

Build Your Own Plant Cell

Standards of Learning

Science 4.4, 5.5, LS.1, LS.2, LS.3

Objective

Students will:

- Create their own models of a plant cell
- Discuss the structures and functions of the plant cell organelles

Materials

- Half-sized Ziploc baggies (one per student)
- Buttons (one per student)
- Elbow macaroni (3-4 pieces per student)
- Gummy life savers (two per student)
- Dried green split peas (3-4 per student)
- Clear corn syrup (3/4 cup per student)
- Pipe cleaners (1 per student)
- Green tissue paper (small piece per student)
- Inside of a Plant Cell worksheet (handout provided)

Background Knowledge

There are many parts to the inside of a plant cell and all of the different parts each have their own function. The cell membrane is the thin layer of protein and fat that surrounds the cell. This membrane is semipermeable, which means it allows some things to pass through but not others. The cell wall is the thick, rigid membrane that surrounds a plant cell. This structure gives the cell its support while bonding with other cells to create the plant. Chloroplast is a disc-shaped organelle containing chlorophyll. This is where photosynthesis takes place. Photosynthesis is when sunlight is converted in chemical energy or food for the plant. Cytoplasm is the jelly-like material outside of the cell nucleus where other organelles are located. The mitochondrion is a rod-shaped organelle that converts the energy stored in glucose into ATP for the cell. The nucleus controls many of the functions of the cell and contains the DNA of the plant. The rough endoplasmic reticulum transports materials through the cell and produces proteins in a sack called cisternae. The smooth endoplasmic reticulum also transports materials through the cell. It contains enzymes and produces and digests lipids and membrane proteins. Lastly, the vacuole is a large space bound by a membrane that is filled with fluid to help the cell keep its shape.

The structure and organelles of the inside of a plant cell can be a difficult concept for students to understand and visualize in their minds. This lesson provides the students with the opportunity to create their own model plant cell, which will help them to comprehend how the inside of a cell works.

Procedure

1. Review with the students what a cell is.
2. Activate students' prior knowledge about cells and their structures and functions.
3. Tell the students that today they will be making their own models of a plant cell and discussing the functions of the structures in the cell.
4. Give each student a copy of the Inside of a Plant Cell worksheet.



5. Tell the students to refer to this sheet throughout the construction of their model cell.
6. Give each student a Ziploc baggie and ask them to write their name somewhere on the baggie.
7. Give each student a button, 3-4 pieces of elbow macaroni, and 3-4 split green peas.
8. Tell the students to look at their worksheet to determine what cell structures these materials represent.
9. Then tell the students to put these materials in their baggie.
10. Give each student two gummy life savers.
11. Allow the students to eat one and then place the other one in their baggie.
12. Discuss what structure the life saver represents.
13. Give each student a pipe cleaner.
14. Demonstrate to the students how to create their endoplasmic reticulum by folding the pipe cleaner back and forth so it creates a wavy pattern.
15. Tell the students to then place this part in their baggie as well.
16. Give each student a small piece of green tissue paper and tell them to attach it to one outside of their Ziploc baggie using tape.
17. Tell the students to look at their worksheet to determine that the tissue paper represents the cell wall.
18. Finally, tell the students to hold open their baggies while you (or a helper) place approximately $\frac{3}{4}$ cup of corn syrup into each student's baggie.
19. After they get the corn syrup, tell the students to zip up their baggies.
20. Place the worksheet up on the overhead.
21. As a class, go over the chart. Fill in the blanks on the chart and write the answers on the overhead sheet and tell the students to copy them down.
22. After all the students have completed their worksheets, go over the structures and functions of a plant cell.
23. Ask if the students have any questions regarding the structures of a plant cell.

Extension

Make a model of an animal cell and compare the parts and functions between the plant and animal cell.

References

Activity adapted from Science NetLinks at www.sciencenetlinks.com



INSIDE OF A PLANT CELL

Name: _____ Date: _____

Structure	Function	Material Used
Cell Wall		Green Tissue Paper
Cell Membrane		Ziplock baggie
Cytoplasm		Syrup
Chloroplast		Split green peas
Nucleus		Button
Mitochondrion		Elbow macaroni
Vacuole		Lifesaver
Endoplasmic Reticulum		Pipe cleaner

