PBS Lesson Series

Math: Grade 4, Lesson 10, Fractions

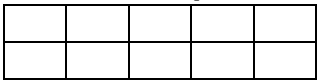
Lesson Focus: Add and Subtract Fractions
Practice Focus: Students will focus on solving word problems involving addition and subtraction of fractions.
Objective: Students will use various strategies to add and subtract fractions with a focus on solving word problems.
Key Vocabulary: numerator, denominator, 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 tenth 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 adding and subtracting fraction word problems 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 adding and subtracting fraction word problems. 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 a model or using a number line. Let's review how to add fractions with like denominators.**	This warm-up will support students' understanding of adding fractions, foreshadowing the work in in the Teacher Model section.

Let's start by thinking about this question: **4/10 + 2/10** **A model might help us thing about this. I'm going to draw a rectangle and split it into ten equal parts, because the denominator tells the number of equal parts in a whole.** **Draw with me!** [Draw the model below]  **Now shade one of the four parts to represent 4/10, because the number tells the number of equal parts.** [Shade four of the 10 parts] **We are adding 4/10 plus 2/10 so what should I shade now?** [Pause] **Right! Shade two of the ten parts!** [Shade two of the 10 parts] **How many parts did I shade?** [Pause] **Great! 6 parts. This means 6 out of 10 equal parts, which tells us that 4/10 + 2/10 = 6/10. Notice that the denominator stays the same because the size of the pieces didn't change. The numerator changes because it represents the total number of equal parts.** **We can also add 4/10 + 2/10 using a number line.** **How many parts should we divide the number line into?** [Pause] **Right! 10 parts because the denominator of the fraction is 10, which is the total number of equal parts. Draw a number line with me like this:** [Draw a number line and label by tenths from 0/10 to 10/10]  **Now we're going to make a point at 4/10 on the number line to show the first fraction.** [Draw a point at 4/10] **Start at 4/10 and count 2 tenths to the right to add 4/10. Count with me!** [Point to the number line, draw jumps, and count aloud] **1 tenth, 2 tenths.** **Where did we land on the number line?** [Pause] **Right! 6/10. This is the same solution we found when using a model.** **Great job! In today's lesson, we will be adding and subtracting fractions. Models and number lines are helpful strategies to use when adding and subtracting fractions.**	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 writing on their own paper and responding to teacher questioning.
<u>Teacher Model (10 mins)</u>	

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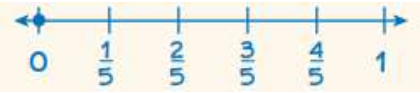
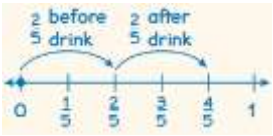
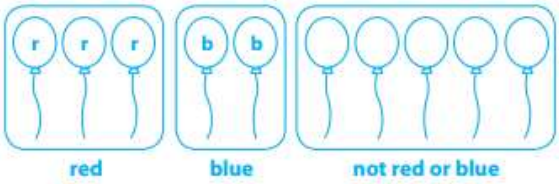
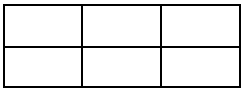
Objective #1: Teacher will explicitly instruct how to use a number line to solve a fraction word problem. **Jessica hikes 2/5 of a mile on a trail before she stops to get a drink of water. After her drink, Jessica hikes another 2/5 of a mile. How far does Jessica hike in all?** **Let's think through what the question is asking.** **What is this question about?** [Pause] **Great! It is about Jessica going on a hike.** **What information do we know?** [Pause] **We know how far Jessica hikes before stopping to get a drink of water. What fraction describes this?** [Pause] **Right, she hiked 2/5 of a mile.** **Is there any other information that we know?** [Pause] **We also know how far Jessica hikes after her drink of water. What fraction describes this?** [Pause] **Great, she hikes another 2/5 of a mile.** **What are we trying to find out?** [Pause] **The question is asking how far Jessica hikes in all.** **A number line can help us answer this question. Draw a number line with me.** **How many parts should we divide the number line into?** [Pause] **Right! 5 parts because the denominator of the fraction is 5, which is the total number of equal parts. Draw a number line with me like this:** [Draw and label number line]  **Start at zero and 'jump' to 2/5 to show the 2/5 of a mile that Jessica walked before stopping for a drink.** [Draw and label this on the number line.] **What do you think we will do next?** [Pause] **Right! 'Jump' 2/5 again to show the 2/5 of a mile that Jessica hiked after getting a drink of water**. [Draw and label this on the number line.]  **What do you notice?** [Pause] **I noticed that we landed on 4/5. This means that Jessica hiked 4/5 of a mile in all on her hike.** **How could we write a fraction equation to represent what we modeled on the number line?** [Pause] **Write 2/5 + 2/5 = 4/5.**	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, the students will solve word problems involving addition and subtraction of fractions and decomposing fractions. Students will model the fractions on paper in different ways.

Nice job! Objective #2: Teacher will explicitly instruct how to solve a fraction subtract problem involving one whole. **Ruth makes 1 fruit smoothie. She drinks 1/3 of it. What fraction of the fruit smoothie is left?** **What is this question about?** [Pause] **This question is about Ruth making a fruit smoothie.** **What information do we know?** [Pause] **We know that Ruth makes 1 fruit smoothie. We also know that she drinks 1/3 of the smoothie.** **What are we trying to find out?** [Pause] **We are trying to find out what fraction of the fruit smoothie is left after Ruth drinks some of it.** **The word problem states that Ruth makes 1 fruit smoothie. What fraction could we write to represent the whole fruit smoothie?** [Pause] **Since the denominator given in the problem is 3, write 3/3 to represent the whole fruit smoothie. 3 parts out of 3 total is the whole smoothie.** **If Ruth starts with 3/3 of the fruit smoothie, and drinks 1/3 of it, how much is left?** [Pause] **2/3 of the smoothie is left. Since Ruth is drinking some of the fruit smoothie, use subtraction to take that part away.** **Write a fraction equation to represent this.** [Pause] **Great! 3/3 – 1/3 = 2/3.** **What does the solution mean in this problem?** [Pause] **It means that 2/3 of the fruit smoothie is left.**	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, the students will solve word problems involving addition and subtraction of fractions and decomposing fractions. Students will model the fractions on paper in different ways.
Objective #3: Teacher will explicitly instruct how to use a model to solve a two –step fraction word problem. **Mr. Chang has a bunch of balloons. 3/10 of the bunch is red. 2/10 of the bunch is blue. What fraction of the bunch is not red or blue?** **What is this question about?** [Pause] **This question is about Mr. Chang and the color of his balloons.** **What information do we know?** [Pause] **We know that 3/10 of the balloons are red. We also know that 2/10 of the balloons are blue.** **What are we trying to find out?** [Pause] **We are trying to find out what fraction of the balloons are not red or blue.**	Objective #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. Through following along with the think aloud, the students will solve word problems involving addition and subtraction of fractions and decomposing fractions. Students will model the fractions on paper in different ways.

Let's draw a picture to answer this question. Draw with me! [See complete image below. Talk aloud and draw sections of the image as you go.] **Draw 3 red balloons and 2 blue balloons.** **How many total balloons does Mr. Change have?** [Pause] **Right, we had 10 balloons. We know this because the denominator 10 tells the total number of equal parts.** **How many balloons did we draw so far?** [Pause] **Great! 5 balloons. How many more balloons should we draw to make a total of 10 balloons?** [Pause] **5 more balloons would make a total of 10 balloons.**  **What fraction of the balloons are not red or blue?** [Pause] **5 out of the 10, or 5/10 of the balloons are not red or blue.** **Write a fraction equation to represent this.** [Pause. Write the equations while you say the following:] **This solution requires two step: addition (3/10 + 2/10) = 5/10 and subtraction (10/10 – 5/10) = 5/10** **OR subtracting twice (10/10 – 3/10 – 2/10) = 5/10.** **What does 5/10 mean in this problem? [Pause]** **It means that 5/10 of the balloons are not red or blue.** Tying the learning together: **There are three questions that you can ask yourself to help make sense of a word problem:** **What is this question about?** **What information do we know?** **What are we trying to find out?** **You can also draw a model or a number line to help add and subtract fractions.**	
<u>Guided Practice (10 mins)</u> [I do] **Let's practice a few more adding and subtracting fractions word problems today.** **Emily eats 1/6 of a bag of carrots. Nick eats 2/6 of the same bag of carrots. What fraction of the bag of carrots do Emily and Nick eat altogether?**	Students work alongside the teacher as the teacher thinks aloud.

Think through these questions: **What is this question about?** [Pause] **This question is about two friends eating a bag of carrots.** **What information do we know?** [Pause] **We know that Emily eats 1/6 of a bag of carrots. We also know that Nick eats 2/6 of the same bag of carrots.** **What are we trying to find out?** [Pause] **We are trying to find out what fraction of the bag of carrots Emily and Nick eat altogether.** **To find the fraction of the bag Emily and Nick ate together, should you add or subtract?** [Pause] **Right! You should add because we are combining the amount of carrots the two friends ate together.** **I drew a model to help me think about this question. Draw with me!**  **The model has 6 equal parts because the denominator is 6. Shade your model and find the solution.** [Pause, allow students a moment to work.] [Point and shade while saying the following:] **Shade one part to show what Emily ate. Shade two parts to show what Nick ate. How many parts are shaded?** [Pause] **Good Job! 3 parts, or 3/6. Now try to write an addition equation and solve.** [Pause, then write] **1/6 + 2/6 = 3/6.** **What does the solution 3/6 mean in this problem?** [Pause] **It means that Emily and Nick ate 3/6 of the bag of carrots.** [We do] **Lin buys some cloth. He uses 5/8 of a yard for a school project. He has 2/8 of a yard left. How much cloth does Lin buy?** **Remember, you can think through these three questions:** **What is this question about?** **What information do we know?** **What are we trying to find out?** **You can also draw a model or a number line.** [Pause to allow students time to think through the questions and solve the problem.]	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.

How did you do? For this question, add the number of yards Lin uses for the project and the number of yards left, 5/8 + 2/8 = 7/8. Lin bought 7/8 of a yard of cloth. [You do] **Now you are going to try a fraction word problem on your own. Remember to make sense of the problem before solving! You can also use a model or a number line. Listen as I read aloud:** **Carmela cuts a cake into 12 equal-sized pieces. She eats 2/12 of the cake, and her brother eats 3/12 of the cake. What fraction of the cake is left?** [Pause to allow students time to think and work.] **Great job, students! Here is the solution:** **7/12 of the cake is left.** **Here is a possible solution strategy: Find the combined amount of cake eaten, 2/12 + 3/12 = 5/12. Subtract the sum from the whole, 12/12 – 5/12 = 7/12** <u>Additional Problems (if Needed):</u> Lin bought 3/4 pound of cheddar cheese and some Swiss cheese. Altogether she bought 7/4 pounds of cheese. How much Swiss cheese did Lin buy? Answer: She bought 4/4 (or 1 whole) pound of Swiss cheese Ms. Atkins had a whole basket of tomatoes. She used 5/12 of the tomatoes to make soup. She used 2/12 in a salad. What fraction of the tomatoes are left? Answer: 5/12 of the basket of tomatoes are left A pizza is cut into 6 equal pieces. After Eli and Dan eat some, 1/6 of the pizza is left. What fraction could each boy eat? Give one possible answer. Answer: Eli 3/6, Dan 2/6 (or vice versa), OR Eli 1/6, Dan 4/6 (or vice versa)	Students are working almost exclusively independently with the teacher providing answers at the end.
<u>Independent Practice (1 min)</u> **Great work, everyone! Today, we practiced adding and subtracting fraction word problems. I hope you're feeling confident about solving word problems with adding and subtracting fractions! 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 adding and subtracting fraction word problems 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!**	