

**Math: Grade 3, Lesson 8, Write Whole Numbers as Fractions**

**Lesson Focus:** Solve problems that require students to write a fraction to represent a whole number.

**Practice Focus:** Students will focus on practicing area models and number lines in order to express whole numbers as fractions.

**Objective:** Students will use fraction models to recognize fractions that are equivalent to whole numbers with a focus on writing whole numbers as fractions.

**Key Vocabulary:** cut (the action taken to divide or separate into fractional pieces), tick mark (the lines drawn on a number line to show the point locations), whole number, fraction

**TN Standards:** 3.NF.A.3c


**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
<p><u>Opening (1 min)</u></p> <p><b>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 eighth in our series.</b></p> <p><b>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!</b></p> <p><b>If you didn’t see our previous lesson, you can find it on the TN Department of Education’s website at <a href="http://www.tn.gov/education">www.tn.gov/education</a>. 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.</b></p> <p><b>Today we will be learning about writing whole numbers as fractions in mathematics! Before we get started, to participate fully in our lesson today, you will need:</b></p> <ul style="list-style-type: none"><li>• Paper and a pencil, and a surface to write on</li></ul> <p><b>Ok, let’s begin!</b></p>	<p>Students get materials ready for the lesson.</p>
<p><u>Intro (5 min)</u></p> <p><b>First, let’s review using a number line as a fraction model. Look at my number line.</b> [Teacher shows the number line below.]</p>	<p>Student actively listens to teacher.</p>

 <p>On the top of the number line, we see whole numbers labeled over their corresponding tick marks. [Teacher points to the tick marks under 1 and 2.] <b>What fractions should we write in the blanks below all the tick marks?</b> [Pause] <b>Well, I notice that the number line is cut into thirds.</b> [Teacher points to the cuts.] <b>So the first tick mark after zero is <math>\frac{1}{3}</math>. I'll skip count by thirds as I label the other fractions. Skip count with me!</b> [Teacher records fractions in the blanks as she skip counts.] <b><math>\frac{1}{3}</math>, <math>\frac{2}{3}</math>, <math>\frac{3}{3}</math>, <math>\frac{4}{3}</math>, <math>\frac{5}{3}</math>, <math>\frac{6}{3}</math>.</b></p>	<p>Student skip counts by thirds out loud with the teacher.</p>
<p><u>Teacher Model (10 min)</u></p> <p>Objective 1: Review/Background/Tying to previous learning, Example (s), Guided Practice</p> <p><b>You've already learned to read and to draw fraction models. Now let's use fraction models to solve a story problem. I'll read the problem to you.</b> [Teacher reads out loud the story problem below while projecting the problem for students to view.]</p> <p><b>Kacey uses 2 boards of the same size to build a birdhouse. He cuts each board into fourths. How can you write the number 2 as a fraction to find how many fourths Kacey cuts the boards into?</b> [Pause]</p> <p><b>What fraction models can we draw to solve this problem?</b> [Pause] <b>It says that Kacey is using 2 boards of the same size to build a birdhouse. When I picture a board, I see a rectangle. So I can draw two rectangles of the same size to represent my two boards or my two wholes. After I draw my two wholes, I am going to cut them into fourths because that's what the story problem says Kacey does. Let's draw this now.</b> [While students watch, teacher draws two equal sized rectangles and then cuts them into fourths so that the rectangles look like the area models below. Be sure to label each fourth as <math>\frac{1}{4}</math>.]</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div data-bbox="203 1808 428 1856" style="border: 1px solid black; width: 100px; height: 20px; position: relative;"> <div style="position: absolute; top: 0; left: 0; right: 0; bottom: 0; border-left: 1px solid black; border-right: 1px solid black;"></div> </div> <div data-bbox="557 1808 782 1856" style="border: 1px solid black; width: 100px; height: 20px; position: relative;"> <div style="position: absolute; top: 0; left: 0; right: 0; bottom: 0; border-left: 1px solid black; border-right: 1px solid black;"></div> </div> </div>	<p>Objective #1: Students will be reviewing using fraction models to solve problems involving finding an equivalent fraction for a whole number. This allows students to develop conceptual understanding of the meaning of the fraction in relation to its equivalent whole number.</p> <p>Student actively listens to teacher think aloud. Student may also draw fraction models along with teacher.</p>

$\frac{1}{4}$   $\frac{1}{4}$   $\frac{1}{4}$   $\frac{1}{4}$   $\frac{1}{4}$   $\frac{1}{4}$   $\frac{1}{4}$   $\frac{1}{4}$

Now we have our fraction models for the 2 boards that are cut into fourths. Each of the parts is  $\frac{1}{4}$  of the whole. There are eight  $\frac{1}{4}$  parts all together. [Teacher continues to display the fraction models.] I'll read the problem out loud again so we know what we're trying solve.

Kacey uses 2 boards of the same size to build a birdhouse. He cuts each board into fourths. How can you write the number 2 as a fraction to find how many fourths Kacey cuts the boards into? [Pause]

How do you think our fraction models can help us write the number 2 as a fraction to find how many fourths Kacey cuts the boards into? [Pause.] Let's skip count by one-fourths to find the total of fourths. Skip count with me!

$\frac{1}{4}$ ,  $\frac{2}{4}$ ,  $\frac{3}{4}$ ,  $\frac{4}{4}$ ,  $\frac{5}{4}$ ,  $\frac{6}{4}$ ,  $\frac{7}{4}$ ,  $\frac{8}{4}$ . [Teacher records the fraction  $\frac{8}{4}$  at the end of the counting.]

We just found our answer! Kacey cut the 2 boards into 8 fourths. This means the whole number 2 can be written as the fraction  $\frac{8}{4}$ . The whole number 2 and the fraction  $\frac{8}{4}$  are equivalent.

We could have also used a number line to solve this problem. Since we have 2 boards, we will need our number line to go from zero to two. [Teacher draws a number line from zero to two. Teacher labels 0, 1, and 2 on the top of the number line at their tick marks.] We will also need to cut the number line into fourths to represent the two boards in the story being cut into fourths. [Teacher places tick marks on the number line to show fourths. Teacher labels from zero to  $\frac{8}{4}$  below the tick marks. Number line should look like below image.]



Does the number line show the same thing as the rectangular area models we used? [Pause] Yes! The distance from zero to one on the number line represents the first board or first whole, and the distance from 1 to 2 on the number line represents the second board or second whole. Notice that each whole number has an equivalent fraction with a denominator of four. The whole number two is equivalent to  $\frac{8}{4}$ . That means that Kacey cut the two boards into eight

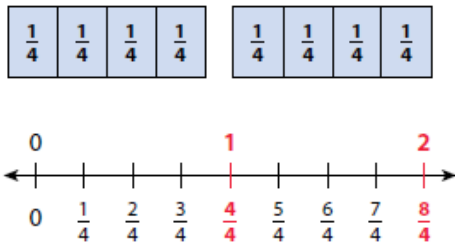
Student skip counts by fourths with the teacher.

Student actively listens to teacher's think aloud about drawing a number line. Student may also draw the number line along with teacher.

**fourths. This is the same answer we found using the area models!**

Objective 2: Explicit Instruction, Example (s), Guided Practice

**Now let's connect our learning from the birdhouse problem to help us understand how to write a whole number as a fraction. Here are the fraction models we drew for the problem.** [Teacher displays fraction models. Use the fraction models you drew earlier or use the models below.]



**How many equal parts are shown in 1 whole? Use your fingers to show many equal parts. Explain out loud how you know.** [Pause.]

**Yes, each whole has 4 equal parts because each 1 whole is cut into fourths.**

**How many equal parts are shown in 2 wholes? Explain out loud how you know.** [Pause.]

**Yes, in 2 wholes, there are 8 equal parts. We know from our previous answer that there are 4 equal parts in 1 whole. So in two wholes, we have 4 equal parts plus 4 equal parts which gives us 8 equal parts.**

**How can we record that two wholes equals eight fourths? I'll give you a minute to write the equivalency statement.** [Pause.]

**Give me a thumbs up if you wrote  $2 = 8/4$ . Great! The whole number 2 represents the 2 wholes. The fraction  $8/4$  represents the equivalent fraction.**

**Notice that the denominator 4 is the number of equal parts in 1 whole and the numerator 8 is the number of equal parts in all 2 wholes together. This process we use for writing a whole number as a fraction is the same that we use for writing other fractions! Did you make that connection? Great thinking!**



Objective #2:

Students will be building off of their work with drawing fraction models to represent the context of the story problem to finding the equivalent fraction for the whole number. This continues to develop their conceptual understanding of writing fractions for whole numbers.

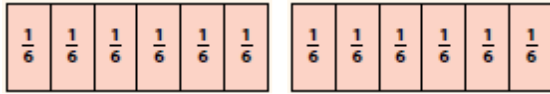
Students use their fingers to show how many equal parts in 1 whole.

Students verbalize how many equal parts shown in 2 wholes and explains how they know.

Students think about what equivalence statement they can write to show that 2 wholes equals eight fourths. Students write an equivalence statement.

<p>Tying the learning together: Explicit Instruction, Example(s), Guided Practice</p> <p><b>Let's apply our learning from today to solve two more problems that involve writing whole numbers as fractions.</b></p> <p><b>First, look at this fraction model to write a fraction equivalent to the whole number 3.</b> [Teacher shows the model below.] I'll give you a minute to think about it. [Pause.]</p>  <p><b>If you haven't written the fraction yet, here's a clue. Remember that the denominator is the number of equal parts in 1 whole.</b> [Pause.]</p> <p><b>Here's another clue. Remember that the numerator is the number of equal parts in all wholes together.</b> [Pause.]</p> <p><b>Give me a thumbs up if you wrote <math>\frac{6}{2}</math> for your fraction that represents 3 wholes. Great job!</b></p> <p><b>Let's try one more, but this time we have a number line as our fraction model. I'll read the problem to you. Follow along as I read.</b> [Teacher displays problem and number line.]</p> <p><b>Lou has two ribbons that are the same length. She cuts each one into eighths. Use the number line to help you write the number 2 as a fraction to show how many eighths she cut the ribbon into.</b></p>  <p><b>I'll give you a minute to write the fraction.</b> [Pause.]</p> <p><b>Did you write <math>\frac{16}{8}</math>?</b> [Pause] <b>8 is the denominator because that's the number of equal parts in one whole, and 16 is the numerator because it's the total number of equal parts in the two wholes.</b></p>	<p>Students actively listen to teacher and try to apply their learning from today to write fractions for whole numbers.</p> <p>Students write the fraction that is equivalent to the 3 wholes in the fraction model.</p> <p>Students give a thumbs up for writing the fraction <math>\frac{6}{2}</math>.</p> <p>Students study the number line and think about how to write the whole number 2 as a fraction.</p> <p>Students write the fraction <math>\frac{16}{8}</math>.</p>
<p><u>Guided Practice (10 min)</u></p> <p><b>Now let's practice. I'll do the first practice problem.</b> [Teacher reads the problem out loud and displays the fraction models that are given in the problem.]</p>	<p>Students actively listen to teacher reading the problem.</p>

Mrs. Clark cuts 2 same-sized pieces of colored paper into sixths to make strips for paper chains. How many strips does she make?



First, I'm going to make sense of the fraction models that are given in the problem. There are two area models because the problem says Mrs. Clark cuts two same-sized pieces of colored paper. This means there are two wholes. Each whole is cut into sixths and each part is labeled with the unit fraction  $\frac{1}{6}$ . I know that's right because the story says Mrs. Clark cuts the papers into sixths to make strips for paper chains.

Second, I'm going to figure out what I'm trying to solve and how I can use the fraction models to help me. The problem asks how many strips Mrs. Clark makes. When I look at the fraction model, I can see the equal parts of sixths that Mrs. Clark cut on the 2 wholes. I can skip count by sixths to find the total of strips.

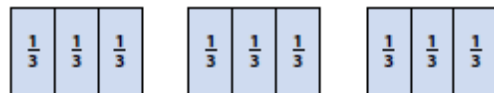
$\frac{1}{6}$ ,  $\frac{2}{6}$ ,  $\frac{3}{6}$ ,  $\frac{4}{6}$ ,  $\frac{5}{6}$ ,  $\frac{6}{6}$ ,  $\frac{7}{6}$ ,  $\frac{8}{6}$ ,  $\frac{9}{6}$ ,  $\frac{10}{6}$ ,  $\frac{11}{6}$ ,  $\frac{12}{6}$

There are 12 sixths total. So 2 wholes is equal to  $\frac{12}{6}$ , and I can write the equivalence statement  $2 = \frac{12}{6}$ . This means that Mrs. Clark made 12 strips.

[We do]

Now let's do a problem together! [Teacher reads the directions below and displays the fraction model and equations.]

Use the fraction models to write the whole numbers as fractions.



$$1 = \frac{\square}{3} \quad 2 = \frac{\square}{3} \quad 3 = \frac{\square}{3}$$

Before we fill in the boxes, let's make sense of the problem. How many wholes do you see in the fraction model? Show me with your fingers. [Pause.]

Great! I also see 3 wholes.

Students actively listen to teacher think aloud.

Students engage with teacher for the "we do" problem.

Students show 3 fingers to indicate they see 3 wholes.

How are the models cut? That is, what are the equal parts in each whole? [Pause.]

If you said thirds or one-thirds, give me a thumbs up. Great! So we have 3 wholes cut into thirds.

What should I write in the first box? It says 1 equals something-thirds. That means how many thirds are equal to one whole. Show me with your fingers what our numerator will be. [Pause.]

That's right! Our numerator is 3 because  $1 = 3/3$ .

What should we write in the second box? It says 2 equals something-thirds. [Pause.]

Before I tell you the answer, you check your answer by skip counting the thirds in 2 wholes.

Did you get 6 thirds? So we put a 6 for our numerator in the second box.  $2 = 6/3$ .

[You do]

You do the third box. I'll wait while you think and write.

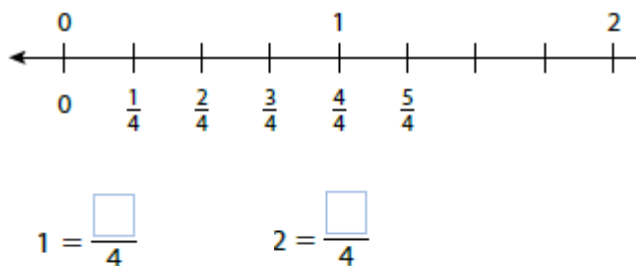
[Pause.]

Give me a thumbs up if you got  $3 = 9/3$ . Great job!

[We do]

Now let's practice using a number line to help us write fractions for whole numbers. Here's our number line.

[Teacher displays number line and equivalence statements below.]



Before we fill in the boxes for the missing numerators, let's make sense of the number line model. Show me with your fingers how many wholes you see. [Pause.]

Yes, there are two wholes. The first whole is from zero to one and the second whole is from one to two.

How are the wholes cut? That is, what are the equal parts?

[Pause.] Give me a thumbs up if you said fourths.

Now that we have made sense of the number line model, we're ready to fill in the boxes so that we have whole

Students give a thumbs up for saying thirds.

Students show 3 fingers to indicate that the numerator is 3.

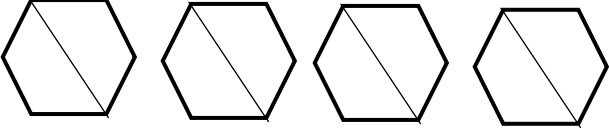
Students verbalize their skip count of  $1/3, 2/3, 3/3, 4/3, 5/3, 6/3$ .

Students fill in the numerator box for the third problem.

Students give a thumbs up for writing 9 in the blank box.

Students hold up two fingers to show there are two wholes on the number line model.

Students give a thumbs up for saying fourths.

<p><b>numbers written as fractions. Show me with your fingers the missing numerator for the whole number 1. [Pause.]</b>  <b>That's correct, <math>1 = 4/4</math>.</b></p> <p>[You do]  <b>Now you try to complete the second fraction by yourself.</b>          [Pause.]</p> <p><b>Give me a thumbs up if you wrote <math>2 = 8/4</math>.</b></p> <p>[Additional Practice if needed.]  <b>Use the fraction models to write an equivalent fraction for the wholes.</b></p>  <p><b>Draw a model to show <math>3 = 18/6</math>. Show your work.</b></p>	<p>Students hold up 4 fingers to show the missing numerator.</p> <p>Students write the fraction <math>8/4</math> for the whole number 2.</p>
<p><u>Independent Practice (10 min)</u>  <b>Great work, students! Today, we reviewed using fraction models to help us write fractions for whole numbers. I hope you're seeing some connections to your previous work on 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, <a href="http://www.tn.gov/education">www.tn.gov/education</a>. [Teacher shows student practice page under document camera or camera zooms in on student practice page.]</b>  <b>Good luck and do your best!</b></p>	
<p><u>Closing (1 min)</u>  <b>I enjoyed reviewing using fraction models to recognize fractions that are equivalent to whole numbers with a focus on writing whole numbers as 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!</b></p>	



## **PBS Lesson Series**

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