

Unit Fractions Counting Game

Description

Students “count up” using unit fractions (for example, $\frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{1}{8}$, etc.). The students or teacher can choose any unit fractions, and the teacher or students can set game rules such as: “When you get to one whole, stand up and state the quantity as both a fraction and as a whole”. Note: this game is similar to a well-known number game called BUZZ.

Mathematics

A unit fraction is the base unit of any fraction and always has a numerator of 1. For example, one-fourth is a single one-fourth unit. Two fourths are two one-fourth units. When we count these fourths, we use the language “1 one-fourth”, “2 one-fourths”, “3 one-fourths”, “4 one-fourths”, “5 one-fourths” and so on. This helps students understand that we are counting units that are fourths and this allows us to count beyond one whole, such as 5 one-fourths.

Curriculum Connections

Students will:

- learn how to count fractions in various ways, developing a sense of magnitude;
- count using unit fractions to go beyond one whole (e.g., 15 one-fourths);
- develop the ability to calculate halves and wholes mentally based on unit fractions counting.

Instructional Sequence

1. Start in a circle, and have students count the unit fraction of your (or a student’s) choice. If the fraction selected is $\frac{1}{4}$, for example, the first person in the circle would say “1 one-fourth”; the second person would say “2 one-fourths”; the third person would say “3 one-fourths”, and so on. When a student arrives at a whole number (such as 4 one-fourths), they need to stand up and say the whole number equivalent. (This continues for each whole number, for example, the student that gets 8 one-fourths needs to say “two”.)
2. Be sure students count well beyond one (such as counting to 28 one-fourths).
3. When all students have counted ask students key questions.

Variations on the game

- a. Use concrete materials to help count by unit fractions (e.g., lay down a corresponding fraction strip piece for each count).
- b. One person states a unit fraction (such as one-fifth). Students move around to join with enough people to represent 1 or 2 or 3 wholes (e.g., to make two wholes counting one-fifths, 10 people, each representing one-fifth, would join together).
- c. Add a second action/word whenever you get to the equivalent of the half-way mark between each whole.
- d. Have students represent the fraction using a model of choice when a random buzzer sounds.

Highlights of Student Thinking

Students may:

- connect counting unit fractions to counting other units, such as units of measure or items in whole number units;
- find the concept of the unit fraction challenging at first;
- get ‘stuck’ when counting beyond the whole;
- come up with a wide range of variations to the game when invited to do so.

Note: Field testing of this game demonstrated that it aided students in distinguishing between unit fractions (e.g., 5 one-fourths) and mixed fractions (e.g., 1 and one-fourth). Further, it supported student understanding of what made up a whole (in both area and set models).

Key Questions

1. If each person counted one-fourth in our count, how many one-fourths would we have counted in total? (e.g., if there are 27 students, they will have counted 27 one-fourths, or 6 wholes and three-fourths).
2. How many wholes did we count? Did we end on a whole?
3. How many one-fourth units did it take to make one? How do you know?

Materials

Optional materials include number lines, and/or concrete materials, such as Cuisinaire rods or fraction tiles.