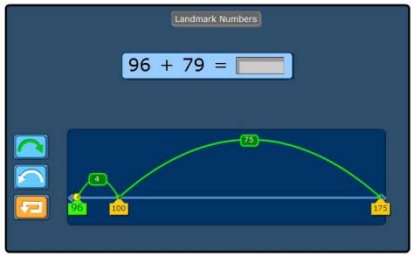
Using Landmark Numbers to Add on the Open Number Line



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

This lesson describes an open number line virtual manipulative for teachers to use in a variety of instructional contexts. In contrast to number lines where all of the counting numbers are visible, the open number line displays only the starting points, change amounts, and resulting values. Using the open number line model, students leverage landmark numbers such as multiples of tens or hundreds to solve addition problems.

Sample Lesson

Objective: Students use landmark numbers as a mental math strategy when adding.

Background: With a problem such as 96 + 79, we want students to realize how close 96 is to 100. By decomposing 79 into 4 + 75, students can add 96 + 4 to make use of 100 as a landmark number.

Instruction:

1. Write 38 + 6 on the board.

   Ask, "Which one of the two values is close to a landmark number (rounding), and that landmark number is?" Call on a student to respond.

   Ask, "If we use 40 as a landmark number, what new equation could we generate to find the sum of 38 + 6? Discuss your strategy with your partner." After students discuss, call on an individual to respond. As the student responds, write the new equations on the board and ask the student to draw the strategy as an open number line.

   Sample student responses and explanations:
   a. "40 + 4 because we added two to 38 so we need to take two away from 6."
   b. "40 + 6 but then we need to take 2 away because we made 38 become 40."
   c. "The answer is 46 – 2 because I added 40 + 6 in my head to make 46 so I only need to subtract 2 because of making the friendly number."

2. Continue the conversation additional equations such as
   47 + 24 and 28 + 46

3. Show the DreamBox open number line on the interactive white board.
   (Example: 96 + 79)
   Ask, "How can we use a landmark number to solve this problem? Discuss your strategy with your partner and draw your own open number line."

4. After students have developed and discussed their strategies, ask for a volunteer to type the number on the line that will become a landmark to use. That student types the number in the open number line. Ask, "Why is that number close to a landmark number?"

   Sample student responses:
   a. "96 is the landmark number because it is close to 100."
   b. "79 because it is real close to 80."

Adapted from: Fosnot & Dolk. "Addition and Subtraction Facts on the Horizon." Young Mathematicians at Work: Constructing Number Sense, Addition, and Subtraction (Portsmouth, NH: Heinemann), 137-138.

5. Ask another student, "How far do we need to jump to reach the landmark number?" Request this student to model that jump on the white board as well as type in the next point on the number line and explain his direction and strategy.

Sample student responses:

a) "A jump of 4 to the right to make it 100."
b) "A jump of 1 to the right to make it 80."

6. After the student has made the jump ask, "What is the next jump that we will make as well as the next location on the number line?" Invite individual students to respond and then ask them to describe how they arrived at an answer. Discuss their strategies.

Sample student responses:

a) "All I have to do is add 79 to 100 to get 179. Then I need to take 4 off the back end since I made 96 the landmark number of 100."
b) "All I have to do is add 75 since I already added 4 to make 96 into 100. The total is 175"
c) "I'll add a jump 90 to 80 and get 170. I decomposed 96 since I don't know 80 + 96. I need to then add 6 to 170. Finally I'll need to take 1 away because of my first friendly number.
d) "I'll add 80 to the hundred and then take five away because I changed both 79 and 96 to landmark numbers."

7. Click the "Next" button on the DreamBox open number line tool and begin a new problem. Engage all students in using the open number line to solve the problem and ask them to explain their thinking and justify their answers. Use the questions above when appropriate to scaffold as needed.

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