Open-Sky School

Category
MATHEMATICS

Atelier

Blades of Grass

MATERIALS
Per group:
- Tape measures
- Clipboards
- Papers and pencils

For the class:
- Pegs and rope to make quadrats
- Scissors

DURATION
90 MINUTES

Activity Summary

This problem-solving activity involves calculating the number of blades of grass on a given section of a schoolyard or park. Students will need to find their own method to avoid counting each blade of grass in the entire section. The objective of this activity is to practice calculating the area of a surface, converting units of measurement and problem solving. You can introduce students to what a quadrat is and what its use is in ecology.

Preparation

Choose a grassy section for this activity, leaving enough space for all students to work. Delimit a rectangular area for each team of students.

Study this document on quadrats from the BEATY Biodiversity Museum to help explain quadrats to your students:
https://explore.beatymuseum.ubc.ca/cms/storage/uploads/2022/05/20/quadrats-transects_uid_6286e96d4a663.pdf

Steps

A. **In class:**
This problem solving activity requires mastery of several mathematical concepts. Thus, it might be necessary to review area, converting units of measurement, and multiplying decimal numbers.

Say:
Practice using a tape measure. For example, measure the length of a branch or the distance between two trees.

B. **Outside**
Present the problem to students. Let students think in teams of two or three to identify an approach to solve the problem. Ask students to write down the steps to their approach before they begin solving the problem.

Students can then try to solve the problem, or you can suggest that students use quadrats to count blades of grass over a small area. (It is recommended to use a quadrat of $1dm^2$)

Solving this problem will typically involve students measuring the area of the grassy section and then counting the blades of grass in a small quadrat. They will then extrapolate the number of blades of grass from this small area to the entire grassy section. (Students often have difficulty extrapolating when the area of the quadrat has been measured in a different unit of measurement than the grassy section.)

C. **Presentation of the quadrat concept**
Say:
- *A quadrat is a geometric shape, usually a square or rectangle, that is used to isolate a unit of area to assess the distribution of plants or animals over a larger area.*

Ask students:
- *How can we use the quadrat to estimate the number of blades of grass?*
- *How big should the quadrat be?*
- *How many times can this quadrat fit in the grassy section?*

Show students how to build the quadrat using branches and string. If necessary, explain how to extrapolate the size of the quadrat to a larger area.

RETURN TO GROUP

- Ask teams to explain their approach to solving the problem.
- Ask each team for their results: how many blades of grass did they determine for the entire grassy section?

REINVESTMENT:
Team results can be used to calculate the class average to get a more accurate result.
The same approach can be used to estimate the amount of other objects in the yard, trees, flowers, insects, etc. using quadrats and interpreting the data using a pie chart.

BEATY Biodiversity Museum, The University of British Columbia (2022 May 20). *Quadrats and Transects in your Schoolyard. https://explore.beatymuseum.ubc.ca/cms/storage/uploads/2022/05/20/quadrats-transects_uid_6286e96d4a663.pdf*