PBS Lesson Series

Math: Grade 3, Lesson 10, Refine Finding Equivalent Fractions

Lesson Focus: Solve problems that require students to find equivalent fractions.
Practice Focus: Students will focus on practicing area models and number lines in order to identify and write equivalent fractions.
Objective: Students will use fraction models to find equivalent fractions with a focus on solving problems in a variety of formats.
Key Vocabulary: numerator, denominator, equivalent, equivalent fractions
TN Standards: 3.NF.A.3
Teacher Materials:

- Paper, pencil, and dry erase board/marker
- 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 3rd 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 finding equivalent fractions with a focus on solving problems in a variety of formats! Before we get started, to participate fully in our lesson today, you will need:** • **Paper and a pencil, and a surface to write on** • **Student packet for Math, Grade 3, Lesson 10 which can be found at www.tn.gov/education.** **Ok, let's begin!**	Students get materials ready for the lesson.

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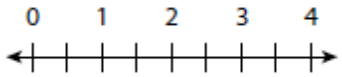
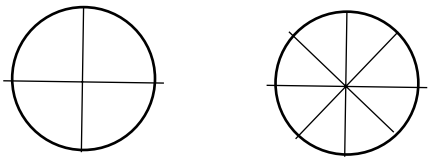
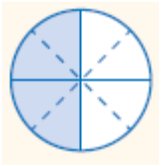
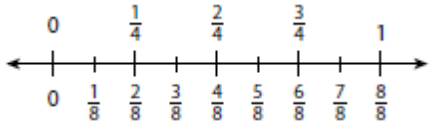
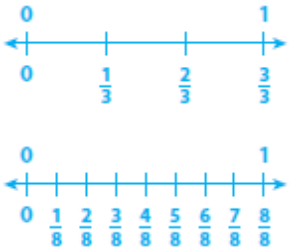
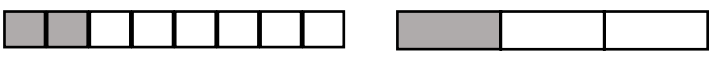
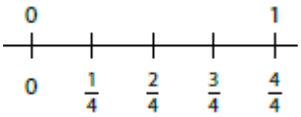
Intro (5 min) **First, let's review how to write an equivalent fraction for fractions that have a denominator of one. Look at my number line.** [Teacher shows the number line below.]  **What do you notice about the number line?** [Pause.] **I'm noticing that the number line is labeled from zero to four above the tick marks. I'm also noticing that there is one tick mark between all the whole numbers. The tick marks are cutting the number line into halves or one-half parts. Give me a thumbs up if you also had one of these noticings. Good thinking!** **Now let's use the number line to find equivalent fractions for 1/1, 2/1, 3/1, and 4/1. Where are these fractions with a denominator of one on our number line? They are the same as the whole numbers 1, 2, 3, and 4. We learned that 1 = 1/1, 2 = 2/1, 3 = 3/1, and 4 = 4/1.** **When we first looked at the number line, we noticed that the number line is cut into halves. If we skip count by halves, we can find the equivalent fractions. Skip count with me!** [Teacher points to each tick mark as she skip counts.] **0/2, ½, 2/2, 3/2, 4/2, 5/2, 6/2, 7/2, 8/2** **So 1/1 = 2/2.** **What is the equivalent fraction for 2/1?** [Pause.] **If you said 4/2, give me a thumbs up.** **What is the equivalent fraction for 3/1?** [Pause.] **Pat yourself on the back if you said 3/1 = 6/2.** **Lastly, what is the equivalent fraction for 4/1? Give yourself some applause if you said 4/1 = 8/2. Great job!**	Students actively listen to teacher. Students verbalize their noticings about the number line. Students give a thumbs up for having one of the noticings. Students skip count by halves with the teacher. Students answer 4/2 and give a thumbs up. Students pat themselves on the back for saying 6/2. Students give themselves some applause for saying 8/2.
Teacher Model (10 min) Objective 1: Review/Background/Tying to previous learning, Example (s), Guided Practice **You've already learned to read and to draw fraction models, and you've already learned how to find and write equivalent fractions. Now let's apply our learning to solve problems in many formats.**	Objective #1: Students will be reviewing using fraction models to solve problems involving finding equivalent fractions.

Here's the first problem. I'll read the problem to you. [Teacher reads out loud the story problem below while projecting the problem for students to view.]	Student actively listens to teacher think aloud. Student may also draw fraction models along with teacher.
Caleb and Hannah buy two melons that are the same size. Caleb cuts his melon into fourths. Hannah cuts her melon into eighths. Hannah eats 4/8 **of her melon. Caleb eats an equal amount of his melon. What fraction of his melon does Caleb eat?**	
What fraction models can we draw to solve this problem? The problem says that Caleb and Hannah buy two melons that are the same size. When I picture a melon, I see a circular shape. So I will draw two circles of the same size to represent the two melons. **The problem also says that Caleb cuts his melon into fourths and that Hannah cuts her melon into eighths. So I will show fourths on one of my circles and eighths on the other circle.** [Teacher draws or displays fraction models like those below.]	
	
Now we have our fraction models for each melon. The problem says that Hannah eats 4/8 of her melon. Caleb eats an equal amount of his melon. What fraction of Caleb's melon does he eat? [Pause.]	
Let's look at Hannah's melon. She eats 4/8 which is 4 pieces out of the total 8. Look at Caleb's melon. How many pieces from his melon cover the same area as the 4/8 in Hannah's circle? [Pause.]	Students show two fingers to show Caleb eats two pieces of melon.
Show me with your fingers how many pieces Caleb eats. Yes, he eats two pieces. How do we write this as a fraction? [Pause.]	Students verbalize that the equivalent fraction is 2/4.
That's right, the fraction of melon that Caleb eats is 2/4. The denominator is 4 because that's the total number of pieces in his melon and the numerator is 2 because that's how many pieces he ate. So 4/8 = 2/4.	
To help us solve the problem, I drew two separate circles to represent each melon. Can we represent both melons on one circle? Look at this fraction model and think about how both	

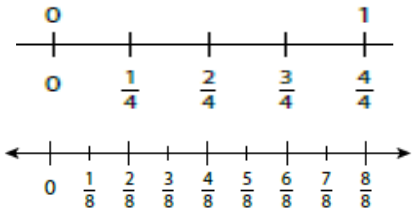
melons are shown. [Teacher displays fraction model below and pauses for student think time.]  **Can you see that the solid lines show the fourths? Then the solid lines along with the dashed lines show the eighths. The circle is shaded to show the pieces of melon that each person ate. We can see that 4/8 and 2/4 are equivalent. Did anybody notice that these fractions also equal ½? Great!** **We could have also used a number line to solve this problem. Look at this number line.** [Teacher displays number line below.]  **Does the number line show the melons? Yes! Notice that the fractions listed above the number line are fourths. This represents Caleb's melon. The fractions listed below the number line are eighths. These pieces represent Hannah's melon. The number line shows us that 4/8 and 2/4 are at the same location on the number line. They are equivalent names for the same point. This means 2/4 = 4/8.** Objective 2: Explicit Instruction, Example (s), Guided Practice **Now let's apply our learning about equivalent fractions to solve another type of problem. Listen as I read the problem.** **Matt says the fraction 3/3 is equivalent to 1. Elisa says the fraction 8/8 is equivalent to 1. Who is correct? Create a fraction model to support your answer.** **Let's draw number lines to help us answer this problem. We'll draw two separate number lines because it's hard to show both thirds and eighths on the same number line. Remember we'll need to draw each number line to be the same size or length from zero to one. And we'll be able to make comparisons better if the number lines are placed so that one is above the other. Let's draw the first one together**	Students actively listen while teacher explains the fraction model. Students actively listen while teacher explains the fraction model. Objective #2: Students will be building off their learnings about equivalent fractions and using fraction models to create their own fraction models to solve various problem types.

and then you'll draw the second one on your own. This first number line will be cut into thirds to represent Matt's thinking that 3/3 is equivalent to 1. [Teacher draws a number line like the image below and shows students.]  	Students draw a number line along with the teacher to represent 3/3 is equivalent to 1.
Now you try drawing a number line below this one so that it represents Elisa's thinking that 8/8 is equivalent to 1. [Pause to allow students time to draw.]	Students draw a second number line to represent 8/8 is equivalent to 1.
Your two number lines look like this. [Teacher displays both number lines for students to see.]  	Students check to see that their number lines look like the teacher's number lines.
Is Matt or Elisa correct? Say out loud what you think the answer is. [Pause.]	Students verbalize if Matt or Elisa or both are correct.
Give me a thumbs up if you said they are both correct. Great job! Now how does our fraction model support our answer? [Pause] **We know that fractions and numbers that name the same point on a number line are equivalent. Our number lines show that both 3/3 and 8/8 are equivalent to the whole number 1. So both Matt and Elisa are correct!**	
Tying the learning together: Explicit Instruction, Example(s), Guided Practice **Let's solve another problem involving fraction models and equivalent fractions.**	
Which model shows a fraction equivalent to 2/6? [Teacher shows the fraction models below.] **I'll give you a moment to think about it.** [Pause.] 	Students study the models to determine which one shows a fraction equivalent to 2/6.
In the model on the left, there are 8 equal parts and 2 of the parts are shaded. That shows the fraction 2/8.	

In the model on the right, there are 3 equal parts and 1 of the parts is shaded. That shows the fraction 1/3. **Now what do you think? Which model shows a fraction equivalent to 2/6?** [Pause.] **The models show the fractions 2/8 and 1/3. Which of these fractions is equivalent to 2/6? Can you picture cutting one of these models into sixths? Yes, we can draw a line or lines on the second model to see that 2/6 is equivalent to 1/3. Give me a thumbs up if you were able to picture one of these models.** [Teacher shows the models below.]  **Both of these models began with the model that showed 1/3. To show sixths, you may have pictured drawing a horizontal line through the middle of the model. This makes the shaded fraction 2/6. Or perhaps you pictured the original 1/3 model with three vertical lines drawn inside each of the thirds at the halfway points. This makes the shaded part 2/6. So the model that shows 1/3 is the answer to this problem. 2/6 = 1/3.** **Did you notice that in this problem, instead of being given the fraction model that shows 2/6, we were given the fraction model of one of its equivalent fractions? Keep that in mind as we move to our guided practice.**	Students try to visualize changing the thirds model into a sixths model.
<u>Guided Practice (10 min)</u> **Now let's practice. I'll do the first practice problem.** [Teacher reads the problem out loud and does a think aloud as she solves it.] **Draw a model to find a fraction equivalent to one-fourth. Show your work.** **I notice that the problem doesn't tell me what type of model to draw so I know I can draw either an area model or a number line because these are the models that we use to help find equivalent fractions.** **I also notice that I'm finding a fraction equivalent to one-fourth so it'll help me to first draw a model for one-fourth. I think fourths are easy to show on a number line so that's the model I'll draw.** **Since the number of parts in the whole is 4, I'll draw my number line to show four equal parts between zero and 1.** [Teacher draws number line that results in the image below.]	Students actively listen to teacher reading the problem. Students actively listen to the teacher's think aloud.



Okay, I have my number line that shows fourths. Now I'm supposed to draw a model to find a fraction equivalent to one-fourth.
I know that when I use a number line to model fractions that equivalent fractions are fractions that name the same point on the number line. So I need to think about what denominator I can use that will have some of the same tick marks on the number line as the fourths. When I look at the number line I've drawn, I can picture drawing a tick mark in the middle of each of the fourths. That will give me eight tick marks which means I should have an equivalent fraction with a denominator of 8. I'll draw and label a number line that shows eighths. [Teacher draws a number line that shows eighths below the number line that shows fourths so that it looks like the number lines below.]



Now can I use this model to find an equivalent fraction for one-fourth? [Pause.] **Yes! I can see that ¼ and 2/8 name the same point on the number lines. So ¼ is equivalent to 2/8.**

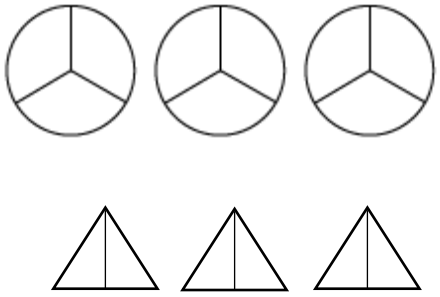
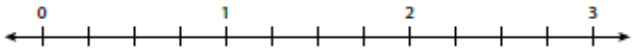
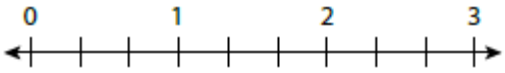
[We do]
You help me with the next problem.
Write two fractions that are equivalent to 3. Draw models to show your work. Give me a thumbs up if you are going to draw area models? [Pause.] **Give me a thumbs up if you are going to draw number lines?** [Pause.] **Great! I'll give you a minute to draw your models.** [Pause.]

Here's a hint if you are not sure how to get started. We are drawing models to help us write two fractions that are equivalent to 3. That means we will have 3 wholes. You can draw the 3 wholes first and then think about how many equal parts will be in each whole. Take another minute to complete your drawings. [Pause.]

Okay. Let's look at some drawings of area models that will help us write two fractions that are equivalent to 3. I used

Students actively listen to teacher think aloud.

Students give a thumbs up to indicate if they're drawing area models or number lines.

circles to show 3 wholes and I also used triangles to show 3 wholes. [Teacher shows images like the one below.]  **For the circles, I cut each of them into 3 equal parts. So my denominator will be 3. The total number of parts, or one-thirds, in all 3 wholes together is 9. So my numerator will be 9. This means I've found that 9/3 is equivalent to 3.** **For the triangles, I cut each of them into 2 equal parts. So my denominator will be 2. The total number of parts, or one-halves, in all 3 wholes together is 6. So my numerator is 6. This means I've found that 6/3 is also equivalent to 3.** **What are some other equivalent fractions that you found for 3?** [Pause.] **If you cut your models into fourths, you have 12/4 = 3.** **If you cut your models into sixths, you have 18/6 = 3.** **I know some of you drew number lines to find equivalent fractions for 3. Look at this number line. It shows that each whole is cut into fourths, or 12/4 = 3.** [Teacher shows number line like image below.]  [You do.] **You are doing great drawing models to find equivalent fractions! Now it's time for you to try a problem on your own.** [Teacher reads the problem below and shows the number line.] **Use the number line to find a fraction equivalent to 3.**  	Students actively listen as teacher explains the fraction models and names the fractions equivalent to 3. Students try this problem on their own. They use the given number line to find that 9/3 is equivalent to 3.

I'll give you some time to solve the problem independently and then we'll talk through the answer. [Pause.] **Say out loud the equivalent fraction that you found.** [Pause.] **Great work! 3 = 9/3.** <u>Additional Practice (if needed)</u> **Kelly ate 3/6 of a banana. Zoey ate an equivalent amount. Which fraction shows how much of a banana Zoey ate? Choose the best answer from the multiple choice items.** **a. 1/3** **b. 2/3** **c. 5/8** **d. ½** **Landon thought 1/3 was the correct answer. How do you think he got that answer?** **Write two fraction equivalent to 4 using the denominators 1 and 3. Use a number line to show how you found your answers.**	Students verbalize their answer.
<u>Independent Practice (10 min)</u> **Great work, students! Today, we reviewed using fraction models to help us write equivalent fractions. I hope you're now able to visualize fraction models mentally to find equivalent 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!**	
<u>Closing (1 min)</u> **I enjoyed reviewing using fraction models to find equivalent fractions with a focus on solving problems in multiple formats! 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!**	