Equivalent Fractions on the Number Line

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

In this DreamBox lesson, students set up race courses of varying lengths by placing and locating resting points, food booths and other stations at different intervals along the course. In this lesson, students represent equivalent fractions in a real-life problem situation, which enables them to use proportional reasoning and understand equivalent fractions as part of a whole.

Sample Lesson

Objective: Students reason proportionally as they learn to use equivalent fractions while setting up a race course.

Background: Students should be able to place fractions on a number line and understand how to mentally compute fractions of a given number (i.e. What is 1/12 of 120?).

Instruction:

1. Begin by opening the lesson and reading the problem. Ask students, "What information do we have that helps us know where to place the resting points along the course?" Call on multiple students for responses. In this example, the course is 80 km long.

   Possible Responses:
   - We know how long the course is.
   - We know the distance between each resting point.
   - We know how many resting points there will be.

2. As students respond, write the list on chart paper. If students don't supply all of the responses above, ask more specific leading questions such as:
   - "What information on the map is important?"
   - "What information in the prompt gives us a clue to placing the resting points?"
   - "What will we have to figure out before placing the resting points?"
   - "If we have to place the resting points at 1/10 intervals, what do we need to know?"

Adapted from: Fosnot & Dolk. Young Mathematicians at Work: Constructing Fractions, Decimals, and Percents (Portsmouth, NH: Heinemann), 84-85.

3. Once students have identified the key information, ask, "Where can we put a resting point, and how did you figure it out? Discuss this with your partner." After students have discussed their strategies, ask for a volunteer to place a marker on the course. After the first marker is placed, invite other students to place other markers.

    Possible Responses:
    - We should place a marker at 8 km because if you divide 80 by 10, you get 8.
        - o   Note: Students might also choose to start at any multiple of 8 up to 80.
    - We should place a marker at 8 km because there needs to be 10 segments.
    - We should place one at 80 because there should be a station at the finish line.
    - We should place a marker at 10 km because you have 10 segments (allow students to place markers at incorrect locations to enable discussion).
    - Consider using these questions during the conversation:
        - o   "How many resting points are needed?"
        - o   "How can we arrange for 10 resting points to be on the same course?"
        - o   "How will having 10 resting points affect the distance between each point?"

4. After correctly placing the entire first group of markers, the lesson will ask for additional stations to be placed at different set intervals.

5. The next prompt will ask students to label each marker with a fractional value. Ask, "Who has an idea about which marker to label first?" Call on volunteers to label a marker as well as explain their reasoning behind the label. Continue this process with the rest of the markers, being sure to use the same denominator for specific stations.

    Possible Responses:
    - "1/10 because it is the first resting point out of ten."
    - "1 because it is the first stop." (Question if this is in correct fraction terms)
    - "5/10 because it is halfway through the course and 5 is half of 10."

6. After the first group of stations has been labeled correctly, students will then label the other stations with the appropriate fractions of the same denominator. Students will see that 5/10 and 1/2 are at the same location. Continue to question students about their strategies and allow them to make mistakes along the way. Use any incorrect responses as an opportunity for great conversation and problem solving to empower students to have a deeper understanding of equivalence.

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