



Science Objectives

- Students will know the names and functions of the major organelles found in eukaryotic cells.
- Students will be able to contrast different cell types (plant and animal cells), based on their structure and function.

Vocabulary

- | | |
|-----------------|----------------|
| • Organelle | • Eukaryote |
| • Unicellular | • Prokaryote |
| • Multicellular | • Macrophage |
| • Necrosis | • B-lymphocyte |
| • Antibody | |

About the Lesson

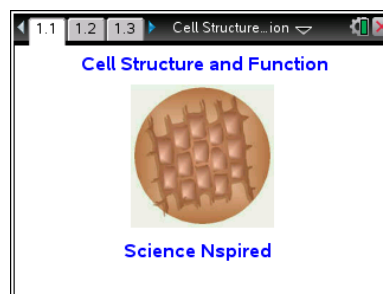
- Using cell model diagrams, students will interact with both animal and plant cells and explore the structure and function of the organelles. Assessments are embedded in the activity to encourage discussion and gauge learning.
- As a result, students will:
 - Learn the basic functions of the following animal cell organelles: nucleus, nucleolus, mitochondria, Golgi apparatus, ribosomes, lysosomes, rough endoplasmic reticulum, smooth endoplasmic reticulum, centrioles.
 - Learn the basic functions of the following plant cell organelles: cell wall, nucleus, chloroplasts, mitochondria, vacuole, Golgi apparatus, rough endoplasmic reticulum, smooth endoplasmic reticulum.

TI-Nspire™ Navigator™

- Send out the *Cell Structure_and_Function.tns* file.
- Monitor student progress using Screen Capture.
- Use Live Presenter to have students demonstrate how to negotiate the simulations and to spotlight student answers.
- Collect student responses from assessment items that are embedded throughout the document.

Activity Materials

- *Cell Structure_and_Function.tns* document
- TI-Nspire™ Technology



TI-Nspire™ Technology Skills:

- Download a TI-Nspire document
- Open a document
- Move between pages
- Explore Hot Spots
- Answer assessment questions within a document

Tech Tips:

Make sure that students know how to move between pages by pressing **ctrl** + **left arrow** and **ctrl** + **right arrow**.

Lesson Materials:

Student Activity

- *Cell_Structure_and_Function_Student.doc*
- *Cell_Structure_and_Function_Student.pdf*

TI-Nspire document

- *Cell_Structure_and_Function.tns*



Discussion Points and Possible Answers

Allow students to read the background information on the student activity sheet.

Part 1: Animal Cell

Move to pages 1.2 and 1.3.

1. Students should read the background information on pages 1.2 and 1.3. Following those pages, there are several questions that assess the students' background knowledge of cells. These questions would probably be best used for discussion after the students answer them.

Move to pages 1.4 – 1.8.

Have students answer questions 1-5 on the handheld, the activity sheet, or both.

- Q1. Which of the following is an example of a unicellular organism?

Answer: C. a bacterium

- Q2. Cells usually have different combinations of organelles, depending on their special function.

Answer: B. Disagree

- Q3. What do you think is meant by the term *multicellular* organism?

Answer: A. an organism that has lots of cells


- Q4. Which cell process is performed by plant cells, but **NOT** by animal cells?

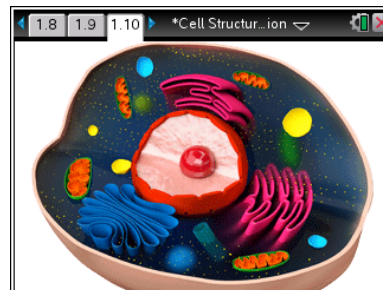
Answer: C. Photosynthesis

- Q5. Big organisms have big cells and little organisms have little cells.

Answer: B. Disagree

Move to pages 1.9 and 1.10.

2. Page 1.9 contains some instructions to the student about navigating the animal and plant cell diagrams. As students move to the animal cell diagram on page 1.10, there is an overlying numbered set of instructions. After reading them, the students should close the box of directions by clicking .





3. Students should move from place to place within the animal cell. When they encounter an icon that looks like a question mark inside a magnifying glass, they should click on that cell part and **take notes** on the name of the organelle and its function in the space provided on the student activity sheet. After completing the search, they should move to the questions on page 1.11 and beyond. At any time, they may move back to the cell diagram and re-check the organelles.

Move to pages 1.11 – 1.18.

Have students answer questions 6-13 on the handheld, the activity sheet, or both.

- Q6. Which organelle did you NOT see in the animal cell?

Answer: B. Chloroplast

- Q7. Mitochondria house important enzymes in the membrane. How is this reflected in the structure of the mitochondria?

Sample Answer: To provide more space for these membrane proteins, the inner-membrane of the mitochondria is folded many times in cristae, creating a large surface area.

- Q8. Some white blood cells (WBC's) are called macrophages. These cells eat bacteria and other disease-causing agents and then destroy them with digestive enzymes. Which organelle do you think macrophages would have in abundance?

Answer: Lysosomes

- Q9. Why do you think release of the lysozyme enzymes can cause necrosis, death of body tissue?

Sample Answer: The digestive enzymes in the lysosome destroy other cells structures that they come into contact with, which is why they are kept separate in the lysosome.

- Q10. Other WBCs, called B-lymphocytes, make and secrete proteins called antibodies. Which cell organelle would B-lymphocytes have a lot of?

Answer: B. Ribosomes

- Q11. Prokaryotes, such as bacteria, do not have organelles. What other cell organelle would you predict that prokaryotes would NOT have?

Answer: C. Nucleolus



Q12. Some cells in your glands secrete chemicals called hormones, which often have to be packaged up before being sent out of the cell. Which organelle would you probably find in great numbers in gland cells?

Answer: B. Golgi apparatus

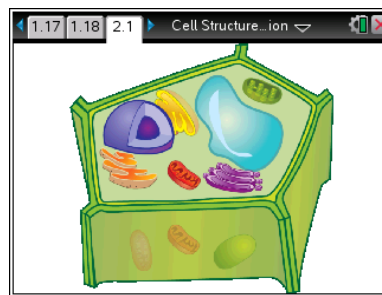
Q13. The cell membrane is made of a lipid bilayer, which is a greasy type of molecule. What does this do to the structure of the cell?

Answer: A. It makes the structure flexible.

Part 2: Plant Cell

Move to page 2.1.

4. After finishing the questions pertaining to the animal cell, students should move to Part 2, which covers the plant cell. The process will be the same as with the animal cell. Students should click on that cell part and **take notes** on the name of the organelle and its function in the space provided on the student activity sheet.



Move to pages 2.2 – 2.9.

Have students answer questions 14-21 on the handheld, the activity sheet, or both.

Q14. Based on your observations, which of these organelles can ONLY be found in plant cells? Select all that apply.

Answer: B. Chloroplasts and C. Cell Wall

Q15. Both Smooth and Rough Endoplasmic Reticulum are responsible for transport. Where do their contents get transported to?

Answer: A. Other organelles, B. Cell wall, C. Outside the cell

Q16. Which organelle contains grana?

Answer: C. Chloroplast

Q17. Plants inherit characteristics from their parents just as animals do. Which cell organelle contains the hereditary information?

Answer: B. Nucleus



Q18. Which pair of plant cell organelles deals with energy processing?

Answer: C. Chloroplasts and Mitochondria

Q19. Plants have both chloroplasts and mitochondria, which can produce energy. Why does the cell have overlapping functions? Explain.

Sample Answer: Chloroplasts only provide energy when there is sunlight. Mitochondria can provide energy from sugar. Together, these provide the cell energy 24 hours a day.

Q20. The vacuole in plants performs a similar function to which organelle in animals?

Answer: D. Lysosome

Q21. When a plant is dried for use as rope, which large organelle makes up most of the fibrous cellulose material that remains?

Answer: B. Cell wall

TI-Nspire Navigator Opportunities

Choose a student to be a Live Presenter to demonstrate how to negotiate the cell diagrams. The questions in the activity may be distributed as Quick Polls or used as a formative or summative assessment

Wrap Up

When students are finished with the activity, retrieve the .tns file using TI-Nspire Navigator. Save grades to Portfolio. Discuss activity questions using Slide Show.

Assessment

- Formative assessment will consist of questions embedded in the .tns file. The questions will be graded when the .tns file is retrieved. The Slide Show will be utilized to give students immediate feedback on their assessment.