



Science Unit: *Plants and Animals Through the Stages of Ecological Life*

Lesson 2: *Plant and Animal Cells – Are they different?*

School year: 2007/2008

Developed for: Mount Pleasant Elementary School, Vancouver School District

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Grade level: Presented to grades 6 - 7; appropriate for grades 3 – 7 with age appropriate modifications.

Duration of lesson: 1 hour and 20 minutes

Notes: Students should have a lesson on the use of light microscopes prior this lesson. If working with a limited amount of time, make the slides before the start of lesson

Objectives

1. Learn the basic differences and similarities between animal and plant cells
2. Establish a connection between animal and plant cell structure and organism function

Background Information

While animals and plants are both living things their ways of existing are very different. Animals often need to move to get food and water and they often need shelter. Plants are static organisms that do not need to gather food or obtain shelter; however, they need nutrient-rich soil and light. These basic differences at the organism level are also translated into the cells the make up the organisms. Plants need to structural support, to withstand gravity and stand tall, while animals also need support; they also require a more malleable system to allow for locomotion. Therefore if we look at plant cells we will see a cellular wall that gives rigidity and structure to the plant cell, a cellular structure that is missing from animal cells. The need for sunlight also translates into the presence of different cellular structures. The chloroplast, the organelle responsible for photosynthesis, is only present in plants. The need for a cell wall has also resulted in the need for a receptacle to store cellular waste.

Vocabulary

<u>Word:</u>	<u>Brief definition.</u>
Organelle	A cellular structure with a specific function within the cell
Cell Wall	An organelle that provides structural support and protection to plant cells
Vacuole	A large compartment present in plant cells that store waste and control water intake
Cell membrane	An organelle that surrounds all cells and controls transport in and out of the cell
Mitochondria	An organelle that converts sugar into useable energy for the cell
Chloroplast	An organelle that converts light and water into sugar molecules
Nucleus	The 'command' center of the cell. Where all genetic material is contained.

Materials

- Light microscopes
- Animal cell slides (cheek cells)
- Diagram of animal cell
- Diagram of plant cell



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- Pictures of animals and plants
- Electron microscope pictures of animal and plant cells (any 1st year university Biology textbook)
- Plant cell slides

In the Classroom

Introductory Discussion

1. Present this scenario:

“Imagine that you are the first humans on the planet. There are many creatures out there. You are an inquisitive person, a ‘natural-born scientist’, and you want to know what the basic differences between those creatures are. How would you go about figuring it out?”

2. Guide students towards a discussion between the basic differences between animals and plants
 - What are the basic needs of an animal?
 - What are the basic needs of a plant?
 - How does an animal function? What about a plant?
 - Brainstorm as a class (and write on the board)
3. Form groups of 3 and ask each group to think of a design for a plant and an animal cell
 - Do you think animal / plant needs and function would be translated into their cell designs?
 - How would they be different?
 - Give an example: Plants need to have a rigid structure for support; therefore the plant cell must have a shape that is also rigid. What about animals?
 - Draw and explain why you made your hypothetical plant and animal cell that particular shape and give a reason for every hypothetical structure you draw. (Emphasize that the reason is the most important part!)

Provide instructions for the rest of the lesson and the safety guidelines

- Each group will be given a microscope and animal and plant slides. Each student should have a turn at observing the cells.
- Students should record / draw their microscope observations in the same worksheet where they drew their hypothetical cell design.

Science Activity: Microscopy

Observing the differences between animal and plant cells

1. Make slides of animal cells (cheek epithelial cells) and plant cells (onion or celery) prior the start of the lesson. If time allows, have the students make their own slides. – Instruction on how to make these slides is provided on the web (site address can be found in the Reference section)
2. Make enough slides so you can have 1 animal and 1 plant slide per microscope.
3. Remind students how use the microscopes
4. Ask students to look at each slide, draw and record their observations.



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5. Once they are happy with their observations compare and contrast the hypothetical design with the actual design – how do they differ?

Closure Discussion

1. Ask students to draw on the board an animal and a plant cell
2. Ask input from the class to achieve a good model of the actual design
 - Show the students electron microscope pictures and label the diagram they have just drawn
 - Explain the function of the labeled organelles
 - i. Cell membrane, mitochondria, chloroplast, vacuole, cell wall, nucleus
3. Draw correlations between animal/ plant function and the design of their respective cells.
 - Do you think there is a reason why plants have a cell wall and animals don't?
 - Why would plants and animals have a nucleus?
 - Why do plants and animals have a cell membrane?

Time permitting; ask the class to make a collage model of either a plant or an animal cell, using the materials provided (cotton balls, paper clips, pieces of string, straws, popsicle/ stir sticks)

References

1. <http://www.hometrainingtools.com/articles/microscope-experiments.html#MakePreparedSlides> Home Science Tools. Introductory Microscope Experiments. Web site hosted by Home Science Tools. Accessed Jan. 28, 2008.
2. Campbell, Reece, Mitchel. Biology. 5th edition. Published by Benjamin Cummings, 1999.

Extension of Lesson Plan

1. Investigate the organelles present in each cell type: which ones are present in both types? Which ones are present in only one type? Make a list correlating cell composition with organism function.

Investigator name: _____

Cell Design - How do Plant and Animal cells differ?

Plant Cell

Animal Cell

Hypothetical	Hypothetical
Comments on Plant cell design:	Comments on Animal cell design:
Microscope observation	Microscope observation
Written observations:	Written observations: