PBS Lesson Series

Math: Grade 4, Lesson 8, Fractions

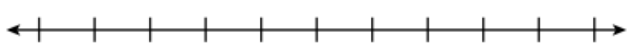
Lesson Focus: Subtract Fractions
Practice Focus: Students will focus on drawing models in order to subtract fractions.
Objective: Students will use various strategies to subtract fractions with a focus on drawing pictures and number lines.
Key Vocabulary: numerator, denominator, fraction
TN Standards: 4.NF.B.3
Teacher Materials:

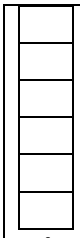
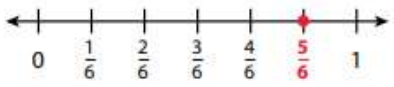
- Whiteboard and markers
- Student Practice Packet

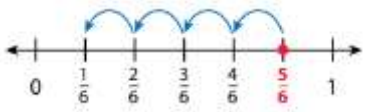
Student Materials:

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

Teacher Do	Student Do
Opening (1 min) **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 eighth in our series.** **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!** **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.** **Today we will be learning about subtracting fractions in mathematics! Before we get started, to participate fully in our lesson today, you will need:** • **Paper and a pencil, and a surface to write on** **Ok, let's begin!**	Students get materials ready for the lesson.
Intro (5 mins) **Today we are going to think about subtracting fractions. A fraction is a number that names equal parts of a whole. We will also think about how to model our thinking about fractions by drawing pictures and number lines.** **Let's start by thinking about this question:** **1/10 more than 5/10 is _____?** **A number line might help us think about this.**	This warm-up will support students' understanding of subtracting fractions, foreshadowing the work in in the Teacher Model section by using a number line.

[Draw a number line and label by tenths from 0/10 to 10/10]  **We are thinking about 1/10 more than 5/10.** [Point to the number line as saw the following] **Start at 5/10 on the number line.** **1/10 more means I will move 1/10 to the right.** **Where did we land?** [Pause] **Right! 6/10. 1/10 more than 5/10 is 6/10.** **Now let's think about 1/10 less than 5/10. What do you think that might be?** [Pause] [Point to the number line as saw the following] **Again, we will start at 5/10 on the number line.** **1/10 more means I will move 1/10 to the left** **Where did we land?** [Pause] **Right! 4/10. 1/10 less than 5/10 is 4/10.**	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 by drawing a number line on their own paper and responding to teacher questioning.
<u>Teacher Model (10 mins)</u> Objective #1: Teacher will explicitly instruct how to draw a picture in order to subtract fractions. **Let's use what we just discussed to try and solve a problem about a water bottle.** **Alberto's water bottle has 5/6 of a liter of water in it. He drinks 4/6 of a liter. What fraction of a liter of water is left in the bottle?** **Let's pause for a moment and talk about measurement. There are two systems of measurement are used in the United States: the customary system and the metric system. In this problem, we are using a metric unit called a liter. A liter is a metric unit of liquid volume.** **Alberto's water bottle has 5/6 of a liter of water in it. How many equal parts is the liter divided into?** [Pause] **Right, 6 equal parts because the denominator tells the number of equal parts in a whole.** **We can use a picture to help understand the problem. Think about what a water bottle might look like if it has 6 equal size parts.** [Pause] **Draw with me a water bottle with 6 equal size parts.**	Objective #1: 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. Through following along with the think aloud, students solve a problem that requires finding the difference between 5/6 and 4/6. Students will model the fractions in the word problem on paper to represent the difference. The purpose of this problem is to have students develop strategies to subtract fractions.

 **Where does the drawing show the total number of equal parts in the bottle?** [Pause, then point to one section of the drawing and say] **Each part of the water bottle is 1/6 liter. There are 6 total equal parts.** **How much water is in the water bottle?** [Pause] **Yes, 5/6 liters of water.** **Let's shade our drawing to show how much water is in the water bottle.** [Shade the drawing] **How much water did Roberto drink?** [Pause] **That's right, he drank 4/6 of a liter.** **Let's show this on our drawing. I am going to cross out 4/6 liters. That water is no longer in the bottle since Roberto drank it.** **How much water is left in the water bottle and where do we see that in the drawing?** [Pause, then point to the drawing and explain] **Nice job! There is 1/6 liter of water left in the water bottle.** [Point to the drawing while recapping the problem] **To review, the five shaded parts show how much water is in the bottle. Alberto drinks 4 sixths of a liter, so take away 4 shaded parts. The 1 shaded part that is left shows the fraction of a liter that is left, which is 1/6.** Objective #2: Teacher will explicitly instruct how to use a number line to subtract fractions. **Nice job! We can also use a number line to model this problem. Let's try this together. How many parts should we divide the number line into?** [Pause] **Right! 6 parts because the denominator of our fraction is 6, which is the total number of equal parts. Draw a number line with me like this:**  **Now we're going to make a point at 5/6 on the number line to show the amount of water in the water bottle.**	Objective #2: 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. Through following along with the think aloud, students solve a problem that requires finding the difference between 5/6 and 4/6. Students will model the fractions in the word problem on paper to

How much of the water did Alberto drink? [Pause] **That's right, Alberto drank 4/6 of a liter of water. To show this on the number line, we are going to start at 5/6 and count back 4 sixths to subtract 4/6. Count with me!** [Point to the number line, draw jumps, and count aloud] **1 sixth, 2 sixths, 3 sixths, 4 sixths.**  **Where did we land on the number line?** [Pause] **1/6! Just like in our drawing, we can see on the number line that 1/6 of a liter of water is left in the water bottle.** **What number tells the number of equal parts in the whole in the water bottle drawing?** [Pause] **What number tells the number of equal parts in the number line?** [Pause] **Is it the same or different?** [Pause] **It is the same! The answer to both questions is 6, because 6 is the denominator. It tells the total number of equal parts in both the water bottle drawing and the number line. Both show 6 equal parts because they represent the same whole.**	represent the difference. The purpose of this problem is to have students develop strategies to subtract fractions.
Tying the learning together: **Let's review!** **Why does 1/6 represent 1 of the equal parts of the liter?** [Pause] **The denominator tells the number of equal parts the bottle is divided into. The water bottle is divided into 6 equal parts, so one part equals 1/6.**	Tying the learning together: Students will compare and connect the different representations and identify how they are related.
What do the numerators, 5 and 4, tell you? [Pause] **5 tells the number of parts of the bottle that had water to begin with. 4 tells the number of parts that Alberto drank.** **How many sixths of a liter are left in the bottle after Alberto drinks 4 sixths?** [Pause] **Right! 1 sixth.** **Write an equation to show what fraction of a liter is left in the water bottle.** [Pause] **Here are two different questions you could write.** [Write and say aloud] **5 sixths – 4 sixths = 1 sixth, OR 5/6 – 4/6 = 1/6.** **What would be the difference be if the fractions were 4/6 – 2/6?** [Pause] **Right! 2/6.**	Students will respond to questions to display an understanding of how to subtract any two fractions that have the same denominator.

Explain how you subtract fractions that have the same denominator. [Pause] **Subtract the numerator of the amount you take away from the numerator of the starting amount to get the numerator of the answer to find how many parts you have left. The denominator of the answer is the same as the denominator of the other amounts because that tells you what kind of parts you subtracted.**	
<u>Guided Practice (10 mins)</u> [I do] **Let's practice three more fraction subtraction problems today. Use models like a drawing or a number line to help you find a solution.** **Here is the first problem: Carmen has 8/10 of the lawn left to mow. She mows 5/10 of the lawn. Now what fraction of the lawn is left to mow?** **I am going to draw a number line like this to help me:** [Draw a number line and label by tenths from 0/10 to 10/10]  **Take a moment to find a solution using your number line.** [Pause] **Nice job! Start at 8/10 on the number line and move 5/10 to the left. Carmen now has 3/10 of the lawn left to mow.** **You can write the equation 8/10 – 5/10 = 3/10.** **Remember, you could also show 1/3 on a number line divided into thirds and count 1 tick mark to the right.** [We do] **Here is the second problem: Mrs. Kirk has 3/4 of a carton of eggs. She uses some for baking and has 2/4 of the carton left. What fraction of the carton does she use?** **Give this one a try! I would suggest drawing a number line to help you.** [Pause to allow students time to think and work.] **For this problem, you might draw a number line divided into fourths.** [Pause and draw this.] **Show 3/4 on a number line divided into fourths and count back 2 fourths.** [Pause and draw this.] **You could also write the equation 3/4 - 2/4 = 1/4. What does 1/4 mean in this problem?** [Pause]	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.

It means that Mrs. Kirk used 1/4 of the carton of eggs. [You do] **Now you are going to try a problem on your own. Remember to draw a picture or use a number line! Listen as I read aloud: Badru reads 4/8 of a book. How much of the book does he have left to read?** [Pause to allow students time to think and work.] **Great job, students! Badru has 4/8 of the book left to read.** Additional Problems (if Needed): What is 5/9 – 3/9? Draw a picture or use a number line to model your thinking. Answer: 2/9 Ali bought a carton of eggs. He used 3/12 of the eggs to cook breakfast. He used another 2/12 to make a dessert. What fraction of the carton is left? Answer: 12/12 - 3/12 - 2/12 = 7/12 Shanice has 1 whole pizza. She eats some of it and has 4/6 of the pizza left. What fraction of the pizza does she eat? Answer: 6/6 - 4/6 = 2/6	Students are working almost exclusively independently with the teacher providing answers at the end.
Independent Practice (1 min) **Great work, everyone! Today, we practiced subtracting fractions. I hope you're seeing subtracting fractions as separating parts referring to the same whole! You sure did a great job! ! I will show you the independent practice problems now, or you can find them in the student practice for this lesson posted on our website, www.tn.gov/education.** [Teacher shows student practice page under document camera or camera zooms in on student practice page.] **Good luck and do your best!**	
Closing (1 min) **I enjoyed learning about subtracting fractions 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!**	