this symbol?** *(Allow students to share ideas.)* That's right, this is the multiplication symbol. Just like the symbols on the slide before, this symbol also has a name and a meaning. It's called the "times" sign. And guess what? You actually already know its meaning, we've been learning it the past two days. It means "groups of!" Over the past two days, every time we've used "groups of" language, drawn a picture using "groups of" or even used repeated addition to represent equal groups, we've actually been doing multiplication! Whenever we use equal groups to find the total, we are multiplying, let me show you.

Let's Think (Slide 5): We know that equal groups means that we have the same number in each group. We can represent equal groups using a picture, using *groups of* language, or using repeated addition. And today, we're going to explore how we use the multiplication sign to represent equal groups. Watch me.

I want to represent 2 x 4 using words. We just learned that the X means groups of. So I can read this as, "2 times 4" or instead of "times," I can say "groups of!" So, "2 groups of 4"...and we've already been learning all about using that "groups of" language. So, I'm going to take each number or symbol and rewrite it as a word that has the same meaning.

 I see the number 2 (*point to the number*) and I'm going to write that as a word. Two, t-w-o (*write as you narrate*), two. Do you see how both the word and the digit represent the number 2. They look different but have the same meaning, that's what a representation is, showing it differently, but keeping the meaning the same.
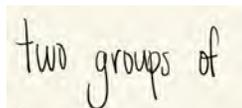
 Next I need to rewrite this symbol (*point to the times symbol*) as words. Do you remember what this symbol means? Groups of! Correct it means groups of. So I have (*point to the "2 x"*) 2 GROUPS OF. I'm going to write the words "groups of" next to my word two.

 Finally, I see the number 4 (*point to the number*) and I'm going to write that as a word. Four, f-o-u-r (*write as you narrate*), four.

Let's see. My original number sentence says 2 times 4. I know that times really means "groups of." So 2 x 4 really means 2 groups of 4. I've written a sentence in words that is the same as my multiplication number sentence. Now I need to represent 2 x 4 with a model. So I need to model 2 groups of 4, or 2 groups with 4 in each group.

With Pictures –
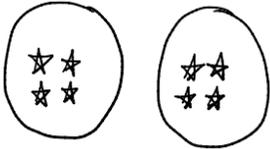
I'm going to begin by drawing 2 large groups because it says TWO GROUPS (*point to "2x"*). Here's one group… and two groups. They're both big enough to fill with objects. Next, I'm going to put 4 in each group because I need GROUPS OF FOUR (*point to the "x 4."*) Help me count 4 stars in each group. Ready, 1, 2, 3, 4… 1, 2, 3, 4. I have 2 groups (*point*). There are 4 in this group and 4 in this group. So I have 2 groups of 4, just like my multiplication number sentence says and just like my sentence with words says.

With Repeated Addition –

4 + 4

Now I need to show 2 x 4 as repeated addition. Do you remember what 2 x 4 really means? 2 groups of 4. Right, we need to show 2 groups of 4 with repeated addition. 2 groups of 4 means I need to add 2 fours. Here's 1 four (*write 4*), AND (*write plus sign*), here's another four (*write 4*). Let me check, I need 2 groups, I have a group here (*point to first 4*) and a group here (*point to second 4*). My repeated addition represents 2 groups of 4.

Look! We just learned another way to represent equal groups! All three of these show 2 groups of 4. One way is to use "groups of" language, another way is to draw a model or a picture, another way is repeated addition and finally we learned that we can use the multiplication symbol! In multiplication, when we find the total, we can call the total the product. So, let's figure out what the product of 2x4…pick a strategy and say the total. It's 8! That's right, so the product of 2x4 is 8!

Let's Think (Slide 6): I'm going to show you another one and you can even call out the answers or steps if you know what I should do next. It says to represent 3 groups of 5. First it wants me to do it with a multiplication number sentence. I know if I'm writing a multiplication number sentence, I need to use the multiplication symbol. Do you remember what the multiplication symbol was called? Times. Correct, it's called times! Do you remember what the symbol means? Groups of!

With number sentence –

3 x 5

Now I'm ready to write my multiplication number sentence for 3 groups of 5. I'm going to write 3 because there are THREE GROUPS (*point to the 3*). Next I'm going to write the times symbol to represent GROUPS OF (*point to "groups of"*). Finally I'm going to write 5 since there are groups OF FIVE (*point to the 5*). 3 x 5 is the same as 3 groups of 5.

With Pictures –
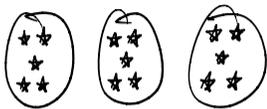
Now I'm going to draw my model to represent 3 groups of 5. . I'll start by drawing 3 groups because it says THREE GROUPS. One large group…two large groups…three large groups. Next, I'll draw 5 stars in each group because it says groups OF FIVE. Count with me: 1, 2, 3, 4, 5… 1, 2, 3, 4, 5… 1, 2, 3, 4, 5. There are 5 stars in every group. Let me check, I have 3 groups, 1, 2, 3, and there are 5 in every group, 5, 5, 5. My picture shows 3 groups of 5 just like my multiplication sentence and the sentence with words.

With Repeated Addition

5 + 5 + 5

Now I need to show 3 groups of 5 as repeated addition. Since I have groups of 5, I know I'll be repeating 5 again and again. Do you know how many 5s I'll add together to represent 3 groups of 5? 3! Correct, I'll need 3 fives since there are 3 groups. So I'll have one 5 and another 5 and another 5. I know I can use the plus sign to represent "and." So I'll have 5 + 5 + 5. This group is 5, this group is 5 and this group

is 5 (*point*). My repeated addition sentence shows 3 groups of 5, just like my model, multiplication sentence and sentence with words.

Finally, let's find the total, or product, or 3x5. Pick a strategy to find the total. So, what's 3x5? 15! That's right, the product of 3x5 is 15!

Let's Try It (Slide 8): Now let's try representing our equal groups as multiplication together. Remember, our multiplication symbol is called the "times" sign and it means "groups of." Whenever we use equal groups to find the total, we're multiplying. That's true whether we use a picture, words, multiplication or repeated addition. And remember, you always find the total in multiplication whether you use a model, repeated addition or the times sign. In multiplication, there's a special word for the total, it's called the product. You'll see that word on your worksheet today. Just know when it says "product," they mean total.

WARM WELCOME

Today we will understand "groups of" language as multiplication.

In math, symbols have a meaning:

+ is called the _____ sign, it means _____

— is called the _____ sign, it means _____

Let's Talk:

What do you know about this symbol?

_____ X _____

X is called the _____ sign, it means _____

Represent **2 x 4**

With words -

With pictures -

With repeated addition -

Represent **3 groups of 5**

With a multiplication number sentence -

With pictures -

With repeated addition -

Let's Try It:

Directions: Fill in the table with the correct representation.

Multiplication	Picture	Words	Product
5 x 6			
3 x 7			
		8 groups of 4	
		4 groups of 2	
	(picture of dots)		
	(picture)		

Multiplication	Picture	Words	Product
6 x 3			
		5 groups of 3	
	(picture of dot groups)		

Directions: Use a model or repeated addition to solve the word problem below.

The bus has 7 rows. There are 5 seats in each row. How many seats does the bus have?

Product: _____

Bonus: What are you looking for when you solve a multiplication sentence?

_____

On your Own:

Remember: Use a model or repeated addition to solve each problem.

1. Write the multiplication sentence in words, then find the product.

4 x 2

Words:

_____

Product: _____

2. Write the words as a multiplication sentence, then find the product.

6 groups of 5

Multiplication Sentence:

_____

Product: _____

3. Write the repeated addition sentence as a multiplication sentence, then find the product.

3 + 3 + 3 + 3 + 3 + 3 + 3

Multiplication Sentence:

_____

Product: _____

4. Represent the picture as a multiplication sentence, then find the product.

(picture of dots)

Multiplication Sentence:

_____

Product: _____

Directions: Fill in the table with the correct representation.

Multiplication	Picture	Words	Product
5 x 6			
3 x 7			
		8 groups of 4	
		4 groups of 2	

Multiplication	Picture	Words	Product
6 x 3			
		5 groups of 3	
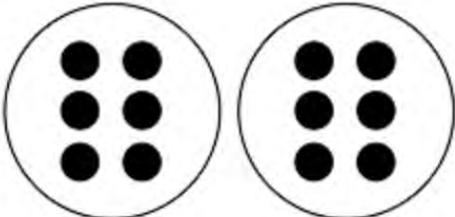
Directions: Use a model or repeated addition to solve the word problem below.

The bus has 7 rows. There are 5 seats in each row. How many seats does the bus have?

Product: _____

_____

Bonus: What are you looking for when you solve a multiplication sentence?

_____

Remember: Use a model or repeated addition to solve each problem.

1. Write the multiplication sentence in words, then find the product.

4 x 2

Words:

_____

Product: _____

---

2. Write the words as a multiplication sentence, then find the product.

6 groups of 5

Multiplication Sentence:

_____

Product: _____

---

3. Write the repeated addition sentence as a multiplication sentence, then find the product.

$$3 + 3 + 3 + 3 + 3 + 3 + 3$$

Multiplication Sentence:

_____

Product: _____

---

4. Represent the picture as a multiplication sentence, then find the product.

Multiplication Sentence:

_____

Product: _____

Directions: Fill in the table with the correct representation.

Multiplication	Picture	Words	Product
5 x 6		5 groups of 6	30
3 x 7		3 groups of 7	21
8 x 4		8 groups of 4	32
4 x 2		4 groups of 2	8
4 x 6		4 groups of 6	24
6 x 2		6 groups of 2	12
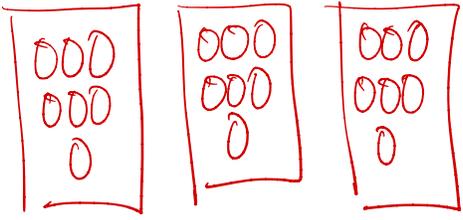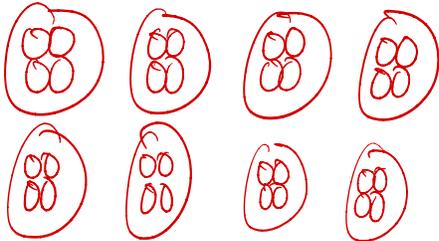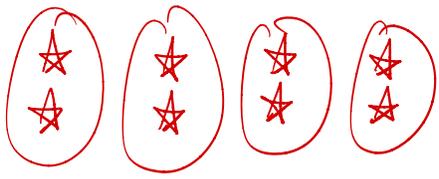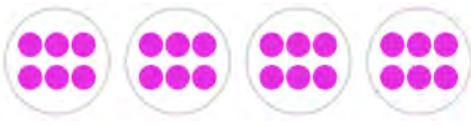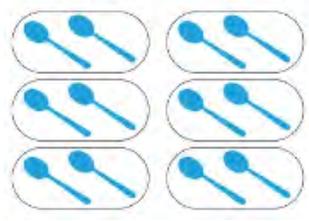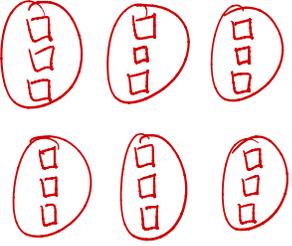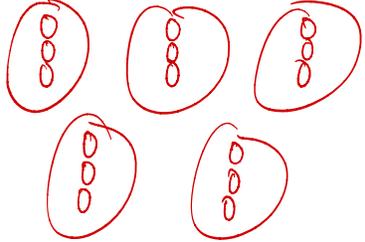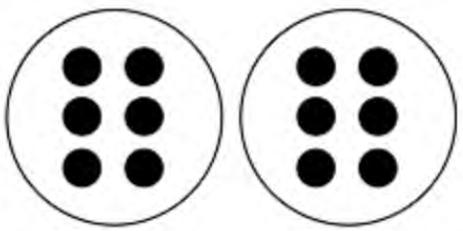
Multiplication	Picture	Words	Product
6 x 3		6 groups of 3	18
5 x 3		5 groups of 3	15
2 x 6		2 groups of 6	12

Directions: Use a model or repeated addition to solve the word problem below.

The bus has 7 rows. There are 5 seats in each row. How many seats does the bus have?

5 5 5 5 5 5 5

10   10   10   15   20
                                + 15
   35   20   15   35

Product: 35

Bonus: What are you looking for when you solve a multiplication sentence?

The total

Name: _____

Remember: Use a model or repeated addition to solve each problem.

1. Write the multiplication sentence in words, then find the product.	**2.** Write the words as a multiplication sentence, then find the product.

1. Write the multiplication sentence in words, then find the product.

4 x 2

$2 + 2 + 2 + 2$

4   4

8

Words:

4 groups of 2

Product: 8

2. Write the words as a multiplication sentence, then find the product.

6 groups of 5

$5 + 5 + 5 + 5 + 5 + 5$

10   10   10

20

20
+10
30

Multiplication Sentence:

6 x 5

Product: 30

3. Write the repeated addition sentence as a multiplication sentence, then find the product.

$3 + 3 + 3 + 3 + 3 + 3 + 3$

6   6   6   9

18

18
9
+
27

Multiplication Sentence:

7 groups of 3

Product: 27

4. Represent the picture as a multiplication sentence, then find the product.

Multiplication Sentence:

3 x 5

Product: 15

G3 U1 Lesson 4

Relate multiplication to the array model

G3 U1 Lesson 4 - Students will relate multiplication to the array model

==Warm Welcome (Slide 1):== Tutor choice

==Frame the Learning/Connect to Prior Learning (Slide 2):== We've learned so many different ways to show and solve multiplication. Let's take a couple minutes to review what we've learned.

==Let's Review (Slide 3):== **Let's list together everything we've learned about multiplication.** You go first, and I'll add anything you may forget. Possible Student Answers/Key Points:
- Multiplication uses equal groups.
  - Equal groups are groups with the same amount in each group.
  - We can show equal groups with a picture.
  - We can show equal groups with repeated addition.
- Multiplication finds the total.
  - We can find the total by counting.
  - We can find the total faster by using repeated addition.
- In multiplication, the total is called the "product."
- The multiplication symbol is called, "times;" it means "groups of."

Correct, we know all these things about multiplication. What I noticed is you named a bunch of ways to "represent" multiplication. We can do it with a picture of equal groups, repeated addition, and the times symbol. Today I'm going to show you another way to represent or show multiplication.

==Let's Talk (Slide 4):== These figures are called "arrays." You may have seen them before in second grade. The rows in an array go from side to side *(show movement)*. You try tracing some of the rows with your finger. **What do you notice about each array?** Possible Student Answers/Key Points:
- Each row is the same.
- Each row is equal.
- The number of squares in each row is equal/the same.

Yes, each row in the array has the same number of squares in it! The first array has 3 rows with 4 in each row. Let's look at the array in the middle. Let's count the squares in each row out loud together: 1, 2, 3, 4, 5, 6… 1, 2, 3, 4, 5, 6… 1, 2, 3, 4, 5, 6… 1, 2, 3, 4, 5, 6. This array had 4 rows with 6 in each row.

Let's look at the last array on the right. Let's see if all the rows have the same number of squares. Count out loud with me: 1, 2… 1, 2… etc. How many squares were in each row? 2! This array had 8 rows with 2 in each row. It is true. Each row in an array is equal. The number of squares is the same in each row. What else have we been learning about where "each has the same amount"? Equal groups!

Right, we've spent the last 3 days showing equal groups with models, repeated addition and the times symbol. The rows in an array are just like the groups in our models because they are equal. Each row has the same number of squares just like each of our groups has the same number of circles/objects. We can use arrays as another way to represent multiplication since their equal rows are the same as equal groups.

==Let's Think (Slide 5):== Here we have one of the arrays from the previous slide. I'm going to represent it as a multiplication number sentence, with words and as repeated addition. Since I'm still getting used to using an array, I'm going to do something to make it more familiar.
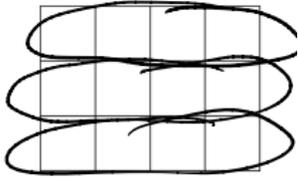
I'm going to circle each row. I'm going to start at the beginning of the row and circle all the way to the end. Now I'm going to do it again for my second row and again for my third row. Now my rows look even more like groups and each group is full of squares. Let's point and count how many rows there are: 1 row, 2 rows, 3, rows. How many rows/groups do you see? 3 rows/groups. Correct, I circled 3 rows. Let's see how many are in each row. Let's count them out loud together. 1, 2, 3, 4... 1, 2, 3, 4... 1, 2, 3, 4. How many are in each row? 4 squares in each row. Correct, there are 3 rows of 4. Now I'm ready to complete my other representations.

I need to write a multiplication sentence. We just said there are 3 rows of 4. I don't have a symbol for "rows of." However, we said earlier that rows are just like groups. So, 3 rows of 4 is the same as 3 groups of 4. I know how to write 3 groups of 4 as a multiplication sentence.

I start with 3 because there are THREE rows or groups. The symbol for "groups of" is the times symbol. Finally there are FOUR in each group, 1, 2, 3, 4...1, 2, 3, 4...1, 2, 3, 4 *(point to each square as you count).* There are 3 *(point to each group)* groups of 4 *(run your finger over a row)* in my array. So this array shows 3x4.

Now I need to represent my array with words. Let's look back at our array. How many groups do we have? Point to them and count them out loud. 1, 2, 3...3 groups. Correct, there are 3 groups. I'm going to write three groups in words. How many are in each group? Point to them and count them out loud. 1, 2, 3, 4...1, 2, 3, 4...1, 2, 3, 4. So, 4 in each group. Correct, there are 4 in each group. I'm going to add on "of four," since each group has 4.

Finally, I'm going to represent my array with repeated addition. I see 4 in each row. There are 4 and 4 and 4. I know I can use the plus sign to show "and." So I have 4 + 4 + 4. My number sentence has 3 fours and my array has 3 rows of 4.

Let's Think (Slide 6):   This time I'm starting off with words and I have to represent them as an array, multiplication sentence and repeated addition. We've never drawn an array before and they can be tricky. I need to represent 8 groups of 2 with an array. I know rows and groups are the same. I also know with an array I use rows and I have to have the same number in each row.

If I have 8 groups of 2, how many are in each row or group? 2! Yes, that means each row has to be a row of 2! I'll start with a row of 2… 1, 2. I put 2 circles in a row, just like the arrays put squares in a row.

I only have 1 row here, how many rows am I supposed to have? 8 rows. Yes, 8 rows just like 8 groups! I need to draw more rows of 2. So I'm going to draw another row of 2…until I have 8 rows. Whew, now I have 8 rows or groups of 2. Let me check, 1, 2, 3, 4, 5, 6, 7, 8…8 rows and there are 2 in each row. Now I know you may be thinking, that's not an array, since it looks different from the other pictures. But it is an array. Arrays just need neat rows and the same amount in each row. We did that, so this is an array. It's also a lot easier to draw this kind of array instead of the other kind. Now let's finish the rest of this one.

8×2

Now, we need to write a multiplication sentence to represent 8 groups of 2. Well, we know the "groups of" symbol is the times sign. So I have EIGHT *(write 8)*, groups of *(write times sign)*, 2 *(write 2)*.

$2 + 2 + 2 + 2 + 2 + 2 + 2 + 2$

Finally we need to write our repeated addition number sentence. We're representing 8 groups of 2. That's going to be a lot of twos, let's make sure we keep track *(narrate as you write)*. Let's see, I needed 8 groups…1, 2, 3, 4, 5, 6, 7, 8 and each group has two…2, 2, 2, 2, 2, 2, 2, 2.

Let's Try It (Slide 8): Now let's work on using arrays to multiply together. Remember arrays are just like our equal groups pictures because each row has the same number in it.

WARM WELCOME

Today we will relate multiplication to the array model.

53

What have we learned so far about multiplication?

💬 Let's Talk:

What do you notice about each array?
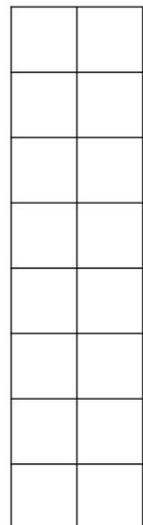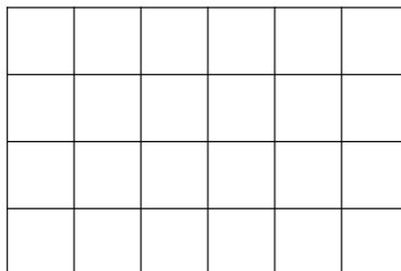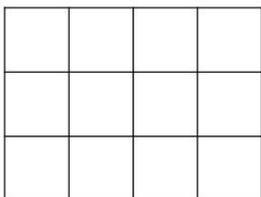
Let's Think:

Represent
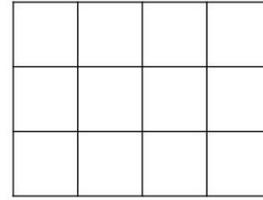
With a multiplication sentence -

With words -

With repeated addition -

Let's Think:

Represent **8 groups of 2**

With an array -

With multiplication sentence -

With repeated addition -

Let's Try It:

Directions: Fill in the table with the correct representation.

Array	Repeated Addition	Words	Multiplication	Product
(array of dots)				
	5 + 5 + 5			
		4 groups of 4		
			3 x 6	

Directions: Write a repeated addition and multiplication sentence to represent the array below.

Repeated Addition: _____   Multiplication: _____

Directions: Solve the story problem below. Use an array to help you solve.

Ms. Crews is setting up her classroom for the school year. She decides to arrange the desks into 7 rows. She puts 3 desks in each row.

a. Draw a picture of what Ms. Crews's classroom will look like.

b. How many students will Ms. Crews have in her class this year? _____

Bonus:
Why can you use arrays for multiplication?

On your Own:

Remember: Use a model or repeated addition to solve each problem.

1. Represent the array with words, then find the product.

Words:

_____

Product: _____

2. Represent the array with a multiplication sentence, then find the product.

Multiplication Sentence:

_____

Product: _____

3. Draw an array to represent the repeated addition sentence below. Then find the total.

6 + 6 + 6

Product: _____

4. Draw an array to represent the multiplication sentence below. Then find the total.

3 x 3

Product: _____

Directions: Fill in the table with the correct representation.

Array	Repeated Addition	Words	Multiplication	Product
	5 + 5 + 5			
		4 groups of 4		
			3 x 6	

Directions: Write a repeated addition and multiplication sentence to represent the array below.

Repeated Addition: _____   Multiplication: _____

Directions: Solve the story problem below. Use an array to help you solve.

Ms. Crews is setting up her classroom for the school year. She decides to arrange the desks into 7 rows. She puts 3 desks in each row.

    a. Draw a picture of what Ms. Crews's classroom will look like.

    b. How many students will Ms. Crews have in her class this year? _____

Bonus:

Why can you use arrays for multiplication?

Remember: Use a model or repeated addition to solve each problem.

1. Represent the array with words, then find the product. **Words:** _____ **Product:** _____	**2.** Represent the array with a multiplication sentence, then find the product. **Multiplication Sentence:** _____ **Product:** _____
3. Draw an array to represent the repeated addition sentence below. Then find the total. **6 + 6 + 6** **Product:** _____	**4.** Draw an array to represent the multiplication sentence below. Then find the total. **3 x 3** **Product:** _____

Directions: Fill in the table with the correct representation.

Array	Repeated Addition	Words	Multiplication	Product
	4 + 4 + 4 + 4 + 4	5 groups of 4	5 x 4	20
	5 + 5 + 5	3 groups of 5	3 x 5	15
	4 + 4 + 4 + 4	**4 groups of 4**	4 x 4	16
	6 + 6 + 6	3 groups of 6	**3 x 6**	18
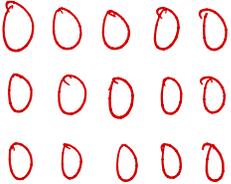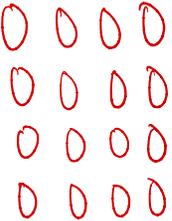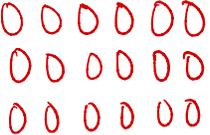
Directions: Write a repeated addition and multiplication sentence to represent the array below.
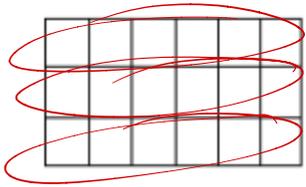
Repeated Addition: _6+6+6_

Multiplication: _3×6_

Directions: Solve the story problem below. Use an array to help you solve.

Ms. Crews is setting up her classroom for the school year. She decides to arrange the desks into 7 rows. She puts 3 desks in each row.

a. Draw a picture of what Ms. Crews's classroom will look like.

O O O
O O O
O O O
O O O
O O O
O O O
O O O

b. How many students will Ms. Crews have in her class this year? _21_

Bonus:

Why can you use arrays for multiplication?

The rows are the same as equal groups because every row has the same amount of squares.

Remember: Use a model or repeated addition to solve each problem.

1. Represent the array with words, then find the product.	**2.** Represent the array with a multiplication sentence, then find the product.

1. Represent the array with words, then find the product.
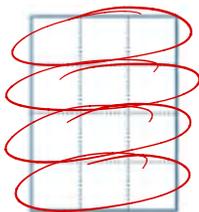
Words:

4 groups of 3

Product: 12

2. Represent the array with a multiplication sentence, then find the product.

Multiplication Sentence:

2 × 10

Product: 20

3. Draw an array to represent the repeated addition sentence below. Then find the total.

6 + 6 + 6

O O O O O O
O O O O O O
O O O O O O
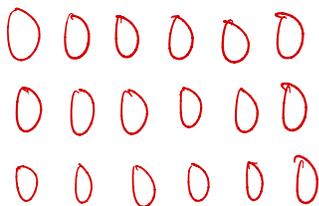
Product: 18

4. Draw an array to represent the multiplication sentence below. Then find the total.

3 x 3

O O O
O O O
O O O

Product: 9

G3 U1 Lesson 5
Split numbers to multiply

G3 U1 Lesson 5 - Students will split numbers to multiply

Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): We've spent the past few days learning how to multiply. First we learned to multiply using a model and then we learned repeated addition as a more efficient way to also multiply. Let's quickly review all that we know about multiplying.

Let's Review (Slide 3): Try to fill in each blank with all you know about multiplication.

Let's Talk (Slide 4): In first and second grade, you learned how to break numbers into parts. **What are some ways you can break up the number 8?** Possible Student Answers/Key Points:
- 1 and 7
- 2 and 6
- 3 and 5
- 4 and 4
- 3 and 3 and 2

Correct, each time you broke up the number 8, you split it up into smaller numbers. However, your smaller numbers together, were always equal to 8. Never more, never less. Even though you used different numbers, it was still always 8. Today we will be splitting up numbers to multiply. Just like you did with 8, it's important to remember that our split up parts must be equal to our original whole.

Let's Talk (Slide 5): As you've been learning to multiply, I'm sure you're starting to memorize some of the multiplication facts better than others. For example, it's easier to memorize the 2s facts because they're just like the doubles facts we learned in 1st and 2nd grade. It's also easier to figure out the 5s and 10s facts since you can skip count by 5s and 10s to solve them.

But there are still some facts that are hard to remember and also hard to solve because they're so big. It can take a really long time to draw out their models or finish solving their repeated addition. Today I'm going to show you how to split up bigger facts into smaller facts that are easier to solve. Let's start with a fact like 4 x 6. It's not a huge fact, but it might not be a fact you already have memorized.

What does 4 x 6 mean in words? 4 groups of 6. Correct, 4 x 6 really means 4 groups of 6.

 I'm going to start by drawing 4 groups of 6 quickly. I'm going to draw 4 groups. Then I'm going to put 6 in each group. I'm going to use the number to make it faster. So, now I have 4 groups of 6.

Now I don't know how much 4 groups of 6 is because I don't know my 4 facts really well. I'm going to split up my 4 groups the same way we split up those 8 circles. If I split them into smaller facts, I might be able to solve them more easily. I know I can split 4 up into 1 and 3. I can also split it up into 2 and 2.
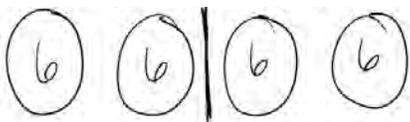
 I'm going to split up my 4 groups into 2 groups here and 2 groups here *(draw line to show splitting of groups).* The reason I'm going to do this is because now, instead of 4 groups of 6, I have 2 groups of 6 and another 2 groups of 6 *(point).* I know my 2s facts because they're just like my doubles facts! Before we solve, let's take a closer look at what I did.

Did I add any more groups after I drew my 4 groups of 6? No. No, I still have 1, 2, 3, 4 *(point)*, 4 groups. Did I add anymore in each group? No. No, I still have 6 in each group. All I did was change how we look at our 4 groups of 6. Now, let's see how much easier it is so solve this fact.
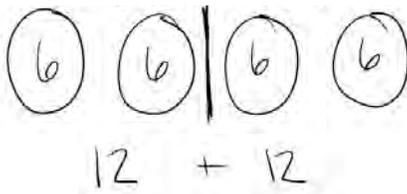
I know 2 x 6 is 12 because I know 6 + 6 is 12! So I have 12 over here and 12 over here. Now all I have to do is add 12 + 12. And, 12 + 12 is 24. So, 4 groups of 6 is equal to 24.
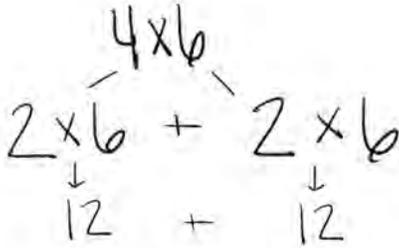
Let's write an equation that represents what we just did. We began with 4 groups of 6, which we can write as 4 x 6. Then we broke up our 4 groups of 6 into 2 groups of 6 and another 2 groups of 6. I know I can write 2 groups of 6 as 2 x 6. I know I can write "and" using the plus sign. So 2 groups of 6 and 2 groups of 6 is 2 x 6 + 2 x 6. Then we knew 2 x 6 was 12, so we had 12 and 12. Finally we added 12 and 12 and got our answer of 24. Now we have an equation that shows the work we did with our model.

We took a fact that we didn't know. We split up the groups in a way that formed smaller facts we did know. We solved our smaller facts. Then we put together their products and got the answer to the bigger fact we started with. This can be really tricky. Let's try another.

<mark>Let's Think (Slide 6):</mark> Let's solve 15 x 3. Now I definitely don't know my 15s facts. But I can split 15 up into facts I do know.
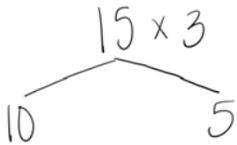
I'm going to split up 15 using the biggest fact that I know really well, 10 and 5. I know my 10s facts well because I can skip count by 10s. So, 10 and 5 make 15, I'm going to show that using my extra wide number bond.
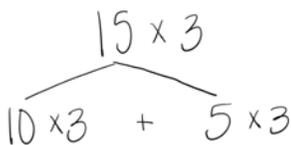
I split my 15 groups into 10 groups and 5 groups. I started with 15 groups OF THREE. That means my 10 groups will have how many in each group? 3. Correct, 3. How many will be in each of my 5 groups? Also 3. Correct, the number in each group does not change. I split my 15 groups of 3 into 10 groups OF THREE *(write x3)* and 5 groups OF THREE *(write x3)*.
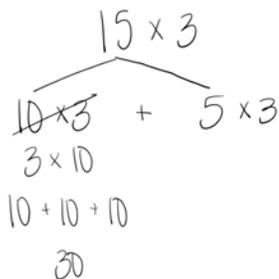
Now, I split my 15 groups this way because I know my 10s facts really well. I know 10 groups of 3 is the same as 3 groups of 10 *(cross out 10 x 3 and replace it with 3 x 10)*. And, 3 groups of 10 means 3 tens. That means 10 and 10 and 10 *(write 10 + 10 + 10 as you narrate)*. That's easy, skip count by 10s with me: 10, 20, 30 *(point as you count)*.

$$15 \times 3$$

$$10 \times 3 \quad + \quad 5 \times 3$$
$$3 \times 10 \qquad 3 \times 5$$
$$10 + 10 + 10 \qquad 5 + 5 + 5$$
$$30 \qquad\qquad 15$$

I'm going to do the same thing on the right side. I'm going to switch my 5 groups of 3 to 3 groups of 5 since I can skip count groups of 5 *(cross out 5 x 3 and write 3 x 5)*. And, 3 groups of 5 is just 5 and 5 and 5 *(write as you narrate)*. Now I can skip count by 5s, count with me…5, 10, 15*!* So, 5x3 is 15.

$$30$$
$$+ \ 15$$
$$\overline{(45)}$$

Now I just need to add my two small totals to get my big total. I need to add 30 and 15 since those are the two parts of 15 that I split up. So, 30 + 15 is 45. 15 x 3 is 45. Wow, we just solved a huge multiplication fact using smaller facts we know!

Let's Try It (Slide 8): Let's try some together now. Remember, we can only split up the groups. We can't change how many are in each group or the total number of groups. That would end up changing our answer.

WARM WELCOME

Today we will split numbers to multiply.

↻ Let's Review:

- Multiplication uses _____ groups.
- We use multiplication to find the _____.
- The times symbol means _____.
- The addition symbol means _____.

💬 Let's Talk:

What are all the ways you can break up the number 8?
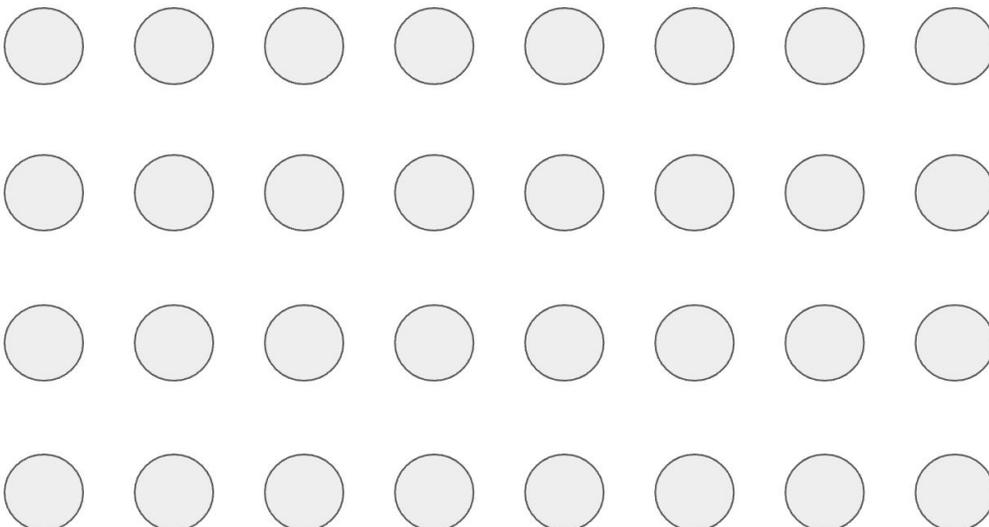
○ ○ ○ ○ ○ ○ ○ ○

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Let's Talk:

Using facts you know, to solve facts you don't know.
4 x 6

Let's Think:

15 x 3

Let's Try It:

Name: _____   G3 Lesson 1-5 Let's Try It

Directions: Solve each multiplication problem by splitting the groups first into smaller facts.

1. 3 x 9 = _____	2. 4 x 5 = _____
3. 5 x 8 = _____	4. 6 x 7 = _____

Directions: Solve each multiplication problem by splitting the groups first into smaller facts.

5. 10 x 4 = _____	6. 7 x 5 = _____
7. 11 x 4 = _____	8. 12 x 6 = _____

When split facts to multiply, what must stay the same?

_____

On your Own:

Name: _____   G3 Lesson 1-5 Independent Work

Remember: Solve each problem by first splitting up the groups. Then use a model or repeated addition if it helps.

4 x 7 = _____
12 x 9 = _____

Directions: Solve each multiplication problem by splitting the groups first into smaller facts.

1. 3 x 9 = _____

2. 4 x 5 = _____

3. 5 x 8 = _____

4. 6 x 7 = _____

Directions: Solve each multiplication problem by splitting the groups first into smaller facts.

5. 10 x 4 = _____	6. 7 x 5 = _____
7. 11 x 4 = _____	8. 12 x 6 = _____

When split facts to multiply, what must stay the same?

_____

Remember: Solve each problem by first splitting up the groups. Then use a model or repeated addition if it helps.

4 x 7 = _____

12 x 9 = _____

Directions: Solve each multiplication problem by splitting the groups first into smaller facts.

1. 3 x 9 = __27__

$1 \times 9 \quad + \quad 2 \times 9$

$9 \quad + \quad 18$

$\begin{array}{r} 18 \\ 9 \\ + \\ \hline 27 \end{array}$

2. 4 x 5 = __20__

$2 \times 5 \quad + \quad 2 \times 5$

$10 \qquad 10$

20

3. 5 x 8 = __40__

$2 \times 8 \quad + \quad 3 \times 8$

$16 \qquad 8 + 8 + 8$

16

$\begin{array}{r} 16 \\ + 8 \\ \hline 24 \end{array}$

$\begin{array}{r} 24 \\ + 16 \\ \hline 40 \end{array}$

4. 6 x 7 = __42__

$2 \times 7 \qquad 4 \times 7$

$14 \qquad 7 + 7 + 7 + 7$

$14 \qquad 14$

$\begin{array}{r} 14 \\ + 14 \\ \hline 28 \end{array}$

$\begin{array}{r} 28 \\ + 14 \\ \hline 42 \end{array}$

74

Directions: Solve each multiplication problem by splitting the groups first into smaller facts.

5. 10 x 4 = __40__

5×4 5×4
20   20

$$\begin{array}{r} 20 \\ + 20 \\ \hline 40 \end{array}$$

6. 7 x 5 = __35__

2×5 5×5
10   25

$$\begin{array}{r} 25 \\ + 10 \\ \hline 35 \end{array}$$

7. 11 x 4 = __44__

1×4 + 10×4
4   40

8. 12 x 6 = __72__

2×6 + 10×6
12   60

$$\begin{array}{r} 60 \\ + 12 \\ \hline 72 \end{array}$$

When split facts to multiply, what must stay the same?

The total number of groups and the number in each group.

Remember: Solve each problem by first splitting up the groups. Then use a model or repeated addition if it helps.

4 x 7 = _28_

2 × 7   +   2 × 7

14   14

$$\begin{array}{r} 14 \\ +\ 14 \\ \hline 28 \end{array}$$

12 x 9 = _108_

2×9   ~~10×9~~

18   9 × 10

10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10

90

$$\begin{array}{r} 18 \\ +\ 90 \\ \hline 108 \end{array}$$

G3 U1 Lesson 6
Model partitive division

G3 U1 Lesson 6 - Students will model partitive division

Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): We're going to continue our multiplication and division unit today. However, today we'll be moving on to division. Multiplication and division go together the same way addition and subtraction do, which is why we learn about them together. Addition and subtraction go together not because they're the same, but because they're opposites. Multiplication and division are also opposites.

Let's Talk (Slide 3): Before I start teaching you about division. I want to see what you know. **What do you think it means to divide?** Possible Student Answers, Key Points:
- If I'm dividing something with a friend, it means I'm breaking it into pieces.
- When I divide something, I make it smaller.
- When I divide something, I take things away to make groups.

Those are all interesting ideas! The word divide is related to the word division. Just like add is related to addition. Division is a kind of math where we divide or break apart a total into equal groups. That is why multiplication and division are related, because they both work with equal groups. We'll talk more about how they're related later. Right now, let's explore division more.

Let's Think (Slide 4): This example says, break apart 20 into 5 groups. In multiplication we have been talking about equal groups. And we just discussed that multiplication and division are related, so if multiplication uses equal groups, so does division. But, division is the opposite. So we aren't making 20 groups of 5. Instead, in division we start with the total and break it apart into equal groups. For example, maybe I have 20 cookies and I want to split them up onto 5 plates.
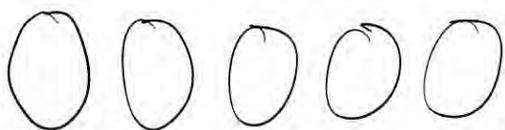
I'm going to start by drawing my groups. Just like when I multiply, I'm going to draw them big enough to fill with objects. I'm going to make them the same size because I know they will be equal. Count with me as I draw: 1 group, 2, groups, 3, groups, 4, groups, 5 groups.

Now I need to break apart 20, my total, into my groups EQUALLY. I'm thinking about the way I would pass out cards if we were playing a card game like uno. In order to make sure everyone gets the same amount of cards, I would pass out one card to every player until I ran out of cards. I can do the same thing here. I can pass out one square to each group until I run out of squares. I would run out at 20 since 20 is my total.

I'm going to draw one square in each group and as I do, I'm going to count out loud and stop when I get to 20. Help me count: 1, 2, 3, 4, 5 (*put 1 square in each group*). Each group has a square and each group has the same number of squares. Can we stop? No, we need to pass out 20 squares total, we only passed out 5. Got it, let's keep going (*continue counting up to 20, putting an object in each group as you go*).
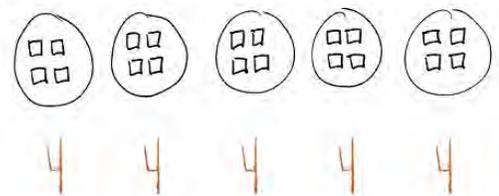
We passed out 20 squares into 5 equal groups. Let's figure out how many squares we ended up with in each group. Count with me…1, 2, 3, 4… 1, 2, 3, 4… (*continue*). How many squares are in each group? 4 squares in each group. Yes! We broke up 20 into 5 equal groups and there were 4 in each group. We just did division!

$$20 \div 5 = 4$$

Let's write our first division equation to show the work we did. In division we start with the total, so I'm going to write 20. The total was broken apart. The symbol to "break apart" is the division symbol, it looks like this *(write the division symbol)*. It doesn't have a fancy name. We broke apart 20 into 5 groups so I'll write 5. My number sentence shows 20 broken up into 5 groups.

Finally, I can finish this equation by writing the answer. We were able to figure out how many are in each group. We counted the number in each group to find the answer. There were 4 in each group so our answer is 4 *(write =4)*. My equation says 20 broken up into 5 groups is 4 in each group.

In division you start with the total and break it apart into equal groups. Today we're finding how many are in each group.

<mark>Let's Think (Slide 5):</mark> Let's try another. This one looks a little different. Over here, it says dividend. In division the dividend is the total that we're splitting into groups, like the 20 that we started with in our previous example.
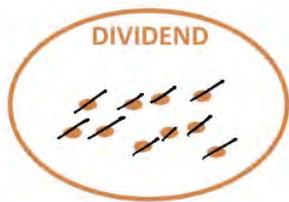
Let's count to see what our total is. I'm going to cross out each dot as I count it so I don't get confused and count it twice. Count with me …1, 2, 3, 4, 5, 6, 7, 8, 9, 10. Our total or our dividend is 10.
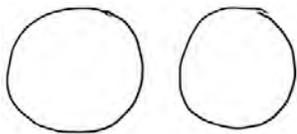
They want us to split our total, or our dividend, into 2 groups. If I'm thinking of this like cookies, I want to take these 10 cookies and split them onto two plates, one for me and one for my sister. Let's draw those…one group, two groups.
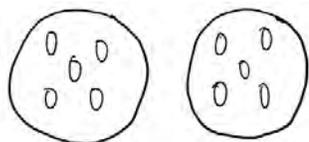
Next I'm going to break apart or divide my dividend into my groups equally by putting one in each group until I run out. I'll count out loud to help me know when I've reached my total. Count with me…1, 2…3, 4…5, 6…7, 8..9, 10. Okay, we've broken apart our total into 2 groups. Now we need to figure out how many are in each group. Count with me…1, 2, 3, 4, 5. 5 in each group. So, there are 5 in each group.

$$10 \div 2 = 5$$

Now I'm ready to write my equation. What does division always start with? The total. Right, we began with 10, so I'll start my equation with 10. Then what did we do with our total? We broke it apart, we split it into groups. Correct, we broke it apart. What's the symbol to show breaking apart into groups? The division symbol. Yes, we broke our total apart into 2 groups. I'm going to write 2 after the division symbol to show 2 groups. Finally what did we figure out? We figured out how many were in each group. Yes, we figured out how many were in each group. There were 5 in each group, so 5 is our answer. Now my equation shows, we began with 10 total, broke our total up into 2 equal groups, and ended up with 5 in each group.

<mark>Let's Talk (Slide 7):</mark> Now that you've learned how to multiply and divide. I want you to think about what you know about multiplication and what you learned about division today. **Let's discuss, how are multiplication**

and division related? What's the same about them? What's different? Possible Student Answers, Key Points:

- Both of them use equal groups.
- They're opposites or they undo each other.
- In multiplication you are making the groups and finding the total but in division you have the total and and the groups and you want to know how many are in each group.
- They use the same numbers but different symbols.

Multiplication and division are related because they both use a total and equal groups. In multiplication, we're told how many groups there are and how many are in each group. We use this information to find the total. However, in division we're given the total and today we were told how many groups there were. We used that information to find out how many are in each group. We'll continue exploring the relationship between multiplication and division in the remainder of our lessons.

<mark>Let's Try It (Slide 9):</mark> For the rest of today, let's try modeling division together on our worksheet. Remember to start with the total and split it into equal groups and then count how many are in each group. It's incredibly important we don't go past our total since our total represents all that we have.

WARM WELCOME

Today we will model partitive division.

What do you think it means to divide?

Let's Think:

Break apart 20 into 5 groups

Division Number Sentence: _____

DIVIDEND
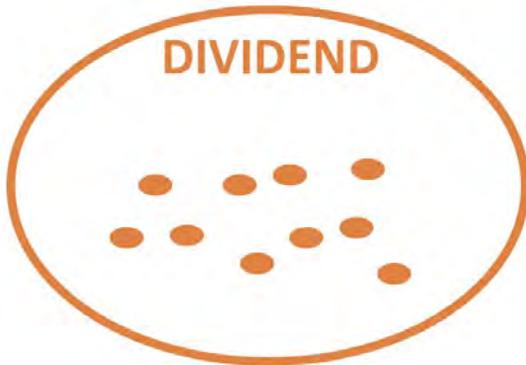
Make 2 groups.

Division Number Sentence: _____

Let's Review:

When we multiply, we _____ or _____ all the

pieces in the _____ groups, to find the _____.

Division is the inverse of multiplication.

| 3 x 5 = 15 | 15 ÷ 3 = 5 |

Let's Try It:

Name: _____   G3 Lesson 1-6 Let's Try It

Directions: Find how many are in each group by drawing a model. Make sure to model equal groups to find the correct answer.

1. Break apart 15 into 3 groups.

_____ in each group

2. Break apart 16 into 4 groups.

_____ in each group

3. Break apart 18 into 6 groups.

_____ in each group

4. Make 2 groups.

_____ in each group

5. Make 2 groups.

_____ in each group

6. Make 7 groups.

_____ in each group

7. 20 ÷ 4 =

_____ in each group

8. 18 ÷ 3 =

_____ in each group

9. 25 ÷ 5 =

_____ in each group

How are multiplication and division different?

_____
_____

How are multiplication and division similar?

_____
_____

On your Own:

Remember: Use a model to solve each problem.

1. Break 8 into 2 groups. Write an equation to match your model.	**2.** Make 7 groups.
____ ÷ ____ = ____	____ in each group
3. 24 ÷ 3 =	**4.** Write an equation to match the model below.
____ in each group	____ ÷ ____ = ____

Directions: Find how many are in each group by drawing a model. Make sure to model equal groups to find the correct answer.

---

1. **Break apart 15 into 3 groups.**

_____ in each group

---

2. **Break apart 16 into 4 groups.**

_____ in each group

---

3. **Break apart 18 into 6 groups.**

_____ in each group

---

4. **Make 2 groups.**

_____ in each group

---

5. **Make 2 groups.**

_____ in each group

---

6. Make 7 groups.

DIVIDEND

_____ in each group

7. 20 ÷ 4 =

_____ in each group

8. 18 ÷ 3 =

_____ in each group

9. 25 ÷ 5 =

_____ in each group

How are multiplication and division different?

_____

_____

How are multiplication and division similar?

_____

_____

Remember: Use a model to solve each problem.

1. **Break 8 into 2 groups. Write an equation to match your model.**

_____ ÷ _____ = _____

2.
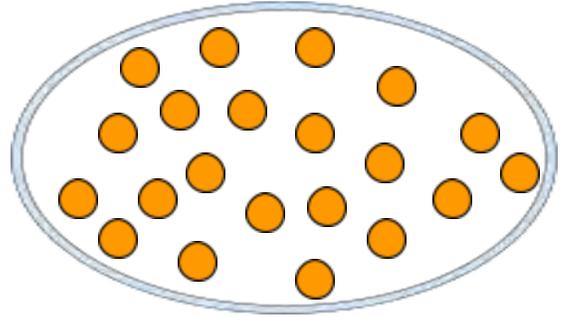
Make 7 groups.

_____ in each group

3. 24 ÷ 3 =

_____ in each group

4. Write an equation to match the model below.
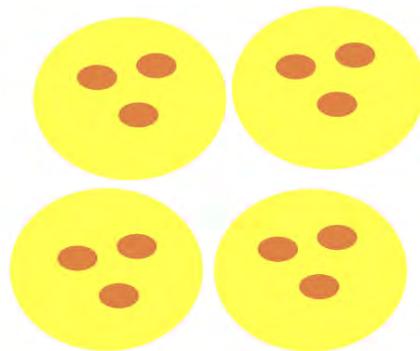
_____ ÷ _____ = _____

Directions: Find how many are in each group by drawing a model. Make sure to model equal groups to find the correct answer.

1. Break apart 15 into 3 groups.

____5____ in each group

2. Break apart 16 into 4 groups.
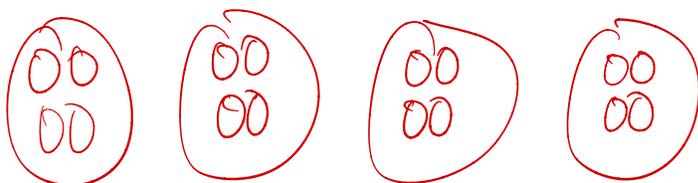
____4____ in each group

3. Break apart 18 into 6 groups.

____3____ in each group

4. Make 2 groups.

DIVIDEND
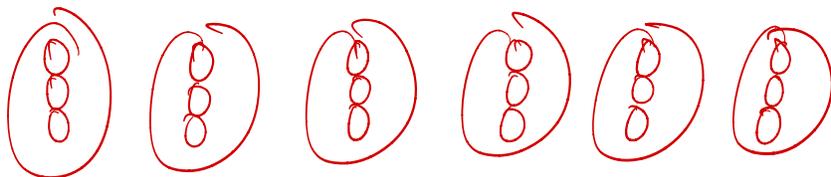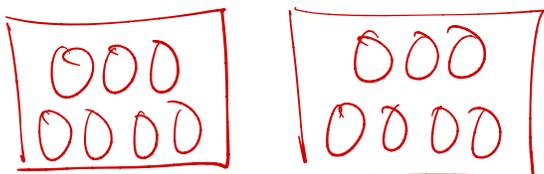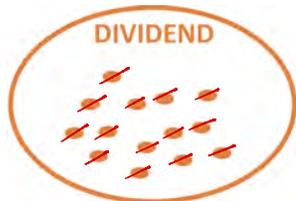
____7____ in each group

5. Make 2 groups.

DIVIDEND
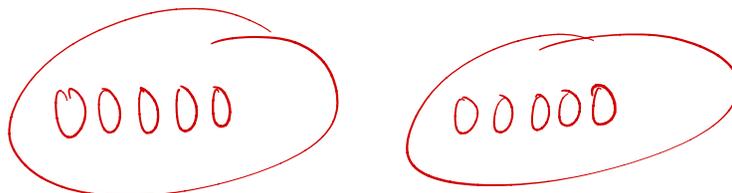
____5____ in each group

6. Make 7 groups.

DIVIDEND
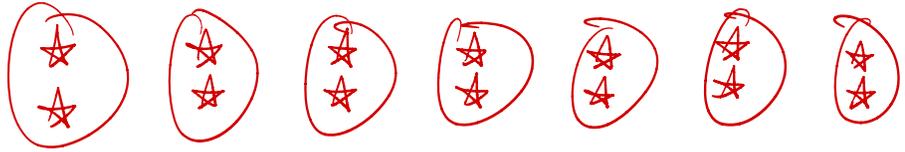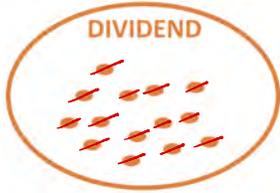
____2____ in each group

7. 20 ÷ 4 =
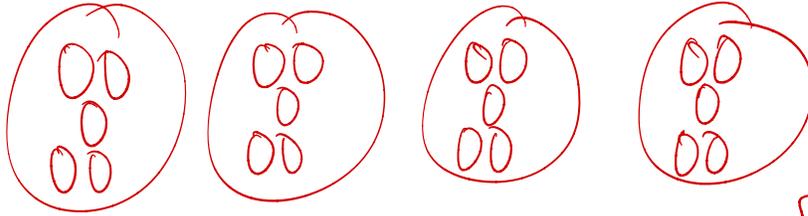
____5____ in each group

8. 18 ÷ 3 =

____6____ in each group

9. 25 ÷ 5 =
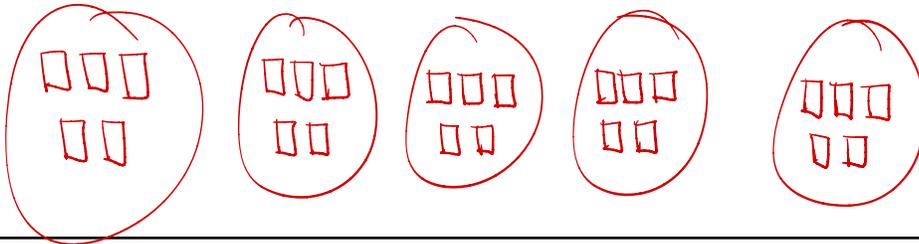
____5____ in each group

How are multiplication and division different?

Multiplication finds the total. Division breaks up the total.

_____

How are multiplication and division similar?

They both use equal groups.

_____

Remember: Use a model to solve each problem.

1. Break 8 into 2 groups. Write an equation to match your model.
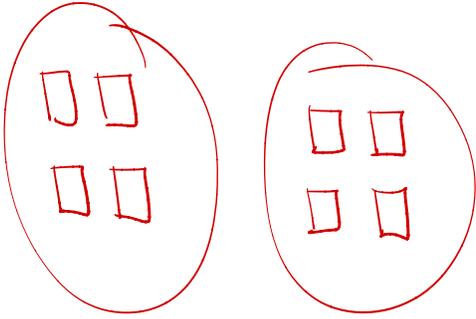
$$\_\_\_8\_\_\_ \div \_\_\_2\_\_\_ = \_\_\_4\_\_\_$$

2.
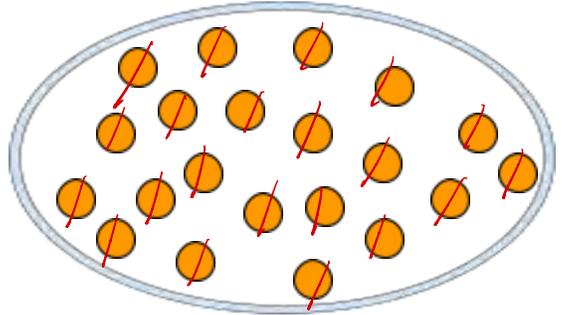
Make 7 groups.
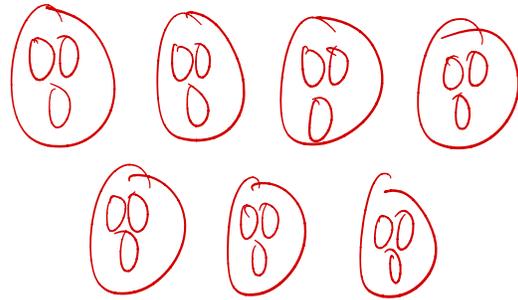
_____3_____ in each group

3. 24 ÷ 3 =
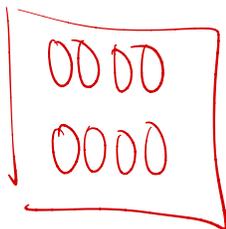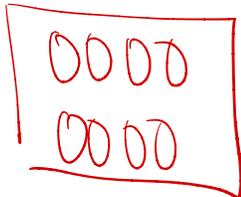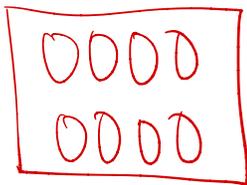
_____8_____ in each group

4. Write an equation to match the model below.
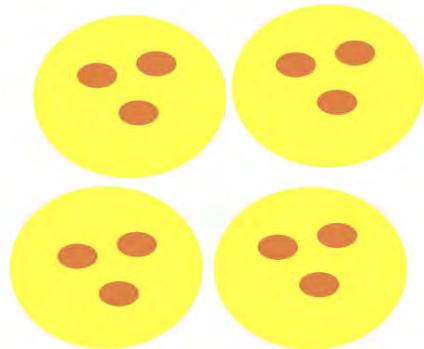
$$\_\_\_12\_\_\_ \div \_\_\_4\_\_\_ = \_\_\_3\_\_\_$$

G3 U1 Lesson 7

Model partitive division story problems

G3 U1 Lesson 7 - Students will model partitive division story problems

<mark>Warm Welcome (Slide 1):</mark> Tutor choice

<mark>Frame the Learning/Connect to Prior Learning (Slide 2):</mark> Today, we're going to use everything we learned yesterday about division and apply it to story problems. Story problems can be tough because we have to make sense of the information in the story and pull out the numbers we need to solve. Before we get into the story problems, let's review some of what we talked about yesterday.

<mark>Let's Review (Slide 3):</mark> I want you to try to fill in each of the sentences below. It's okay to skip around.
- Division is the **opposite/inverse** of multiplication
- Division starts with the **total/dividend**.
- Yesterday we solved division problems and found the **number in each group**.

Great job working with me to fill those in. Yes, division is the opposite of multiplication. They both use equal groups, but division starts with the total, whereas in multiplication we solve for the total at the end. In division we solve for the number in each group or number of groups. Yesterday we only found the number in each group and we'll do that again today.

<mark>Let's Talk (Slide 4):</mark> Yesterday, we solved a ton of division problems. Each time we solved, we were given part of an equation and we had to solve it to find the answer. What information were we given? The total and the number of groups! Right, we used the total and the number of groups in order to begin solving. Today, just like yesterday, as we're solving word problems, I'm going to be looking for the total and I'm going to be looking for the number of groups in order to draw my model and solve.

<mark>Let's Think (Slide 5):</mark> Whenever I get a word problem, first I read it. Listen as we read this together, "There are 12 stickers and 4 pages. If I put the same number of stickers on each page, how many stickers are on each page?" Then, before I solve it, I retell it in my own words to make sure I understand it. So, there's a photo book or photo album with 4 pages. I need to put the 12 pictures on the pages. All the pages have to have the same amount of photos. I need to figure out how many photos are on each page.

Now that I'm sure I understand the story, I need to pull out the important information. I know I need to find the total. The total must be 12, it's the largest number, it's all the pictures we have. I know I need to find the groups. The pages must be my groups, because I'll put the pictures on the pages just like I'd put my squares in my groups.

Now I'm ready to draw my model. I'm going to draw 4 groups because there are FOUR PAGES. Count the groups with me as I draw: 1 group, 2 groups, 3 groups, 4 groups. There, I have 4 groups for my 4 pages.
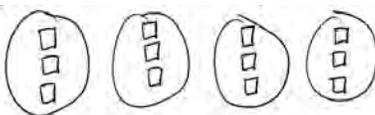
Now I need to break up my total equally onto my pages/groups. My total is 12. I'm going to put one square in each group like I'm putting one sticker on each page. I'm going to keep putting squares in groups and continue counting until I get to 12. We know we have to stop at 12, because that's my total and that's all the stickers I have.
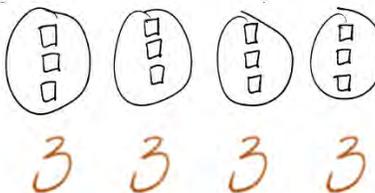
Now I need to count how many stickers I put on each page, let's count together…1, 2, 3…1, 2, 3… 1, 2, 3… 1, 2, 3. Each page has 3 stickers on it. The answer is 3 stickers on each page. We figured out how many stickers were on each page by figuring out how many were in each group.

$12 \div 4 = 3$

Finally, I'm going to write an equation to represent my work. I started with 12 and broke it apart into 4 groups. I ended with 3 stickers on each page *(write equation as you narrate meaning)*.

Let's Try It (Slide 7): Let's try some division story problems together now. Remember, we need to read the problem out loud, retell it, pull out the important information, draw a model, write an equation and solve it. Those may seem like a lot of steps, but they'll help us get the right answer.

WARM WELCOME

Today we will model partitive division story problems.

- **Division is the _____ of multiplication.**

- **Division starts with the _____.**

- **Division solves for the <u>number of groups</u> or <u>number in each group</u>.**

- **Yesterday we solved division problems and found _____.**

Let's Talk:

Story problems have all the information we need. We just have to find it.

What information were we given to solve division problems yesterday?

There are 12 stickers and 4 pages. If I put the same number of stickers on each page, how many stickers are on each page?

Let's Try It:

Name: _____   G3 Lesson 1-7 Let's Try It

Directions: Find how many are in each group by drawing a model. Make sure to identify and label your final answer at the bottom.

1. Max has 14 stickers. He wants to put an equal number of stickers on 2 posters. How many stickers will go on each poster?

_____ ÷ _____ = _____   in each

2. There are 16 dogs. The dogs are divided equally between 2 homes. How many dogs are in each home?

_____ ÷ _____ = _____   in each

3. There are 3 marker boxes. 21 crayons are divided between the boxes. How many markers are in each box.

_____ ÷ _____ = _____   in each

4. Thirty students are in each classroom. There are five equal table groups in each classroom. How many students are at each table group?

_____ ÷ _____ = _____   in each

Directions: Find how many are in each group by drawing a model. Write an equation and label each answer below.

5. Suzy is decorating cupcakes. She only has 32 sprinkles left, but still needs to decorate 4 more cupcakes. How many sprinkles will each cupcake get?

_____ ÷ _____ = _____   in each

6. Ms. Robinson gave out stickers in her classroom everyday last week. She started the week with 30 stickers and used them all. How many stickers did she give out each day last week?

_____ ÷ _____ = _____   in each

7. Richard is bringing prize bags for his best friends for his birthday. He has 6 best friends and 36 prizes altogether. How many prizes will each friend get in their prize bag?

_____ ÷ _____ = _____   in each

8. Kim needs to sleep 56 hours every week to feel rested. How many hours will she need to sleep every night?

_____ ÷ _____ = _____   in each

On your Own:

Remember: Use a model to solve each problem.

1. Jade loves reading books. She has a goal of reading 50 books. If she reads the same amount of books every month for 10 months, how many books will she need to read each month to reach her goal?

   _____ ÷ _____ = _____   _____ in each _____

2. Barry wants to bring in brownies for every teacher he works with. He only has 4 brownie pans at home, but he needs 36 brownies in order for every teacher to get one. How many brownies must each pan make for him to have enough brownies?

   _____ ÷ _____ = _____   _____ in each _____

3. Emily has 3 children who love to eat crabs (Emily doesn't eat crabs). There are 21 crabs. How many crabs will each child get?

   _____ ÷ _____ = _____   _____ in each _____

Directions: Find how many are in each group by drawing a model. Make sure to identify and label your final answer at the bottom.

1. Max has 14 stickers. He wants to put an equal number of stickers on 2 posters. How many stickers will go on each poster?

_____ ÷ _____ = _____   _____ in each _____

2. There are 16 dogs. The dogs are divided equally between 2 homes. How many dogs are in each home?

_____ ÷ _____ = _____   _____ in each _____

3. There are 3 marker boxes. 21 crayons are divided between the boxes. How many markers are in each box.

_____ ÷ _____ = _____   _____ in each _____

4. Thirty students are in each classroom. There are five equal table groups in each classroom. How many students sit at each table group?

_____ ÷ _____ = _____   _____ in each _____

Directions: Find how many are in each group by drawing a model. Write an equation and label each answer below.

---

5. Suzy is decorating cupcakes. She only has 32 sprinkles left, but still needs to decorate 4 more cupcakes. How many sprinkles will each cupcake get?

_____ ÷ _____ = _____   _____ in each _____

---

6. Ms. Robinson gave out stickers in her classroom everyday last week. She started the week with 30 stickers and used them all. How many stickers did she give out each day last week?

_____ ÷ _____ = _____   _____ in each _____

---

7. Richard is bringing prize bags for his best friends for his birthday. He has 6 best friends and 36 prizes altogether. How many prizes will each friend get in their prize bag?

_____ ÷ _____ = _____   _____ in each _____

---

8. Kim needs to sleep 56 hours every week to feel rested. How many hours will she need to sleep every night?

_____ ÷ _____ = _____   _____ in each _____

Remember: Use a model to solve each problem.

1. Jade loves reading books. She has a goal of reading 50 books. If she reads the same amount of books every month for 10 months, how many books will she need to read each month to reach her goal?

_____ ÷ _____ = _____   _____ in each _____

2. Barry wants to bring in brownies for every teacher he works with. He only has 4 brownie pans at home, but he needs 36 brownies in order for every teacher to get one. How many brownies must each pan make for him to have enough brownies?

_____ ÷ _____ = _____   _____ in each _____

3. Emily has 3 children who love to eat crabs (Emily doesn't eat crabs). There are 21 crabs. How many crabs will each child get?

_____ ÷ _____ = _____   _____ in each _____

Directions: Find how many are in each group by drawing a model. Make sure to identify and label your final answer at the bottom.

1. Max has 14 stickers. He wants to put an equal number of stickers on 2 posters. How many stickers will go on each poster?

___14___ ÷ ___2___ = ___7___   ___stickers___ in each ___poster___

2. There are 16 dogs. The dogs are divided equally between 2 homes. How many dogs are in each home?
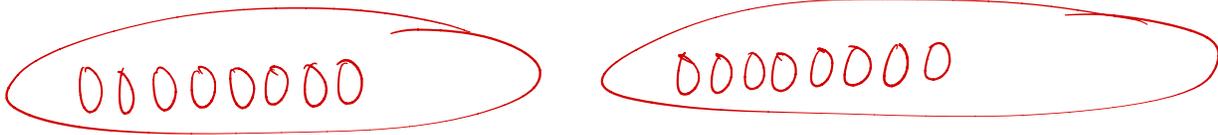
___16___ ÷ ___2___ = ___8___   ___dogs___ in each ___home___

3. There are 3 marker boxes. 21 crayons are divided between the boxes. How many markers are in each box.
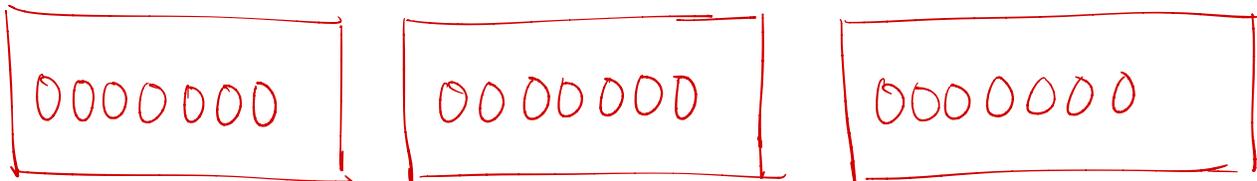
___21___ ÷ ___3___ = ___7___   ___markers___ in each ___box___

4. Thirty students are in each classroom. There are five equal table groups in each classroom. How many students sit at each table group?
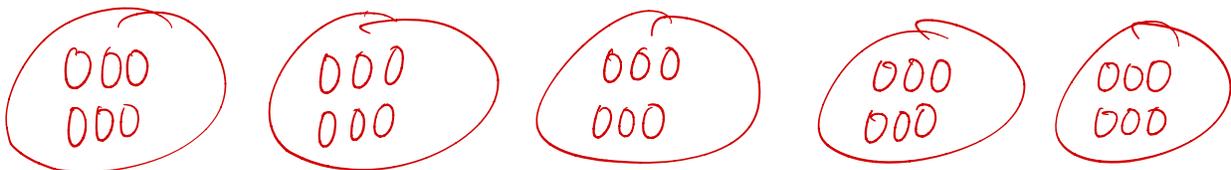
___30___ ÷ ___5___ = ___6___   ___students___ in each ___table group___

Directions: Find how many are in each group by drawing a model. Write an equation and label each answer below.

---

5. Suzy is decorating cupcakes. She only has 32 sprinkles left, but still needs to decorate 4 more cupcakes. How many sprinkles will each cupcake get?
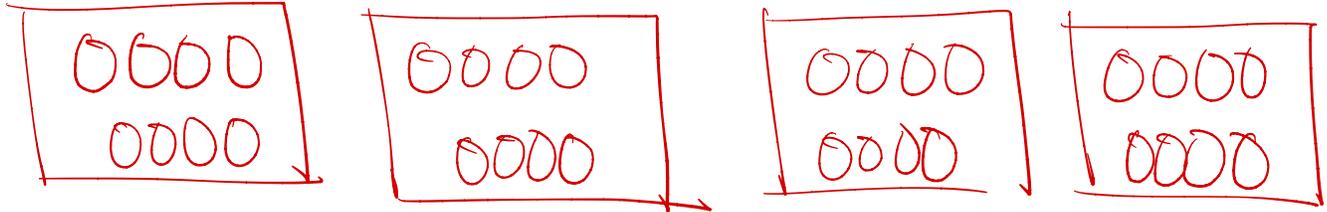
$\underline{32} \div \underline{4} = \underline{8}$ $\underline{sprinkles}$ in each $\underline{cupcake}$

---

6. Ms. Robinson gave out stickers in her classroom everyday last week. She started the week with 30 stickers and used them all. How many stickers did she give out each day last week?
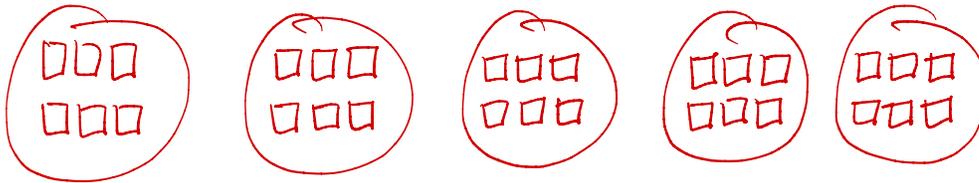
$\underline{30} \div \underline{5} = \underline{6}$ $\underline{stickers}$ in each $\underline{day}$

---

7. Richard is bringing prize bags for his best friends for his birthday. He has 6 best friends and 36 prizes altogether. How many prizes will each friend get in their prize bag?
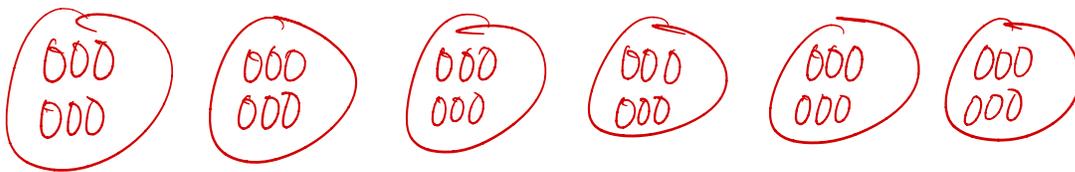
$\underline{36} \div \underline{6} = \underline{6}$ $\underline{prizes}$ in each $\underline{bag}$

---

8. Kim needs to sleep 56 hours every week to feel rested. How many hours will she need to sleep every night?

$\underline{56} \div \underline{7} = \underline{8}$ $\underline{hours}$ in each $\underline{night}$

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Remember: Use a model to solve each problem.

1. Jade loves reading books. She has a goal of reading 50 books. If she reads the same amount of books every month for 10 months, how many books will she need to read each month to reach her goal?
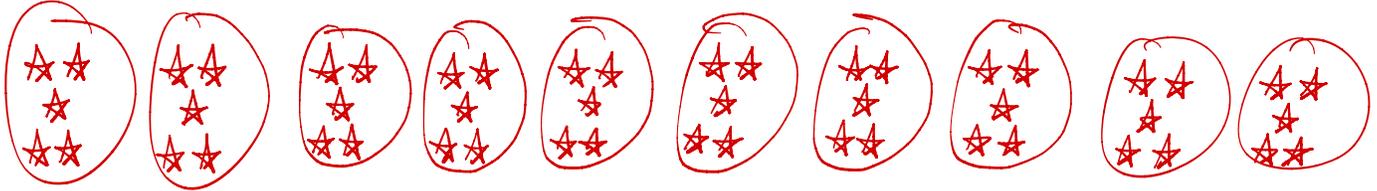
___50___ ÷ ___10___ = ___5___   ___books___ in each ___month___

2. Barry wants to bring in brownies for every teacher he works with. He only has 4 brownie pans at home, but he needs 36 brownies in order for every teacher to get one. How many brownies must each pan make for him to have enough brownies?
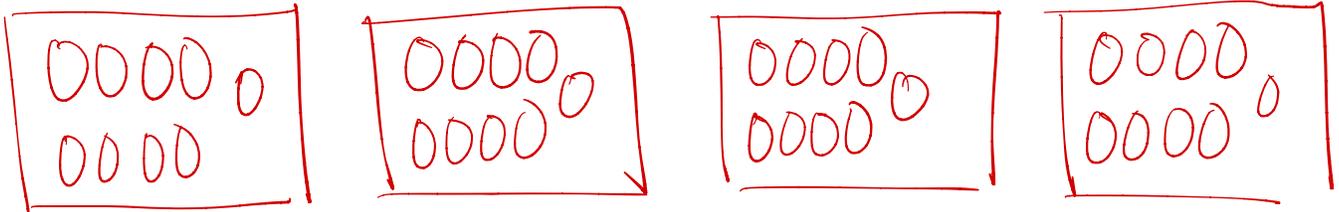
___36___ ÷ ___4___ = ___9___   ___brownies___ in each ___pan___

3. Emily has 3 children who love to eat crabs (Emily doesn't eat crabs). There are 21 crabs. How many crabs will each child get?
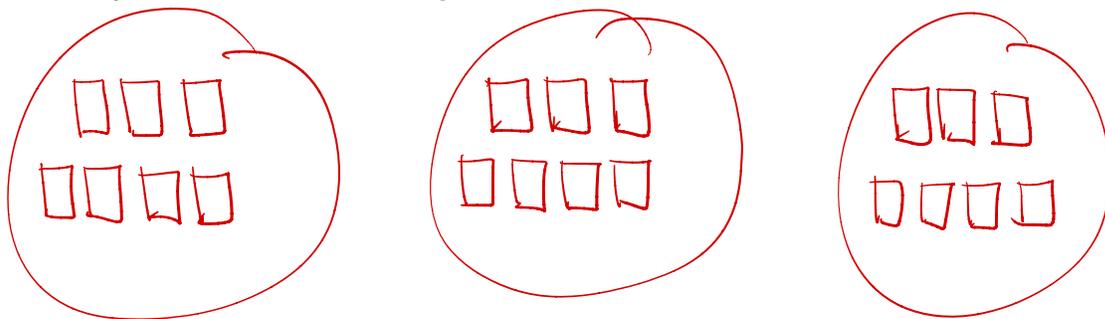
___21___ ÷ ___3___ = ___7___   ___crabs___ in each ___child___

G3 U1 Lesson 8

Model quotative division

CITYTUTOR

G3 U1 Lesson 8 - Students will model quotative division

Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): We're going to continue learning about division today by learning about a different, but similar, kind of division. First, let's quickly review what we've learned so far.

Let's Review (Slide 3): Fill in the blanks to show what you know so far about division.
- Division starts with the **total**.
- Yesterday (and the day before) we solved division problems and found the **amount in each group**.

Today we're going to continue dividing, but instead of finding the number in each group, we're going to find the number of groups.

Let's Talk (Slide 4): Let's start with a quick discussion, **what are some ways we can pass out Uno cards?**
Possible Student Answers/Key Points:
- Pass out one card at a time to each person
- Pass out more than one card at a time, but the same amount to each person (2, 3, 4 cards at a time)

When we began dividing, we started by passing out cards or objects one at a time, because we didn't know how many cards each person would get. But, we can also give out more than 1 card at a time, as long as everyone still gets the same number of cards. Let's try handing out more than one card today.

Let's Think (Slide 5): There are two problems below. One is the kind of problem we've had over the past couple days. One is new. Take a look. **What's the same about the problems, what's different?** Possible Student Answers/Key Points:
- Both problems start with 15 as the total/dividend.
- Both problems break into 3
- One wants you to make 3 groups and we don't know how many are in each group.
- One wants you to make groups of 3 and we don't know how many groups there are.
- I think the answer to both is the same, we just get it in a different way.

That's great thinking! In the problem on the right, it tells us to break 15 into 3 groups and just like the problems we solved yesterday, we don't know how many there are in each group. But, in the problem on the left it says break 15 into groups of 3, so we'd be making groups of three, or passing three cards out at a time, and we don't know how many times we could pass out 3, in other words we don't know how many groups there are.

These are the two kinds of division problems you'll encounter. We spent the past two days solving the problem on the left, counting how many are in each group. Today I'm going to show you how to solve the problem on the right.
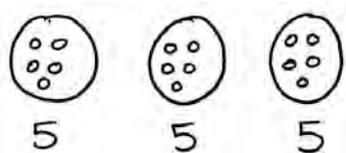
Let's start by quickly solving the problem on the right. Everybody get your whiteboard or a piece of paper and draw a picture to break 15 into 3 groups. Very good! I see that people started by drawing 3 groups and then passing out 15, one by one. And then going back to count HOW MANY were in EACH group. Your answer was 5. Your picture looks something like this!

Now let's work together to think about how the problem on the right is different from this. It says break 15 apart into groups of 3. We have the same two numbers but it's asking us to do something different. It says break 15 into groups of 3. So we know how many are going to be in each group...three!

OOO

OOO

OOO

OOO

OOO
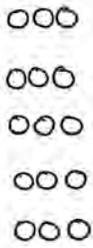
So, I'm going to make groups of 3 until I get to 15. As I draw my groups OF THREE, I'm going to be careful to separate them so I can go back and count how many groups. This is kind of like passing out Uno cards, I'm making a pile of 3 and then another pile of 3, until I run out. Count with me…1, 2, 3…4, 5, 6…7, 8, 9…10, 11, 12…13, 14, 15. Look, I made groups of 3 until I got to 15.

[OOO] 1

[OOO] 2

[OOO] 3

[OOO] 4

[OOO] ⑤
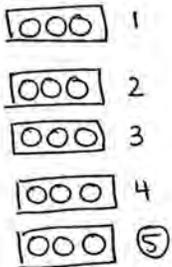
Now, my answer isn't 3. In this type of division problem I'm not trying to figure out how many are in each group, I'm trying to figure out how many groups there are. So let's go back and count the groups. I'm going to circle them, or put a box around them, to show that they're a group. Count the groups with me…1 group, 2 groups, 3 groups, 4 groups, 5 groups. So in this problem, the answer isn't the number in each group, it's how many groups I made.

Now that we explored two different ways to model division, let's come back to our question. **How are these two problems the same and how are they different?**

That's right, they both have 15 divided by 3 and they both equal 5 but what we're trying to figure out is different. This is called quotative division, where we know the total and the amount in each group but we don't know the number of groups.

Let's Think (Slide 6): Let's look at one more problem together. It says break about 20 into groups of 5. Normally we start by drawing the groups. But we don't actually know how many groups there are. However, we do know how many go in each group. So we're going to make the groups one at a time, just like we might make piles of Uno cards. We know each group has 5, so once we have 5, we have a full group.

Just like yesterday, we know our total tells us when to stop. We count out loud and when we get to 20 we stop. I want you to pay special attention to how I arrange each group. That means pay special attention to where I put everything.

O
O
O
O
O

I'm going to make my first group of 5 because it says to break 20 into GROUPS OF 5. I want it to be super neat so I'm going to make my group in one long line. I'm going to put each circle underneath the other. Watch me: 1, 2, 3, 4, 5. 5. That's one whole group.

O O
O O
O O
O O
O O

Now that I have my first group, I'm going to make my next group. I'm going to arrange my second group next to the first group with a little space in between. How many will be in my next group? 5. Yes 5, because it says groups of 5 and because we know our groups have to be equal. I'm going to keep counting out loud, remember, I keep going until I get to 20. *(Recount the first group, pointing at each circle: 1, 2, 3, 4, 5; then keep going and count/draw the next group of 5 like shown below, "6, 7, 8, 9, 10")* Even though I counted up to 10, I know this group has 5 in it because it lines up perfectly with my first groups, which I KNOW had 5.

O O O
O O O
O O O
O O O
O O O

I only got to 10 total, so I'm going to keep going and make another group. I'm being careful to line up each group next to the previous group. I line them up to make sure they each have 5 since I have to keep counting the total past 5.

0 0 0 0
0 0 0 0
0 0 0 0
0 0 0 0
0 0 0 0

I got to 15 total, but I know I need to keep going to get to 20 total, I'm going to start my next group, being careful to line my next group up next to the previous group. Whew, I finally got to 20. Why did I stop at 20? Because 20 is the total, it's all you have. Yes, even though our modeling looks different today, our total never changes. It's all we have and we have to stop when we reach it.
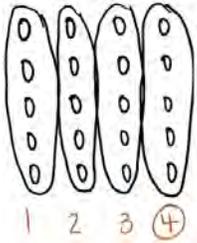
Today, they told me how many were in each group, unlike yesterday. I need to figure out HOW MANY GROUPS I have. I'm going to count each group of 5 out loud and as I do, I'm going to circle it, so my groups are really easy to see. Count with me…1 group, 2 groups, 3, groups, 4, groups. How many groups did we make? 4! We have 4 total groups. Did you see how easy it was to count our groups now that we lined them up so carefully.

$20 \div 5 = 4$

I can clearly see that I have 4 groups circled and they're equal with 5 in each one. Finally I need to write the division sentence to match my work: 20 total broken apart into groups of 5 make 4 groups, so 20 divided by 5 equals 4.

Let's Try It (Slide 8): This was an interesting lesson as another way to solve division, let's work on some together. Remember we always start with our total and we always make equal groups. However this time we'll be finding out how many groups rather than how many are in each group.

WARM WELCOME

Today we will model quotative division.

- **Division starts with the _____.**

- **Division solves for the <u>number of groups</u> or <u>number in each group</u>.**

- **Yesterday we solved division problems and found _____.**

💬 Let's Talk:

What are some ways we can pass out Uno cards?

What do you notice about the two problems below?

Break 15 apart into 3 groups.	Break 15 apart into groups of 3.

Let's Think:

Break apart 20 into groups of 5.

Division Number Sentence: _____

Let's Try It:

On your Own:

Directions: Find how many groups there are by drawing a model. Make sure to model equal groups to find the correct answer.

1. **Break apart 15 into groups of 3**

_____ groups

2. **Break apart 16 into groups of 4**

_____ groups

3. **Break apart 18 into groups of 6**

_____ groups

4. **Make groups of 2**
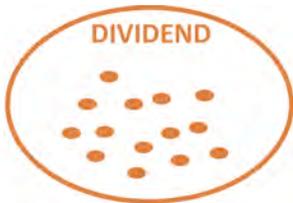
_____ groups

5. **Make groups of 2**

_____ groups

6. Make groups of 7

DIVIDEND
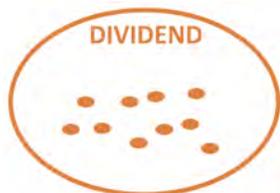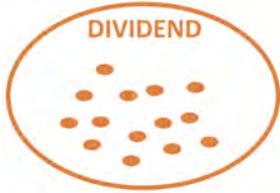
_____ groups

7. 20 ÷ 4 =

_____ groups

8. 18 ÷ 3 =

_____ groups

9. 25 ÷ 5 =

_____ groups

When you're solving division, what 2 things can you be solving for?

_____

_____

How are multiplication and division related?

_____

_____

Remember: Use a model to solve each problem.

1. Break 8 into groups of 2. Write an equation to match your model.

_____ ÷ _____ = _____

2.
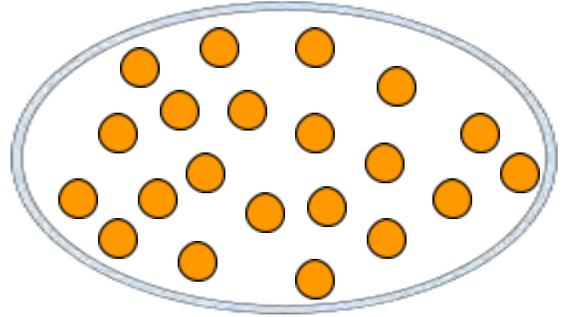
Make groups of 7

_____ groups

3. 24 ÷ 3 =

_____ groups

4. Write an equation to match the model below.
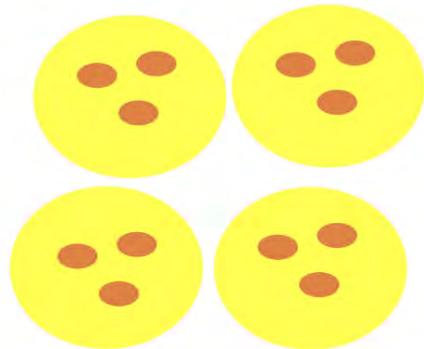
_____ ÷ _____ = _____

Directions: Find how many groups there are by drawing a model. Make sure to model equal groups to find the correct answer.

1. **Break apart 15 into groups of 3**
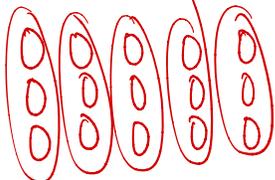
   _____5_____ groups

2. **Break apart 16 into groups of 4**
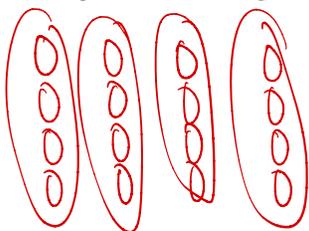
   _____4_____ groups

3. **Break apart 18 into groups of 6**
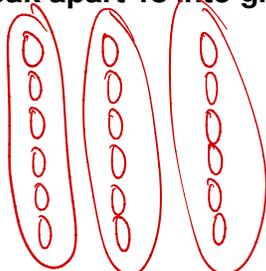
   _____3_____ groups

4. **Make groups of 2**

   DIVIDEND
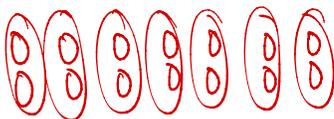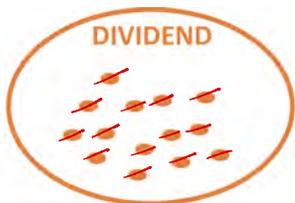
   _____7_____ groups

5. **Make groups of 2**

   DIVIDEND
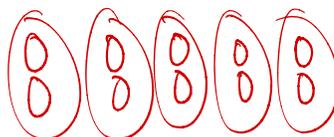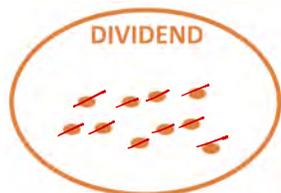
   _____5_____ groups
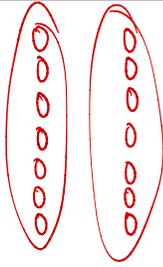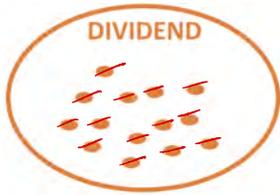
6. **Make groups of 7**	_____2_____ groups
7. **20 ÷ 4 =**	_____5_____ groups
8. **18 ÷ 3 =**	_____6_____ groups
9. **25 ÷ 5 =**	_____5_____ groups
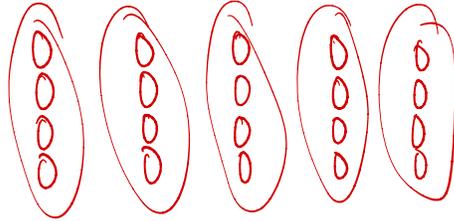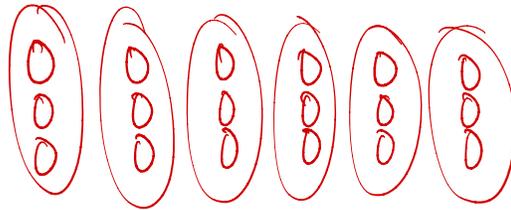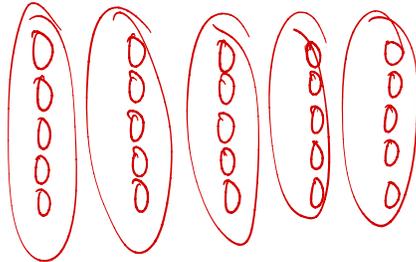
When you're solving division, what 2 things can you be solving for?

The number of groups and number in each group.

How are multiplication and division related?

Multiplication and division are inverses.

Remember: Use a model to solve each problem.

1. Break 8 into groups of 2. Write an equation to match your model.
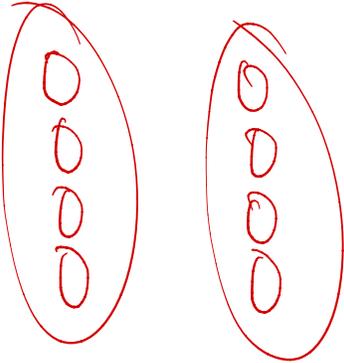
_**8**_ ÷ _**2**_ = _**4**_

2.
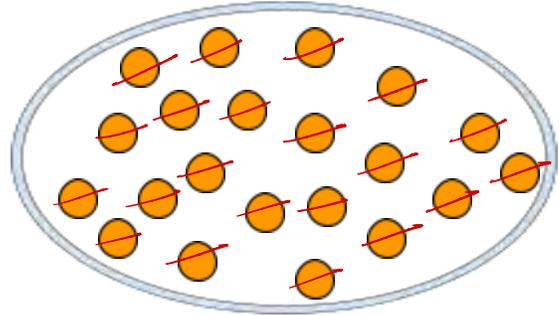
Make groups of 7
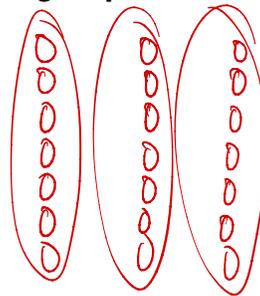
_**3**_ groups

3. 24 ÷ 3 =
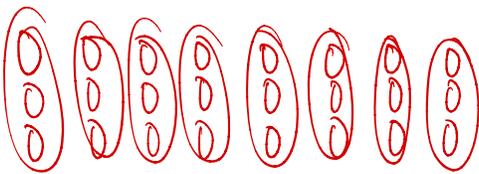
_**8**_ groups

4. Write an equation to match the model below.

_**12**_ ÷ _**4**_ = _**3**_

118
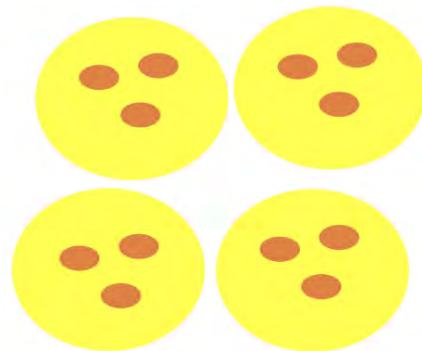
G3 U1 Lesson 9

Model quotative division story problems

G3 U1 Lesson 9 - Students will model quotative division story problems

<mark>Warm Welcome (Slide 1):</mark> Tutor choice

<mark>Frame the Learning/Connect to Prior Learning (Slide 2):</mark> Today, we're going to use everything we learned yesterday about quotative division and apply it to story problems. Story problems can be tough because we have to make sense of the information in the story and pull out the numbers we need to solve. Before we get into the story problems, let's review some of what we talked about yesterday.

<mark>Let's Review (Slide 3):</mark> I want you to try to fill in each of the sentences below. It's okay to skip around.
- Division starts with the **total/dividend**.
- Yesterday we solved division problems and found the **number of groups**.

Great job working with me to fill those in. In division we solve for the number in each group or number of groups. Yesterday we worked to find the number of groups. We'll continue that today.

<mark>Let's Talk (Slide 4):</mark> Yesterday we solved a lot of division problems. Each time we solved, we were given part of an equation and we had to solve it to find the answer. What information were we given? The total and the number in each group

Correct, we need the total and the number in each group to begin solving. Today as we're solving word problems, I'm going to be looking for the total and I'm going to be looking for the number in each group in order to set up my model and solve.

<mark>Let's Think (Slide 5):</mark> Whenever I get a word problem, first I read it, listen as I read this. "There is $10. Each kid gets $2. How many kids are there? Then I retell it in my own words to make sure I understand it. **Turn and retell the story to a partner in your own words.**

Now that I'm sure I understand the story, I need to pull out the important information. I know I need to find the total. The total must be 10, since that's the whole amount of money that we have to pass out to the kids. I know that each kid is going to get $2 so that means that 2 goes in each group, kind of like those piles of Uno cards…we're making groups, or piles, of 2! That means the kids must be the groups since they're getting the money.

Now I'm ready to draw my model. I'm going to draw 2 circles, 1, 2. Those are 2 dollars for one kid. I need to keep giving out 2 dollars until I get to 10. I need to keep drawing groups of 2 until I get to 10 total.
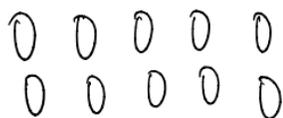
Let's keep counting until we get to 10. I'll draw our groups of 2 and stop when we get to 10. Let's start from the beginning: 1, 2, *(start drawing)* 3, 4… 5, 6… 7, 8… 9, 10. We have 10 total so we can stop.
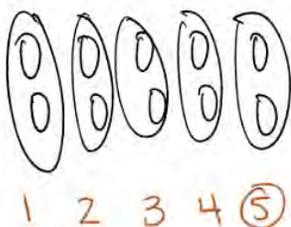
Now, we need to figure out how many groups we made, or how many kids there are. You count the groups as I circle them: 1 group, 2, groups, 3 groups, 4 groups, 5 groups. There are 5 groups or 5 kids that each got 2 dollars.

$10 \div 2 = 5$

Now I'm ready to write my equation. There were 10 dollars total, we broke apart the total to give each kid 2 dollars. We ended up giving money to 5 kids. So, 10 divided by 2 equals 5.

Let's Try It (Slide 6-7): Let's try some division story problems together now. Remember, we need to read the problem, retell to make sure we understand, draw a model of the important information and finish with an equation to show how we got our answer.

WARM WELCOME

Today we will model quotative division story problems.

Let's Review:

- **Division starts with the _____.**

- **Division solves for the <u>number of groups</u> or <u>number in each group</u>.**

- **Yesterday we solved division problems and found _____.**

Let's Talk:

Story problems have all the information we need. We just have to find it.

What information did we need to solve division problems yesterday?

Let's Think:

There is $10. Each kid gets $2. How many kids are there?

Let's Try It:

On your Own:

Remember: Use a model to solve each problem.

1. Jade loves reading books. She has a goal of reading 50 books. If she reads 5 books a month, how many months will it take her to reach her goal?

_____ ÷ _____ = _____   _____ in each _____

2. Barry wants to bring in brownies for the 36 teachers he works with. The brownie pans at the store only make 9 brownies each. How many pans should Barry buy to make all the brownies at once?

_____ ÷ _____ = _____   _____ in each _____

3. Emily has 3 children who love to eat crabs (Emily doesn't eat crabs). If each of her kids can eat 4 crabs, how many should she buy?

_____ ÷ _____ = _____   _____ in each _____

Directions: Find how many groups there are by drawing a model. Make sure to identify and label your final answer at the bottom.

1. Max has 14 stickers. He wants to put 2 stickers on each poster. How many posters should Max buy?

    _____ ÷ _____ = _____ groups.   _____ are the groups.

2. There are 16 dogs. 8 of the dogs were put into each home. How many homes were there?

    _____ ÷ _____ = _____ groups.   _____ are the groups.

3. There are 3 markers in each box. There are only 21 markers available. How many boxes will get used?

    _____ ÷ _____ = _____ groups.   _____ are the groups.

4. Thirty students are in Ms. Love's classroom. There are five students sitting at each table. How many tables must there be in Ms. Love's class?

    _____ ÷ _____ = _____ groups.   _____ are the groups.

Directions: Find how many are in each group by drawing a model. Write an equation and label each answer below.

---

5. Suzy is decorating cupcakes. She only has 32 sprinkles left and feels a cupcake must have at least 8 sprinkles. How many more cupcakes can she finish decorating?

_____ ÷ _____ = _____ groups. _____ are the groups.

---

6. Elijah volunteers at the library for 30 hours. He volunteered for 6 hours each day. How many days did he volunteer?

_____ ÷ _____ = _____ groups. _____ are the groups.

---

7. Tom has 12 crayons. He wants to give 2 crayons to each friend. How many friends will get crayons?

_____ ÷ _____ = _____ groups. _____ are the groups.

---

8. There are 56 pencils and each table gets 7 pencils. How many tables are there?

_____ ÷ _____ = _____ groups. _____ are the groups.

Name: _____   G3 U1 Lesson 9 - Independent Work

Remember: Use a model to solve each problem.

---

1. Jade loves reading books. She has a goal of reading 50 books. If she reads 5 books a month, how many months will it take her to reach her goal?

_____ ÷ _____ = _____   _____

---

2. Barry wants to bring in brownies for the 36 teachers he works with. The brownie pans at the store only make 9 brownies each. How many pans should Barry buy to make all the brownies at once?

_____ ÷ _____ = _____   _____

---

3. Emily's children love to eat crabs (Emily doesn't eat crabs). If each of her kids can eat 4 crabs, and she only purchased 12 crabs, how many children must Emily have?

_____ ÷ _____ = _____   _____

Directions: Find how many groups there are by drawing a model. Make sure to identify and label your final answer at the bottom.

---

1. Max has 14 stickers. He wants to put 2 stickers on each poster. How many posters should Max buy?

_____14_____ ÷ _____2_____ = _____7_____ groups.   _____Posters_____ are the groups.

---

2. There are 16 dogs. 8 of the dogs were put into each home. How many homes were there?
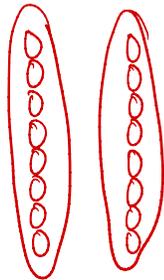
_____16_____ ÷ _____8_____ = _____2_____ groups.   _____Homes_____ are the groups.

---

3. There are 3 markers in each box. There are only 21 markers available. How many boxes will get used?
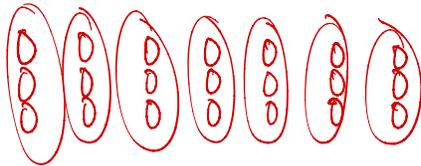
_____21_____ ÷ _____3_____ = _____7_____ groups.   _____Boxes_____ are the groups.

---

4. Thirty students are in Ms. Love's classroom. There are five students sitting at each table. How many tables must there be in Ms. Love's class?
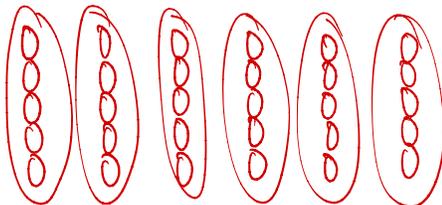
_____30_____ ÷ _____5_____ = _____6_____ groups.   _____Tables_____ are the groups.

Directions: Find how many are in each group by drawing a model. Write an equation and label each answer below.

5. Suzy is decorating cupcakes. She only has 32 sprinkles left and feels a cupcake must have at least 8 sprinkles. How many more cupcakes can she finish decorating?
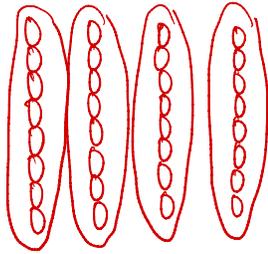
__32__ ÷ __8__ = __4__ groups. __Cupcakes__ are the groups.

6. Elijah volunteers at the library for 30 hours. He volunteered for 6 hours each day. How many days did he volunteer?
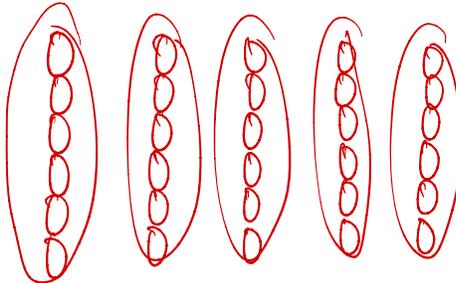
__30__ ÷ __6__ = __5__ groups. __Days__ are the groups.

7. Tom has 12 crayons. He wants to give 2 crayons to each friend. How many friends will get crayons?
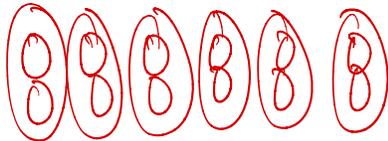
__12__ ÷ __2__ = __6__ groups. __Friends__ are the groups.

8. There are 56 pencils and each table gets 7 pencils. How many tables are there?
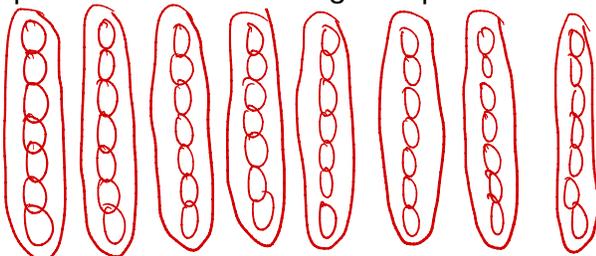
__56__ ÷ __7__ = __8__ groups. __Tables__ are the groups.

130

Remember: Use a model to solve each problem.

1. Jade loves reading books. She has a goal of reading 50 books. If she reads 5 books a month, how many months will it take her to reach her goal?
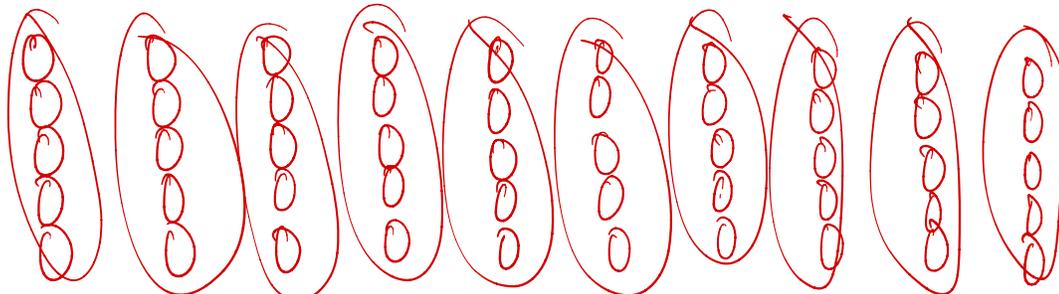
__50__ ÷ __5__ = __10__   __months__

2. Barry wants to bring in brownies for the 36 teachers he works with. The brownie pans at the store only make 9 brownies each. How many pans should Barry buy to make all the brownies at once?
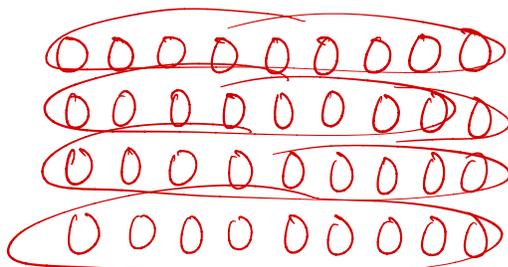
__36__ ÷ __9__ = __4__   __pans__

3. Emily's children love to eat crabs (Emily doesn't eat crabs). If each of her kids can eat 4 crabs, and she only purchased 12 crabs, how many children must Emily have?
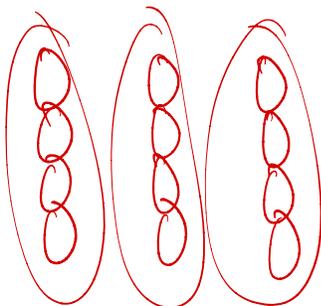
__12__ ÷ __4__ = __3__   __kids__

G3 U1 Lesson 10

Represent division as repeated subtraction

G3 U1 Lesson 10 - Students will represent division with repeated subtraction

<mark>Warm Welcome (Slide 1):</mark> Tutor choice

<mark>Frame the Learning/Connect to Prior Learning (Slide 2):</mark> We've been learning about division for the past four days by drawing models. There's one more way to represent division that you're going to learn about today.

<mark>Let's Review (Slide 3):</mark> Once again, let's see if you can help me fill in the blanks.
- Division is the **opposite/inverse** of multiplication
- Multiplication is the same as **repeated addition**.

Correct, multiplication is the same as repeated addition because as we count the number of total pieces we add each equal group. The addition repeats since the numbers we add are the same because the groups are equal.

<mark>Let's Talk (Slide 4):</mark> Let's start by thinking about division and subtraction. Think about everything we've been doing the last few days with division and I'm wondering if you see any connections between division and subtraction. **How are division and subtraction similar and how are they different?** Possible Student Answers, Key Points:
- Both involve taking away from the whole.
- Both are taking apart.
- When we're subtracting, we're starting with a whole amount and taking away a smaller amount.
- With division, we're also start with the whole amount but taking away the same amount over and over again.

These are interesting connections you all are making! I think you're onto something with those ideas, today we're going to explore how division is related to subtraction.

<mark>Let's Think (Slide 5):</mark> Let's get into this problem that we solved yesterday but let's focus on answering the question of "Is division repeated subtraction?"
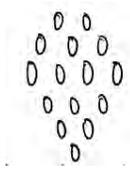
 I'm going to do something that I don't normally do, which is draw my total. How many circles should I draw if I'm drawing my total? 15. Correct, my total is 15.
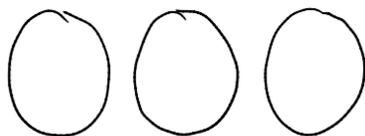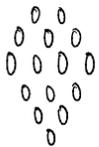
 Now I'm going to break up my total into 3 groups like the problem says. What should I do next if I'm going to break up my total into 3 groups? Draw 3 groups. Correct! I can start with my empty groups since they told me how many there are. Now I'm ready to split the total into my groups.
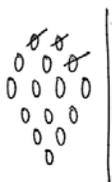
 So, I'm going to put one in each group until you get to 15. Hmmm, but when I put one in each group, the circles don't come from nowhere, they come from the total. So when I put one in each group, I'm going to cross them out of my total. I'm going to start by putting one in each group: I'm going to put one in this group, I'm going to put one in this group and one in this group since they all

have to be equal *(draw one circle in each group and stop).* Wait, I just put 3 circles in the groups, those circles came from my total, so I need to show that by crossing them out from my total. It's like if I was dealing cards, once I give the cards to players, they're no longer in the deck, they're gone from the total.

$$\begin{array}{r} 15 \\ -\ 3 \\ \hline 12 \end{array}$$

Look, I just took 3 from my total and put them in my groups. I'm going to show that using an equation. I started with 15 and I took away 3 for the three groups. What math symbol shows "take away?" Minus. Now, I'm left with 12 circles in my total.
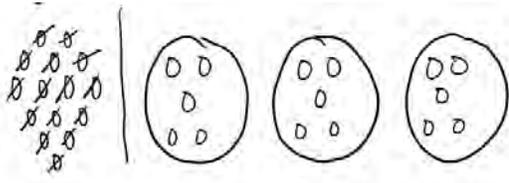
Now, like we did on previous days, I'm going to keep going until I am done passing out the total. I'll pass out another 3 and cross them out. And another 3 and cross them out *(continue until 0 are left).* I can stop now because I've reached my total. I know I've given out all 15 because there are no circles left in my drawing of the total.

Now let me show you what I just did with an equation. I started with 15 and I took away 3 *(point to the first object in each group),* and that left me with 12. Then I took another 3 and passed them out. I kept taking away three until there were zero left. Everytime we make a group when we're dividing, we're actually subtracting from the total. Because we're making equal groups, we always subtract the same amount. The subtraction repeats when we take away the same amount over and over again.

However, we're still not done. We need to figure out how many are in each group. If we look at the model, we can count how many are in each group, let's count…1, 2, 3, 4, 5…1, 2, 3, 4, 5…1, 2, 3, 4, 5. There are 5 in each group.
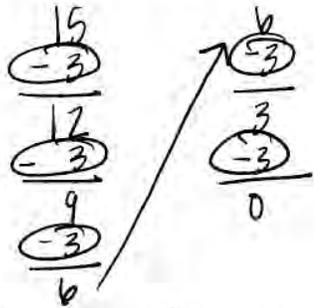
In the model, we can see that there's 5 in each group. When we look at repeated subtraction, each time we subtracted, we put 1 in each group. If we count up how many times we subtracted, we'll see how many are in each group. I'm going to circle each time we subtracted, each time it says "-3."We subtracted three 5 times. That means we put one in each group 5 times, we put 5 in each group, the answer is 5.
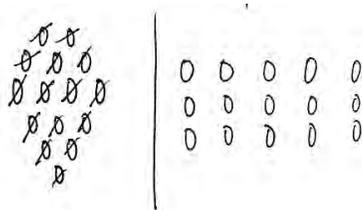
It even works when we divide the other way. Watch. I'll start again with 15. I'm going to make a group of 3 and subtract 3 from my total. This time I'm making groups of 3 instead of starting with 3 groups. I'm going to make my first group, 1, 2, 3 *(draw 3 circles in a row).* Where did my 3 come from? The total. What equation can show what we just did in our model? 15 - 3 = 12. Correct, we took 3 from our total 15 and now there are 12 left.

How do I know it's time to stop? There are no more circles left in your total in the picture and the subtraction reached 0. Yes, both our equation and our subtraction show us there are no more left in our total to take from.
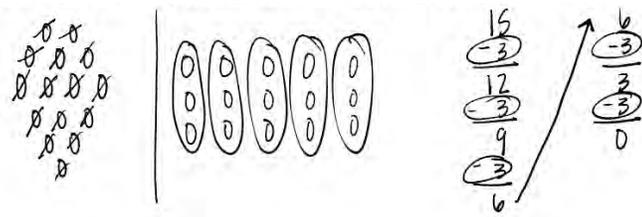
However, we're still not done. We need to figure out how many groups there are. If we look at the model, we can count that there are 1, 2, 3, 4, 5 groups *(circle each group as you count).* In the model, we can see that there are 5 groups. How do we find our how many groups there are in the repeated subtraction? Count how many times we subtracted 3.

Yes, when we look at the repeated subtraction, each time we subtracted, we made a group of 3. If we count up how many times we subtracted 3, we'll see how many groups we made. I'm going to circle each time we subtracted, each time it says "-3." Count with me…1, 2, 3, 4, 5. The answer is 5 again, even though this time it's 5 groups instead of 5 in each group.

<mark>Let's Think (Slide 6):</mark> Let me show you one more. But this time, we'll just do the repeated subtraction, without the model. We need to break apart 12 into groups of 3.

In division AND subtraction, what do we always begin with? Our total. Right, I'll begin with my total of 12. If we were to draw a model, I would take 3 from the total to make a group. I won't draw it, I'll just subtract 3 from the total. I still have 9 left in my total that I can use to make more groups of 3, I'm going to keep subtracting. How will we know when to stop? When we get to 0. Correct, then there will be none left in our total.

I'll subtract 3 again to make a group of 3. Now I have 6 left.

I'll subtract 3 again and make a group of 3. Now I have 3 left, I'll subtract 3 again and make a group of 3.

Now I have none left. How do we figure out how many groups of 3 we made? We count each time we subtracted 3.

So, let's go through and circle each time we subtracted 3 to make a group of 3. Count with me… 1, 2, 3, 4. We circled 4 groups.

Let's finish by writing our division equation. We started with 12and broke it apart into groups of 3 and we did that 4 times. So, 12 divided by 3 is 4.

<mark>Let's Try It (Slide 7-8):</mark> Let's try some together. Remember we're still dividing, but instead of drawing a picture, we'll subtract the same amount until we get to zero to find the answer.

WARM WELCOME

Today we will represent division with repeated subtraction.

- Division is the _____ of multiplication.

- Multiplication is the same as _____ addition.

💬 Let's Talk:

How are subtraction and division similar?
How are they different?

Break apart 15 into 3 groups.	Break apart 15 into groups of 3.

Let's Think:

Break apart 12 into groups of 3.

Division Number Sentence: _____

Let's Try It:

Directions: Use repeated subtraction to solve each division equation.

1. Break 16 apart into 4 groups	2. Break 18 into groups of 6.
Answer = _____	Answer = _____
3. $20 \div 4 =$	4. $18 \div 3 =$
Answer = _____	Answer = _____

Directions: Use repeated subtraction to solve each division equation.

5. Break 14 into 7 groups	6. Break 27 into groups of 3
Answer = _____	Answer = _____
7. $36 \div 6 =$	8. Akeem has a bag of 42 chocolate chips for his 6 cookies. How many chocolate chips will be on each cookie if they all have the same amount?
Answer = _____	Answer = _____

On your Own:

Remember: Solve each problem using repeated subtraction.

1. $24 \div 3 =$	2. Break 54 into 6 groups.	3. Eric likes to workout and does 50 push-ups every week. How many push-ups will he need to do each day in order to reach his goal?
Answer = _____	Answer = _____	Answer = _____

Directions: Use repeated subtraction to solve each division equation.

1. Break 16 apart into 4 groups Answer = _____	2. Break 18 into groups of 6. Answer = _____
3. $20 \div 4 =$ -Answer = _____	4. $18 \div 3 =$ Answer = _____

Directions: Use repeated subtraction to solve each division equation.

5. Break 14 into 7 groups.	6. Break 27 into groups of 3
Answer = _____	Answer = _____
7. 36 ÷ 6 =	8. Akeem has a bag of 42 chocolate chips for his 6 cookies. How many chocolate chips will be on each cookie if they all have the same amount?
Answer = _____	Answer = _____

Remember: Solve each problem using repeated subtraction.

1. 24 ÷ 3 =	2. Break 54 into 6 groups.	3. Eric likes to workout and does 28 push-ups every week. How many push-ups will he need to do each day in order to reach his goal? (Remember how many days are in a week).
Answer = _____	Answer = _____	Answer = _____

Directions: Use repeated subtraction to solve each division equation.

1. Break 16 apart into 4 groups	2. Break 18 into groups of 6.
$$\begin{array}{r} 16 \\ -\ 4 \\ \hline 12 \\ -\ 4 \\ \hline 8 \\ -\ 4 \\ \hline 4 \\ -\ 4 \\ \hline 0 \end{array}$$	$$\begin{array}{r} 18 \\ -\ 6 \\ \hline 12 \\ -\ 6 \\ \hline 6 \\ -\ 6 \\ \hline 0 \end{array}$$
Answer = __4__	Answer = __3__
3. 20 ÷ 4 =	4. 18 ÷ 3 =
$$\begin{array}{r} 20 \\ -\ 4 \\ \hline 16 \\ -\ 4 \\ \hline 12 \\ -\ 4 \\ \hline 8 \\ -\ 4 \\ \hline 4 \\ -\ 4 \\ \hline 0 \end{array}$$	$$\begin{array}{r} 18 \\ -\ 3 \\ \hline 15 \\ -\ 3 \\ \hline 12 \\ -\ 3 \\ \hline 9 \\ -\ 3 \\ \hline 6 \\ -\ 3 \\ \hline 3 \\ -\ 3 \\ \hline 0 \end{array}$$
-Answer = __5__	Answer = __6__

Directions: Use repeated subtraction to solve each division equation.

5. Break 14 into 7 groups.	6. Break 27 into groups of 3

5.

$$
\begin{array}{r}
14 \\
-7 \\
\hline
7 \\
-7 \\
\hline
0
\end{array}
$$

Answer = 2

6.

$$
\begin{array}{r}
27 \\
-3 \\
\hline
24 \\
-3 \\
\hline
21 \\
-3 \\
\hline
18 \\
-3 \\
\hline
15
\end{array}
$$

$$
\begin{array}{r}
15 \\
-3 \\
\hline
12 \\
-3 \\
\hline
9 \\
-3 \\
\hline
6 \\
-3 \\
\hline
3 \\
-3 \\
\hline
0
\end{array}
$$

Answer = 9

7. $36 \div 6 =$	8. Akeem has a bag of 42 chocolate chips for his 6 cookies. How many chocolate chips will be on each cookie if they all have the same amount?

7.

$$
\begin{array}{r}
36 \\
-6 \\
\hline
30 \\
-6 \\
\hline
24 \\
-6 \\
\hline
18 \\
-6 \\
\hline
12
\end{array}
$$

$$
\begin{array}{r}
12 \\
-6 \\
\hline
6 \\
-6 \\
\hline
0
\end{array}
$$

Answer = 6

8.

$$
\begin{array}{r}
42 \\
-6 \\
\hline
36 \\
-6 \\
\hline
30 \\
-6 \\
\hline
24
\end{array}
$$

$$
\begin{array}{r}
24 \\
-6 \\
\hline
18 \\
-6 \\
\hline
12 \\
-6 \\
\hline
6
\end{array}
$$

$$
\begin{array}{r}
6 \\
-6 \\
\hline
0
\end{array}
$$

Answer = 7

Remember: Solve each problem using repeated subtraction.

1. 24 ÷ 3 =	2. Break 54 into 6 groups.	3. Eric likes to workout and does 28 push-ups every week. How many push-ups will he need to do each day in order to reach his goal? (Remember how many days are in a week).

1.

24
(− 3)
21
(− 3)
18
(− 3)
15
(− 3)
12
(− 3)
9
(− 3)
6
(− 3)
3
(− 3)
0

Answer = __8__

2.

54
(− 6)
48
(− 6)
42
(− 6)
36
(− 6)
30
(− 6)
24
(− 6)
18

18
(− 6)
12
(− 6)
6
(− 6)
0

Answer = __9__

3.

28
(− 7)
21
(− 7)
14
(− 7)
7
(− 7)
0

Answer = __4__

G3 U1 Lesson 11

Solve division and multiplication story problems

CITYTUTOR

G3 U1 Lesson 11 - Students will solve division and multiplication story problems

<mark>**Warm Welcome (Slide 1):**</mark> Tutor choice

<mark>**Frame the Learning/Connect to Prior Learning (Slide 2):**</mark> We've spent a few days working on multiplication and a few days working on division. We're going to spend today working with both multiplication and division. Even though you've gotten pretty good at working with each separately, working with them together can be tricky.

<mark>**Let's Talk (Slide 3):**</mark> **Tell me everything you know about multiplication and division.** Possible Student Answers/Key Points:
- Division is the opposite/inverse of multiplication.
- Multiplication and division both use equal groups.
- They both have a total, a number of groups and an equal amount in each group.
- Multiplication uses equal groups to find the total.
- Division uses equal groups to find the number of groups or number in each group.
- Multiplication is the same as repeated addition.
- Division is the same as repeated subtraction.

You know so much about multiplication and division. You're right, they have a lot in common. However they are different in important ways. We use multiplication to find the total. We are given the number of groups and amount in each group and we use that to find the total. We use division to find the number of groups or number in each group. We are given the total and must break it up to find the number of groups or number in each group.

<mark>**Let's Review (Slide 4):**</mark> Let's look at an example of this. We use multiplication to find the total. Here we are given the number of groups, 3 groups, the number in each group, 5 in each group and we use that to find the total. And, 3x5 is 15. So the total is 15. But, division is the opposite. We use division to find the number of groups or number in each group. We are given the total,15 and must break it up into 3 groups or groups of 3, to find the number of groups or number in each group. There are either 5 groups of 5 in each group.

Today you'll be solving word problems, so you won't know if they're multiplication word problems or division word problems. You'll have to figure out which kind of math to do based on the information they give you and the answer they want you to find. If they give you the groups (point) and number in each group *(point)* and they ask you to find the total *(point)*, we should multiply *(point)*. If they give you the total *(point)* and want you to break it up *(point)*, we should divide *(point)*. It's important to do the right math.

<mark>**Let's Think (Slide 5):**</mark> I always start by reading the story out loud, read it with me… "Your class is having a pizza party. You buy 5 pizzas. Each pizza has 6 slices. How many slices are there?" Now, let's retell the story in our own words to make sure we understand it. So, there's a party with 5 pizzas. Each pizza was cut into 4 slices. I need to figure out how many slices there are from all the pizzas.

Now I need to figure out the kind of math I need to do. I can do that by drawing a model of the information I've been given.
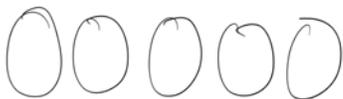
I know there are 5 pizzas. I'm going to draw 5 circles to show pizzas. Count with me: 1, 2, 3, 4, 5. There, we have 5 pizzas.

The story says that each pizza has 4 slices. How can I show that each pizza has 4 slices? Draw a 4 in each circle/draw 4 objects in each circle. Yes, I'll write a 4 in each circle to quickly show that there are 4 slices in each pizza…this pizza has 4 pieces, this one, this one, and this one.

Now I need to figure out what kind of math to do. My picture looks like 5 groups of 4. My 5 pizzas are my 5 groups and my 4 slices are the 4 in each group. They want me to figure out how many slices there are altogether. That's multiplication: they told me the groups and number in each group and I need to find the total.
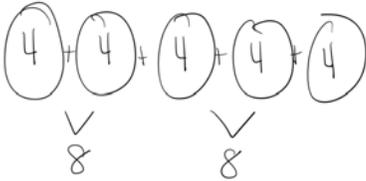
What can we do to find the total quickly? Repeated addition. Yes, we can use repeated addition to solve multiplication. Let's start adding. Now that I have my repeated addition number sentence, I can add. I know 4 + 4 = 8 because I know my doubles facts. Now I have 8, 8 and 4.
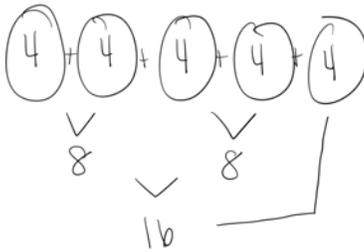
I'm going to leave the 4 for later and add my 2 eights. Use your doubles facts, what's 8 + 8? 16. Correct, 16! Now what is our final step to solve? We add 16 to the 4 that is left. Yes, we can't forget about that 4.

So, et's stack and add 16 + 4. Our final answer is 20. Do you remember what our 20 is, we have 20 what? We have 20 pizza slices altogether. Correct, there are 20 pizza slices altogether. Whenever you're solving word problems, it's important to remember what all your numbers represent. Not just 5, but 5 pizzas. Not just 4, but 4 slices in each pizza. Not just 20, but 20 slices of pizza altogether.

$$5 \times 4 = 20$$

The final answer is 20. Now I'm ready to write my equation. There were 5 pizzas and each pizza had 4 slices. There were 20 slices total. So, 5x4 is 20.

Let's Think (Slide 6): Let's try another. I always start by reading the story out loud, "Jade has 18 candy bars. She wants to put them into 3 bags and wants the same number in each bag. How many candy bars go in each bag?" Next I retell the story to make sure I understand it.

Now I need to figure out the kind of math I need to do. I can do that by drawing a model of the information I've been given. I'm starting with 18 bars and I'm going to put them into 3 bags. I'm going to draw 3 circles to show the 3 bags I need to fill with bars: 1 bag, 2 bags, 3 bags.
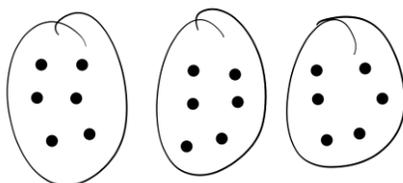
Next I need to split the bars into the bags evenly. Let's pause. What kind of math is it when we split up or break apart into equal groups? Division. Yes it's division because we're breaking apart the 18 total candy bars into 3 groups! I'm going to keep drawing my model to divide and then check my work with repeated subtraction. So, it looks like 6 candy bars go in each bag.

Let's check that with repeated subtraction. We'll start with my total of 18, then I need to keep subtracting 3 for the 3 candy bars I would take away when I put 1 into each bag. How do I know when to stop subtracting? When you get to 0 and there's no more in your total. Yes, let's keep subtracting until we get to 0.

$$\begin{array}{r} 18 \\ -\ 3 \\ \hline 15 \\ -\ 3 \\ \hline 12 \\ -\ 3 \\ \hline 9 \end{array} \qquad \begin{array}{r} 9 \\ -3 \\ \hline 6 \\ -3 \\ \hline 3 \\ -3 \\ \hline 0 \end{array}$$

I'll start with 18 and subtract 3, now I'm left with 15. I can keep going. I have 15 and subtract 3, now I'm left with 12. I can keep going. I have 12 and subtract 3, now I'm left with 9. I can keep going. I have 9 and subtract 3, now I'm left with 6. I can keep going. I have 6 and subtract 3, now I'm left with 3. I can keep going. I have 3 and subtract 3, now I'm left with 0. I can not keep going.

$$\begin{array}{r} 18 \\ \boxed{-\ 3} \\ \hline 15 \\ \boxed{-\ 3} \\ \hline 12 \\ \boxed{-\ 3} \\ \hline 9 \end{array} \qquad \begin{array}{r} 9 \\ \boxed{-3} \\ \hline 6 \\ \boxed{-3} \\ \hline 3 \\ \boxed{-3} \\ \hline 0 \end{array}$$

Are we finished solving? No, we need to circle all the times we took away 3. Great, let's go back and circle each time we subtracted 3 and you count out loud: 1, 2, 3, 4, 5, 6. We subtracted 3 six times. Our answer is 6. But, 6 what? 6 candy bars in each bag. Correct, there are 6 candy bars in each bag.

$$18 \div 3 = 6$$

Now we're ready to write our equation. We started with 18 candy bars and split them up into 3 bags equally. This left us with 6 candy bars in each bag. So, 18 divided by 3 is 6.

Let's Try It (Slide 7-8): Let's try some together. Remember, we can't just start solving. We have to figure out the kind of math we need to use first and we can do that by reading carefully and retelling.

WARM WELCOME

Today we will solve division and multiplication story problems.

What do you know about multiplication and division?

Let's Review:

Multiplication	Division
3 x **5** = _____ (groups) (# in each group) (total)	**15** ÷ **3** = _____ (total) (groups or # in each group)

Let's Think:

Your class is having a pizza party. You buy 5 pizzas. Each pizza has 6 slices. How many slices are there?

Let's Think:

Jade has 18 candy bars. She wants to put them into 3 bags and wants the same number in each bag. How many candy bars go in each bag?

Name: _____ G3 Lesson 1-11 Let's Try It

Directions: Solve each word problem using a model, repeated addition or repeated subtraction. Write an equation to show the work you did. Label your answer.

1. Sayla has 4 packs of crayons. Each pack has 10 crayons in it. How many crayons does Sayla have?

2. You want to share 34 pencils among 6 friends. How many would each friend get?

3. Londyn bought 18 small cakes. She gave each of her children 3 cakes. How many children does Londyn have?

4. Julian is writing a comic book. His story has 100 frames. If he wants to put 10 frames on each page, how many pages will his comic book have?

Directions: Solve each word problem using a model, repeated addition or repeated subtraction. Write an equation to show the work you did. Label your answer.

5. Lukas averages 6 points per game in basketball. How many points would he score after 5 games?

6. It takes 7 minutes to bake one pan of cookies. How long will it take to bake 4 pans of cookies?

7. Richard is bringing prize bags for his best friends for his birthday. He has 6 best friends and 36 prizes altogether. How many prizes will each friend get in their prize bag?

8. Kim needs to sleep 56 hours every week to feel rested. How many hours will she need to sleep every night?

Name: _____ G3 Lesson 1-11 Independent Work

Directions: Solve each word problem using a model, repeated addition or repeated subtraction. Write an equation to show the work you did. Label your answer.

1. Robin has 9 packages of gum. There are 8 pieces of gum in each package. How many pieces of gum does Robin have?

2. 63 people are going to the zoo. There are 7 cars to take people to the zoo. How many people will fit in each car, if each car has the same number of people?

3. I have 80 cents to buy candy. If each gumdrop costs 10 cents, how many gumdrops can I buy?

Directions: Solve each word problem using a model, repeated addition or repeated subtraction. Write an equation to show the work you did. Label your answer.

1. Sayla has 4 packs of crayons. Each pack has 10 crayons in it. How many crayons does Sayla have?

_____ ◯ _____ = _____   _____

2. You want to share 36 pencils among 6 friends. How many would each friend get?

_____ ◯ _____ = _____   _____

3. Londyn bought 18 small cakes. She gave each of her children 3 cakes. How many children does Londyn have?

_____ ◯ _____ = _____   _____

Directions: Solve each word problem using a model, repeated addition or repeated subtraction. Write an equation to show the work you did. Label your answer.

---

4. Julian is writing a comic book. His story has 100 frames. If he wants to put 10 frames on each page, how many pages will his comic book have?

_____ ◯ _____ = _____   _____

---

5. Lukas averages 8 points per game in basketball. How many points would he score after 5 games?

_____ ◯ _____ = _____   _____

---

6. It takes 7 minutes to bake one pan of cookies. How long will it take to bake 4 pans of cookies?

_____ ◯ _____ = _____   _____

Name: _____   G3 U1 Lesson 11 - Independent Work

Directions: Solve each word problem using a model, repeated addition or repeated subtraction. Write an equation to show the work you did. Label your answer.

1. Robin has 5 packages of gum. There are 8 pieces of gum in each package. How many pieces of gum does Robin have?

_____ ◯ _____ = _____   _____

2. 63 people are going to the zoo. There are 7 cars to take people to the zoo. How many people will fit in each car, if each car has the same number of people?

_____ ◯ _____ = _____   _____

3. I have 50 cents to buy candy. If each gumdrop costs 10 cents, how many gumdrops can I buy?

_____ ◯ _____ = _____   _____

Directions: Solve each word problem using a model, repeated addition or repeated subtraction. Write an equation to show the work you did. Label your answer.

1. Sayla has 4 packs of crayons. Each pack has 10 crayons in it. How many crayons does Sayla have?

$$10 \quad 10 \qquad 10 \quad 10 \qquad \begin{array}{r} 20 \\ +\ 20 \\ \hline 40 \end{array}$$
$$\qquad \underset{20}{\vee} \qquad\qquad \underset{20}{\vee}$$
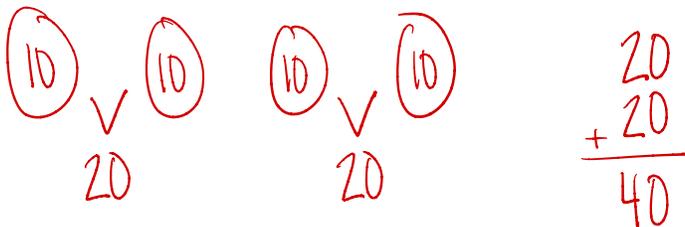
__4__ Ⓧ __10__ = __40__   __total crayons__

2. You want to share 36 pencils among 6 friends. How many would each friend get?

OOO   OOO   OOO   OOO   OOO   OOO
OOO   OOO   OOO   OOO   OOO   OOO
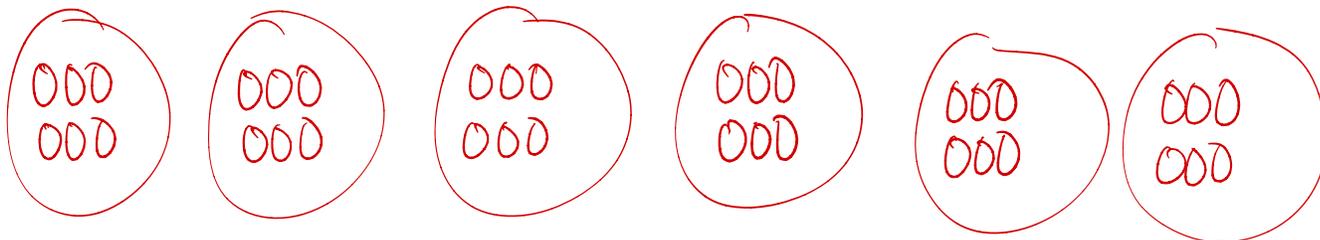
__36__ ⊘ __6__ = __6__   __pencils per friend__

3. Londyn bought 18 small cakes. She gave each of her children 3 cakes. How many children does Londyn have?

$$\begin{array}{c} 18 \\ \boxed{-3} \\ \hline 15 \\ \boxed{-3} \\ \hline 12 \end{array} \Big/ \begin{array}{c} 12 \\ \boxed{-3} \\ \hline 9 \\ \boxed{-3} \\ \hline 6 \end{array} \Big/ \begin{array}{c} 6 \\ \boxed{-3} \\ \hline 3 \\ \boxed{-3} \\ \hline 0 \end{array}$$
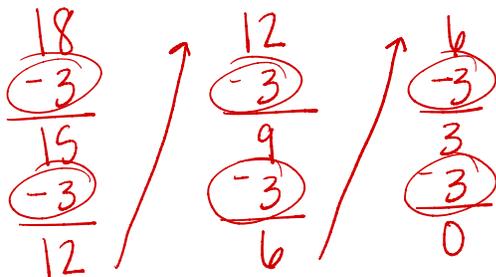
__18__ ⊘ __3__ = __6__   __children__

Directions: Solve each word problem using a model, repeated addition or repeated subtraction. Write an equation to show the work you did. Label your answer.

4. Julian is writing a comic book. His story has 100 frames. If he wants to put 10 frames on each page, how many pages will his comic book have?

$$100 - 10 = 90$$
$$90 - 10 = 80$$
$$80 - 10 = 70$$

$$70 - 10 = 60$$
$$60 - 10 = 50$$

$$50 - 10 = 40$$
$$40 - 10 = 30$$

$$30 - 10 = 20$$
$$20 - 10 = 10$$

$$10 - 10 = 0$$

__100__ ÷ __10__ = __10__   __pages__

5. Lukas averages 8 points per game in basketball. How many points would he score after 5 games?

__5__ × __8__ = __40__   __points total__

6. It takes 7 minutes to bake one pan of cookies. How long will it take to bake 4 pans of cookies?

$$7 + 7 + 7 + 7$$
$$14 \quad\quad 14$$

$$\begin{array}{r} 14 \\ + 14 \\ \hline 28 \end{array}$$

__4__ × __7__ = __28__   __minutes total__

Directions: Solve each word problem using a model, repeated addition or repeated subtraction. Write an equation to show the work you did. Label your answer.

---

1. Robin has 5 packages of gum. There are 8 pieces of gum in each package. How many pieces of gum does Robin have?

$8 + 8 + 8 + 8 + 8$

16   16

32

$$16 + 16 = 32$$
$$32 + 8 = 40$$

__5__ ⊗ __8__ = __40__   __total pieces__

---

2. 63 people are going to the zoo. There are 7 cars to take people to the zoo. How many people will fit in each car, if each car has the same number of people?

63 − 7 = 56
56 − 7 = 49
49 − 7 = 42
42 − 7 = 35
35 − 7 = 28
28 − 7 = 21
21 − 7 = 14
14 − 7 = 7
7 − 7 = 0

__63__ ÷ __7__ = __9__   __people per car__

---

3. I have 50 cents to buy candy. If each gumdrop costs 10 cents, how many gumdrops can I buy?

50 − 10 = 40
40 − 10 = 30
30 − 10 = 20
20 − 10 = 10
10 − 10 = 0

__50__ ÷ __10__ = __5__   __gumdrops__

G3 U1 Lesson 12

Explore how multiplication and division are connected

CITYTUTOR

G3 U1 Lesson 12 - Students will explore how multiplication and division are related

<mark>**Warm Welcome (Slide 1):**</mark> Tutor choice

<mark>**Frame the Learning/Connect to Prior Learning (Slide 2):**</mark> Today we'll take another look at how multiplication and division are connected, or related. But of course, we're first going to review all that you already know about how they're related to each other.

<mark>**Let's Talk (Slide 3):**</mark> You've been learning about multiplication and division for weeks now, you know so much about both kinds of math. Before we jump into our lesson, **I want to hear how you think multiplication and division are connected?**
- They both use equal groups.
- They are opposites.
- They both use something repeated (addition/subtraction)
- Both have a total, groups and number in each group.

Up until this point, we've seen that multiplication and division both have a total, a number of groups and an amount in each group.

<mark>**Let's Talk (Slide 4):**</mark> Let's look at the model here. Let's first describe it in words. There are 2 groups of 3. Correct! There are 2 groups of 3. Let's write those words as a multiplication expression and include the total. So, "groups of" is the same as the multiplication sign. So we can write 2 x 3 = 6, in other words there are 6 total in the 2 groups. Now let's write a division equation to represent the same picture. We know that with division, we start with the total. So the total is 6 and we divided it into 2 groups with 3 in each group. So we can write, 6 divided by 2 equals 3.

Now that we have both our equations. **What do you notice is similar about the equations? What do you notice is different?** Possible Student Answers/Key Points:
- The equations are similar because they have all the same numbers. They both have 2, 3, and 6.
- The equations are different because the numbers are in different places and use different symbols.
- The multiplication equation starts with the groups or amount in each group.
- The division equation starts with the total.
- This reminds me of fact families in first and second grade like 1+3=4 and 4-1=3.

Wow, those are some really big ideas! These equations are related because they share the same numbers and relationships. They both have a total of 6 circles, in 2 groups with 3 in each group. But, they are different because the information is just presented differently.

In the multiplication equation, we start by describing the groups and amount in each group. Then we find the total. In the division equation we start with the total and number of groups and find out how many are in each group. Even though the equations look different, they actually describe the same information. These equations are opposites or inverses. We're going to work today to find inverse equations that are related to each other.

<mark>**Let's Think (Slide 5):**</mark> They've given me an incomplete equation and want me to find the inverse. First, I need to solve the equation they've given me before I find the inverse. How can I solve this equation? Repeated subtraction. Correct, let's set up our repeated subtraction.

How do we begin? We start with 24 and subtract 3. Correct! and we'll keep going until we get to 0. We have 24 and subtract 3, now we have 21 (*continue narrating as you subtract to zero*). Whew, we finally got to zero. Now we need to go back and count how many times we took away three. Ready? I'll circle, while you count: 1, 2, 3, 4, 5, 6, 7, 8. We subtracted three 8 times. Our answer is 8. We can finish the equation they gave us. So, 24 divided by 3 is 8. Now we need to find the inverse.

Our inverse equation will be a multiplication fact. We know multiplication equations say " _____ groups of _____ equals _____". We know there are 8 groups of 3 because I circled 8 groups of 3 in my repeated subtraction. See, 1, 2, 3, 4, 5, 6, 7, 8 (*point to each group you subtracted*). 8 groups and each of them was 3. I know my total is 24 because that's what I started my repeated subtraction with.

So 8 groups of 3 is 24 total. I just wrote the inverse, or opposite, equation. I didn't need to draw a model to get the inverse equation, I used the information I already had from my division equation. I just rearranged it to make the opposite. The information stayed the same, I just changed the order to make the inverse.

Let's Think (Slide 6): This time I'm beginning with a multiplication equation. I need to solve this first before I can find the inverse equation. I'm going to solve this using repeated addition.

I have 4 groups of 6, so I'm going to add 6 and 6 and 6 and 6. I know I can use the plus sign to show "and." My repeated addition equation is 6 + 6 + 6 + 6. Now I'm going to add using my doubles facts. I know 6 + 6 = 12. That leaves me with 2 twelves. I don't know the doubles fact 12+12 so I'm going to stack and add. 12 + 12 is 24 total. Now I can finish my equation. 4 x 6 = 24.

Now I'm ready to write my inverse equation. What kind of equation will be the inverse of our multiplication equation? Division! Right, our equation will be division. I know division equations always go a certain way. I'm going to set it up so we can fill in the blanks. Do you know what always comes first in division? The total. Correct! What is the total from our multiplication equation? 24 is the total. Yes, 24 is the total, I'm going to fill in our first blank with 24.

What comes next? Divided by 4/6. Correct, we divided our 24 into 4 groups. Finally, what's our answer? 6 in each group. Correct!

Question…**would it still be correct if we said the inverse was 24 ÷ 6 = 4 instead of 24 ÷ 4 = 6? Why or why not?** Possible Student Answers, Key Points:
- It would still be correct!
- It's still a related fact because it uses the same total, groups and amount in each group.
- It's the same information but switched around.

Let's Try It (Slide 7): Let's try some together. Remember, related multiplication and division equations use the same total, number of groups and number in each group. They just solve for different information.

WARM WELCOME

Today we will explore how multiplication and division are connected.

How are multiplication and division related?

Let's Think:

Let's write an equation to match this model.

Multiplication	Division

How are the equations similar?

How are the equations different?

Solve. Write the inverse equation.

$$24 \div 3 = \underline{\hspace{2cm}}$$

Solve. Write the inverse equation.

$$4 \times 6 = \underline{\hspace{2cm}}$$

Let's Try It:

Name: _____ G3 Lesson 1-12 Let's Try It

Directions: Write both equations that represent the model below.

1. _____ x _____ = _____   _____ ÷ _____ = _____

2. _____ x _____ = _____   _____ ÷ _____ = _____

3. _____ x _____ = _____   _____ ÷ _____ = _____

Directions: Solve and write the division fact for each multiplication fact.

4. 2 x 9 = _____ and _____ ÷ _____ = _____

5. 3 x 7 = _____ and _____ ÷ _____ = _____

6. 4 x 6 = _____ and _____ ÷ _____ = _____

Directions: Solve and write the multiplication fact for each division fact.

7. 16 ÷ 8 = _____ and _____ x _____ = _____

8. 27 ÷ 3 = _____ and _____ x _____ = _____

9. 32 ÷ 4 = _____ and _____ x _____ = _____

Bonus: How are multiplication and division related?

_____

_____

On your Own:

Name: _____ G3 Lesson 1-12 Independent Work

Remember: Use what you know about how multiplication and division are related.

1. Write a multiplication and division equation to match the picture below.

_____ x _____ = _____

_____ ÷ _____ = _____

2. Solve and write a division equation for the multiplication equation below.

6 x 4 = _____

_____ ÷ _____ = _____

3. Solve and write a multiplication fact for the division equation below.

20 ÷ 5 = _____

_____ x _____ = _____

4. Write a multiplication and division equation to match the picture below.

_____ x _____ = _____

_____ ÷ _____ = _____

Directions: Write both equations that represent the model below.

1. _____ x _____ = _____   _____ ÷ _____ = _____

2. _____ x _____ = _____   _____ ÷ _____ = _____

3. _____ x _____ = _____   _____ ÷ _____ = _____

Directions: Solve and write the division fact for each multiplication fact.

4. 2 x 9 = _____   and   _____ ÷ _____ = _____

5. 3 x 7 = _____   and   _____ ÷ _____ = _____

6. 4 x 6 = _____   and   _____ ÷ _____ = _____

Directions: Solve and write the multiplication fact for each division fact.

7. 16 ÷ 8 = _____   and   _____ x _____ = _____

8. 27 ÷ 3 = _____   and   _____ x _____ = _____

9. 32 ÷ 4 = _____   and   _____ x _____ = _____

Bonus: How are multiplication and division related?

_____

_____

Remember: Use what you know about how multiplication and division are related.

1. Write a multiplication and division equation to match the picture below.

    _____ x _____ = _____

    _____ ÷ _____ = _____

2. Solve and write a division equation for the multiplication equation below.

    6 x 4 = _____

    _____ ÷ _____ = _____

3. Solve and write a multiplication fact for the division equation below.

    20 ÷ 5 = _____

    _____ x _____ = _____

4. Write a multiplication and division equation to match the picture below.

    _____ x _____ = _____

    _____ ÷ _____ = _____

Directions: Write both equations that represent the model below.

1. $3 \times 6 = 18$ $18 \div 3 = 6$

2. $2 \times 4 = 8$ $8 \div 2 = 4$

3. $3 \times 5 = 15$ $15 \div 3 = 5$

Directions: Solve and write the division fact for each multiplication fact.

4. 2 x 9 = 18 and $18 \div 2 = 9$

5. 3 x 7 = 21 and $21 \div 3 = 7$

$7 + 7 + 7$

$14 \checkmark$

14

$+ \; 7$

21

6. 4 x 6 = __24__ and __24__ ÷ __6__ = __4__

6 + 6 + 6 + 6

12   12

12   12

24
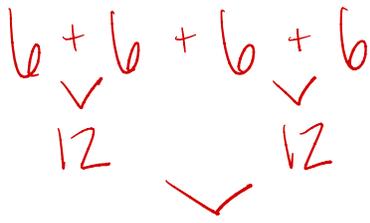
Directions: Solve and write the multiplication fact for each division fact.

7. 16 ÷ 8 = __2__ and __8__ x __2__ = __16__

8. 27 ÷ 3 = __9__ and __9__ x __3__ = __27__

9. 32 ÷ 4 = __8__ and __8__ x __4__ = __32__

Bonus: How are multiplication and division related?

Multiplication and division are opposites.

Remember: Use what you know about how multiplication and division are related.

---

1. Write a multiplication and division equation to match the picture below.

$\underline{3} \times \underline{5} = \underline{15}$

$\underline{15} \div \underline{3} = \underline{5}$

---

2. Solve and write a division equation for the multiplication equation below.

6 x 4 = ___24___

$4 + 4 + 4 + 4 + 4 + 4$

$8 \qquad 8 \qquad 8$

16

16
$+\ 8$
$\overline{24}$

$\underline{24} \div \underline{4} = \underline{6}$

---

3. Solve and write a multiplication fact for the division equation below.

20 ÷ 5 = ___4___

$\begin{array}{r} 20 \\ -\ 5 \\ \hline 15 \\ -\ 5 \\ \hline 10 \\ -\ 5 \\ \hline 5 \end{array}$

5
0

$\underline{4} \times \underline{5} = \underline{20}$

---

4. Write a multiplication and division equation to match the picture below.

$\underline{2} \times \underline{3} = \underline{6}$

$\underline{6} \div \underline{2} = \underline{3}$

G3 U1 Lesson 13
Explore multiplication and division facts

G3 U1 Lesson 13 - Students will explore multiplication and division facts

Tutor choice

Today we will continue exploring related multiplication and division facts. Yesterday we wrote one related division or multiplication fact. But, guess what? We can write 2 related multiplication and division facts to create a fact family.

You already know so much about fact families using addition and subtraction. **Can you give me an example of a fact family using addition and subtraction?** You showed that fact families have four facts. They have 2 addition facts and 2 subtraction facts and all four number sentences use the same three numbers, the same two parts and the same whole. Let's see how multiplication and division fact families go.

Yesterday we wrote 1 equation each to describe a model. Today let's try writing two multiplication and two division equations to describe the array above. Let's begin with multiplication.

$$2 \times 6 = 12$$
$$6 \times 2 = 12$$

We know that arrays have equal groups that go across AND equal groups that go up and down. So, let's start by looking at the rows. We see two rows that have 6 in each row. So, 2 times 6 is 12.

But, we can also look at the columns, which go up and down! We see 6 columns with 2 in each group. So, 6 times 2 is 12.

What did you notice stayed the same in the equations? What did you notice changed? Possible Student Answers/Key Points:
- The total stayed the same. It was 12. It also stayed in the same place.
- The groups and in each group numbers stayed the same, but they switched places.

That's right. The numbers that switched are called the factors in multiplication. We can switch the factors and the product, or total, stays the same. That works for every multiplication equation. You can always write two multiplication equations by switching the factors and it does not change the total.

$$12 \div 2 = 6$$
$$12 \div 6 = 2$$

Now let's look at the division equations. When we write division equations, we always start with the whole. We see 12 in all. So we start with 12 and then if we look at the rows, we are splitting 12 into 2 groups with 6 in each group. So, 12 divided by 2 is 6.

Now instead of looking at rows, let's look at columns. We're still starting with all 12. And we're splitting 12 into 6 groups (*point to columns*), and there are 2 in each column. So 12 divided by 6 is 2. Now we have two division equations to describe the model.

So, **what changed in the division equations and what stayed the same?** Possible Student Answers/Key Points:
- All the numbers stayed the same. There was still a 2, 6 and 12.
- The total stayed in the same place, it's always before the division symbol because that's what we start with.
- The groups and amount in each group switched.

You are correct. When you described what stayed the same in both the multiplication and division, you said the total stayed the same. Multiplication always ends with the total and division always begins with the total.

But you said you can switch the number of groups and number in each group. Let's remember this in order to write fact families.

<mark>Let's Think (Slide 5):</mark> We need to write three more equations to finish the fact family. We have a division equation. Let's remember what I learned about division.

24 ÷ 3 = 8	$24 \div 8 = 3$

So, 24 is the total and in this first equation it's broken into 3 groups with 8 in each group, but I could have 24 broken into 8 groups with 3 in each group. So another equation would be 24 ÷8 = 3 to show 24 broken into 8 groups is 3 in each group.

I only switched the groups and amount in each group. Now I can write my multiplication equations.

24 ÷ 3 = 8	$24 \div 8 = 3$
$3 \times 8 = 24$	

I know I need to multiply the groups by the amount in each group to get the total. There are 3 groups with 8 in each group, that equals 24 total. The equation that shows that is 3 x 8 = 24.

24 ÷ 3 = 8	$24 \div 8 = 3$
$3 \times 8 = 24$	$8 \times 3 = 24$

We know we can switch the groups and amount in each group. Instead, there can be 8 groups with 3 in each group. The equation to show that would be 8 x 3 = 24. Again I only switched the groups and amount in each group, not the total.

Look at what we just did! We wrote four different equations that use the same three numbers! We used multiplication to show that we can switch the factors, 8 and 3 and the total stays the same. And we used division to show that we can switch the divisors and the dividend, or total, stayed the same!

<mark>Let's Try It (Slide 6-7):</mark> Let's try some together. Remember whether it's division or multiplication, we don't move the total. However, we can always switch the number of groups and amount in each group.

WARM WELCOME

Today we will explore multiplication and division facts.

Give an example of a fact family.

Let's Think:

Multiplication	Division

What numbers can you switch in multiplication? Why?

What numbers can you switch in division? Why?

Write all four equations of the fact family

24 ÷ 3 = 8	

Let's Try It:

Name: _____ G3 Lesson 1-13 Let's Try It

Directions: Write four equations that represent the model below.

1. _____ x _____ = _____   _____ ÷ _____ = _____
    _____ x _____ = _____   _____ ÷ _____ = _____

2. _____ x _____ = _____   _____ ÷ _____ = _____
    _____ x _____ = _____   _____ ÷ _____ = _____

3. _____ x _____ = _____   _____ ÷ _____ = _____
    _____ x _____ = _____   _____ ÷ _____ = _____

Directions: Solve and complete the fact family.

4. 7 x 4 = _____   _____ ÷ _____ = _____
    _____ x _____ = _____   _____ ÷ _____ = _____

5. 45 ÷ 5 = _____   _____ x _____ = _____
    _____ x _____ = _____   _____ ÷ _____ = _____

6. 6 x 8 = _____   _____ ÷ _____ = _____
    _____ x _____ = _____   _____ ÷ _____ = _____

7. 48 ÷ 8 = _____   _____ x _____ = _____
    _____ x _____ = _____   _____ ÷ _____ = _____

8. 3 x 5 = _____   _____ ÷ _____ = _____
    _____ x _____ = _____   _____ ÷ _____ = _____

9. Sam is explaining to Jake that 16 ÷ 2 is the same as 2 ÷ 16. Is Same correct? Explain your answer.

_____
_____

✏️ On your Own:

Remember: Use what you know about how multiplication and division are related.

1. Write the fact family to represent the picture below.

_____ x _____ = _____

_____ x _____ = _____

_____ ÷ _____ = _____

_____ ÷ _____ = _____

2. Solve and complete the fact family.

4 x 6 = _____

_____ x _____ = _____

_____ ÷ _____ = _____

_____ ÷ _____ = _____

3. Solve and complete the fact family.

36 ÷ 9 = _____

_____ ÷ _____ = _____

_____ x _____ = _____

_____ x _____ = _____

4. Write the fact family to represent the picture below.

_____ x _____ = _____

_____ x _____ = _____

_____ ÷ _____ = _____

_____ ÷ _____ = _____

Directions: Write four equations that represent the model below.

1.

_____ x _____ = _____   _____ ÷ _____ = _____

_____ x _____ = _____   _____ ÷ _____ = _____

2.

_____ x _____ = _____   _____ ÷ _____ = _____

_____ x _____ = _____   _____ ÷ _____ = _____

3.

_____ x _____ = _____   _____ ÷ _____ = _____

_____ x _____ = _____   _____ ÷ _____ = _____

Directions: Solve and complete the fact family.

4. 7 x 4 = _____   _____ ÷ _____ = _____

_____ x _____ = _____   _____ ÷ _____ = _____

5. 45 ÷ 5 = _____   _____ x _____ = _____

_____ x _____ = _____   _____ ÷ _____ = _____

6. 48 ÷ 8 = _____   _____ x _____ = _____

_____ x _____ = _____   _____ ÷ _____ = _____

7. 3 x 5 = _____   _____ ÷ _____ = _____

_____ x _____ = _____   _____ ÷ _____ = _____

8. Sam is explaining to Jake that 16 ÷ 2 is the same as 2 ÷ 16. Is Same correct? Explain your answer.

Remember: Use what you know about how multiplication and division are related.

1. Write the fact family to represent the picture below.

   _____ x _____ = _____

   _____ x _____ = _____

   _____ ÷ _____ = _____

   _____ ÷ _____ = _____

2. Solve and complete the fact family.

   4 x 6 = _____

   _____ x _____ = _____

   _____ ÷ _____ = _____

   _____ ÷ _____ = _____

3. Solve and complete the fact family.

   36 ÷ 9 = _____

   _____ ÷ _____ = _____

   _____ x _____ = _____

   _____ x _____ = _____

4. Write the fact family to represent the picture below.

   _____ x _____ = _____

   _____ x _____ = _____

   _____ ÷ _____ = _____

   _____ ÷ _____ = _____

Directions: Write four equations that represent the model below.

1.

$4 \times 6 = 24$ $24 \div 4 = 6$

$6 \times 4 = 24$ $24 \div 6 = 4$

2.

$4 \times 3 = 12$ $12 \div 3 = 4$

$3 \times 4 = 12$ $12 \div 4 = 3$

3.
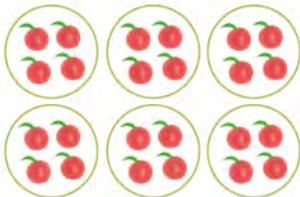
$6 \times 4 = 24$ $24 \div 4 = 6$

$4 \times 6 = 24$ $24 \div 6 = 4$

Directions: Solve and complete the fact family.

4. $7 \times 4 = 28$ $28 \div 4 = 7$

$4 \times 7 = 28$ $28 \div 7 = 4$

5. $45 \div 5 = \underline{9}$ $\underline{5} \times \underline{9} = \underline{45}$

   $\underline{9} \times \underline{5} = \underline{45}$ $\underline{45} \div \underline{9} = \underline{5}$

6. $48 \div 8 = \underline{6}$ $\underline{6} \times \underline{8} = \underline{48}$

   $\underline{8} \times \underline{6} = \underline{48}$ $\underline{48} \div \underline{6} = \underline{8}$

7. $3 \times 5 = \underline{15}$ $\underline{15} \div \underline{3} = \underline{5}$

   $\underline{5} \times \underline{3} = \underline{15}$ $\underline{15} \div \underline{5} = \underline{3}$

   $$5 + 5 + 5$$
   $$10 \quad\quad \begin{array}{r} 10 \\ + 5 \\ \hline 15 \end{array}$$

8. Sam is explaining to Jake that $16 \div 2$ is the same as $2 \div 16$. Is Same correct? Explain your answer.

   No he is not correct. Division must start with the total. You can't move the total.

Name: _____   G3 Lesson 1-13 Independent Work

Remember: Use what you know about how multiplication and division are related.

1. Write the fact family to represent the picture below.

2 x 5 = 10

5 x 2 = 10

10 ÷ 2 = 5

10 ÷ 5 = 2

2. Solve and complete the fact family.

4 x 6 = 24

$6+6+6+6$ 12
12 12 $+12$
                24

6 x 4 = 24

24 ÷ 6 = 4

24 ÷ 4 = 6

3. Solve and complete the fact family.

36 ÷ 9 = 4

36 ÷ 4 = 9

4 x 9 = 36

9 x 4 = 36

4. Write the fact family to represent the picture below.

5 x 7 = 35

7 x 5 = 35

35 ÷ 3 = 7

35 ÷ 7 = 3

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