EXAMPLE LESSON

SCAFFOLDING AND DIFFERENTIATION

Topic: Generating Equivalent Fractions
Grade Level: 4
Standard: 4.NF.A.1
Objective: Students will learn to generate equivalent fractions by drawing visual models.
Duration: 60 minutes
Materials: Fraction strips, markers, chart paper

Warm-Up (5 minutes)

Would you rather have 1/4 of the year off or 3 months off in the summer?

Steps:

- Display the problem and ask students to consider which option makes the most sense.
- Direct students to justify their explanation to a partner.
- After students share their responses, take a poll of class responses.
- Facilitate a class discussion where students explain their choices.
- Listen for mathematical language and comparing of fractions.

Guiding Questions:

- How did you compare the fractions?
- Is this a fair comparison? Why or why not?
- How can understanding fractions help us make decisions?

Scaffolding:
Make these sentence frames visible for all to reference as needed during the discussion.

- The fraction _____ is greater than _____.
- This is/is not a fair comparison because _____.
- I agree with _____ because _____.
- I disagree with _____ because _____.

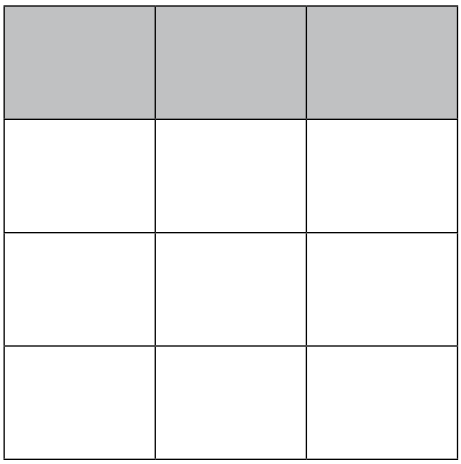
Differentiation:
This question is relatable for students and provides an entry point to the lesson for all learners. Consider changing the warm-up question based on your students' particular circumstances or interests. If students don't get summers off, for instance, ask a question such as: Would you rather live somewhere that is hot for 1/4 of the year or three months during the summer? Students who like soccer might be motivated by a question such as: Do you think soccer season should last 3/4 of the year or 9 months?

Modeling (5 minutes)

Display the phrase "equivalent fractions" with the definition: *Equivalent fractions are fractions that have the same value.*

Steps:

- Say: Let's use an area model to take a closer look at the relationship between 1/4 of a year and three months.
- Show a large square. See example below. Say: Imagine this square represents one year.
- There are 12 months in a year, so let's divide this square into 12 equal parts.
- Divide the square into four equal-sized rows and three equal-sized columns. See example below.
- Ask: How did I know to divide the square in this way? *It creates 4 sections vertically and 3 sections horizontally, so there are 12 sections total.* How else could I divide the square? *It could be divided into 6 rows and 2 columns.*
- Shade the three squares in the first row. Ask: What fraction of parts are shaded? *3/12* What fraction of rows are shaded? *1/4* How can you tell that 3/12 and 1/4 are equivalent fractions? *They are equivalent because they represent the same area.*

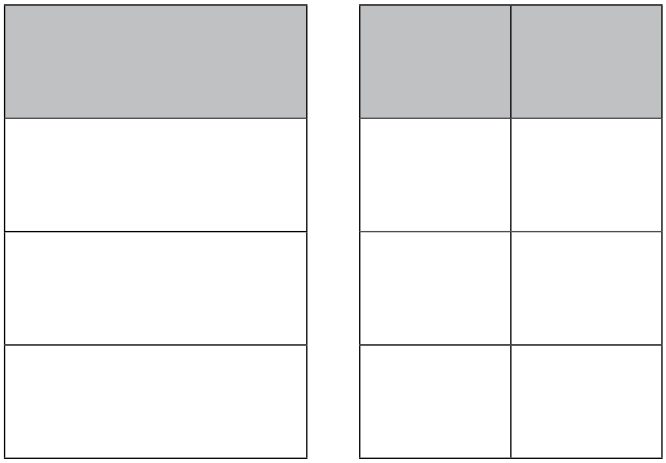


Guided Practice (10 minutes)

Problem:
There are eight children in the classroom. Two children are wearing hats. Alfonso says 1/4 of the children are wearing hats. Isabella says that 2/8 of the children are wearing hats. Who is correct?

Steps:

- Display the problem above. Have students turn and talk to discuss their responses.
- Ask students who think that Alfonso is correct to explain their answer. Then invite students who think that Isabella is correct to explain why.
- Guide the group to the consensus that both Alfonso and Isabella are correct because the fractions are equivalent. Display the visual below.
- Challenge students to come up with another fraction that is equivalent to 1/4 and 2/8.



Guiding Questions:

- How can you show that 1/4 and 2/8 are equivalent fractions? *Students can use fraction strips, draw models of the fractions, or use other manipulatives.*
- What number can you multiply the numerator and denominator of 1/4 by to get the equivalent fraction 2/8? *The answer is 2.* What number can you multiply the numerator and denominator of 2/8 by to get the equivalent fraction 4/16? *The answer is 2.* What number can you multiply the numerator and denominator of 1/4 by to get the equivalent fraction 3/12? *The answer is 3.* Can you come up with a rule for generating equivalent fractions? *If the numerator and denominator of a fraction are multiplied by the same nonzero number, the result is an equivalent fraction.*
- What is another fraction that is equivalent to 1/4 and 2/8? Remind students that they can use what they know about the relationship between the numerator and denominator of the fractions 1/4 and 2/8. *Examples are 3/12 and 4/16.*

Scaffolding:
Read the problem aloud to the class. Think aloud how to solve the problem, using the visual aid above.

Differentiation:
Provide students with fraction strips, markers, chart paper, and other relevant resources and manipulatives. Allow students to choose the manipulatives they will use to solve the problems and show their work. Pull a small group if some students need additional practice.

Independent Practice (15 minutes)

Draw and label the fraction 2/3. Then draw and label a fraction that is equivalent.

Steps:

- Present the independent practice problem above for students to complete.
- Circulate as students work in pairs or individually, looking for moments to provide just-in-time scaffolds to guide student thinking as needed.

Scaffolding:
If students need support, provide a sheet with two blank squares that are the same size. Encourage students to use one square to show 2/3 and the other square to show an equivalent fraction.

Differentiation:
If students need a challenge, prompt them to come up with additional equivalent fractions.

Extension Activity (15 minutes)

Challenge students to create a physical model of an equivalent fraction using items in a makerspace. Create a makerspace in class, with items like sticky notes, poster board, paper plates, paper towel rolls, pipe cleaners, blocks, modeling dough, yarn, markers, scissors, tape, and glue.

Scaffolding:
Create a model that you can show to the class. Here are some examples:

- Separate one orange into two halves. Then separate all the segments in another orange to show the fraction 5/10.
- Add 1/4 cup water to a clear cup. Then add 2/8 cup water to another clear cup. (Use 1/8 and 1/4 measuring cups for this demonstration.)
- Construct an object using five yellow interlocking blocks and 20 red interlocking blocks. Show students how 5/20 of the blocks are yellow and 1/5 of the bricks are yellow.
- Draw a pizza with eight slices and broccoli on two slices. Cut out the slices. Show students how 2/8 of the pizza is topped with broccoli and 1/4 is topped with broccoli.
- Demonstrate equivalent fractions using students in the class. Let's say you have 20 students. Have five students stand up. Ask: What fraction of students are standing? *5/20* What is an equivalent fraction? *1/5*

Differentiation:
The makerspace provides differentiation since students get to choose the materials they will use to show equivalent fractions. If students need more of a challenge, encourage them to create a book, online presentation, or poster that illustrates equivalent fractions.