Initial Fraction Ideas
Lesson 15: Overview

Students reflect on the characteristics of number lines showing integers to highlight meaning for the unit on the number line, points as numbers on the number line and the arrows at the end of the number line to show that our numbers continue infinitely.

Materials
- Number line Pictures A-D
- Student Pages A-C

Teaching Actions

Warm Up

The thermometer shows the temperature. What do we call the numbers above the 0 point? What do we call the numbers below the 0 point? What is the value of the point at letter A? How do you know this?

Large Group Introduction

1. Explain: the thermometer from the warm up is like a number line. Number lines are pictures that show the numbers we work with.

2. Look at this partial number line (A). Let’s imagine that the number line is a picture showing the distance from Janel’s house to her grandparent’s home. Her grandparents live 5 miles from her house. Where is Janel’s house on the number line? (Point 0; label it “Janel’s house” or draw a picture of a house

Comments

Before locating fractions on a number line students should review the characteristics of a number line from their experiences with whole numbers on the number line. Big ideas in this lesson include the following:

- Unit length
- Point at the end of a unit length is a number
- Arrows at the end of the line communicate that our numbers are infinite
- Fractions are numbers located between two integers
Teaching Actions

above 0) Where would her grandparent’s house be on the number line? (Point 5; label “grandparent’s house or draw a picture of a house above point 5). Explain that the unit on the number line is 1 mile; the distance from point 0 to the first tick mark represents one mile. Where would 7 miles be? (7th tick mark from point 0)

3. Look at this picture of a number line (B). How are the two lines different? Which one do you think is a correct way to represent 1, 2, and 3 miles from Janel’s house or from point 0? Why do you think so?

4. Explain: The distance between whole numbers like 1, 2, 3, 4 should be the same on the number line. The distance from 0 to 1 shows the “unit” length. When we build a number line we can keep on adding unit lengths to show the other numbers. If we have 2 unit lengths then the point at the end of 2 unit lengths is the number 2. In this case it represents 2 miles.

5. Invite a student up to show how to place the numbers 3, 4 and 5 on the number line C to represent 3, 4 and 5 miles from Janel’s house (point 0). Ask student to explain his/her thinking. (Does the student make sure the distances between the tick
Teaching Actions | Comments
--- | ---
marks are equal?)

6. Ask: The line in this number line ends. Does that mean the numbers end? What can we do to show that our numbers keep on growing? (Include an arrow at the end of the line on the right)

7. Show number line D. There are tick marks/points to the left of zero. What kind of numbers are those? Imagine a winter in Minnesota. The temperature is 5 below zero. Where is “5 below zero” on the number line? What does each tick mark represent in this scenario? How many unit lengths to the left of zero did you count off? What number is at that point?

8. What can we do to the number line to show that our negative numbers keep on going? (Include an arrow at the end of the line to the left)

9. Look at number line D. Ask: Are these all the numbers we have in the world? What are some other numbers we can show on the number line? About where would 1 ½ be on the number line D to show 1 ½ miles from Janel’s house? Where would ¼ of a mile be?

It is important to only estimate where the fractional amounts will be. Just see if the students can see that 1 ½ is between the two integers 1 and 2; if ¼ is understood to be between 0 and 1.
Teaching Actions

10. Explain that you will end the fraction unit, by finding out different ways to locate fractions on the number line.

Group/Partner work

11. Assign Student Pages A - B to students in pairs. Explain that you will be asking students to share their thinking during the wrap up of the lesson.

Wrap Up

12. Share responses to problems 1 - 3 on student pages. Have more than one student share his/her thinking. Focus the discussion on the unit and numbers as points on the number line.

13. For problems 4 and 5 act out the problem with a student to emphasize distances from zero and how a number names the distance from zero. For example, ask a student to stand near zero (Project problem 4 on the Smart board). Explain that zero is the starting place; where you live. Now walk one mile, ask: Where are we on the number line? Keep walking stopping at mile marker 2 and 3. Now ask: Where is 3 ¼ miles?

14. Repeat for Problem 5.

15. Look at Problem 6 together. Have students provide rationales for why the number 1/3 is between 0 and 1. Don’t be surprised if some students say that 1/3 is

Comments

As students do the seat work, observe if:

- Students place whole numbers on the line by iterating equal unit lengths
- Students determine unit length when given lengths >1
- Students can make reasonable estimates for locating fractional amounts on the line

Identify students to share their solutions to make public any errors or misunderstandings as well as solution strategies that would help all students.

Estimate only distances with fractional amounts.
<table>
<thead>
<tr>
<th>Teaching Actions</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>the number 1 as 1 is 1/3 of 3. If this happens reflect</td>
<td></td>
</tr>
<tr>
<td>on 1/3 as a number. Is this number greater than</td>
<td></td>
</tr>
<tr>
<td>zero but less than one?</td>
<td></td>
</tr>
</tbody>
</table>

**Translations**

- Context to picture to verbal
- Context to picture to symbol
- Symbol to picture
What do we call the numbers above 0?
What do we call numbers below 0?
What is the temperature reading at Point A?
How do you know this?
Number line A

Number line B
Number line C

Number line D
Problem 1

Place the numbers 2 and 3 on the number line. Explain how you did this.

Problem 2

Place the numbers 1, 3 and 4 on the number line. Explain how you did this.

Problem 3

Place the numbers 2 and 4 on this number line. Explain how you did this.
Problem 4

Imagine that you lived 4 miles from schools. You rode your bike 3 ¼ miles before you got a flat time. Estimate where you think 3 ¼ would be on this number line. **Put an X at your estimate.** Explain your thinking.

![Number line](image)

Problem 5

The distance from school to the library is 3 miles. What does the number 0 on the number line represent if the 3 miles represents the distance from school to the library?

![Number line](image)

You walked ½ mile to the library from school before your Dad picked you up in his car. Estimate where ½ mile is on the number line. Put an X at that spot. Explain your thinking.
Problem 6

Look closely at the number line. Put in the number 0.

Now consider how big is the number $\frac{1}{3}$. Is $\frac{1}{3}$ between 0 and 1 or 1 and 2 or 2 and 3? Put an X about where the number $\frac{1}{3}$ is on the number line.

Problem 7

Fill in the missing numbers for the tick marks.