

Cell Size

Summary

Students investigate the relationship between surface area (cell membrane) and volume of a cell.

Main Core Tie

Science - Biology

[Standard 2 Objective 3](#)

Time Frame

1 class periods of 60 minutes each

Group Size

Small Groups

Materials

- [student sheet](#)
(attached)
- [cell cutouts handout](#)
(attached)
- scissors
- masking tape
- sand
- 25 ml and 100 ml graduated cylinders
- calculators (optional)

Background for Teachers

Safety Concerns:

Proper use of scissors should be emphasized.

Instructional Procedures

Read the introduction with students and discuss why cells are small. While there is some variation in cell size the upper limit seems to be the same for all organisms. See if students can generate ideas but do not provide answers.

Read the materials and procedures with students and assign groups if needed. 3-4 students per group is desirable.

Review the calculations needed to find the ratios. Assume that the cells have "lids" even though they do not.

The students should discover that a cubic centimeter is the same as a milliliter in this activity. This is why they measure volume 2 different ways. They should be able to use either volume, the calculated one or the one measured with sand because they should be similar numbers. Have students post their final ratio of surface area to volume on the board. Compare their results and make sure groups made their calculations correctly.

Once students discover that smaller cells have more surface area to volume, discuss why that might be important to cells. (cells have no circulatory system, all materials must flow inside and out through cell membrane, osmosis occurs more easily when substances are near the membrane.

You may wish to see if students can apply this finding to raindrops.
Give students time to finish with analysis questions and conclusions.
air-share conclusions and encourage students to write complete thoughts that summarize their learning.

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

[Utah LessonPlans](#)