Facilitator Guide: Equivalent Areas

Lesson Overview:

Big Idea: This lesson develops students' understanding of equivalent fractions using an area model. Students use a *Grid Tool* to prove that two fractions are equivalent by modeling those fractions and showing that they cover the exact same area.

The idea of composing and decomposing unit fractions is at the heart of this lesson on equivalent fractions. Fractions that have a unit fraction equivalent, e.g., 2/4, 6/8, 2/6, etc… can be composed into a unit fraction using an area model. Think of glueing the pieces together into a larger piece. Unit fractions can be decomposed into an equivalent fraction by cutting it into equal parts. If 1/3 of the square is selected, cutting all the thirds in half will show that 1/3 of the area is the same as 2/6 of that area.

Lesson Flow: Project the Equal Shares prompt, have students sketch the prompt then discuss if the shaded areas are equivalent. Project the Scavenger Hunt and have students open the *Grid Tool*. Students use the *Grid Tool* to model and solve the Scavenger Hunt. Activity One, part 1: Project the prompt and have students use the *Grid Tool* to model and solve the problem before having a class discussion. Part 2, have students work in pairs and share a device to solve the **Finding Unit Fractions Problem Sheet**. Activity 2, part 1: Project the prompt and have students use the *Grid Tool* to model and solve the problem before having a class discussion. Part 2, students work in pairs sharing a device to solve the **Finding Unit Fractions Problem Sheet**. Project the conclusion prompt, have students sketch it and discuss their solutions as a class.

Warm Up: Equal Shares

Part 1: Project Equal Shares prompt, students sketch their answer on a blank sheet, discuss with a partner then as a class (5 min)

- Student sketches are likely to be rough estimations depending on how accurate they are.
- Students may partition both squares into eighths and explain why both models show 2/8.
- Have students name and label the shapes (1/4 and 2/8)

Part 2: Project the Scavenger Hunt and have students open *Grid Tool* (5 min)

- Scavenger Hunt
  - Create a fourth in two ways (all horizontal, vertical, or one cut of each)
  - Shade in two fourths (click in an area to create a block)
  - Drag a block from one grid to another (blocks are movable)
  - Delete a block (put in trash)

Activity One: Finding Unit Fractions

Part 1: Project prompt, students use *Grid Tool* to show equivalent unit fraction, discuss as a class (5 min)

- Ask students to use one of the squares to model the prompt
- Ask students to use the second square to model an equivalent 'unit fraction'
  - "How can you cut the square so that one of the parts equals all the shaded parts in the example?"
  - "How can you combine the smaller units in the picture into one area?"
  - "What would we call that unit?"

Part 2: Students work in pairs to complete the **Finding Unit Fractions Problem Sheet** using the *Grid Tool* (5 min)

- Group students into pairs and have one of them close their computer
- Students take turns modeling the given prompt on one square and modeling the unit fraction in the other square
- Each student records their work in the problem sheet

Activity Two: Decomposing Unit Fractions

Part 1: Project prompt, students use *Grid Tool* to show equivalent fraction, discuss as a class (5 min)

- Ask students to use one of the squares to model the prompt
- Ask students to use the second square to model an equivalent fraction
  - "How can you cut the square so that three of the parts are equal to the unit fraction in the example?"
  - "Do all the parts have to be cut or only the shaded ones?"
    - *Key idea:* All the parts need to be cut so that they all represent the same unit

Part 2: Students work in pairs, complete **Decomposing Unit Fractions Problem Sheet** with *Grid Tool* (5 min)

- Group students into pairs and have one of them close their computer
- Students take turns modeling the given unit fraction on one square and modeling the equivalent fraction in the other square
- Each student records their work in the problem sheet

Conclusion: Comparing Shares

Project prompt, students use *Grid Tool* to solve, discuss with a partner, then as a class (5 min)

- Both squares have 1/2 of the area shaded, one in 4/8 and the other as 2/4.
- Students prove that both are equivalent by showing 4/8 is equal to 2/4 and by showing both are 1/2 of the whole square
  - What fraction of the square is shaded? How do you know?
  - What unit fraction can you make with both partitions? Explain.