MSTAR INTERVENTION

L1

Lesson 1: Area Models for Fractions

Lesson Objectives

- Students will name fractions, given an area model.
- Students will create area models to represent a given fraction.

Instructional Materials

Material	Quantity	Description
Grid paper	Several sheets per student	
Colored pencils	1 per student	
How Am I Doing? graph	1 per student	
Display Masters	1 each	• Preview: Key Ideas: Area Models for Fractions • Demonstrate: Area Model A • Demonstrate: Area Model B • Demonstrate: Area Model C • Demonstrate: Steps to Naming a Fraction • Demonstrate: $\frac{3}{4}$ • Demonstrate: Steps to Create an Area Model for a Fraction
Handouts	1 per student	• Practice • Independent Practice
Answer Keys	1 each	• Practice • Independent Practice

Preview

This lesson will build students' conceptual knowledge of fractions. Area models will be used for this lesson. Students will interpret and represent parts of area models as fractions. Students will use the mathematical ideas from this lesson in subsequent lessons.

Display and introduce through a brief explanation the key ideas for this lesson:

- Fractions are related to a whole.
- Fractional parts of a whole are equal in area.

Use the Key Ideas: Area Models for Fractions DM display master as needed.

Engage Prior/Informal Knowledge

To open the lesson, present questions to activate students' background knowledge related to the content to be taught in this lesson. For the fraction $\frac{3}{5}$ ask students questions such as:

- What is the number on the top called? (numerator)
- What is the number on the bottom called? (denominator)

If students cannot answer these questions, stop and explicitly teach the material.

Demonstrate

1. Model $\frac{3}{4}$ using an area model.

Display a rectangle. Use the Area Model A DM display master as needed.

Say: *I am going to divide this rectangle into 4 parts.*

Use a line segment to make halves first and then halve those to make fourths.

Display a rectangle divided into fourths. Use the Area Model B DM display master as needed.

Say: *Now I am going to shade 3 parts.*

Shade 3 parts of the rectangle divided into fourths. Use the Area Model C DM display master as needed.

2. Generate a fraction that describes the shaded rectangle.

Say: *I want to write a fraction that describes this rectangle.*

Display the steps to name a fraction. Use the Steps to Name a Fraction DM display master as needed.

Say: *I know I need to find the denominator first. The denominator tells what types of parts are being counted, or the fractional parts. This rectangle is divided into 4 pieces, so I know the denominator is 4.*

Say: *I am going to write 4 in the denominator's position, which is below the fraction bar.*

Display 4 under a fraction bar and *denominator* beside the 4.

TEACHER NOTE

Students usually have experience with the concepts in this lesson but may need to review them. Students need to understand that they are reviewing to get the concepts fresh in their mind.

Say: *Now I am going to find the numerator. The numerator counts the number of selected parts. There are 3 parts shaded, so I know the numerator is 3.*

Say: *I am going to write 3 in the numerator's position, which is above the fraction bar.*

Display 3 above the fraction bar and numerator beside the 3.

Say: *The name of this fraction is three-fourths.*

Display three-fourths.

Say: *Another way to say it is out of 4 parts, select 3.*

TEACHER NOTE
It is important that students understand that a fraction is always associated with a whole. Use language such as "$\frac{3}{4}$ of the whole is shaded" and expect students to do the same.

Display out of 4 parts, select 3. Use the $\frac{3}{4}$ DM display master as needed.

3. Create an area model for a fraction.

Use a fraction such as $\frac{2}{8}$ to go through the steps below.

Say: *I want to create an area model for the fraction* $\frac{2}{8}$.

Display the steps to create an area model for a fraction. Use the Steps to Create an Area Model DM display master as needed.

Say: *First, I am going to draw the whole.*

Steps to create an area model for a fraction:

1. Draw the whole.

2. Identify the denominator. Divide the whole into the given

number of parts specified by the denominator.

3. Identify the numerator. Shade the number of parts specified by the numerator.

4. Write the name of the fraction.

Practice

For each practice activity, provide detailed feedback to students, highlighting what was done correctly and what needs improvement. Provide opportunities for students to correct their errors. Collect student work to review and monitor student progress.

Activity 1: Help students work in pairs to create area models for fractions. Use fractions such as $\frac{2}{6}$, $\frac{6}{8}$ and $\frac{3}{6}$. Each set of partners should have a different fraction.

For each fraction used, select a few students to verbalize their reasoning. Listen for the development of any misconceptions in the reasoning.

Ask questions such as:

- How many sections did you shade?
- Did your partner shade the same number of sections as you did? Does it matter?
- Did your partner shade the same sections as you did? Does it matter?

When students answer these questions, have them explain

WATCH FOR

Some students confuse the terms *numerator* and *denominator*. Teach students what numerators and denominators represent and expect students to use *numerator* and *denominator* correctly. For those students who do not know these terms, teach each term separately and then use both terms with pictorial and symbolic representations.

TEACHER NOTE

Give grid paper to students who have trouble drawing and dividing rectangles free hand. Have students outline a rectangle with the correct number of parts and shade the parts needed.

their reasoning and thought process. Listen for the development of any misconceptions within the reasoning.

Explain to students that it matters how many sections are shaded but that it does not matter which sections are shaded.

Activity 2: Have students work in pairs or small groups to complete the activity on the Practice handout. Have students verbalize their reasoning and each step in the process to their partners. Listen for the development of any misconceptions within the reasoning.

Independent Practice

1. Have students work independently to complete the activity on the Independent Practice handout.

2. Go over the answers (students self-check and correct using a colored pencil).

3. Have students record the number correct in the box and complete their How Am I Doing? graph.

4. Collect the papers to review student progress.

Closure

Review the key ideas. Have students provide examples from the lesson.

Have students discuss their answers to the following questions:

- What does a numerator represent?
- Would you agree with this statement: "Denominators tell the number of selected parts"? Why or why not?

Clear up any misconceptions. Students who confuse the numerator and denominator need additional instruction.