

# Cell Structures and Functions

**Grade Level or Special Area:** Fifth Grade

**Written by:** Judy Beggs, Belle Creek Charter School, Henderson, CO and Holly Stroud, Flagstaff Academy, Longmont, CO

**Length of Unit:** Seven lessons (45 minutes each)

## I. ABSTRACT

This unit will provide a basic study of the animal and plant cell characteristics and their functions. In addition, the students will make a replica of a cell using Jell-O and get an edible representation of a 3-D version of a cell. The use of the Internet will provide detailed information about the structure of the cells.

## II. OVERVIEW

### A. Concept Objectives

1. Students will gain an appreciation for the complex structures of living things.
2. Students will understand that all living things are made up of cells.
3. Students will understand that information can be gathered through observation and experimentation.
4. Students recognize how to write and speak for a variety of purposes and audiences by using content technical vocabulary accurately.

### B. Content from the *Core Knowledge Sequence*

1. Fifth Grade: Science: Cells: Structures and Processes (page 127) (this unit does not cover all of the content listed in this section)
  - a. All living things are made up of cells.
  - b. Structure of cells (both plant and animal).
    - i. Cell membrane: selectively allows substances in and out
    - ii. Nucleus: surrounded by nuclear membrane, contains genetic material, divides for reproduction.
    - iii. Cytoplasm contains organelles, small structures that carry out the chemical activities of the cell, including mitochondria (which produce the cell's energy) and vacuoles (which store food, water, or wastes).
  - c. Plant cells, unlike animal cells, have cell walls and chloroplasts.
  - d. Cells are shaped differently in order to perform different functions.

### C. Skill Objectives

1. List and identify characteristics of living and nonliving things.
2. Sort, compare and contrast living and nonliving things.
3. Respond and discuss characteristics of the structure of animal's cells.
4. Define vocabulary words through content reading.
5. Create pictorial representations of various parts of the cell.
6. Respond and discuss the characteristics of a plant cell.
7. Compare/contrast the similarities and differences of plant and animals cells.
8. Take notes.
9. Define key words.
10. Create a visual representation of a cell.
11. Practice oral and listening skills.
12. Demonstrate comprehension of the basic structures of a plant and animal cell by labeling the cell and matching the vocabulary words with their definitions.

### III. BACKGROUND KNOWLEDGE

- A. For Teachers
  - 1. Hirsch E.D. Hirsch, *What Your Fifth Grader Needs to Know*
  - 2. *Core Knowledge Text Resources to Accompany the Core Knowledge Teacher Handbook – Grade 5*
  - 3. Discovery Channel School Science - *Cells*
- B. For Students
  - 1. *Core Knowledge Sequence* Grade 2: Science: The Human Body: Cells

### IV. RESOURCES

- A. Discovery Channel School Science – *Cells* (Lesson Two)
- B. *Inside a Cell* (video) (Lesson Four)
- C. Cells Alive - [http://www.cellsalive.com/cell\\_cycle.htm](http://www.cellsalive.com/cell_cycle.htm) (Lesson Two)
- D. *What Your Fifth Grader Needs to Know* (Lessons One and Three)

### V. LESSONS

#### Lesson One: Living Versus Nonliving Things (45 minutes)

- A. *Daily Objectives*
  - 1. Concept Objective(s)
    - a. Students will gain an appreciation for the complex structures of living things.
    - b. Students will understand that information can be gathered through observation and experimentation.
  - 2. Lesson Content
    - a. Cells: Structures and Processes
  - 3. Skill Objective(s)
    - a. List and identify characteristics of living and nonliving things.
    - b. Sort, compare and contrast living and nonliving things.
- B. *Materials*
  - 1. Appendix A : *Living Versus Nonliving* (one per student)
  - 2. Appendix B : *Living Versus Nonliving Answer Key* (for teacher)
  - 3. One pencil for each student
  - 4. White board and marker for teacher
  - 5. Five grocery bags
  - 6. Each bag will contain five living and five nonliving items; items may include: ants, clouds, popcorn, pop can, bears, trees, starfish, rocks, computers, fingernails, sponges, crabs, plants, butterflies, flower, books, eagle, caterpillar, carrots, ice cream, TV, ruler, eraser
  - 7. *What Your Fifth Grader Needs to Know* (one copy for the teacher)
- C. *Key Vocabulary*
  - 1. *Living* is anything that has ever been alive.
  - 2. *Nonliving* is anything that has never been alive.
  - 3. *Nutrients* are ingredients needed to sustain life.
  - 4. *Energy* is needed to do work.
  - 5. *Reproduce* is to produce again or recreate.
  - 6. *Wastes* are indigested residue of food eliminated from the body.
- D. *Procedures/Activities*
  - 1. Prior to class teacher will set up five different workstations.
  - 2. At these workstations, there will be a bag of five living and five nonliving items. Examples of these items maybe pictures of ants, clouds, popcorn, pop can, bears,

trees, starfish, rocks, computers, fingernails, sponges, crabs, plants, butterflies, flower, books, eagles, caterpillar, carrots, ice cream, TV, ruler, eraser.

3. At the beginning of the lesson, the teacher will give a brief overview of the Cells Science unit as described in the *Core Knowledge Sequence* pg. 127.
4. In whole group, teacher and students will brainstorm ideas of what characterizes living versus nonliving things. The following questions will be used as a guideline for discussion:
  - a. take in nutrients
  - b. use energy to do work
  - c. reproduce
  - d. grow
  - e. get rid of wastes
  - f. react to outside changes
5. For example:
  - a. Is a cloud alive?
  - b. What about a fire?
  - c. Do you think cells inside organisms are alive? Why or why not?
  - d. Can one cell be a living organism?
6. These ideas will be put on the whiteboard.
7. Students will be put into groups of five.
8. In their groups, students will go to a workstation and each student will pick one item from the bag and complete the worksheet “*Living vs. Nonliving*” (Appendix A).
9. Students will gather as a whole group and discuss the results, based upon their worksheet, of the item they found and the characteristics that makes their item a “Living or Nonliving” thing.
10. This discussion (10 minutes) will include the section of Living versus Nonliving things in the Core Knowledge *What Your Fifth Grader Needs to Know* pg. 334 in the orange-bordered box in the middle of the page. The items discussed will be the six activities that all living things do. They:
  - a. take in nutrients
  - b. use energy to do work
  - c. reproduce
  - d. grow
  - e. get rid of wastes
  - f. react to outside changes
11. For example:
  - a. Is a cloud alive?
  - b. What about a fire?
  - c. Do you think cells inside organisms are alive? Why or why not?
  - d. Can one cell be a living organism?

E. *Assessment/Evaluation*

1. Appendix A: *Living and Nonliving* (one per student)
2. Teacher observations based on the discussion at the beginning and the end of the lesson.

**Lesson Two: Cell Organization (Animals) (45 minutes)**

A. *Daily Objectives*

1. Concept Objective(s)
  - a. Students will gain an appreciation for the complex structures of living things.

- b. Students will understand that all living things are made up of cells.
    - c. Students will understand that information can be gathered through observation and experimentation.
  - 2. Lesson Content
    - a. Cell Structures and Processes
  - 3. Skill Objective(s)
    - a. Respond and discuss characteristics of the structure of animal's cells.
    - b. Define vocabulary words through content reading.
    - c. Create pictorial representations of various parts of the cell.
- B. *Materials*
  - 1. *Cells* book from the Discovery School Science Series
  - 2. Pencils
  - 3. Appendix C: *Cell Organization* (one per student)
  - 4. Appendix C1: *Cell Organization Answer Key* (for teacher)
  - 5. Computers
  - 6. Website: [http://www.cellsalive.com/cell\\_cycle.htm](http://www.cellsalive.com/cell_cycle.htm)
- C. *Key Vocabulary*
  - 1. *Organelles* are small organs within the cell.
  - 2. *Cells* are the tiny building block of living things.
  - 3. *Nucleus* is the cell's control center.
  - 4. *Mitochondria* are the parts of the cell that help change food into energy.
  - 5. *Cytoplasm* is the jellylike liquid in which all the other cell parts are embedded.
  - 6. *Vacuoles* are inside the cytoplasm that store food, water, and wastes.
  - 7. *Cell membrane* helps give the cell its shape, and controls what goes through it such as food, water, oxygen and wastes.
  - 8. *Nuclear membrane* surrounds the nucleus and controls what goes into and comes out of the nucleus.
- D. *Procedures/Activities*
  - 1. Teacher will introduce what a cell is by reading "*Cells*" from the Discovery Channel School Science Series pages 4, 5, and 8.
  - 2. Teacher will explain the worksheet *Cell Organization*" (Appendix C) by telling students that they will be looking at various parts of the cell on the computer, which will be their vocabulary words. On the worksheet the students will define, state an interesting fact and draw a picture of the cell part. The students will not be expected to draw pictures of the following vocabulary words; *cell membrane*, *nuclear membrane* and *cytoplasm* (these words do not have links). The web site will have pictures of the following vocabulary words: *cell*, *nucleus*, *mitochondria* and *vacuole*. Appendix C
  - 3. Students will go to the computer lab. At each computer, the following website will be in place [http://www.cellsalive.com/cell\\_cycle.htm](http://www.cellsalive.com/cell_cycle.htm).
  - 4. On left hand side of screen click on "Animal Cell."
  - 5. At the top of the page, it says "Animal Cell Organelles." Teacher will give definition that organelles are the little organs within the cell.
  - 6. To get students familiar with the structure of a cell, use the picture of the animal cell and put your cursor on various parts of the cell and the correct name will appear in the white space below.
  - 7. Students will scroll down below the picture and click on to the following links: *cell*, *nucleus*, *mitochondria* and *vacuole*.
  - 8. At each of these different links, the student will use their worksheet and complete the activities for each of the vocabulary words.

9. Students will reconvene in the classroom where there will be a group discussion about the different parts of an animal cell.
- E. *Assessment/Evaluation*
1. Appendix C: *Cell Organization* will be used for a study guide.
  2. Teacher observations based on the discussion at the beginning and the end of the lesson.

**Lesson Three: Plant Cells (45 minutes)**

A. *Daily Objectives*

1. Concept Objective(s)
  - a. Students will gain an appreciation for the complex structures of living things.
  - b. Students will understand that all living things are made up of cells.
  - c. Students will understand that information can be gathered through observation and experimentation.
2. Lesson Content
  - a. Cells: Structures and Processes
    - i. All living things are made up of cells.
    - ii. Plant cells, unlike animal cells, have cell walls and chloroplasts.
    - iii. Cells are shaped differently in order to perform different functions.
3. Skill Objective(s)
  - a. Respond and discuss the characteristics of a plant cell.
  - b. Compare/contrast the similarities and differences of plant and animals cells.

B. *Materials*

1. Overhead projector
2. Vis-à-vis (markers used for transparencies for the overhead projector)
3. Whiteboard and markers for teacher
4. Appendix D: *Plant Cell* (one for each student)
5. Transparency of Appendix D: *Plant Cell*
6. Appendix D: *Plant Cell Answer Key* (for the teacher)
7. Appendix E: *Plant and Animal* (one per student)
8. Appendix F: *Plant and Animal Study Guide* will be used as an Answer Key for Appendix E
9. Appendix F: *Plant and Animal Study Guide* (one for each student and teacher)
10. Appendix G: *Guidelines for Cell Unit Presentation* to be used as a guideline for the end of the unit presentation (one per student)
11. Pencils for students
12. *What Your Fifth Grader Needs to Know* (one copy for the teacher)

C. *Key Vocabulary*

1. *Cell wall* is the rigid outer most cell layer found in plants but absent from animals cells.
2. *Chloroplast* is another structure of a plant cell that animals do not have and they contain chlorophyll.
3. *Chlorophyll* is the green substance that traps the energy from the sunlight and enables plants to make food.
4. *Photosynthesis* is the process of chlorophyll trapping energy they need to make food.

D. *Procedures/Activities*

1. The key vocabulary words will be written on the board and the teacher will read these words and discuss their definitions and what their roles are in the plant cell.
2. Teacher will read aloud to the class “Not All Cells Are Alike” in the Core Knowledge *What Your Fifth Grader Needs to Know* on pages 334-335.
3. Read from *What Your Fifth Grader Needs to Know* for background knowledge of the Plant Cell.
4. Students will be given Appendix D with a picture of a plant cell.
5. Teacher will put transparency of Appendix D on the overhead.
6. Teacher will point to various parts of the plant cell while students fill in their copy of Appendix D.
7. The following questions will be asked:
  - a. Where is the *cell membrane* and does anyone remember what the purpose of the *cell membrane* is? A *cell membrane* surrounds the cell and it helps to give the cell its shape and controls what goes through it such as food, water, oxygen, and wastes.
  - b. Where is the *nucleus* and what is its purpose? The *nucleus* is the center of the cell and it’s the cells control center.
  - c. Where is the *nuclear membrane* and what is its purpose? The *nuclear membrane* surrounds the nucleus and controls what goes into and comes out of the nucleus.
  - d. Can anyone locate the *cytoplasm* and tell me its function? The *cytoplasm* is in between the organelles/cell parts and is the jelly like liquid in which all the cell parts are embedded.
  - e. Where can we find the *mitochondria* and what is its purpose? The *mitochondria* are located within the cell and it is the part of the cell that helps change food into energy.
  - f. Where the vacuoles and what are their purposes? The *vacuoles* are inside the cytoplasm that store food, water, and wastes.
8. Teacher will explain that not all cells look the same and cells can be in different shapes. Students will be given Appendix E for the comparison/contrast discussion.
9. On the white board teacher will draw a Venn diagram labeling one side animal cells and the other plant cells. This will be used for a comparison/contrast discussion about the characteristics of these two types of cells.
10. The following questions will be asked: Which parts of the animal/plant cell are the same and which ones are different? List all the parts that are the same and all the parts that are different. The following parts are the same:
  - a. cell membrane
  - b. nucleus
  - c. nuclear membrane
  - d. mitochondria
  - e. cytoplasm
  - f. vacuolesThe following parts are different:
  - a. cell wall
  - b. chloroplast
  - c. chlorophyll
  - d. photosynthesis
11. Students will keep Appendix F for a study guide.

12. Homework – Students will pick from the following topics and become “an expert” on their topic by writing a well-written paragraph on their topic, which they will use in the presentation at the end of the unit. The following options are: cell wall, cell membrane, vacuole, cytoplasm, chloroplast, mitochondria, nucleus, nuclear membrane, chloroplast, chloroform, and photosynthesis. Students will be given Appendix G to take home.
- E. *Assessment/Evaluation*
1. Informal assessment will be based upon the discussions and the Venn Diagram.
  2. Appendix D: *Plant Cell*

**Lesson Four: “Inside the Cell” (45 minutes)**

- A. *Daily Objectives*
1. Concept Objective(s)
    - a. Students will understand that information can be gathered through observation and experimentation.
    - b. Students will recognize purpose for useful note taking.
  2. Lesson Content
    - a. Cells: Structures and Processes
      - i. All living things are made up of cells
      - ii. Structure of cells (both plant and animal)
        - a) Cell membrane: selectively allows substances in and out
        - b) Nucleus: surrounded by nuclear membrane, contains genetic material, divides for reproduction
        - c) Cytoplasm contains organelles, small structures that carry out the chemical activities of the cell including mitochondria (which produce the cells energy) and vacuoles (which store food, water or wastes)
      - i. Cells are shaped differently in order to perform different functions.
  3. Skill Objective(s)
    - a. Take notes.
    - b. Define key words.
- B. *Materials*
1. DVD player/television
  2. Movie “Inside a Cell” by Teacher’s Video Company
  3. Appendix H: *Inside a Cell* (for each student to take notes)
  4. Appendix I: *Inside a Cell Answer Key* (one for teacher)
  5. Pencils
- C. *Key Vocabulary (Review)*
1. *Cell membrane* helps give the cell its shape, and controls what goes through it such as food, water, oxygen and wastes
  2. *Nucleus* is the cell’s control center.
  3. *Nuclear membrane* surrounds the nucleus and controls what goes into and comes out of the nucleus.
  4. *Mitochondria* are the parts of the cell that help change food into energy.
  5. *Cytoplasm* is the jelly-like liquid in which all the other cell parts are embedded.
- D. *Procedures/Activities*
1. The movie “Inside a Cell” will be put into the DVD player before students arrive in class.
  2. Students will be given Appendix H.

3. Explain to the students that they will only need to take notes on the words from Appendix J. The words will be: *cell membrane, nucleus, nuclear membrane, mitochondria, and cytoplasm.*
  4. Students will watch the video.
  5. While watching the video, they will complete Appendix H.
  6. Students will be given time to ask questions about the video.
- E. *Assessment/Evaluation*
1. Will be based upon definitions from Appendix H and discussion after the video.

**Lesson Five: The Incredible Edible Cell (45 minutes)**

- A. *Daily Objectives*
1. Concept Objective(s)
    - a. Students will understand that information can be gathered through observation and experimentation.
  2. Lesson Content
    - a. Cells: Structures and Process
      - i. Structure of cells (both plant and animal)
        - a) Cytoplasm contains organelles, small structures that carry out the chemical activities of the cell including mitochondria (which produce the cells energy) and vacuoles (which store food, water or wastes)
        - b) Cell membrane: selectively allows substances in and out
      - ii. Cells are shaped differently in order to perform different functions.
  3. Skill Objective(s)
    - a. Create a visual representation of a cell.
- B. *Materials*
1. Knox gelatin (to add the to the Jell-O – please follow the directions on the box)
  2. Five 6 ounce boxes of Jell-O gelatin mix (suggested kiwi-strawberry flavor)
  3. 9 ounce plastic cups (two for each student – one for Jell-O mix and one to contain organelles)
  4. Paper plates (one for each student)
  5. Plastic knives and spoons (one for each student)
  6. Pam (to spray into the Dixie cups before putting the Jell-O in to help with removal of the Jell-O)
  7. One small Dixie cup of full of cell parts (organelle)
  8. Hot tamales (four pieces per student) – mitochondria
  9. Chocolate cover raisins (four pieces per student) – Vacuoles
  10. Chewy Gum Balls (four pieces per student) – Nucleus
  11. M and M's (four pieces per student) – Nuclear Membrane
  12. Out side of Jell-O will be –Cell Membrane
  13. Inside of Jell-O will be – Cytoplasm
- C. *Key Vocabulary*
- None
- D. *Procedures/Activities*
1. The day before the activity, do the following. Follow the package directions to prepare batches of Jell-O gelatin mix. (Suggested flavor is kiwi-strawberry.) Every 6-ounce package will make up four or five cells. Add some unflavored Knox gelatin to the Jell-O to make it set up a little stiffer. (Pour the Jell-O/Knox mixture into individual 9-ounce Solo brand plastic cups until they are about two-thirds full. Put them into the refrigerator to set.

2. Remove the Jell-O from the plastic cup onto a paper plate. The students may need to run the knife around the very outside edge of the Jell-O to loosen it. (Suggestions may be to spray Pam inside of cups; before putting Jell-O in.)
  3. Cut the Jell-O/Know in half and separate halves.
  4. Dig out bottom half of the cell (the cytoplasm).
  5. Take chewy gumballs (nucleus) and put an M & M inside of it (nuclear membrane).
  6. Using a spoon, dig out small portion of the bottom half of the Jell-O mixture and put the gumballs (nucleus) with the M & M's inside (nuclear membrane).
  7. Spoon out a small portion of the top half of the Jell-O mixture and put the hot tamales (mitochondria) and chocolate covered raisins (vacuoles) in the top.
  8. Place top and bottom of the Jell-O mixture together.
  9. Ask students to point to the:
    - a. cell membrane (the outside of the Jell-O)
    - b. cytoplasm (the inside of the Jell-O cytoplasm)
    - c. the nucleus (chewy gumballs)
    - d. the nuclear membrane (the M & M's)
    - e. the mitochondria (hot tamales)
    - f. vacuoles (chocolate covered raisins)
  10. After reviewing the parts, the students may feast upon their edible cell.
- E. *Assessment/Evaluation*
1. Teacher observation about correctly naming the parts of the cell.

**Lesson Six: I'm an Expert (45 minutes)**

A. *Daily Objectives*

1. Concept Objective(s)
  - a. Students will gain an appreciation for the complex structures of living things.
  - b. Students will understand that all living things are made up of cells.
  - c. Students will understand that information can be gathered through observation and experimentation.
  - d. Students recognize how to write and speak for a variety of purposes and audiences by using content technical vocabulary accurately.
2. Lesson Content
  - a. Cells: Structures and Process
    - i. All living things are made up of cells
    - ii. Structure of cells (both plant and animal)
      - a) Cell membrane: selectively allows substances in and out
      - b) Nucleus: surrounded by nuclear membrane, contains genetic material, divides for reproduction
      - c) Cytoplasm contains organelles, small structures that carry out the chemical activities of the cell including mitochondria (which produce the cells energy) and vacuoles (which store food, water or wastes)
    - iii. Cells are shaped differently in order to perform different functions.
3. Skill Objective(s)
  - a. Practice oral and listening skills.

B. *Materials*

1. Students prepared paragraphs from Lesson Three

2. Evaluation rubric Appendix J: *Rubric for Unit Cell Presentation* (one for each student to be used as the teacher does the evaluation)
- C. *Key Vocabulary*  
None
- D. *Procedures/Activities*
1. Students will present their paragraphs by standing in front of the class and sharing their paragraph.
  2. Teacher will remind students that while they present, they must speak clearly, stand up straight, and look at their audience.
  3. Teacher will also remind audience that they need to keep their focus on the speaker by staying quiet, by looking at the speaker, and staying in their seats.
  4. Each presentation should last between two-three minutes.
  5. Teacher will use one rubric (Appendix J) to evaluate each student.
- E. *Assessment/Evaluation*
1. Evaluation rubric Appendix J: *Rubric for Unit Cell Presentation* (one for each student to be used as the teacher does the evaluation).

**Lesson Seven: Culminating Activity (Unit Test) (45 minutes)**

- A. *Daily Objectives*
1. Concept Objective(s)
    - a. Students will gain an appreciation for the complex structures of living things.
    - b. Students will understand that all living things are made up of cells.
  2. Lesson Content
    - a. Cells: Structures and Process
      - i. All living things are made up of cells.
      - ii. Structure of cells (both plant and animal).
        - a) Cell membrane: selectively allows substances in and out
        - b) Nucleus: surrounded by nuclear membrane, contains genetic material, divides for reproduction.
        - c) Cytoplasm contains organelles, small structures that carry out the chemical activities of the cell, including mitochondria (which produce the cell's energy) and vacuoles (which store food, water, or wastes).
      - iii. Plant cells, unlike animal cells, have cell walls and chloroplasts.
      - iv. Cells are shaped differently in order to perform different function
  3. Skill Objective(s)
    - a. Demonstrate comprehension of the basic structures of a plant and animal cell by labeling the cell and matching the vocabulary words with their definitions.
- B. *Materials*
1. Appendix K: *Parts of a Cell and Function Test* (one per student)
  2. Appendix L: *Parts of a Cell and Function Test Answer Key* (one for teacher)
  3. Pencils
- C. *Key Vocabulary*  
Review all unit vocabulary
- D. *Procedures/Activities*
1. Students will be given tests.
  2. Teacher will remind students to stay focused on their own pages.

3. When students are done, they will turn the tests into the teacher and read quietly until everyone is finished with the test.
- E. *Assessment/Evaluation*
1. The unit test - Appendix K. Use Appendix L to grade.

## VI. CULMINATING ACTIVITY

- A. Unit Test-Appendix K

## VII. HANDOUTS/WORKSHEETS

- A. Appendix A: “Living vs. Nonliving” Worksheet  
B. Appendix B: “Living vs. Nonliving” Answer Key  
C. Appendix C: “Cell Organization” Worksheet and Answer Key  
D. Appendix D: “Plant Cell” Worksheet and Answer Key  
E. Appendix E: “Plant and Animal” Worksheet  
F. Appendix F: “Plant and Animal Study Guide” Worksheet  
G. Appendix G: “Guidelines for Cell Unit Presentation” Worksheet  
H. Appendix H: “Inside a Cell” Video Worksheet  
I. Appendix I: “Inside a Cell” Video Answer Key  
J. Appendix J: “Rubric for Unit Cell Presentation” Worksheet  
K. Appendix K: “Parts of a Cell and Function” Test  
L. Appendix L: “Parts of a Cell and Function” Answer Key

## VIII. BIBLIOGRAPHY

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Appendix A  
**Living vs. Nonliving**

Name: \_\_\_\_\_ Class: \_\_\_\_\_

Each student will take one item from the bag and decide if the item is considered a living item or a nonliving item. Write the name of your item under living or nonliving section of the worksheet. Answer the question at the end of the worksheet.

<b>Living</b>	<b>Nonliving</b>

**Give a reason why you placed your item under the living column or nonliving column.**

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Appendix B  
**Living vs. Nonliving Answer Key**

Living	Nonliving
Trees	Clouds
Bear	Soda
Heart	Computer
Starfish	Milk
Fingernail	Pillow
Plant	Book
Butterfly	Computer
Eagle	Ruler
Carrot	Backpack
Bird	Chalkboard
Apple	Meat
Insect	Cereal
Skin	Shoes
Dog	Pants
Grass	Computer Mouse
Fungi	CD
Moss	Television
Mushrooms	Clock
Cactus	Skateboard
Fish	Football
Worm	Car
Hair	Phone
Flower	Video Games
Bees	Gameboy
Shark	Moon

**Give a reason why you placed your item under the living column or nonliving column.**

Answers can include any of the six characteristics of life as follows: 1. have cells; 2. obtain and use energy; 3. grow and develop; 4. reproduce; 5. respond to environment; and 6. adapt to environment. Any nonliving item would not have all of these characteristics. Answers may vary due to lack of background knowledge.

**Appendix C, page 1**  
**Cell Organization**

Name: \_\_\_\_\_ Class: \_\_\_\_\_

This lesson will be completed in the lab. Students will go to the “Cells Alive” web site (Google/cells/cells alive/animal cell) to become familiar with the animal cell and its parts. From this activity, students will write a definition for the vocabulary word, write an interesting fact, and sketch the cell, nucleus, mitochondria, and vacuole.

**Cell/Plasma Membrane:**

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**Interesting fact:**

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**Diagram**

**Nucleus:**

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**Interesting fact:**

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**Diagram**

**Appendix C, page 2**

**Nuclear Membrane:**

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**Interesting fact:**

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**Diagram**

**Mitochondria:**

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**Interesting fact:**

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**Diagram**

**Appendix C, page 3**

**Vacuoles:**

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**Interesting fact:**

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**Diagram**

**Cytoplasm:**

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**Interesting fact:**

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**Diagram**

Appendix C, page 4  
**Cell Organization Answer Key**

**Cell/Plasma Membrane-** Helps to give the cell its shape, and controls what goes through it such as food, water, oxygen and wastes.

**Interesting fact:** Answers will vary.

**Diagram:**

**Nucleus:** The cells control center.

**Interesting fact:** Answers will vary.

**Diagram:**

**Nuclear Membrane:** Surrounds the nucleus and controls what goes into and comes out of the nucleus.

**Interesting fact:** Answers will vary.

**Diagram:**

**Mitochondria:** Parts of the cell that help change food into energy.

**Interesting fact:** Answers will vary.

**Diagram:**

**Vacuoles:** Inside the cytoplasm that store food, water, and wastes.

**Interesting fact:** Answers will vary.

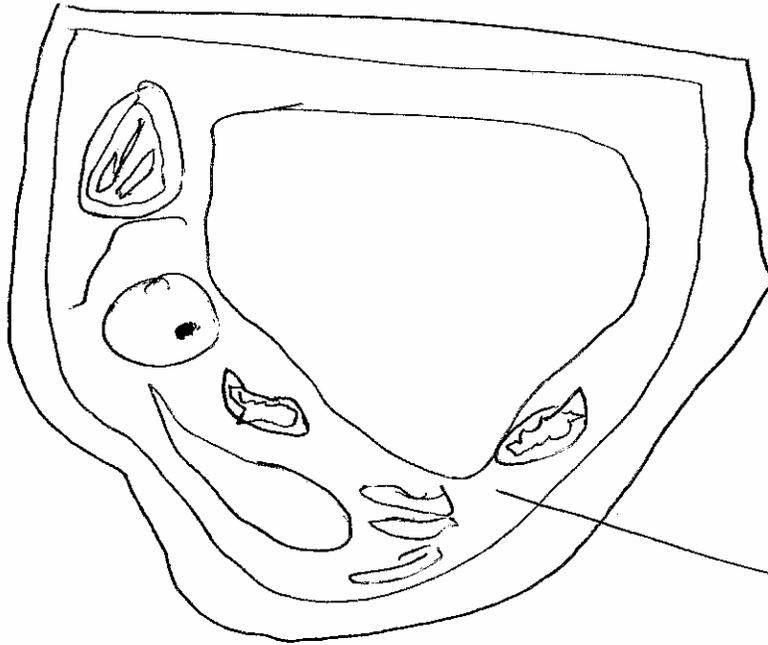
**Diagram:**

**Cytoplasm:** The jellylike liquid in which all the other cell parts are embedded.

**Interesting fact:** Answers will vary.

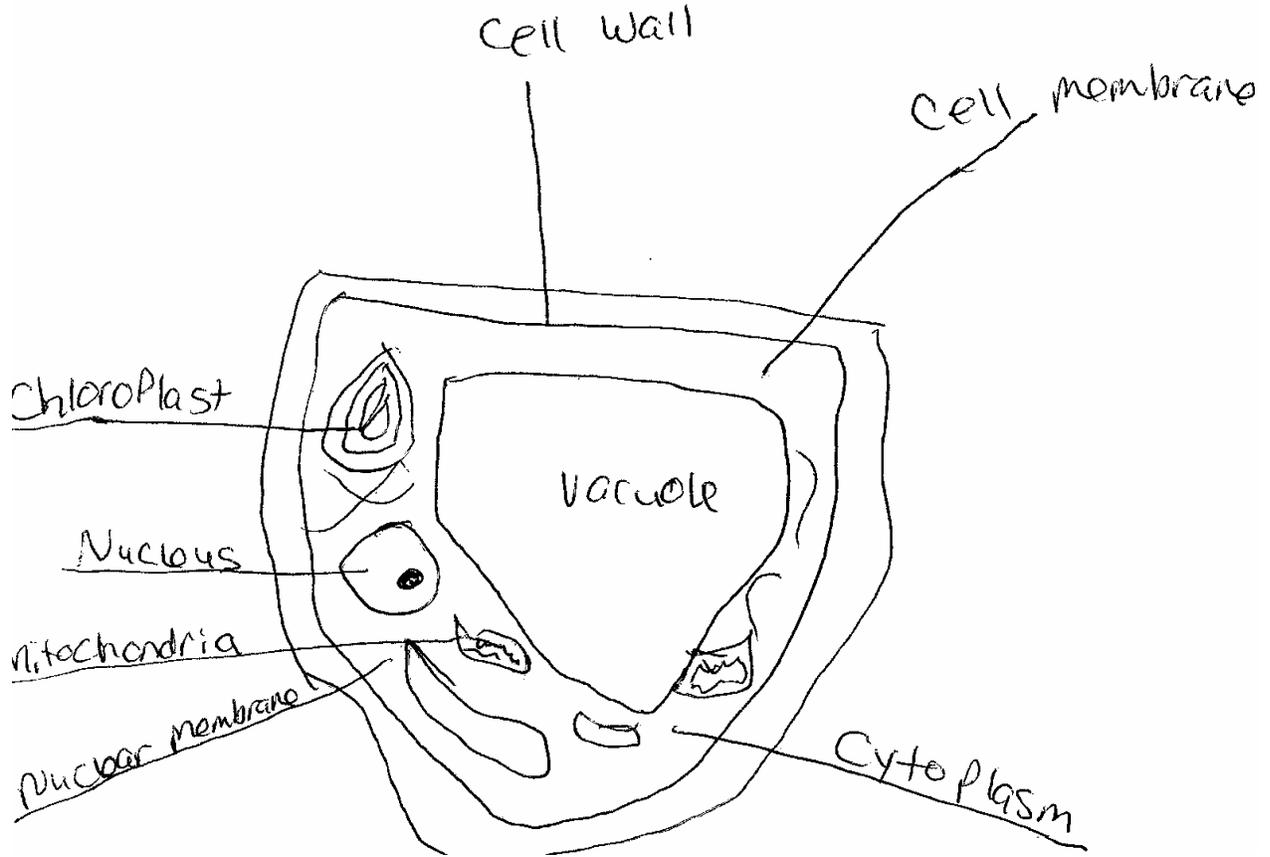
**Diagram:**

## Plant Cell



## Typical Plant Cell

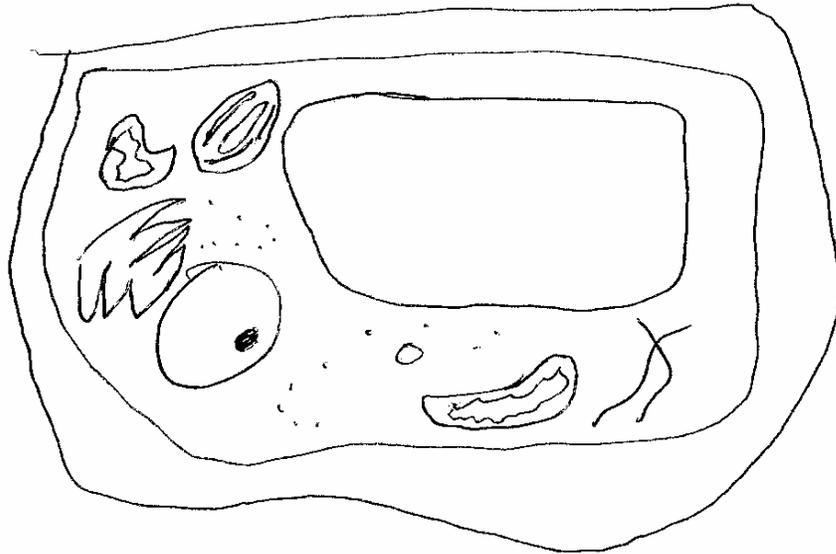
# Plant Cell Answer Key



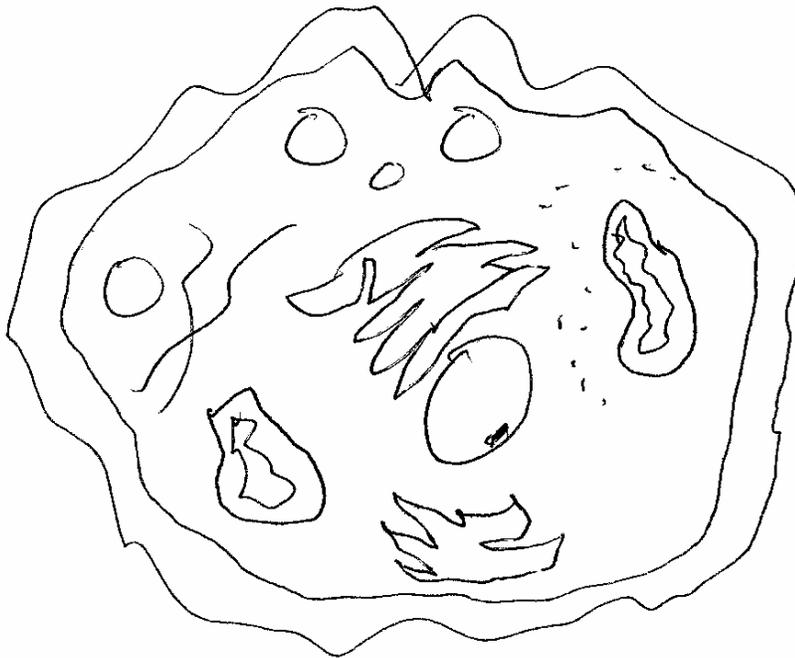
## Typical Plant Cell

Appendix E  
**Plant and Animal**

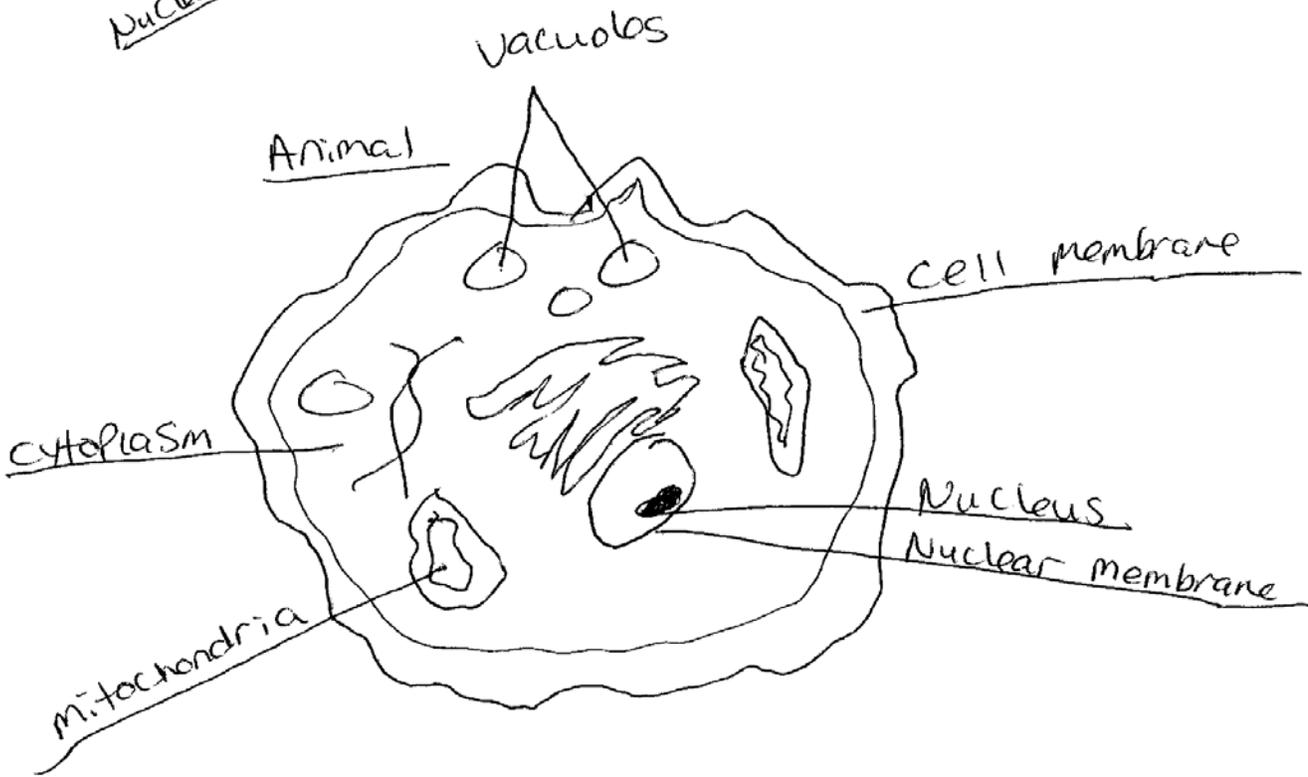
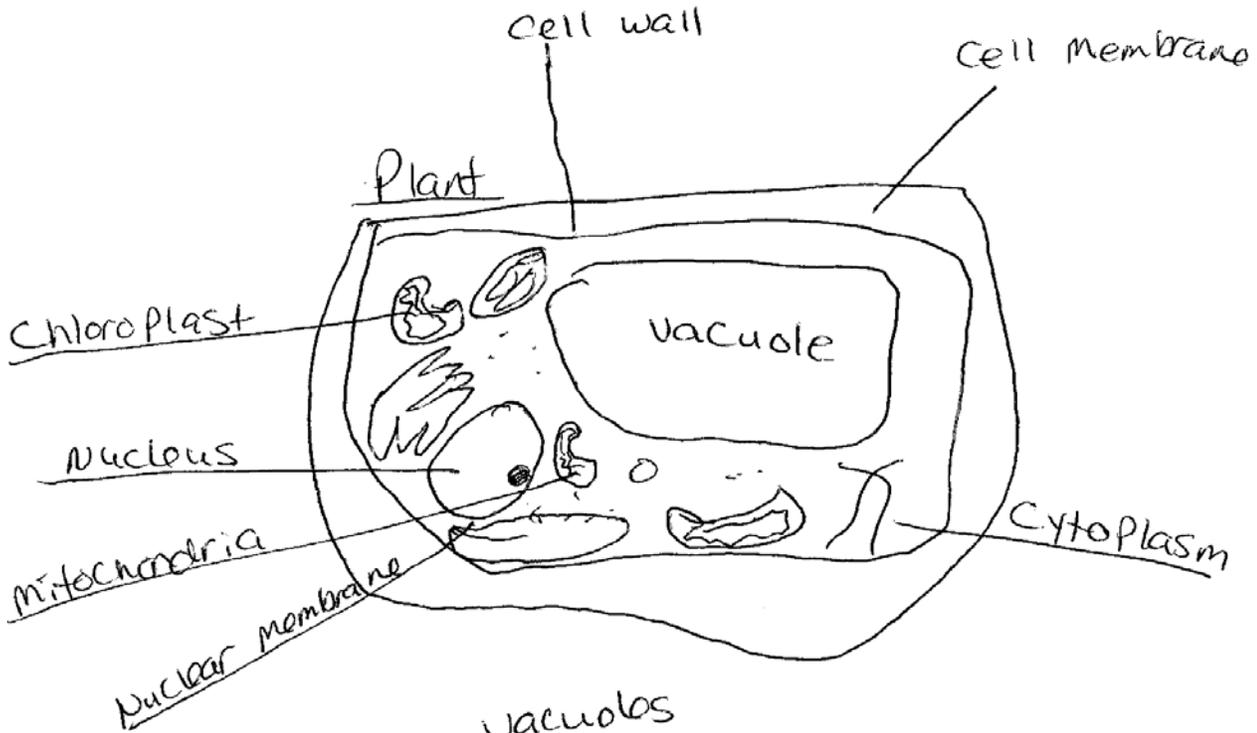
Plant



Animal



Appendix F  
**Plant and Animal Study Guide**



## Appendix G

# **Guidelines for Cell Unit Presentation**

Choose a topic, which should be a cell part of your choice from any of the organelles of the animal/plant cell. You will then write a well written one to two paragraph report. Your report will need to include the name of your topic, a brief definition, its function, and a brief description (what it looks like), and any interesting facts or something new you learned about your cell part. You will present this paragraph at the end of the unit.

Appendix H  
**Inside a Cell (Video)**

While watching the movie you need to look for the following key words and write their definitions. You may put definitions in your own words or use the definitions given in the video.

<b>Key Words</b>	<b>Definitions</b>
Cell Membrane	
Nucleus	
Nuclear Membrane	
Mitochondria	
Cytoplasm	
Vacuoles	

Appendix I  
**Inside a Cell (Video) Answer Key**

<b>Key Words</b>	<b>Definitions</b>
Cell Membrane	Helps give the cell its shape and controls what goes through it such as food, water, oxygen, and wastes.
Nucleus	Is the cell's control center.
Nuclear Membrane	Surrounds the nucleus and controls what goes into and comes out of the nucleus.
Mitochondria	Are the parts of the cell that help change food into energy.
Cytoplasm	Is the jellylike liquid in which all subparts are embedded.
Vacuoles	Are part of the cytoplasm that store food, water, and wastes.

Appendix J

## Rubric for Unit Cell Presentation

Each category will be worth four points. Presentation will be worth 24 points.

	4	3	2	1	Points
<b>Name of Topic</b>	Name of topic is included and expanded upon.	Name of topic is included.	Name of topic is included, but it is not completely clear.	Name of topic is not included.	
<b>Definition</b>	Definition is included and expanded upon.	Definition is included.	Definition is included, but it is not completely clear.	Definition is not included.	
<b>Function</b>	Function is included and expanded upon.	Function is included.	Function is included, but it is not completely clear.	Function is not included.	
<b>Brief Description</b>	Brief description is included and expanded upon.	Brief description is included.	Brief description is included, but it is not completely clear.	Brief description is not included.	
<b>Interesting Fact</b>	Four-five interesting facts are included.	Two-three interesting facts are included.	One interesting facts is included.	No interesting facts are included.	
<b>Presentation</b>	Well prepared and shows full understanding of subject. Speaks clearly.	Pretty prepared and a good understanding of subject matter. Speaks clearly most of the time.	Somewhat prepared and Shows good understanding of parts of the topic. Mispronounces several words.	Student does not seem prepared. Understanding of subject matter is poor. Mumbles or cannot be understood.	
<b>TOTAL POINTS</b>					_____ /24
<b>PERCENTAGE</b>					_____ %

**TEACHER COMMENTS:**

## Parts of a Cell and Function Test

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

Match the word with the correct definition by placing the correct number in the blank of the definition.

- 1) Chlorophyll      \_\_\_\_ The process of chlorophyll trapping energy they need to make food.
- 2) Nonliving      \_\_\_\_ The rigid outer most cell layer found in plants but absent from animal cells.
- 3) Cytoplasm      \_\_\_\_ Anything that has ever been alive.
- 4) Nucleus      \_\_\_\_ The tiny building blocks of living things.
- 5) Cell Membrane      \_\_\_\_ To produce again or recreate.
- 6) Organelles      \_\_\_\_ Inside the cytoplasm that store food, water, and wastes.
- 7) Chloroplast      \_\_\_\_ Ingredients needed to sustain life.
- 8) Vacuole      \_\_\_\_ Needed to do work.
- 9) Living      \_\_\_\_ The green substance that traps the energy from the sunlight and enables plants to make food.
- 10) Cell Wall      \_\_\_\_ Anything that has never been alive.
- 11) Nutrients      \_\_\_\_ Surrounds the nucleus and controls what goes into and comes out of the nucleus.
- 12) Energy      \_\_\_\_ Is another structure of a plant cell that animals do not have and they contain chlorophyll.
- 13) Reproduce      \_\_\_\_ Are indigested residue of food eliminated from the body.

**Appendix K, page 2**

- 14) Mitochondria      \_\_\_\_\_ Small organs within the cell.
- 15) Wastes             \_\_\_\_\_ The cells control center.
- 16) Nuclear Membrane      \_\_\_\_\_ Parts of the cell that help change food into energy.
- 17) Cells                \_\_\_\_\_ Helps to give the cell its shape, and controls what goes through it such as food, water, oxygen and wastes.
- 18) Photosynthesis      \_\_\_\_\_ The jellylike liquid in which all the other cell parts are embedded.

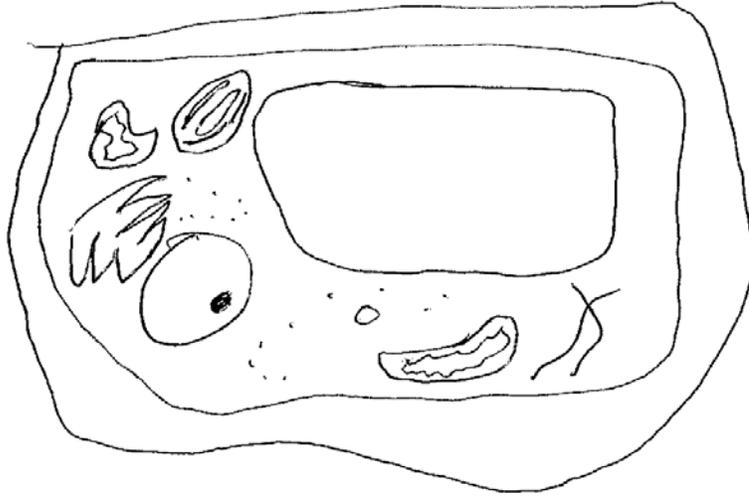
**What cell part belongs in the animal cell and in the plant cell? Place an X to show if the cell part belongs in an animal cell, plant cell, or both.**

<b>Cell Part</b>	<b>Animal Cell</b>	<b>Plant Cell</b>
Cell Membrane		
Cell Wall		
Nucleus		
Nuclear Membrane		
Organelles		
Mitochondria		
Cytoplasm		
Vacuoles		
Cell Wall		
Chloroplast		
Chlorophyll		
Photosynthesis		

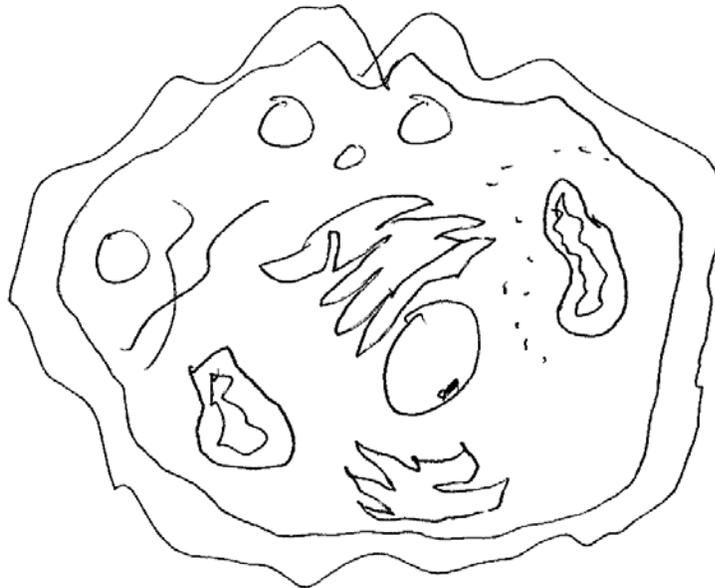
## Plant and Animal

Label each cell (plant or animal). Then write the cell part in the correct blank for both the animal and plant cells.

Plant



Animal



# Parts of a Cell and Function Test Answer Key

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

Match the word with the correct definition by placing the correct number in the blank of the definition.

- |                      |        |   |
|----------------------|--------|---|
| 1) Chlorophyll       | __18__ | The process of chlorophyll trapping energy they need to make food.  |
| 2) Nonliving         | __10__ | The rigid outer most cell layer found in plants but absent from animal cells.                               |
| 3) Cytoplasm         | __9__  | Anything that has ever been alive.  |
| 4) Nucleus           | __17__ | The tiny building blocks of living things.  |
| 5) Cell Membrane     | __13__ | To produce again or recreate.   |
| 6) Organelles        | __8__  | Inside the cytoplasm that store food, water, and wastes.  |
| 7) Chloroplast       | __11__ | Ingredients needed to sustain life.   |
| 8) Vacuole           | __12__ | Needed to do work.  |
| 9) Living            | __1__  | The green substance that traps the energy from the sunlight and enables plants to make food.                |
| 10) Cell Wall        | __2__  | Anything that has never been alive.   |
| 11) Nutrients        | __16__ | Surrounds the nucleus and controls what goes into and comes out of the nucleus.                             |
| 12) Energy           | __7__  | Is another structure of a plant cell that animals do not have and they contain chlorophyll.                 |
| 13) Reproduce        | __15__ | Are indigested residue of food eliminated from the body.  |
| 14) Mitochondria     | __6__  | Small organs within the cell.   |
| 15) Wastes           | __4__  | The cells control center.   |
| 16) Nuclear Membrane | __14__ | Parts of the cell that help change food into energy.  |
| 17) Cells            | __5__  | Helps to give the cell its shape, and controls what goes through it such as food, water, oxygen and wastes. |
| 18) Photosynthesis   | __3__  | The jellylike liquid in which all the other cell parts are embedded.  |

Appendix L, page 2

What cell part belongs in the animal cell and in the plant cell? Place an X to show if the cell part belongs in an animal cell, plant cell, or both.

<b>Cell Part</b>	<b>Animal Cell</b>	<b>Plant Cell</b>
Cell Membrane	X	X
Cell Wall	X	X
Nucleus	X	X
Nuclear Membrane	X	X
Organelles	X	X
Mitochondria	X	X
Cytoplasm	X	X
Vacuoles	X	X
Cell Wall		X
Chloroplast		X
Chlorophyll		X
Photosynthesis		X

# Plant and Animal

Label each cell (plant or animal). Then write the cell part in the correct blank for both the animal and plant cells.

