

Math: Grade 4, Lesson 16, Division

Lesson Focus: Division with Remainders

Practice Focus: Students will focus on practicing division in order to interpret remainders.

Objective: Students will use division to solve word problems with a focus on making sense of the remainder.

Key Vocabulary: division, divisor, dividend, quotient, remainder

TN Standards: 4.OA.A.3

Teacher Materials:

- Whiteboard and markers
- 20 counters
- Student Activity Packet

Student Materials:

- Paper and a pencil, and a surface to write on
- 20 items to use as counters

Teacher Do	Student Do
<p><u>Opening</u> (1 min)</p> <p>Hello! Welcome to Tennessee's At Home Learning Series for math! Today's lesson is for all our 4th graders out there, though all children are welcome to tune in. This lesson is the sixteenth in our series.</p> <p>My name is ____ and I'm a ____ grade teacher in Tennessee schools! I'm so excited to be your teacher for this lesson! Welcome to my virtual classroom!</p> <p>If you didn't see our previous lesson, you can find it on the TN Department of Education's website at www.tn.gov/education. You can still tune in to today's lesson if you haven't see any of our others. But, it might be more fun if you first go back and watch our other lessons since we'll be talking about things we learned previously.</p> <p>Today we will be learning about division with remainders! Before we get started, to participate fully in our lesson today, you will need:</p> <ul style="list-style-type: none">• Paper and a pencil, and a surface to write on• 20 items to use as counters• The student activity packet for Math, Grade 4, Lesson 16 which can be found at www.tn.gov/education. <p>Ok, let's begin!</p>	<p>Students get materials ready for the lesson.</p>
<p><u>Intro</u> (3 mins)</p> <p>Today we are going to solve problems using division.</p>	

**Let's start by looking at this situation:
Four friends split a bill for lunch equally. The bill is \$48. How much will each person pay for lunch?**

**What is this problem about? [Pause]
Great! It's about friends paying for their lunch.
What information do we know? [Pause]
That's right! We know that there are 4 friends. We also know that the total bill is \$48.
What are we trying to find out? [Pause]
We are trying to find out how much each friend will have to pay for lunch.**

**What strategy might you use to solve this problem? [Pause]
I am hearing that we need to use division! Good job! We know the total amount of the bill and we need to split that amount into equal groups because the friends are splitting the bill equally. How many equal groups? [Pause]
Right, 4, because there are 4 friends.
How can we divide 48 by 4? We can call these numbers the dividend and the divisor. The dividend is 48: the total amount of money that is being split into equal groups. The divisor is 4: the number of equal groups we are splitting into, in this case the number of friends.**

**We are thinking about how many times 4 goes into 48. One way is to think about multiplication. Let's list some multiples of 4. Think about 4 times 1 is 4, 4 times 2 is 8, and so on to make a list. Give it a try! [Pause, then say and write the list of multiples below.]
4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48**

4 times what gave us 48? That's right, 4 times 12. Remember that multiplication and division are related. We know that $4 \times 12 = 48$. This also means that $48 \div 4 = 12$.

**This division sentence says that 4 goes into 48 twelve times. 12 is our quotient, or the solution to our division problem. Think back to the question about what each of these numbers mean. [Pause]
We took the total lunch bill of \$48 and split it equally among 4 friends. Each friend will pay \$12 for lunch.**

For this next division problems, we are going to use some items that you have around the house as counters. Take a moment to look around for 20 small objects that you can use. These could be small blocks, coins, or any other small object.

This warm-up will support students' understanding of division without a remainder, foreshadowing the work in the Teacher Model section.

Students will listen to the teacher think aloud modeling the thought process for a problem from the start of the problem through finding the solution. Students will follow along and responding to teacher questioning.

If you cannot find 20 objects, that's okay! Just grab your pencil and paper. Let's start with another problem.

Teacher Model (12 mins)

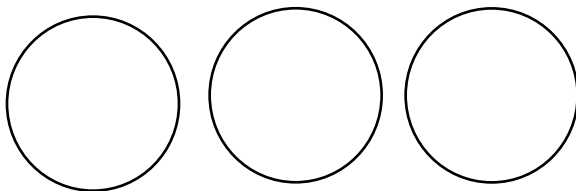
Objective #1: Teacher will guide students through how to solve a division problem and make sense a remainder in a partitive situation using a drawing.

Andrea and 2 friends are playing a game of dominoes. There are 20 dominoes in the set. Andrea wants each player to receive the same number of dominoes. Can she divide them equally among the 3 players?

You can use division to find the number of dominoes each player will receive.

Let's draw three large circles to represent the 3 players.

[Draw]

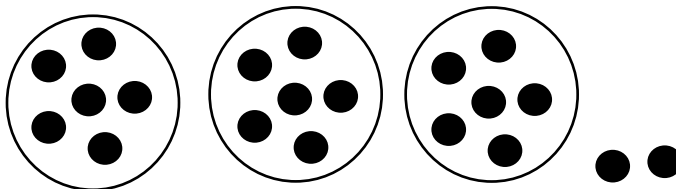


Use your 20 items as counters to represent the 20 dominoes. We are going to share the counters equally among the 3 groups by placing them in the circles that we drew. If you don't have counters, use a pen or pencil and draw dots.

[Pause]

Keep placing 1 counter or dot in each circle until the number of counters you have is less than the number of circles.

[Pause, then model placing counters into the circles one at a time until there are 6 in each circle and 2 left over.]



How many counters did you place in each circle? [Pause]

Me too! I placed 6 counters in each circle.

How many counters do you still have? [Pause]

Right, there are two counters left.

We just modeled a division problem with a remainder. Our division problem is $20 \div 3$. [Write $20 \div 3$.]

Students will listen to the teacher do a think aloud working a contextual problem modeling the thought process for a problem from the start of the problem through finding the solution.

Objective #1:

Through following along with the think aloud, students will learn how to solve a partitive division problem and make sense of a remainder using a drawing.

Remember that 20 is called the dividend, or the total number of objects, in this case, dominoes. 3 is called the divisor. In this problem, the divisor is the number of people.

We found that we could equally put 6 objects in each group. 6 is the quotient, or the result of our division problem.

[Write $20 \div 3 = 6$.]

We found that there were 2 counters left. This is called the remainder. In division, the remainder is the amount left over that cannot be divided evenly by the divisor.

[Write $20 \div 3 = 6 \text{ r } 2$.]

To revisit this problem, we found that when we divided 20 dominoes equally among 3 friends, each friend received 6 dominoes with 2 left over. Awesome job! Let's keep going.

Objective #2: Teacher will guide students through how to solve a division problem and make sense a remainder in a quotative situation using a drawing.

Students are driven to soccer games in vans. Each van holds 9 students. How many vans are needed for 31 students?

What is this problem about? [Pause]

Great! It's about students driving to a soccer game in vans.

What information do we know? [Pause]

That's right! We know that there are 31 students. We also know that each van holds 9 students.

What are we trying to find out? [Pause]

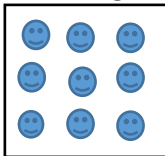
We are trying to find out how many vans are needed for the 31 students.

What strategy might you use to solve this problem? [Pause]

Right, we are going to use division. We know the total number of students is 31. This is the dividend. We are going to divide the total number of students by 9, the divisor, or the number of students that fit in each van.

Let's draw a picture. Draw with me I'm going to draw a rectangle to represent a van. How many students fit in 1 van?

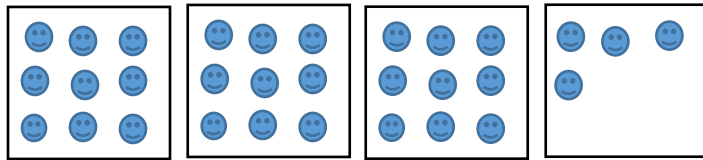
[Pause] Right, 9 students! Let's put 9 smiley faces in the van.



Objective #2:

Through following along with the think aloud, students will learn how to solve a quotative division problem and make sense of a remainder using a drawing.

We need to drive a total of 31 students to the soccer game. Let's keep drawing vans of 9 students until we have drawn 31 students. [Draw and count out loud.]



9 students 18 students 27 students 31 students

Hmmm. We drew 31 students but the last van isn't full. That means have a remainder. 31 students split equally into vans of 9 students fills up 3 vans with 4 students left over.

As a division equation, this would look like: [Write and say.] $31 \div 9 = 3$, remainder 4.

In this situation, what will the quotient and remainder, or our solution represent? [Pause]

That's right, the number of vans needed to drive the students to their soccer games.

Can 3 vans be used to drive 31 students? [Pause]

No, because there are still 4 more students that need a ride to their soccer game.

How many vans do we need to drive all 31 students to the soccer games? [Pause]

Good job! 4 vans. We need another van to carry the 4 students still left to the soccer game. Even though this van will not be full, we still need 4 vans to transport all of the students.

Objective #3: Teacher will guide students through how to solve a division problem using multiplication facts and make sense of a remainder in context.

Let's look at another situation:

Ben is a tour guide at a museum. He can take no more than 7 people at a time on a tour. If 80 people want to go on a tour, how many groups of 7 people will Ben show around?

What information do you know? [Pause]

Right! We know that Ben can lead tours of no more than 7 people. There are 80 people who want a tour.

What do you need to find? [Pause]

We need to find the number of tour groups of 7 people Ben can show around.

How might you solve this problem? [Pause]

Objective #3:

Through following along with the think aloud, students will learn how to solve a division problem using multiplication facts and make sense of a remainder in context.

<p>Did I hear division? That's right! We need to divide $80 \div 7$ to find out how many tour groups Ben can show around the museum. [Write $80 \div 7$.]</p> <p>I am going to think about fact families to solve this problem. 7 times what number is close to 80? [Write $7 \times \underline{\quad} =$ for each of the following.] Hmm.</p> <p>7×10 is 70</p> <p>7×11 is 77</p> <p>7×12 is 84</p> <p>84 is more than 80 so 7×12 is too much.</p> <p>7×11 is 77 which is close without going over. [Circle this fact.]</p> <p>So that means that $80 \div 7$ is 11 with a remainder. [Next to $80 \div 7$, write = 11 r and fill in 3 when you get to it.] $7 \times 11 = 77$, which is only 3 away from 80, so there is a remainder of 3.</p> <p>The quotient is 11. Ben can give tours to 7 people at a time. The quotient is the number of tour groups of exactly 7 people he can show around. After he completes the tours for groups of 7 people, how many people are in his last tour? [Pause]</p> <p>Great! The remainder is 3. That means Ben's last tour will have 3 people.</p> <p>If Ben gives tours to all 80 people, how many tours will he give? [Pause]</p> <p>Ben will give 11 tours with 7 people on each tour, and the last tour will have 3 people. That's a total of 12 tours!</p> <p>Tying the learning together:</p> <p>Not all real-world division problems require the quotient and the remainder as the answer. We need to interpret the problem situation and the question in order to determine what answer makes sense. The answer can vary: sometimes the question might be asking for a quotient without a remainder. Sometimes, the question might be asking to explain what the remainder means in the problem.</p> <p>Thank you for thinking through the different ways to interpret a quotient and remainder with me. Now you will get to practice these strategies. So get your paper and pencil ready!</p>	
<p><u>Guided Practice</u> (9 mins)</p> <p>Work through this next problem with me as I think aloud.</p>	

[I do]

Daniel made 32 ounces of soup for 5 people. How many ounces of soup will each person get?

[Point to each part of the problem as you talk through it.]

I understand that Daniel is feeding 5 people with 32 ounces of soup. He wants everyone to get the same amount of soup to be fair. So he will need to divide 32 ounces of soup among 5 people or $32 \div 5$. [Write $32 \div 5$.]

I'm going to think about multiples to solve this problem, since division and multiplication are related. 5 times what number is close to 32? [Write $5 \times \underline{\quad} =$ for each of the following.] Hmm. 5×5 is 25, 5×6 is 30, and 5×7 is 35. 35 is more than 30 so 5×7 is too much. [Mark through $5 \times 7 = 35$.] 5×6 is 30 which is closer to 32 than 5×5 , so 6 is my answer. [Circle this fact.]

But since we were looking for 32 instead of 30, that means that $32 \div 5$ is 6 with some left over, which will be a remainder. [Next to $32 \div 5$, write $= 6 \text{ r}$ and fill in 2 when you get to it.] $5 \times 6 = 30$, which is only 2 away from 32, so there is a remainder of 2.

Therefore, every person will get 6 ounces of soup with 2 ounces left over. [Write this out including the "ounces of soup".]

Now you try this one with me.

[We do]

A total of 14 students sign up to be greeter's on Parents' Night at school. The principal wants an equal number of students to greet parents at each entrance. There are 3 entrances. How many students will be at each entrance?

What information does this problem tell us? [Pause] Okay, 14 students are available to greet people at 3 entrances to the school.

And what do we need to find? [Pause] Yes, how many students will be at each entrance. So what do we need to do to find out? [Pause] Good! We need to divide 14 students by 3 entrances.

Students work alongside the teacher as the teacher thinks aloud.

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

<p>Go ahead and divide. Remember if you need to, you can use your multiples or draw a picture to help you. [Allow students time to think and divide.]</p> <p>What did you find? [Pause] 4? Yes, good. Is there a remainder? [Pause] Yes, 4×3 is 12, which is 2 away from 14, so there is a remainder of 2.</p> <p>So the answer would be that 4 students will greet people at each entrance. I bet the principal will find another job for the extra 2 students.</p> <p>[You do]</p> <p>Go ahead and try this one on your own. I'll give you some time to think it through.</p> <p>Myra has a 17-foot roll of crepe paper to cut into streamers to decorate for a party. She needs each streamer to be 2 feet long. How many streamers will she have?</p> <p>[Allow time for students to think through and solve.]</p> <p>How many 2-foot long streamers will Myra be able to cut from her roll of crepe paper? [Pause] I heard 8 streamers. Very good! Will there be any crepe paper left over? [Pause] Yes, there will be 1 foot left over. I'm sure she will find something else to do with that remaining piece.</p> <p>Great job, students!</p> <p><u>Additional Problem (if needed):</u></p> <p>Juan has a piano recital next month. Last week, he practiced for a total of 8 hours in the morning and 7 hours in the afternoon. Each practice session is 2 hours long. How many full practice sessions did Juan complete?</p> <p>Solution: 7 full practice sessions.</p>	<p>Students are working almost exclusively independently with the teacher providing answers at the end.</p>
<p><u>Independent Practice (1 min)</u></p> <p>Great work, everyone! Today, we practiced division with remainders. I hope you're seeing that sometimes when you divide you will end up with some left over! You sure did a great job! After the video, you will have some problems to practice on your own. I will show you the independent practice problems now, or you can find them in the student practice for this lesson posted on our website, www.tn.gov/education. [Teacher shows student practice</p>	

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page under document camera or camera zooms in on student practice page.] Good luck and do your best!	
<u>Closing (1 min)</u> <ul style="list-style-type: none">• Boys and Girls, I enjoyed learning about division with remainders with you! Thank you for inviting me into your home. I look forward to seeing you in our next lesson in Tennessee's At Home Learning Series!• Bye!	

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