

Cell Structure and Function, Biology Grade 9-12

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Content Objective:

Students will be able to:

1. Recognize the characteristics of living things and analyze their cell structure and function;
2. Compare the structures and functions of viruses and cells and describe the role of viruses in causing diseases and conditions such as acquired immune deficiency syndrome, common colds, smallpox, influenza, and warts. **TEKS Biology.§112.43. (4)(C).**
3. Identify the parts of prokaryotic and eukaryotic cells. **TEKS Biology.§112.43. (4)(A)**
4. Investigate and identify cellular processes including homeostasis, permeability, energy production, transportation of molecules, disposal of wastes, function of cellular parts, and synthesis of new molecules. **TEKS Biology.§112.43. (4)(B)**

Language Objective

Students will be able to use cell structures, cell function and key vocabulary in listening, speaking, reading and writing skills.

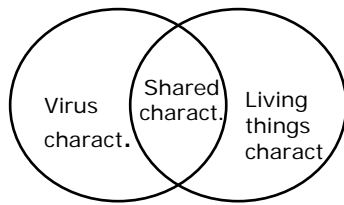
Vocabulary Key Words			
Cell theory	Prokaryotic cell	Eukaryotic cell	Animal cell
Unicellular	Multicellular	Chromosomes	ATP
Plant cell	Organelle	Cytoplasm	Cytosol
Ribosome	Golgi Apparatus	Nucleus	Nucleolus
Lysosomes	Endoplasmic reticulum	Mitochondria	Chloroplast
Cytoskeleton	Plasma membrane	Cell wall	Central vacuole
Rough ER	Smooth ER		

Materials:

1. [Video of Black-chinned hummingbird](#)
2. Cell animations at [CELLS alive!](http://www.cellsalive.com/cells/3dcell.htm) (<http://www.cellsalive.com/cells/3dcell.htm>)
3. Antibodies PowerPoint
4. Prokaryotic Cell Diagram (showing all organelles)
5. Eukaryotic Cell Diagram (showing all organelles)
6. Animal Cell Diagram
7. Plant Cell diagram

Procedure

1. Begin the class by showing the TIDES video of a Black-chinned Hummingbird. (<http://tides.sfasu.edu/LSA/Bbchu2.htm>)
2. Ask the students what characteristics of the hummingbird and the plant they can see. Guide the group to list the characteristics of all living things (protist, plants and animals), then make a T-list containing all the information gathered by the students, followed by the definition of unicellular and multicellular organism. Ask the students to list examples of each.
3. Next, start a discussion by asking the students if viruses are alive.
4. The teacher will divide the group into teams of 3 members which will each use the information listed on the T-list of the characteristics of living things to:
 - o Built up a contrast Overlay Map of the characteristics of viruses and living things.



- Share the Map with the rest of the class.
 - Classify viruses as living or non-living.
 - Explain how the group came to that conclusion.
 - Discuss the group's findings with the other teams.
5. The teacher will explain how viruses cause diseases like: AIDS, common colds, smallpox, influenza, and warts.
 6. Analyze the symptoms of these viruses, how they are transmitted, and vaccines.
 7. Design different structures like antibodies and give one to each student. The students will find the different antibodies that will destroy smallpox, influenza and warts.
 8. Explain the cell theory and ask the class to talk about what they understand about each statement of the cell theory.
 9. Show the diagrams of the prokaryotic and eukaryotic cells.
 10. The teacher will divide the students into teams of 3-4 members. These teams will each:
 - State 5 differences between the eukaryotic and prokaryotic cells.
 - Give a definition for eukaryotic and prokaryotic cell.
 - Classify the information into a graphic organizer about the types of cells.
 11. Classify the examples of cells into prokaryotic and eukaryotic (plant cell, bacteria, amoeba, skin cell, chicken egg, sperm, fungi cell, archea).
 12. Show the Animal cell interactive diagram and explain each of the organelles functions.
 13. Show the Plant Cell interactive diagram to explain give definitions for each of the organelles functions.(10 min)
 14. Ask the class what the differences and similarities are between plant and animal cells. Depending on how the students answer, draw a Contrast overlay Map with the student's ideas.
 15. Allow some students to come to the front of the class and label the organelles on the cells' diagrams.

Assessment

1. For homework the teacher will ask the student to build a creative animal and a plant cell model in teams of 3 members. These models will be used in an exhibition.
2. The teacher will distribute the grading rubric to the students.
3. Ask the students to show their cell models in class and score them according to the rubrics.
4. Ask students to vote for the best model.
5. Compare the cell to a factory. Have students check the following link:
<http://www.beyondbooks.com/lif71/4a.asp>