Facilitator Guide: Comparing Fair Shares

Lesson Overview:

Big Idea: Equivalent fractions are challenging because students are not used to having two numbers describe the same amount or point on a number line. Until they study fractions, students use the equal sign to show equivalences that include at least one of the four operations, e.g., 4 = 3 + 1. Now they are expected to understand that an equation can be written about two numbers: 3/4 = 6/8. Students need multiple experiences using fractions to describe situations in more than one way using equivalent fractions.
This lesson begins with students comparing two different sharing situations that have the same, equivalent, solution: 2 JiJis share 1 box (each gets 1/2) and 4 JiJis share 2 boxes (2/4). While some students will quickly see that the latter problem can be solved using 1/2, this experience sets up the idea of equivalence. Students then find different ways to 'fair share'. They learn that while you can partition in different ways, a fair share always ends up giving the same amount. The strategies produce equivalent fractions and the class discussions focus on proving why both fractions are equal (equivalent).

Lesson Flow: The opening problem has students compare two JiJis sharing one box to 4 JiJis sharing 2 boxes. Then, students work in pairs to solve six JiJis sharing 3 boxes in their problem sheet. After they find two different solutions for the problem, facilitate a class discussion on how both solutions (each JiJi gets 1/2 a block or 3/6 of a block) are equivalent. Students then complete the remaining problems in their problem sheet before another class discussion. The conclusion asks students to compare two solutions to the problem six JiJis share 2 boxes.

Warm Up: Compare Shares

Part 1: Project problem, students work independently on paper or whiteboards (5 min)

- *Monitor*: Look for students using different strategies and use them for a class discussion.
  - Divide each square by the number of JiJis. This strategy will give equivalent fractions with denominators that match the number of JiJis in the problem (1/2 and 2/4)
  - Think Multiplicatively: divide the boxes while keeping the number of JiJis in mind. 'If I cut the two boxes in half, that gives me 4 pieces. That works because I have 4 JiJis'
  - Use Rates: 2 boxes for 4 JiJis can be solved by giving 1 box for 2 JiJis to share and the other box for the other 2 JiJis. Now students can see that both situations have the same rate: 2 JiJis for each box

Part 2: Students discuss in small groups before discussing their thinking as a class (5min)

- Ask students to describe their strategy and look for at least two of the strategies described above
  - How did you share the two boxes between the four JiJis?
  - Can you think of another way to share the boxes with fewer/more cuts?
- Have two students with different strategies share their thinking with the class and compare the two strategies
  - How are these two strategies similar? How are they different?

- Goal: Students should describe that both strategies show that each group gets the same amount but that they break up the squares in different ways.
  - *Vocabulary*: both solutions are *equivalent*.

Activity One: Different Ways to Share Fairly

Part 1: Project problem, have students work in pairs to solve it using the *Boxes Sharing Tool* and record in their **Different ways to Share Fairly Problem Sheet**, then discuss solutions as a class (5 min)

- *Monitor*: look for students cutting the squares into sixths and students cutting them in half.
  - Ask students cutting squares in sixths, if there is another way to share the squares making fewer cuts.
  - Ask students cutting squares in half if there is another way by making more cuts.
- *Discuss:* have a students share how they solved the problem using sixths and another using halves.
  - Ask class if both solutions are *equivalent*, 'Will each JiJi get the same amount?'
  - Students should prove why 3/6 is the same amount as 1/2 .

Part 2: Students continue solving **Different ways to Share Fairly Problem Sheet** on their own using the *Boxes Sharing Tool*, then discuss four JiJis sharing 3 boxes problem (5 min)

- *Discuss:* Ask a student cutting two boxes in half and the third into fourths and compare that to all three boxes cut into fourths.
  - Students should explain why 2/4 is equivalent to 1/2 using drawings or the tool

Conclusion: Analyze Two Sample Strategies

Part 1: Project the prompt while students work in pairs to model the solutions and discuss their thinking (5 min)

- Student partners use the *Box Sharing Tool to* analyze the prompt. Each student models a different solution.
- Students construct viable arguments why Six JiJis share 2 squares can be solved by partitioning the squares into thirds or sixths
  - *Monitor:* look for students approaching the problem by
    - Combining 2 sixths and reasoning why that makes thirds
    - Partitioning 1 third and reasoning why that makes sixths

Part 2: Students discuss their thinking in small groups, then share out as a class (5 minutes)

- *Discuss*: focus on how much each JiJi gets in group A and group B (each JiJi gets 1/3 and 2/6). Ask students to explain why those fractions are equivalent.
  - If you give each JiJi 2/6, there are three sets 2/6 in the first square and three in the second square.
  - You can combine 2/6 and that makes 1/3
  - If you cut 1/3 in half, you get 2/6