Decomposing Fractions Using Time or Money

The interactive white board tool for this lesson can be found on our website under Resources and Teacher Tools. (www.dreambox.com/teachertools)

Students investigate building equivalent fractions using time and money. The teacher uses questioning to assist students with making the connection between denominators and divisible units. The clock is used as a model for halves, thirds, fourths, sixths and twelfths. Money is used as a model for halves, fifths, tenths, and twentieths. Students convert the units of each model into whole numbers (minutes or cents) as well as fractions.

Sample Lesson

Objective: Students choose time or money as models for decomposing fractions.

Background: Students should be able to compare and order fractions whether or not the fractions have like denominators. They should also be familiar with how to represent fractions using either time or money models and understand the use of improper fractions. Don't be afraid to allow students to make mistakes in this lesson. Use these as teachable moments and help students think critically about the models and math. Allow the model to illustrate why their choice works or doesn't work.

Instruction:

1. To begin, discuss how each model can be expressed as a fraction. You can draw or copy the models of clocks and money on the board. Starting with the clock, ask students to find the fraction linked to each model. Spend a significant time discussing and using physical manipulatives if necessary. This step could be a class lesson by itself.

   For example:
   5 minutes   = 1/12 of an hour   nickel   = 1/20 of a dollar
   10 minutes = 1/6 of an hour   dime   = 1/10 of a dollar
   15 minutes = 1/4 of an hour   quarter   = 1/4 of a dollar
   20 minutes = 1/3 of an hour   half dollar = 1/2 of a dollar
   30 minutes = 1/2 of an hour

2. If a student uses time, select time and have the student attempt to use the tool. When the student cannot solve the problem using time, ask students to explain why. (This one can't be represented using this DreamBox tool; the display of 3 minute pieces is too small).

3. After the class determines that money is the best way to solve this problem, bring up the DreamBox interactive white board lesson. Let students know, "We need to build a model of the fraction 3/20. Should we use money or time to build that model? Discuss which model you would choose with your partner and why you chose it." After students have discussed their responses, ask a student explain his or her choice and select time or money on the interactive whiteboard tool.
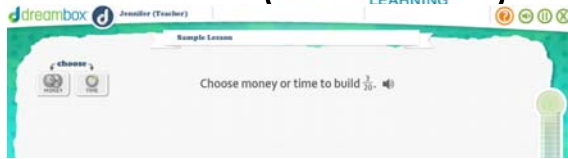
Possible responses:

- "I would use the money model because 20 nickels equals a dollar."
- "I would use money because you can divide 100 by 20 and that gives you a nickel. It's easy to skip count by 5s."
- "I would use money because the clock isn't easily divided into twentieths."
- "I would choose time because 60 divided by 20 = 3. I know my threes."

Note: If a student chooses time, validate that as a good choice, but is one that can't be represented using this DreamBox tool; the display of 3-minute pieces is too small.
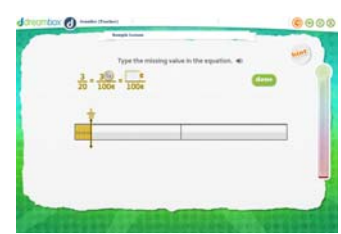
4. The teacher points to the prompt, Use coins to build 3/20 of a dollar. She asks the class, "How would you build 3/20 using coins? Which coins would you use and why? Discuss and then plan to share your response and record it on the board." See pictures (A) and (B).

A. B. C.

Possible responses:

- "I would use 3 nickels because each nickel which equals 1/20 of a dollar."
- "I would use a dime and a nickel because it's the same as 3 nickels."

5. Once the student enters a response and clicks "done," the teacher points to the next prompt: "Type the missing value in the equation." See picture (C). Ask for a volunteer to calculate the total amount of change over the whole dollar and explain the equivalent fraction and click done.
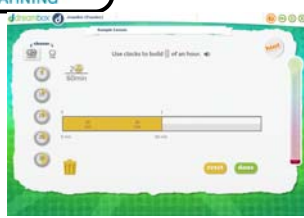
Possible responses:
- "The answer is 15 cents because 3 nickels equals 15 cents."
- "The fraction is 15/100 because it represents 15 out of 100 cents."

6. Below is an example of a prompt that involves an improper fraction. Use questioning and discussion for these as you did above; however, you may add conversations that discuss how to represent the whole (hour or dollar), how students know the fraction is improper and how much is left after representing the whole. Don't be afraid to allow students to make mistakes. Use these as teachable moments and guide the students to correct choices using questions. Use the models and context as a way for students to construct their arguments, illustrating why their choice works or doesn't work.