



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.

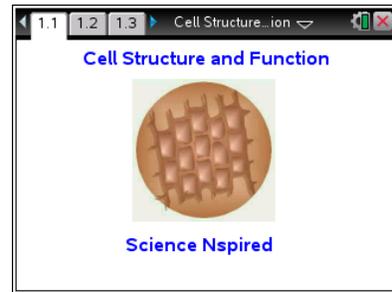


TI-Nspire™ Navigator™

- Send out the *Cell Structure_and_Function.tns* file.
- Monitor student progress using Class Capture.
- Use Live Presenter to spotlight student answers.

Activity Materials

- Compatible TI Technologies:  TI-Nspire™ CX Handhelds,  TI-Nspire™ Apps for iPad®,  TI-Nspire™ Software



Tech Tips:

- This activity includes class captures taken from the TI-Nspire CX handheld. It is also appropriate for use with the TI-Nspire family of products including TI-Nspire software and TI-Nspire App. Slight variations to these directions may be required if using other technologies besides the handheld.
- Watch for additional Tech Tips throughout the activity for the specific technology you are using.
- Access free tutorials at <http://education.ti.com/calculators/pd/US/Online-Learning/Tutorials>

Lesson Files:

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 and/or the .tns file.

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 device, 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

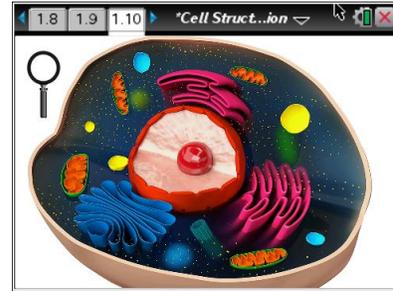
- Q5. Large organisms have large cells and little organisms have little cells.

Answer: B. disagree



Move to pages 1.9 and 1.10.

- Page 1.9 contains some instructions to the student about navigating the animal and plant cell diagrams.



- On page 1.10, students should move the cursor over various parts of the animal cell. When they encounter an icon that looks like a question mark inside a magnifying glass, they should select 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.



Tech Tip: To explore the cell diagram, students can simply tap organelles in the image.

Move to pages 1.11 – 1.18.

Have students answer questions 6 - 13 on the device, 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 select 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 device, 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.