

4.2 – Parts of a Cell

10/6/05

Purpose / rationale:

The purpose of this lesson is for students to identify the structures of plant and animal cells and to explain the functions of each. Students will also compare and contrast animal and plant cells.

SOLs:

LS. 2 - The students will investigate and understand that all living things are composed of cells.

Key concepts include:

- a) cell structure and organelles (cell membrane, cell wall, cytoplasm, vacuole, mitochondrion, endoplasmic reticulum, nucleus, and chloroplast);
- b) similarities and differences between plant and animal cells

NSES C - The students should develop an understanding of the structure and function in living systems.

Materials and Resources:

Colored construction paper

Scissors

Markers

Tape

Two large pieces of poster board w/ outline of plant and animal cell

Pieces of paper w/ structures written on them (to assign to students)

Science textbook

Safety:

Students should carry scissors with sharp ends point towards floor only and should not run or play around in classroom during the activity, especially with scissors in hand.

Procedures:

Engage

1. The teacher will engage the students in learning about cell structure and function by comparing its parts and processes to that of the students' school. **(10 minutes)**
 - *What are the different roles of people/things in your school?*(possible answers listed below)
 - Outer school walls – regulates what enters and leaves the school, access only at certain points, contact with external environment (plasma membrane)

- Principal/Vice Principal – controls building activities, determines what needs to be done (nucleus)
 - Floors – inside outer walls of building (cytoplasm)
 - Classrooms – where students do their work (ER)
 - Students/Faculty – workers (ribosomes)
 - Main office – directs all school activities, processes requests (Golgi Apparatus)
 - Cafeteria aids/Janitors, etc. – responsible for maintaining materials inside the building, discarding or obtaining materials (lysosomes)
 - Support beams (wall, ceilings, floors) – maintains building shape (cytoskeleton)
 - Generator/Power source – provides energy to turn on lights, run computers, etc. (mitochondria, chloroplasts)
 - Closets/storage – store materials (vacuoles)
- *Today we are going to see that cells have many of these same functions/structures to carry out necessary roles*

Explore

2. Students will explore cell structure and function among plant and animal cells by being assigned a particular structure to (1) identify as part of an animal/plant/both cell, (2) create from construction paper, and (3) write its corresponding function on the cut-out structure. Students will use their textbook as the source to get needed information. **(15 minutes)**

Explain

3. Students will then present their construction paper structure to the class and explain what they wrote for it. They will then tape it onto the animal and plant cells (poster board) in its general location (using diagrams from book). As students are reporting, everyone will make the appropriate notes in their notebook (as outlined on the board for them). **(20 minutes)**
 - Nucleus – control center for cell's activities
 - Endoplasmic Reticulum – transports materials throughout cells
 - Ribosomes – protein factories of cell, located in ER and cytoplasm
 - Golgi Body – center of manufacturing and shipping cell products
 - Vacuole – stores water and food materials; stores/gets rid of wastes
 - Mitochondria – powerhouse of the cell, provides energy to cell
 - Cell membrane – controls what enters and leaves cell
 - Cell wall – provides support and protection, so plant can grow upwards
 - Nuclear Membrane – controls what enters/leaves nucleus
 - Chloroplast – contains chlorophyll; energy producer
 - Cytoplasm – jellylike; site of most cell processes; found throughout cell
 - Lysosome – breaks down cell waste, old cells
 - Organelle found only in plant cells: chloroplast, central vacuole, cell wall
 - Organelle found mostly in animal cells (few plants): lysosome

Elaborate

Students will identify the part only found in plant cells and explain why **(1-2 minutes)**.

- Chloroplast – primary producer

Evaluate

Performance Criteria	Evidence	Points or Rating
Students should create a cell structure and identify its function.	Cut out structure from construction paper with function written on it.	Completed yes or no?
Students should be able to explain cell structure function.	Present created structure to class, explaining function.	Completed yes or no?
Students should identify general location of cell structure in animal and/or plant cell .	Place structure on animal or plant cell made from poster board.	Completed yes or no?
Students should record functions of all structures presented.	Notes for each structure recorded in notebook.	Completed yes or no?

**If any class time is left, I will wrap-up with questions reviewing what we've done today.

4.2 – Parts of a Cell

10/13/05 – 10/14/05

Purpose / rationale:

The purpose of this lesson is for students to further explore parts of the cell and their corresponding functions. At this point, students should be familiar with cell parts and functions. This lesson will further challenge students' familiarity with the material when seen in yet another context.

SOLs:

LS. 2 - The students will investigate and understand that all living things are composed of cells.
Key concepts include:

- c) cell structure and organelles (cell membrane, cell wall, cytoplasm, vacuole, mitochondrion, endoplasmic reticulum, nucleus, and chloroplast);
- d) similarities and differences between plant and animal cells

NSES C - The students should develop an understanding of the structure and function in living systems.

Materials and Resources:

Cell names written on a section poster board (12)
Cell functions written on a section of poster board (12)

Safety:

Students should conduct themselves appropriately while walking around the room and use a reasonable voice level.

Procedures:

Engage (5 minutes)

1. "Minds on Science" – What is the difference between a plant cell and an animal cell? Use complete sentences.

(Animal cells more commonly have lysosomes; Plant cells have cell wall, central vacuole, chloroplasts)

Explore

2. Students will review material on parts of a cell by matching a cell part/organelle with its corresponding function. Each student will be given either a cell part name (blue poster board) or a cell part function (green poster board) and students will have the task of

walking around the room to find their corresponding mate. The teacher will also be assigned a part in the case of an odd number of students. Paired students should sit at a vacant table together once confident of their match. In case of disputes, students should practice scientific inquiry without arguing (think through the answer together). No books or notes should be used. Once everyone appears situated, the class will go over the matches together (**10-15 minutes**).

Explain

3. The teacher will start with one pair. The match will be read out loud and the teacher will ask if anyone thinks this is not the correct match. If so, the student should explain why they think this and which answer they think is correct. The teacher will guide students until all matches are correct (addressing all pairs) (**15-20 minutes**).
 - This same activity can be repeated as many times as needed/possible for reinforcement, with students being assigned a different part each time.
 - The teacher can also quiz individual students to see how many they can correctly match.

Evaluate

On Friday, students will be given a 10-question multiple-choice test that covers the material learned from the unit (**15-20 minutes**).

Elaborate

As a fun review activity, students will play the class trivia game, Jeopardy. The class will be divided into 2 teams (one side of the room versus the other). The teacher/game show host will pose a question to one side of the room and then either award points or allow the other side to attempt an answer (no points taken off for wrong answers). One student will answer for each team but can get assistance from team mates. Students will rotate this role within their team. Only one answer can be given each turn. The teacher or an appointed student will keep track of points on the board (**30-35 minutes**).

Used cell parts/functions:

- Nucleus – control center for cell's activities
- Endoplasmic Reticulum – transports materials throughout cells
- Ribosomes – protein factories of cell, located in ER and cytoplasm
- Golgi Body – center of manufacturing and shipping cell products
- Vacuole – stores water and food materials; stores/gets rid of wastes
- Mitochondria – powerhouse of the cell, provides energy to cell
- Cell membrane – controls what enters and leaves cell
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