

Lesson 4.10: Life Science – Plant & Animal Cell Functions

Weekly Focus: Reading Comprehension
Weekly Skill: Compare & Contrast

Lesson Summary: This week students will continue with lessons in Life Science. The work contains foundational knowledge about plant and animal cell structure. The vocabulary used incorporates content from previous lessons. Students will then compare and contrast plant and animal cells with a Venn diagram (graphic organizer). You may wish to remind students that the 2014 GED test modules may ask them to compare and contrast different texts, passages, graphs, and charts.

Materials Needed:

- Comprehension Reading **Unit 4.10 Handout 1**
- Plant & Animal Cell Diagrams and Graphic Organizer **Unit 4.10 Handout 2**
- Extra Work/Homework **Unit 4.10 Handout 3** (6-way Paragraphs, Introductory Level, #35, pages 70 – 71)

Objectives: Students will be able to...

- Read comprehension passages with vocabulary related to basic cell functions
- Compare and contrast animal and plant cells

College and Career Readiness Standards: RI, RST, WHST

ACES Skills Addressed: EC, LS, ALS, CT, SM

Notes: Please review and be familiar with classroom routine notes for: reading for fluency strategies (**Routine 2**), summarizing techniques (**Routine 4**), self-management skills (**Routine 1**). The notes for the different activities will help with making a smooth transition to each activity.

GED 2014 Science Test Overview – For Teachers and Students

The GED Science Test will be 90 minutes long and include approximately 34 questions with a total score value of 40. The questions will have focus on three content areas: life science (~40%), physical science (~40%), and Earth and space science (~20%). Students may be asked to read, analyze, understand, and extract information from a scientific reading, a news brief, a diagram, graph, table, or other material with scientific data and concepts or ideas.

The online test may consist of multiple choice, drop down menu, and fill-in-the-blank questions. There will also be two short answer questions (suggested 10 minutes each) where students may have to summarize, find evidence (supporting details), and reason or make a conclusion from the information (data) presented.

The work students are doing in class will help them with the GED Science Test. They are also learning skills that will help in many other areas of their lives.

Lesson 4.10: Life Science – Plant & Animal Cell Functions

Activities:

Warm-Up: KWL Chart

Time: 10 - 15 minutes

- As students enter the class, have the following written on the board or overhead: **“Plant cells and animal cells look different and yet have many similarities. What do you know about the similarities and differences between the two basic types of cells?”** Have students create a **“KWL”** chart on a piece of notebook paper (below). This helps to activate students' prior knowledge by asking them what they already **Know** (column 1); students (collaborating as a classroom unit or within small groups) set goals specifying what they **Want** to learn (column 2); and after reading students discuss what they have **Learned** (column 3).
- Students apply higher-order thinking strategies which help them construct meaning from what they read and help them monitor their progress toward their goals.

KWL Chart:

K - What (else) do I KNOW?	W - What do I WANT to know?	L - What did I LEARN?

Activity 1: Reading Comprehension (Unit 4.10 Handout 1)

Time: 40 - 45 minutes

- Hand out **Unit 4.10 Handout 1** to students.
- Explain to students they will read about the basic functions of animal and plant cells. This information is important foundational knowledge for questions that may be on the 2014 GED Science module.
- Discuss with students that when reading for comprehension, there are many strategies to use: read the title to predict what the reading is about; look at the sub headings to get an idea of the topic of each section or paragraph; if there are images, look at them to get a better understanding; while reading remember to ask “What is this all about?”
- Have students read the passages independently. When they are finished, they can work on the questions.
- Circulate class while they are reading to make sure they understand the information presented and see if there are any questions.
- Review answers as a whole class. Ask students to point to the evidence from the reading passage that helped them determine the answer.
- If there is time, students can summarize the reading or write a main idea.
- Students can fill in the **“L”** portion of the KWL chart.

Break: 10 minutes

Lesson 4.10: Life Science – Plant & Animal Cell Functions

Activity 2: Compare and Contrast (Unit 4.8 Handout 2)

Time: 45 - 50 minutes

- 1) Hand out **Unit 4.10 Handout 2** to students.
- 2) Explain to students they will continue to examine the similarities and differences between plant and animal cells, only with diagrams.
- 3) Point out to students that the first page of the handout has the information needed for them to fill in the diagrams on pages 2 and 3. Page 4 is a graphic organizer (Venn diagram) that will have them compare and contrast information from the diagrams. They can also use information from the reading in Activity 1 (Unit 4.10 Handout 1).
- 4) If you have an overhead projector, it may be best to project the color diagram on a screen to point out the similarities and differences.
- 5) Circulate class while students are working on filling in the diagram. (**Note:** the diagrams on pages 2 & 3 are not exact replicas of the one on page 1. This was done intentionally to give students the experience of looking carefully at the information presented and interpreting it in a modified manner.)
- 6) Review answers as a whole class. Ask students to point to the evidence from the diagram on page 1 that helped them determine the answer.
- 7) If there is time, students can summarize the diagrams or write up a main idea. This is something they may have to do on the 2014 GED test.

Wrap-Up: Summarize

Time: 5 minutes

Have students turn to a partner (or write in their journals) about what they have learned today about comparing and contrasting animal and plant cells. Ask them to tell a partner one thing they learned today in one or two sentences. *Note: Use Routine 4 Handout*

Extra Work/Homework: Unit 4.10 handout 3

Time: 30 minutes outside of class

Students can continue work with another reading passage from 6-way Paragraphs, Introductory Level, #35 (pages 70 – 71).

Differentiated Instruction/ELL Accommodation Suggestions

Activity

If some students finish early, they can turn their paper over and summarize the reading passage and the diagrams. Also, if they finish early, students can help newer students with the work.

**Activity 1
and
Activity 2**

Teachers should be aware that ELLs could have some difficult time with some of the vocabulary encountered in the handouts for Activity 1 & 2. Encourage them to look for context clues in the reading that will help them with interpreting the main idea of the reading passage. They may have to use a dictionary for the vocabulary in the diagrams.

**Activity 1
& 2**

Lesson 4.10: Life Science – Plant & Animal Cell Functions

Online Resources:

If students have Internet connection, they can try their hands at an interactive animal and plant cell animation. If at all possible, try to show this to the entire class to allow students to see parts of cells and their functions.

<http://www.cellsalive.com/cells/3dcell.htm>

This resource contains a quiz about animal and plant cells. It allows students to monitor what they have learned.

<http://www.neok12.com/quiz/CELSTR08.htm>

Suggested Teacher Readings:

- GED Testing Service – GED Science Item Sample (to get an idea of what the test may be like)

<http://www.gedtestingservice.com/itemsamplerscience/>

- Assessment Guide for Educators: A guide to the 2014 assessment content from GED Testing Service:

<http://www.riaepdc.org/Documents/ALALBAASSESSMENT%20GUIDE%20CHAPTER%203.pdf>

- Minnesota is getting ready for the 2014 GED test! – website with updated information on the professional development in Minnesota regarding the 2014 GED.

http://abe.mpls.k12.mn.us/ged_2014_2

- Essential Education's 2014 GED Test Curriculum Blueprint (PDF)

<http://www.passged.com/media/pdf/educators/curriculum-blueprint.pdf>

Unit 4.10 Handout 1 (4 pages total)

What Do Cells Do?

Plant Cells and Animal Cells

All living things are made of cells. All cells need food, water, and a way to eliminate wastes. A single cell is the smallest structure that carries out the activities necessary for life. Different structures in the cell do different things. One part gets food or water. Another part keeps the cell clean. Still other parts are in charge of reproduction. Like the parts of a factory, all parts of the cells must work together to run smoothly. An organism cannot survive without cells doing their work.

Animal cells and plants cells look different, but all cells have three parts: cell membrane, nucleus, and cytoplasm. The cell membrane is the outer covering of the cell. Water and food enter through the cell membrane, and wastes leave through it. Plant cells have an extra structure called the cell wall. The cell wall adds more support to a plant cell.

The nucleus is the control center for the cell. It directs all cell activities. The cytoplasm in animal and plant cells is a gel-like substance that surrounds all parts of the cell within the membrane. The cytoplasm contains the nucleus and the cell's organelles.

An organelle is a cell part with a particular job. Plants have special organelles called chloroplasts. Chloroplasts use energy from the Sun to combine water and carbon dioxide to make food for the cell.

Cell Transportation

The cell membrane holds matter inside but allows water, gases, and wastes to pass through it. In passive transport, matter moves into or out of the cell without using any of the cell's energy.

The simplest kind of passive transport is diffusion. Diffusion spreads substances through a gas or liquid. You can smell dinner across the room because food molecules diffuse through the air. Diffusion also transports many gases into and out of cells. Substances diffuse from areas with more matter to areas with less matter.

One special form of diffusion is called osmosis. Osmosis is the diffusion of water across a membrane. The membrane often stops many substances that are dissolved in the water. Osmosis keeps water inside cells.

Sometimes a cell needs to move materials opposite to the way diffusion would move them. In active transport, substances move from areas with less matter to areas with more matter. The cell must use energy to do this.

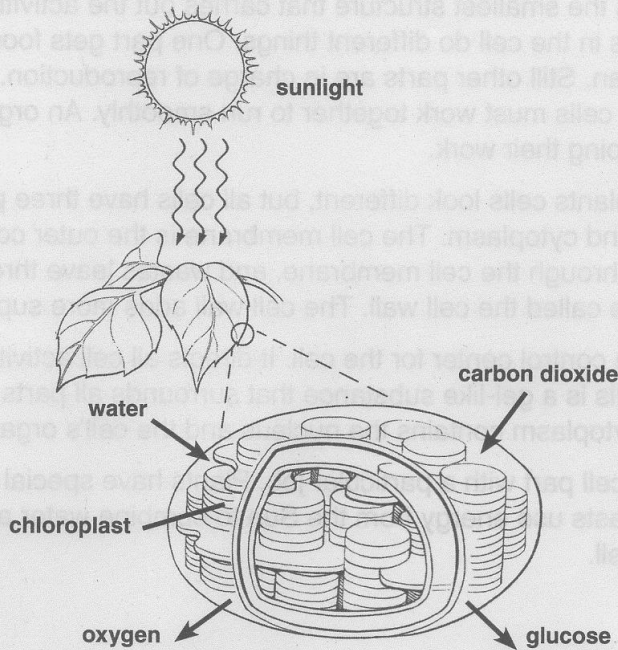
Large proteins in the cell membrane often help move materials in and out. The proteins act as tunnels that allow only certain materials to pass. Scientists study these proteins for clues to how the cell operates.

Lesson 4.10: Life Science – Plant & Animal Cell Functions

Using Energy

All living things need energy to survive. Plants use a process called photosynthesis to make food. This process takes place in chloroplasts and uses green pigment called chlorophyll to capture energy from sunlight.

During photosynthesis, chemical reactions join water with carbon dioxide. The byproducts are oxygen, which is released into the air, and glucose, or sugar, which the plant uses for food.



Plants and animals use organelles called mitochondria to break down sugars. Cells can use sugars as energy. Mitochondria perform cell respiration, the reverse reaction of photosynthesis. Glucose is combined with oxygen to form water and carbon dioxide. Energy is released. Mitochondria store this energy to be used later.

Cell Division

A human body is made of trillions of cells, but it began as just one cell. Cells can copy themselves through a process called cell division. New organisms begin when cells from two parents combine to form a new cell. The single cell divides into two cells. The two cells divide into four cells, and so on. As cells divide, they become different from each other. Early on, the cells organize themselves into three groups called germ layers. One layer will form the skin and nerves. Another layer becomes the lining of the digestive tract. The third layer produces all other body parts.

Bacteria and other single-celled organisms can also copy themselves. This copying results in new individuals. When conditions favor division, a bacterial colony can double very quickly.

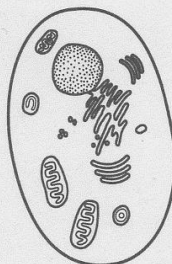
Name _____ Date _____

What Do Cells Do?

Fill in the blanks.

- The smallest structure that carries out all of the activities necessary for life is a(n) _____.
- In both plant and animal cells, the _____ is the control center.
- During the process of _____, substances are spread through a gas or a liquid.
- _____ is a specialized form of diffusion, and diffusion is a type of passive transport.
- During active transport, substances move from regions of _____ concentration to regions of _____ concentration.
- The byproducts of photosynthesis are oxygen, which is released into the air, and a molecule called _____, a type of sugar.
- Cells copy themselves in a process called _____.
- Photosynthesis takes place in _____, which use energy from sunlight to make food in plants.
- _____ perform a process the opposite of photosynthesis to help plants use energy as food.

animal cell



plant cell



Lesson 4.10: Life Science – Plant & Animal Cell Functions

Name _____ Date _____

10. Main Idea What do cells need to stay alive?

11. Vocabulary Use the terms *chloroplast* and *organelle* in a sentence that describes cell function.

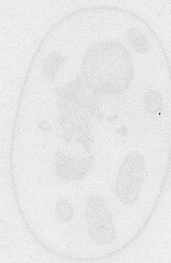
12. Reading Skill: Draw Conclusions Could a cell survive without its mitochondria if all the other organelles were present?

13. Critical Thinking: Analyze What are the parts of a cell? How do cell parts work together to keep the cell alive?

14. Inquiry Skill: Use Models Why is a drop of food coloring in water a good model for the process of diffusion?

15. Test Prep To make food, plants use a process called

- A photosynthesis.
- B cell division.
- C passive transport.
- D mitochondria.



Lesson 4.10: Life Science – Plant & Animal Cell Functions

Unit 4.10 handout 1

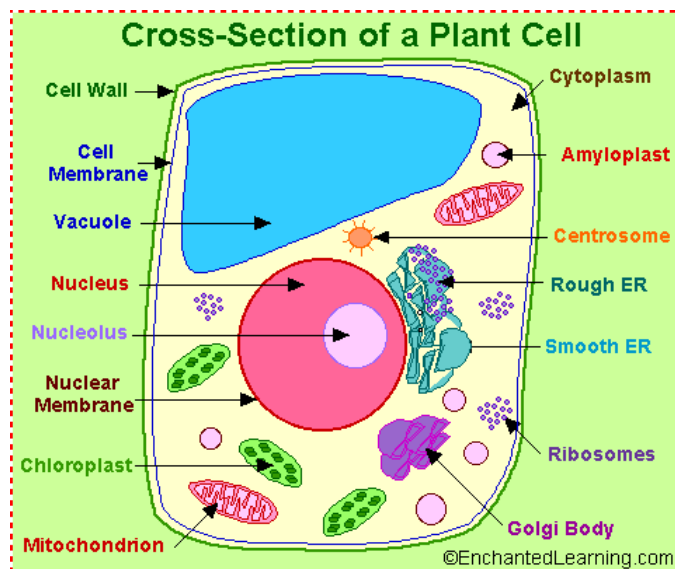
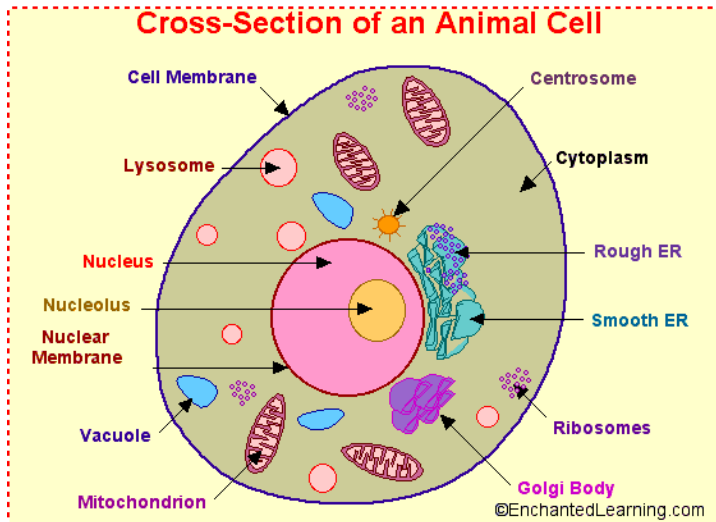
TEACHER ANSWER KEY

1. cell
2. nucleus
3. diffusion
4. osmosis
5. low, high
6. glucose
7. cell division
8. *chloroplasts.*
9. *mitochondria*
10. *Answer will vary, suggested answer:* Cells need food, water, and a way to eliminate wastes.
11. *Answer will vary, suggested answer:* A chloroplast is an organelle in plant cells that makes food for the plant.
12. *Answer will vary, suggested answer:* No, it could not survive because the mitochondria provides energy to the cell.
13. *Answer will vary, suggested answer:* Cell membrane lets material in and out and keeps the cell together. The nucleus directs all cell activities. The cytoplasm surrounds the nucleus and organelles.
14. *Answer will vary, suggested answer:* Diffusion spreads substances through a gas or liquid, so the substance, food coloring, is being spread through the liquid, water.
15. A

Lesson 4.10: Life Science – Plant & Animal Cell Functions

Unit 4.10 handout 2 (4 pages total)

Directions: Use the diagrams below of animal and plant cells to fill in your own diagrams.



Name _____ Date _____

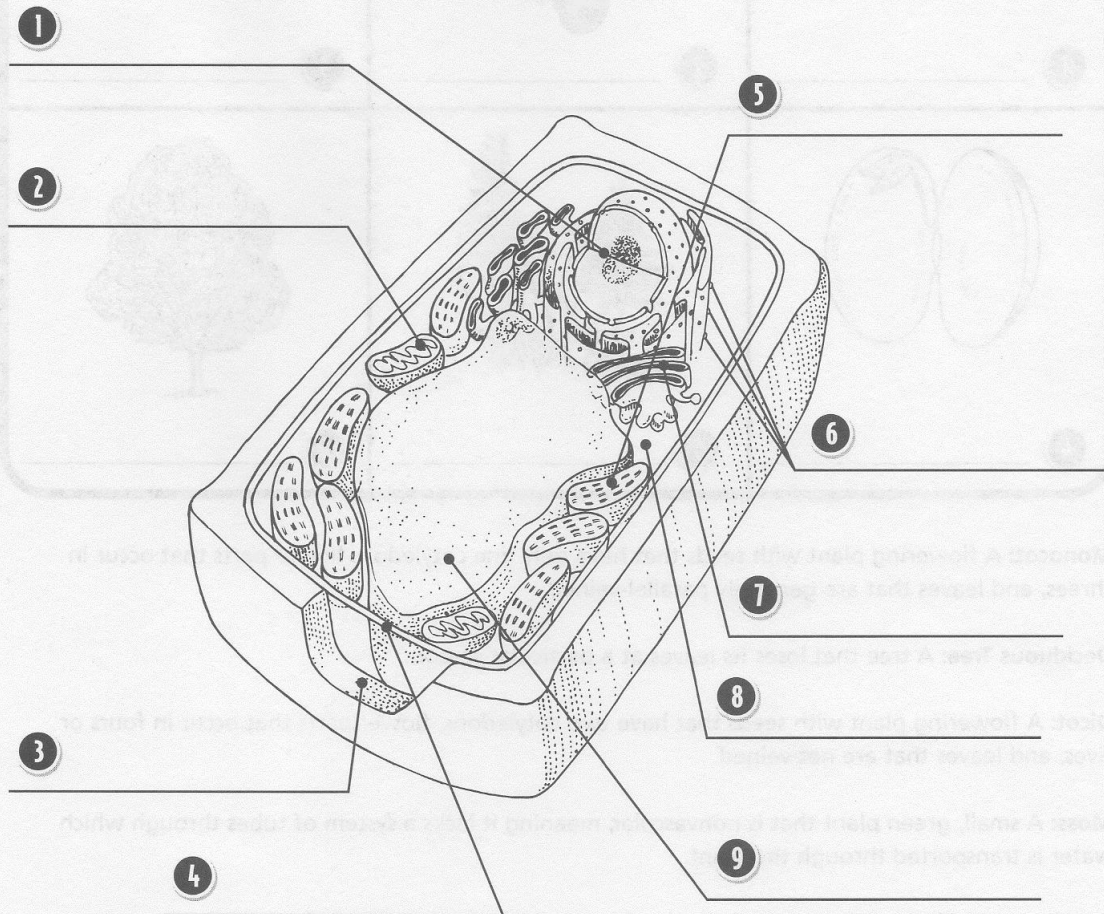
A Typical Plant Cell

Plant cells have basic structures in common, even though plant cells are as varied as the plants themselves. Each individual plant cell is partly self-sufficient, carrying on processes contained within the cell membrane. A plant cell differs from an animal cell because it contains chloroplasts and has a cell wall made of cellulose. Use the terms in the word box to label the diagram.

cytoplasm
endoplasmic reticulum
mitochondrion

chloroplast
ribosomes
cell wall

vacuole
nucleus
cell membrane



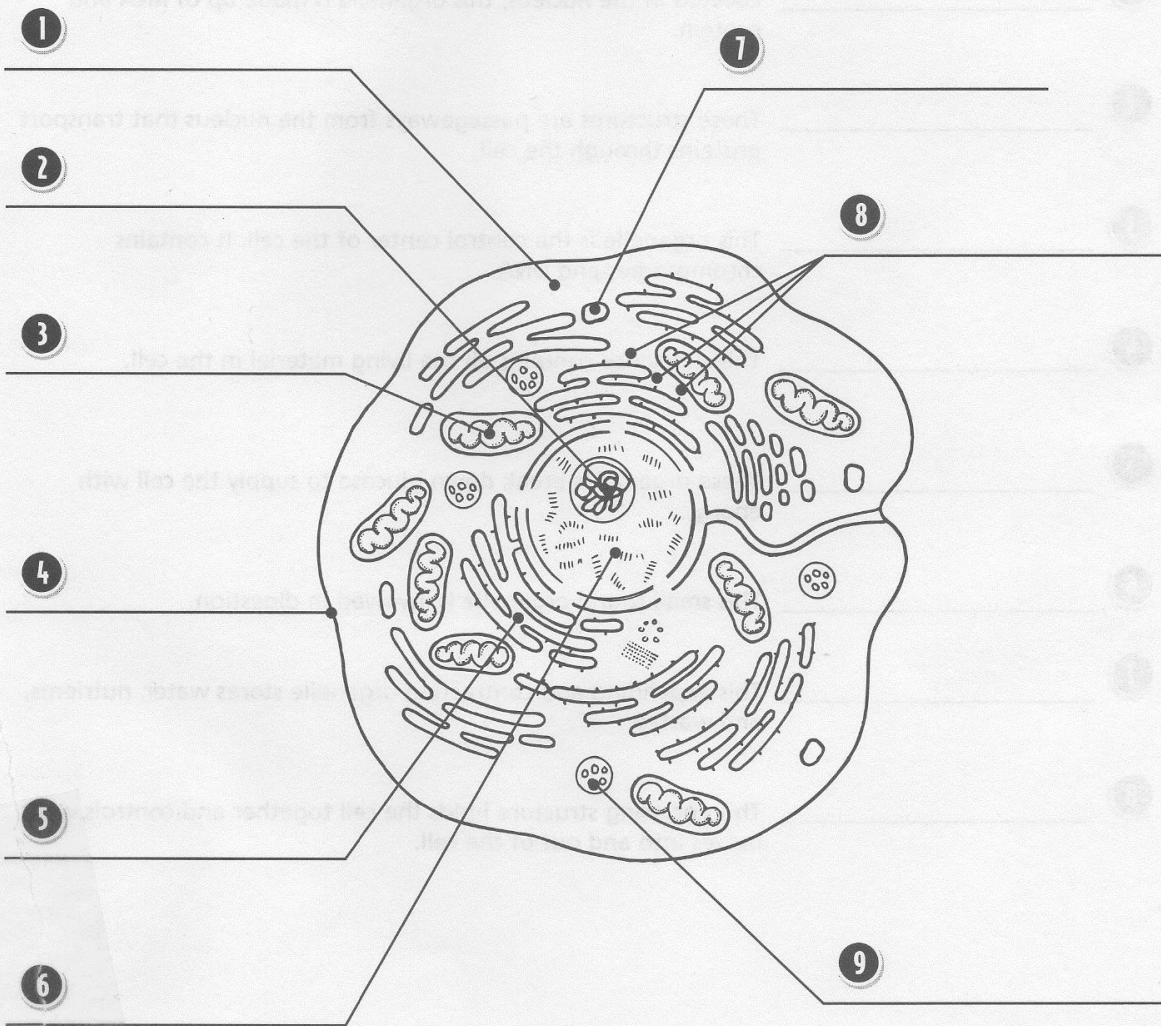
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Name _____ Date _____

A Typical Animal Cell

While the cells found in various tissues of animals are unique and specialized, the basic structure of animal cells is the same. Animal cells lack the rigid cell wall found in plant cells. Use the terms in the word box to label the diagram.

cytoplasm	nucleolus	lysosome
cell membrane	nucleus	ribosomes
endoplasmic reticulum	mitochondrion	vacuole



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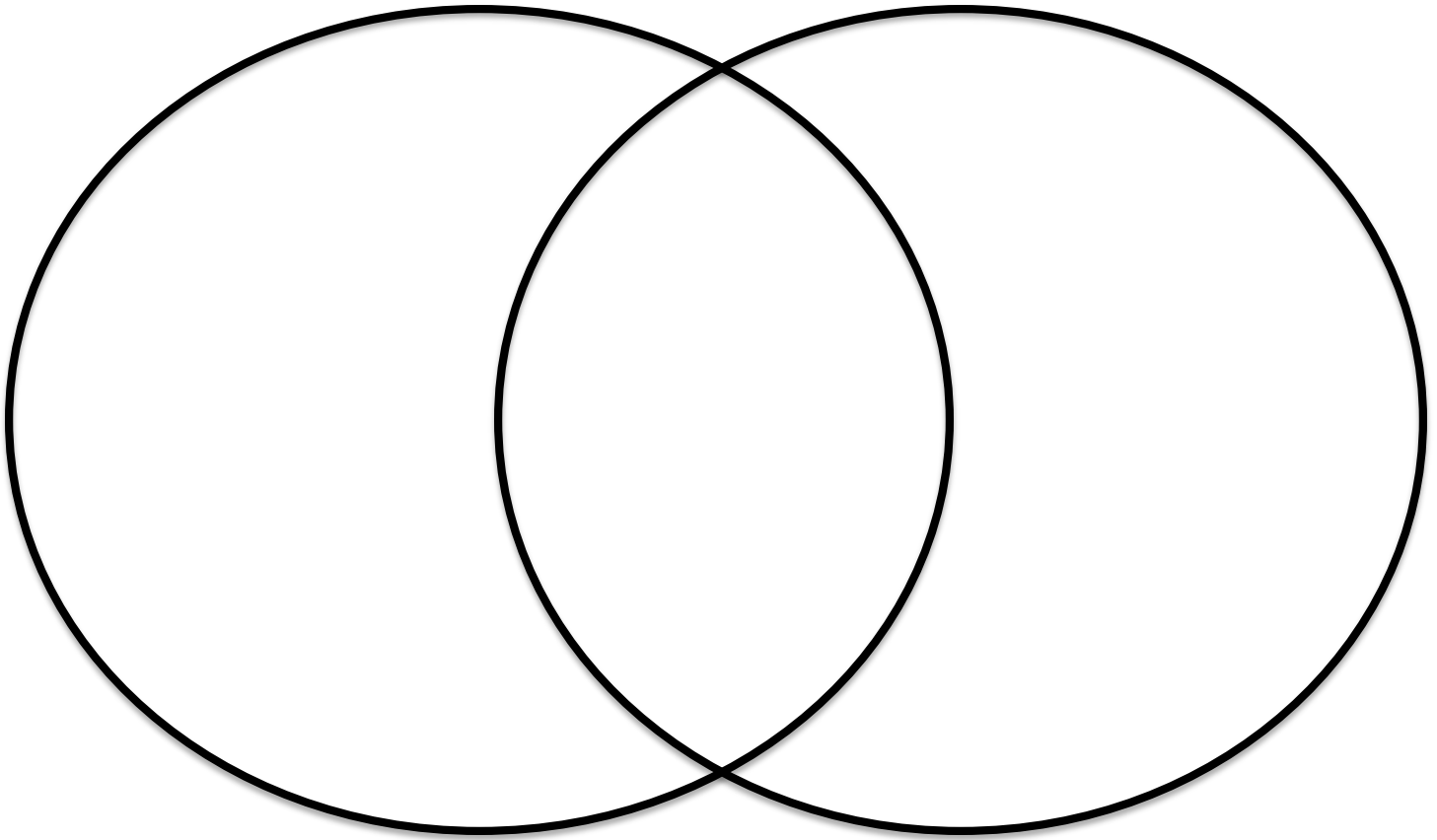
Lesson 4.10: Life Science – Plant & Animal Cell Functions

Compare and Contrast Animal and Plant Cells

Directions: Fill in the Venn diagram with information from the reading and diagrams.

Plant Cell

Animal Cell



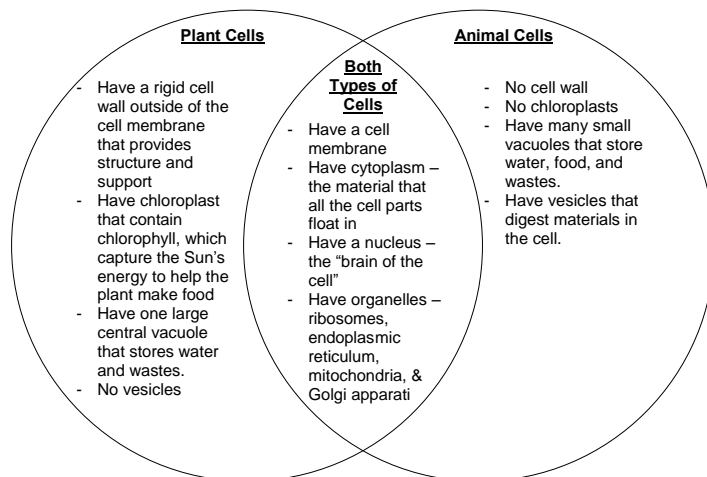
Unit 4.10 handout 2

TEACHER ANSWER KEY**Page 2 A Typical Plant Cell**

- | | |
|--------------------------|------------------|
| 1. nucleus | 2. mitochondrion |
| 3. cell wall | 4. Cell membrane |
| 5. chloroplast | 6. ribosomes |
| 7. endoplasmic reticulum | 8. cytoplasm |
| 9. vacuole | |

Page 3 A Typical Animal Cell

- | | |
|--------------------------|------------------|
| 1. cytoplasm | 2. nucleolus |
| 3. mitochondrion | 4. Cell membrane |
| 5. endoplasmic reticulum | 6. nucleus |
| 7. vacuole | 8. ribosomes |
| 9. lysosome | |

Plant/Animal Cell Venn Diagram**Answers may vary – Possible Venn diagram**