

Walk the Line

Description

Students actively equi-partition a number line using different fractional units (e.g., halves, fifths) as they place mixed and improper fractions. Students will enjoy walking, jumping or using every day classroom items as a method of kinaesthetically partitioning a number line on the floor. This task becomes increasingly complex based upon the sets of fractions used.



Mathematics

Accurately placing fractions on a number line involves significant spatial reasoning and the use of a large number line allows students to gesture and walk to communicate their spatial reasoning. Research shows that the number line is a powerful model for representing fractions that supports a deeper understanding of fraction as number (as opposed to a circle model). Unit amounts are purposefully scaffolded to allow students to use their knowledge of benchmark fractions (e.g., $\frac{1}{5}$) to place other fractions (e.g., $\frac{6}{5}$).

Curriculum Connections

Students will:

- understand a fraction as a number on the number line;
- represent and compare fractions;
- accurately place fractions on a number line by reasoning about their relative size.

Instructional Sequence

1. Tape a number line (masking tape is easiest) on the floor. Label 0 and 1, ensuring that the number line extends beyond 1. Ask students to place the first set of fractions on the number line appropriately. Have students share their reasoning for locating each fraction.
SET #1: $\frac{1}{4}, \frac{1}{2}, \frac{1}{3}, \frac{1}{5}, \frac{1}{6}$ (use all the same colour sticky notes, such as green)
2. Have students leave that set of fractions on their number line and add the second set of fractions. Observe and highlight the strategies that they use to place this set.
SET #2: $\frac{6}{5}, \frac{2}{5}, \frac{3}{5}, \frac{4}{3}, \frac{2}{3}, \frac{3}{3}$ (fifths in a new colour and thirds in yet another colour)
3. Allow students to identify another fraction which could be placed on this number line and record it on a new coloured sticky. One at a time, the students show their fraction to their group mates, who must come to agreement and then place it appropriately on the number line.

Highlights of Student Thinking

Students may:

- immediately understand that the whole can't move (e.g., $\frac{5}{5}$ is 1);
- walk the line (using steps as benchmarks) to help check proportions in the segments;
- use floor tiles, a long chalk brush, hands held at a fixed distance apart, and length of feet or stride to make 'consistent' proportions;
- pay attention to only the denominator or numerator when ordering fractions, without thinking about the relationship between them;
- focus initially on putting the fractions in the right numerical order, then think about equal spacing;
- refine their thinking based on input from their peers;
- show understanding of fractions greater than one;
- recognize that the larger the digit in the denominator, the smaller the segment.

Key Questions

1. How did you know where the fractions should go?
2. What do you notice about these fractions?
3. How could you count these fractions as you walk along the number line?
4. Can you walk the line to see if these fractions are in the correct place?
5. Is there anything else in the room that could help you decide where to place the units?

Materials

Masking tape

ribbon (at least as long as number line)

various coloured sticky notes