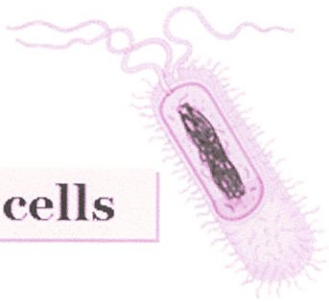
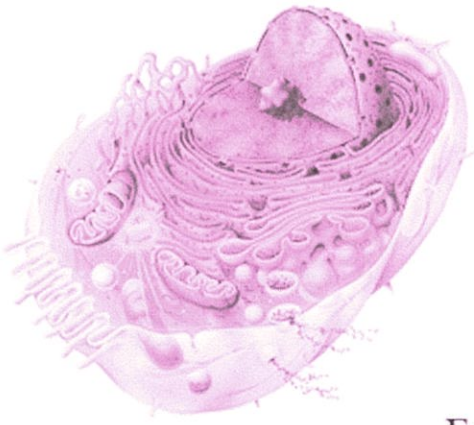
Unit 2: Life Process and The Cell Note Packet

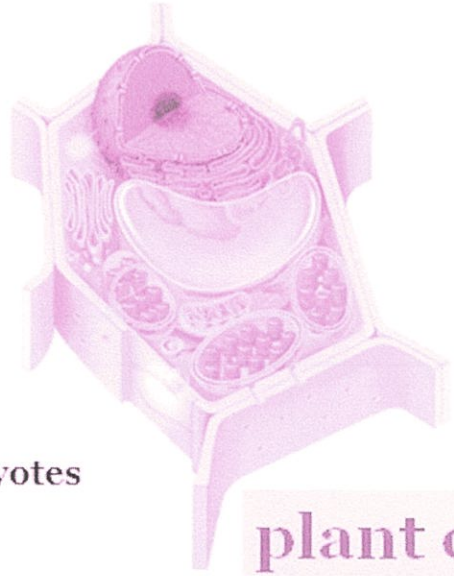
Types of Cells

Prokaryote



Bacterial cells





Eukaryotes

animal cells

plant cells

Name: _____ Period: _____

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Grade 7 - Unit 2 – Cells Vocabulary

1. Living Thing
2. Non-Living Thing
3. Cell Theory
4. Organelle
5. Cell Membrane
6. Selectively permeable membrane
7. Cytoplasm
8. Cell Wall
9. Nucleus
10.Chromosomes
11.Ribosomes
12.Endoplasmic Reticulum
13.Vacuoles
14.Mitochondria
15.Chloroplast
16.Cell
17.Tissue
18.Organ
19.Organ system
20.Organism

(3)

Name _____ Class _____ Date _____

1-2 What are living things?

Lesson Review

PART A Complete the following.

1. Any living thing is called an _____.
2. The basic unit of structure and function in living things is the _____.
3. A reaction to a change in your surroundings is a _____.
4. The source of energy for most living things is the _____.
5. Everything around you is made up of _____.
6. When two or more atoms from different elements join, they form a _____.

PART B Place a check mark beside each statement that describes a characteristic that is true of all living things.

_____ 1. have cells

_____ 2. can move

_____ 3. grow or develop

_____ 4. produce more of their own kind

_____ 5. use sunlight to make food

_____ 6. use energy

_____ 7. respond to changes

_____ 8. have features that help them adapt to surroundings

Skill Challenge

Skills: *applying concepts, classifying*

Use the illustration below to answer the questions.

1. What is the source of energy for the puppies in the illustration? _____

_____

_____

2. In what ways will the puppies change to become more like their mother? _____

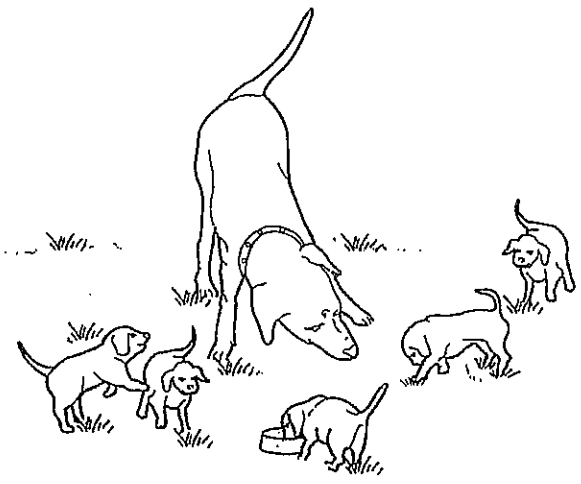
_____

_____

3. Which characteristics of living things are shown in the illustration? _____

_____

_____



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Name: _____ Date: _____

Aim: How can we Differentiate between Living and Non-living?

Characteristics of Life

- All living things:
  - Are made up of one or more cells
  - Undergo metabolic processes
  - Maintain homeostasis
  - Perform the eight life functions

3 R GENTS

R _____

R _____

R _____

G _____

E _____

N _____

T _____

S _____

Metabolism

- _____ that occur in an organism to make and use energy.
  - **R**espiration, **R**egulation, **R**eproduction, Growth, **E**xcretion, **N**utrition, **T**ransport, **S**ynthesis
    - 3R-GENTS

Homeostasis

- _____ _____ **regardless** of the external environment
- Example: _____

Cellular Respiration

- Produces _____ _____
  - Occurs in the _____

a. Aerobic: needs _____

b. Anaerobic: does _____ need oxygen

Regulation

- _____ and _____ of life processes
- Allows the body to _____

Reproduction

- _____
  a. Asexual – _____
  b. Sexual – _____
- _____ required for the survival of the individual

Growth and Repair

- To _____
- Change over an individual's life time
  - Gets bigger
  - Matures

Excretion

- _____
  - CO_2, water, urea, urine, sweat

Nutrition

- All organisms get _____
  - Autotrophic: _____ through photosynthesis
  - Heterotrophic: Get nutrients from the_____

Transport

- Organisms _____ and _____ materials through the cells

Synthesis

- To _____ from small to large

Name _____ Period _____

Characteristics of Life

READ AND HILITE THE MAIN IDEAS IN EACH PASSAGE THEN ANSWER THE QUESTIONS.

Most people feel confident that they could identify a living thing from a nonliving thing, but sometimes it's not so easy. Scientists have argued for centuries over the basic characteristics that separate life from non-life. Some of these arguments are still unresolved. Despite these arguments, there do seem to be some generally accepted characteristics common to all living things. Anything that possesses all these characteristics of life is known as an organism.

1. The scientific term for a living thing is a(n) _____.

1. CONTAIN ONE OR MORE CELLS

Scientists know that all living things are organized. The smallest unit of organization of a living thing is the cell. Cells can perform all the functions we associate with life.

Cells are organized and contain specialized parts that perform particular functions. Cells are very different from each other. A single cell by itself can form an entire living organism. Organisms consisting of only a single cell are called unicellular. A bacterium or a protist like amoebas and paramecia are unicellular. However, most of the organisms you are familiar with, such as dogs and trees, are multicellular. Multicellular organisms contain hundreds, thousands, even trillions of cells or more. Multicellular organisms may have their cells organized into tissues, organs, and systems. Whether it is unicellular or multicellular, all structures and functions of an organism come together to form an orderly living system.

2. All living things are _____.
3. All cells perform various jobs or _____.
4. What is the difference between unicellular and multicellular organisms?
5. Multicellular organisms can be organized into what other levels

2. REPRODUCTION

Perhaps the most obvious of all the characteristics of life is reproduction, the production of offspring. Organisms don't live forever. For life to continue, organisms must replace themselves. Reproduction is not essential for the survival of an individual organism. However, it is essential for the continuation of an organism's species. If individuals in a species never reproduced, it would mean an end to that species' existence on Earth.

6. Define reproduction.

7. Reproduction is NOT essential for the survival of an individual _____ but is essential for the survival of the _____.

3. GROWTH AND DEVELOPMENT

Adults don't always look like the babies of a species. All organisms begin their lives as single cells. Over time, these organisms grow and take on the characteristics of their species.
All organisms grow, and different parts of organisms may grow at different rates. Organisms made up of only one cell may change little during their lives, but they do grow. On the other hand, organisms made up of numerous cells go through many changes during their lifetimes. Think about some of the structural changes your body has already undergone in your short life. All of the changes that take place during the life of an organism are known as its development.

A snowball grows when you roll it over fresh snow! Why isn't it a living thing? The growth of the snowball is not internal. It does not grow by producing more cells like organisms. It just adds on more material to the outside. Someone has to roll the snowball. It won't grow bigger by just sitting there and it certainly cannot change liquid water or solid ice into new snow from which it can grow larger. This is one of the differences between growth of a living thing and growth of a nonliving thing.

8. How is the growth of a living thing different from the growth of a nonliving thing?

4. OBTAIN AND USE ENERGY

Energy is the ability to make things change. Energy is important because it powers life processes. It provides organisms with the ability to maintain balance, grow, reproduce, and carry out other life functions. Some organisms obtain energy from the foods they eat or, in the case of plants and several other types of organisms, the foods that they produce. Organisms that get energy from the food they eat are called heterotrophs. Organisms that use energy from the sun to make their own food (which they then use for energy) are called autotrophs. The process is called photosynthesis.

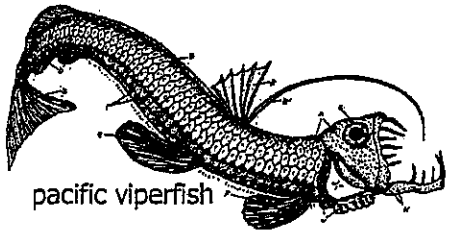
9. Define energy.

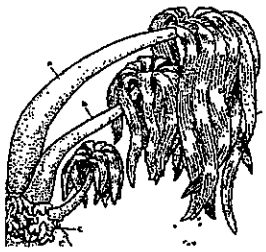
10. Why is energy important to a living organism?

11. What is the difference between an autotroph and a heterotroph?

12. What is the name of the process that plants use to make their own food using energy from the sun?

13. Identify each of the organisms below as either a heterotroph or an autotroph.





_____ _____

5. RESPOND TO THE ENVIRONMENT / MAINTAIN HOMEOSTASIS

Living things live in a constant connection with the environment, which includes the air, water, weather, temperature, any organisms in the area, and many other factors. These external environmental factors act as stimuli and can cause a response from living things. Organisms need to respond to the changes in order to stay alive and healthy. For example, if you go outside on a bright summer day, the sun may cause you to squint. Perhaps the bark of an approaching dog causes you to turn your head quickly. Just as you are constantly sensing and responding to changes in your environment, so are all other organisms.

An organism must respond to changes in the internal environment as well. Internal conditions include the level of water, nutrients, and minerals inside the body. It also refers to body temperature and hormone levels. Adjustments to internal changes help organisms maintain a stable internal environment. The regulation of an organism's internal environment to maintain conditions suitable for life is called **homeostasis**. Or you can just think of it as keeping everything in BALANCE! For example, you have a "thermostat" in your brain that reacts whenever your body temperature varies slightly from 37°C (about 98.6°F). If this internal thermostat detects a slight rise in your body temperature on a hot day, your brain signals your skin to produce sweat. Sweating helps cool your body.

14. What are some environmental factors (stimuli) that organisms respond to?

15. Organisms must also respond to _____ factors in order to stay healthy & survive.

16. Give <u>two</u> examples from the reading of how living things respond to changes in their environment.

23. Describe homeostasis.

(9)

Name: _____ Date: _____

HW: Life Functions

Directions: Using the word bank provided, match each term with the correct description. Underline the key words in the description that assisted you in answering the questions.

Metabolism	Regulation	Excretion	Synthesis
Homeostasis	Reproduction	Nutrition	
Respiration	Growth	Transport	

_____ 1. All chemical life processes that occur in your cells

_____ 2. Control and coordination of all life processes

_____ 3. Absorption and circulation of materials

_____ 4. Increase in cell size or cell number

_____ 5. Removal of cellular wastes

_____ 6. Build/make larger materials from smaller building blocks

_____ 7. Balance, Internal stability regardless of external conditions

_____ 8. Organisms ingest (take in) materials from the environment

_____ 9. Production of new individuals

_____ 10. Energy (ATP) is produced in the mitochondria

(16)

Aim: How was the Cell Theory Developed?

The Wacky History of Cell Theory

Directions: As you watch the video, answer the following questions.

1. List the three parts of the cell theory.
   - _____
   - _____
   - _____
2. Briefly summarize the findings of each of the scientists in the chart.

Scientist	Finding
Anton Van Leeuwehoek	
Robert Hooke	
Matthias Schleiden	
Theodore Schwann	
Rudolph Virchow	

Cell Theory

1. _____
2. Cells are the basic unit of_____
3. _____

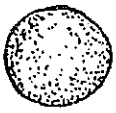
Exception to the Cell Theory

1. _____
2. Where did the first cell come from?
3. _____ & _____ have their own genetic material & can reproduce on their own (yet they are organelles NOT cells)

Name

Cell Organization

CELL

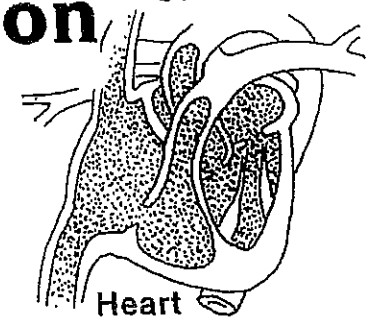


Red Blood Cell

TISSUE

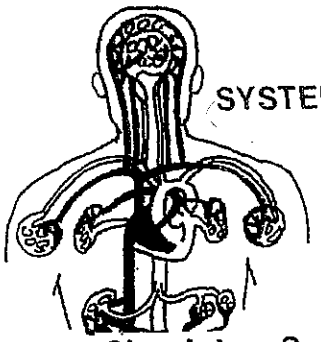
Blood

ORGAN



Heart

SYSTEM



Circulatory System

The basic unit or building block of a living thing is a cell. All organisms (living things) are made up of cells. Every cell in an organism has a special job to do. However, the cell may act alone or be part of a team depending on the complexity of the organism. The simplest animals, the sponges, have cells which work independently.

The next higher phylum of animals includes the jellyfish. Jellyfish are more complex than sponges because jellyfish contain tissues. Tissues are made from *cells* working together to do a special job. For example, jellyfish have a tissue which digests (breaks down) food.

The next phylum of animals includes the planarian. Planaria are more complex than jellyfish because planaria contain organs. Organs are made from *tissues* working together to do a special job. Planaria have several organs, including eyespots and reproductive organs.

Finally, *organs* may work together to form a system. In the earthworm as well as in the most complex animal, man, the circulatory system carries food and oxygen to all parts of the body. Organs such as the heart and blood vessels work together to carry the blood and form the circulatory system.

The simplest animals have cells which work independently. More complex animals have specialized tissues, organs, and/or systems to do all the things necessary for living. As we progress through the animal phyla, we will generally find that their members become increasingly more complex.

I. Use the paragraphs and chart above to complete the following:

O _ _ _ _ _ _ _ _	living thing
_ R _ _ _	tissues working together
_ _ G _ _ _	break down
A _ _ _ _ _ _ _	sponges → man
_ N _ _	cell
_ I _ _ _ _	cells working together
S _ _ _ _ _ _	organs working together
M _ _	most complex animal

II. Number the following in order from simplest to most complex:

____ tissue
____ system
____ organ
____ cell

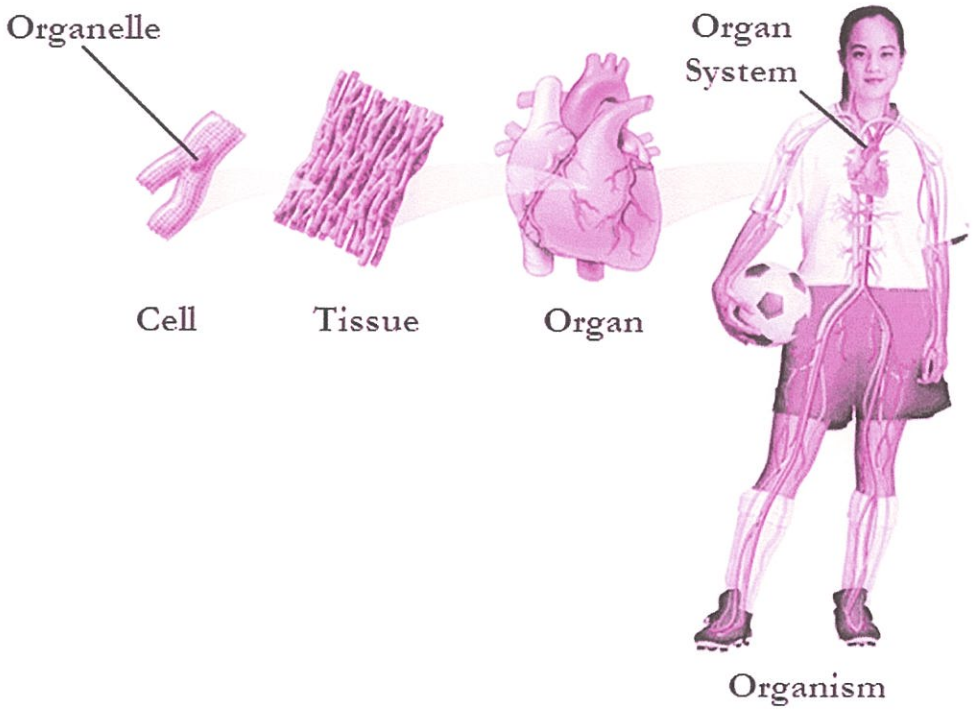
III. Place these in the right category: heart, circulatory, red blood cell, blood vessel, blood, eyespot.

CELL	TISSUE	ORGAN	SYSTEM

Aim: How do cellular organelles perform the life functions?

Levels of Tissue Organization

- **Organelle** – specialized **structures** that perform the 8 life functions in the cell
- **Cell** - unit of structure and function for all life
- **Tissue** - composed of groups of similar cells
- **Organs** - composed of groups of tissues functioning together
- **Organ systems** - composed of groups of organs functioning together
- **Organism** – composed of organ systems working together

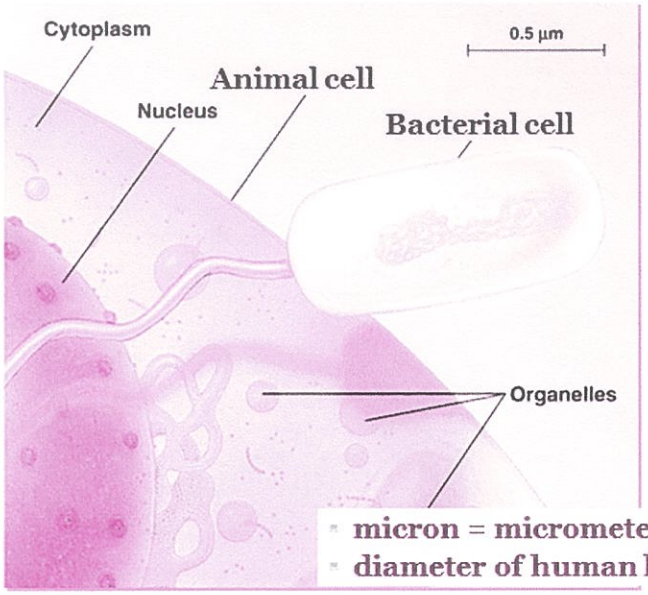


Types of Cells

- Prokaryotes - _____
  - Example: _____
- Eukaryotes - _____
  - Examples: _____

13

Cell Size Comparison



- most bacteria (prokaryotes)
  - 1-10 microns
- eukaryotic cells
  - 10-100 microns

Cell Size and Scale

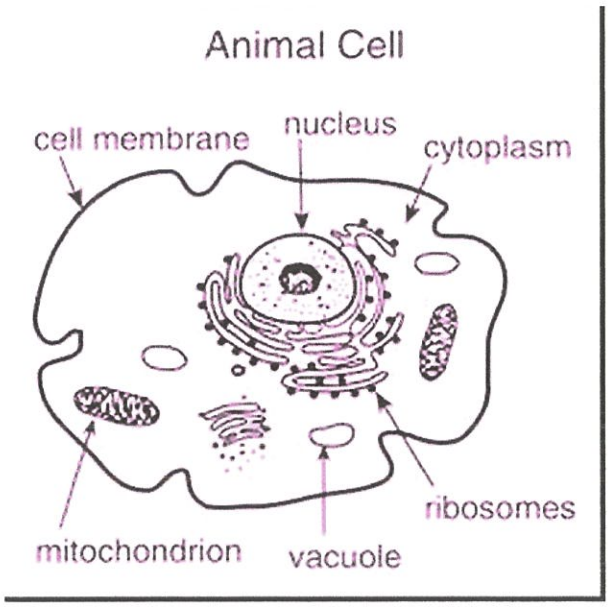
- **micron = micrometer = 1/1,000,000 meter**
- **diameter of human hair = ~20 microns**

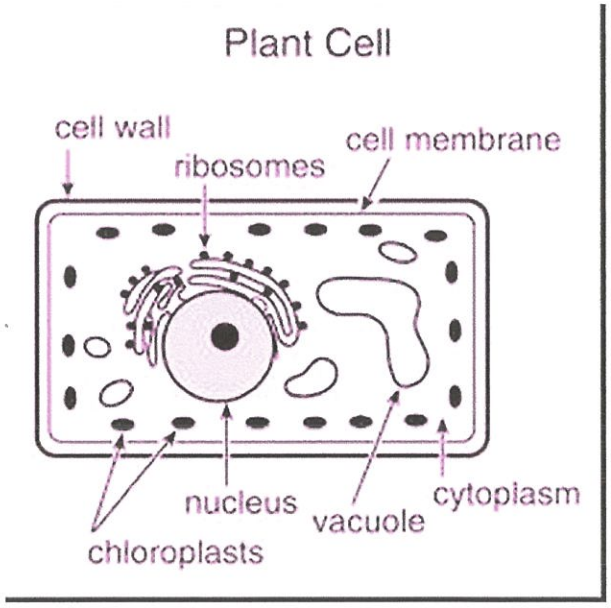
Organelles

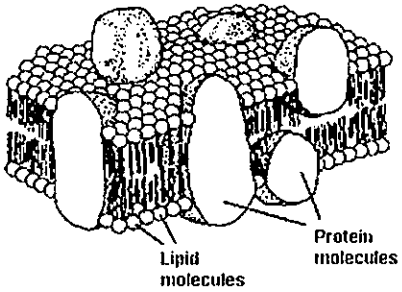
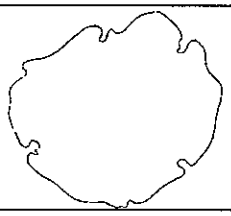
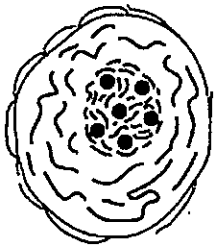
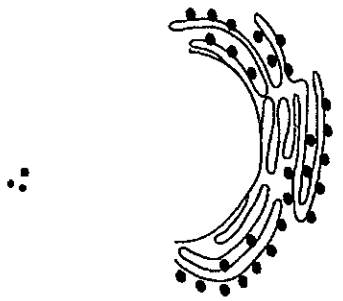
- _____

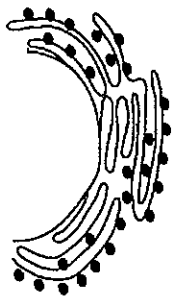
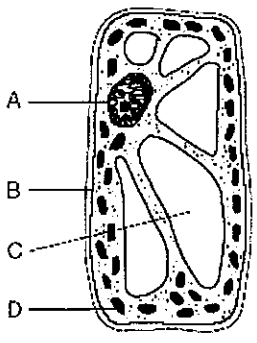
_____

- Only found in _____ **CELLS**





Organelle (Structure)	Function	Image
Plasma (Cell) Membrane	– _____ _____ • Oxygen, Carbon Dioxide, Water, Food, Wastes – _____ _____From other cells – Allows for _____ _____	
Cytoplasm	• Jelly-like material holding organelles in place	
Nucleus	• **Function:** _____ _____ • Contains _____ – _____ _____ • Structure – Nuclear Membrane – Nucleolus • Makes ribosomes – Chromosomes - DNA	
Ribosome	• **Function:** Site of _____ _____ – Proteins are made here _____ _____ from the nucleus • Found "free" in cytoplasm or attached to the Endoplasmic Reticulum	

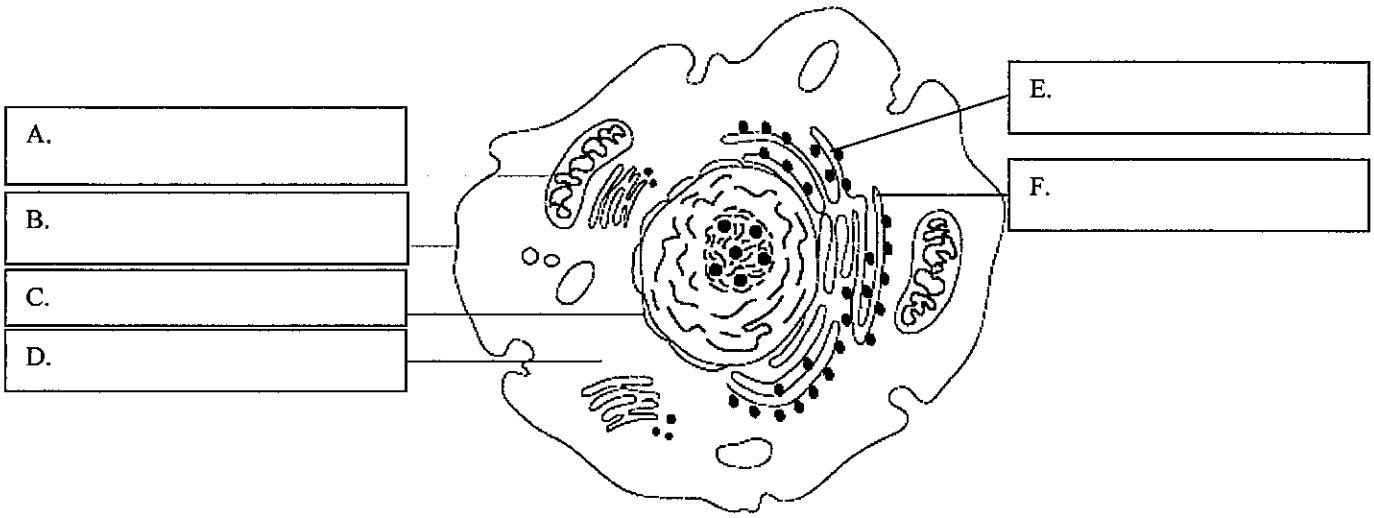
Endoplasmic Reticulum	• **Function:** _____ _____ throughout the cell • Rough ER – _____ • Smooth ER – _____	
Golgi Apparatus	• **Function**: Finishes, sorts, labels and ships proteins	
Lysosome	**Functions:** • _____ food • _____ _____	
Vacuole	• **Function:** Serves as a _____ _____ _____ • Types: – Food vacuole – stores and digests food – Contractile vacuole – pumps out excess water to maintain homeostasis	
Mitochondria	• **Function**: Site of_____ _____ – "Powerhouse of the cell" – Produces _____ (ATP)	
Centriole	• **Function**: Help coordinate _____ _____ – Found in *only* animal cells	
Cell Wall	• **Function**: Surrounds and supports the cell	
Chloroplast	• **Function**: Site of _____ _____ – Uses the sun's energy to make food (sugar) for the plant	

(16)

Name: _____ Date: _____

HW - Plant Vs. Animal Cell

Directions: Label the diagrams of the plant and animal cells below.



Directions: Using the word bank provided, match each organelle with its proper function. Underline the key word for each statement.

Ribosome	Mitochondria	Nucleus	Endoplasmic Reticulum
Cell Membrane	Vacuole	Chloroplast	Cell Wall
Golgi Apparatus	Lysosomes	Centrioles	

_____1. Site of Cellular Respiration; "Powerhouse of the cell"; Makes ATP

_____2. Storage Site

_____3. Site of Photosynthesis; Found only in plant cells

_____4. Site of Protein Synthesis

_____5. Regulates (Controls) what can exit and enter the cell

_____6. Transports proteins in the cell

_____7. Control center, "Brain", of the cell

_____8. Gives plant cells their square shape

_____9. Clean up crew for the cell; digests worn-out organelles

_____10. Packages and ships proteins

_____11. Involved in cell division, only found in animal cells

12. List two ways that a plant cell differs from an animal cell.

_____

LESSON 8 | What is a cell?

The Great Pyramids of Egypt are made of stone blocks. Buildings are put together with bricks. Birds build their nests with grass and twigs. Everything is made up of smaller parts . . . EVEN YOU!

All living things are made up of small parts called **cells**. The cell is the basic unit of structure in all living things. Because all living things are made up of cells, cells often are called "the building blocks of life." The cell also is the basic unit of function in living things. All the life processes are carried out by cells.

Some organisms, such as bacteria, are made up of only one cell. Larger organisms have many more cells. A person, for example, is made up of trillions of cells. Can you imagine how many cells a whale must have?

Cells come in many sizes. Most are microscopic [my-kruh-SKAHP-ik]. Some cells, however, can be seen easily. For example, a chicken's egg is a single cell. Do you need a microscope to see a chicken's egg?

Cells also come in many shapes. For example, a muscle cell has a different shape than a nerve cell. Skin cells have a different shape than fat cells.

The cell itself is made up of smaller parts. Most cells have three main parts: the **cell membrane**, the **nucleus** [NEW-klee-us], and the **cytoplasm** [SYT-uh-plaz-um].

CELL MEMBRANE The cell membrane is like a thin skin that covers the cell. It protects the cell and gives it its shape. The cell membrane has tiny holes in it. Materials enter and leave the cell through these tiny holes.

NUCLEUS The nucleus is inside the cell. It controls everything that happens in the cell. The nucleus is like the "boss" of the cell. The nucleus usually is near the center of a cell.

CYTOPLASM The cytoplasm is the material located between the nucleus and the cell membrane. It fills most of the inside of the cell and contains many small structures. Like the cell membrane, the cytoplasm helps give a cell its shape. Most life functions take place in the cytoplasm.

OTHER CELL PARTS

Figure A shows eight cell parts. These parts are found in most cells. The name of each cell part is listed below.

- **cell membrane**
- **cytoplasm**
- **nucleus**
- **nuclear membrane**
- **mitochondria** [myt-uh-KAHN-dree-uh]
- **ribosomes** [RY-buh-sohmz]
- **endoplasmic reticulum** [EN-duh-plaz-mic rih-TIK-yuh-lum]
- **vacuoles** [VAK-yoo-wohls]

Each cell part is described below the diagram. As you read each description, identify the cell part in the diagram.

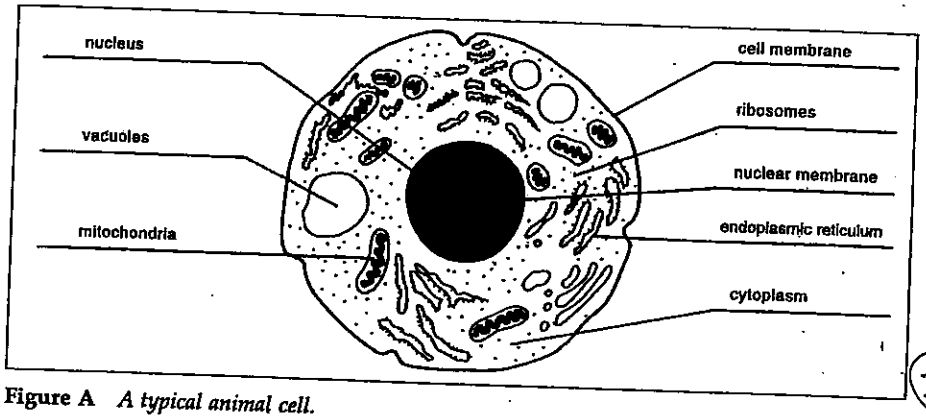


Figure A *A typical animal cell.*

CELL MEMBRANE

A thin covering that surrounds the cell. The cell membrane.

a) protects the cell,

b) helps give the cell its shape,

c) allows materials to enter and leave the cell, and

d) helps keep the cell material together.

CYTOPLASM

The living material inside the cell membrane but outside of the nucleus. Cytoplasm helps give a cell its shape. Most of the life functions take place within the cytoplasm.

NUCLEUS

A structure often found near the center of the cell. The nucleus is the "boss" of the cell. It controls all of the cell's activities. The nucleus is especially important during reproduction.

NUCLEAR MEMBRANE

A thin covering that surrounds the nucleus. The nuclear membrane controls the passage of materials into and out of the nucleus. It also gives the nucleus its shape.

MITOCHONDRIA	Mitochondria are rod-shaped. They are the "power houses" of the cell. Mitochondria store and release the energy the cell needs to carry out the life functions.
ENDOPLASMIC RETICULUM	A network of channels. The endoplasmic reticulum is like a series of "roadways." They are used for moving materials within the cell.
RIBOSOMES	Tiny grainlike structures. The ribosomes make and store protein. Most ribosomes are found on the endoplasmic reticulum. Some, however, move freely within the cytoplasm.
VACUOLES	Liquid-filled spaces. They store food and wastes. Some vacuoles also store extra water. They pump extra water out of the cell.

Answer the following questions about cells.

1. Where do most of the life functions take place within a cell? _____
2. Does each part of the cell work alone? Explain your answer. _____

_____

_____

3. What are two jobs of the cell membrane? _____

_____

4. How are vacuoles like storage bins? _____

_____

LABEL THE PARTS

Figure B shows an animal cell. Label each part of the cell on the lines provided.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

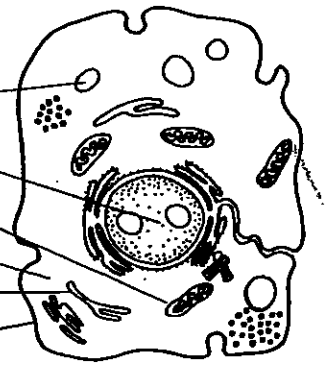


Figure B

HOW ARE PLANT CELLS DIFFERENT FROM ANIMAL CELLS?

Plant cells and animal cells are not exactly alike. Plant cells have certain parts that animal cells do not. These parts are a cell wall and chloroplasts.

CELL WALL The cell wall surrounds the cell membrane of a plant cell. The cell wall is made of a nonliving material called cellulose [SEL-yoo-lohs]. The cell wall is more rigid (stiff) than the cell membrane. It gives a plant cell its stiffness. It also gives it its shape.

CHLOROPLASTS Chloroplasts are found in the cytoplasm of a plant cell. Chloroplasts contain a green substance called chlorophyll [KLAWR-uh-fil]. Chlorophyll is needed by green plants for food-making. The food-making process of green plants is called photosynthesis [foht-uh-SIN-thuh-sis]. Most chlorophyll is found in the leaf cells of green plants.

Plants can make their own food. Animals cannot. Animal cells do not contain chlorophyll.

The number and size of vacuoles also is different in plant and animal cells. Plant cells have only one or two vacuoles. The vacuoles are usually very large. Animal cells have many small vacuoles.

Figure C shows a plant cell. The parts of the plant cell that are shown in the figure include:

- cell membrane
- cytoplasm
- nucleus
- cell wall
- chloroplast
- vacuole

Find each part of the plant cell in Figure C.

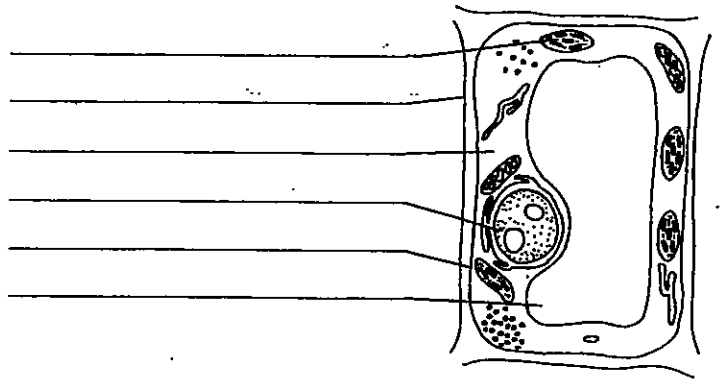


Figure C

(19)

Answer the following questions about plant and animal cells.

1. What two parts do plant cells have that animal cells do not have? _____

   and _____

2. What is the cell wall made of? _____
   protoplasm, cellulose

3. Is cellulose living material? _____
   yes, no

4. Where are the chloroplasts located? _____
   in the nucleus, in the cytoplasm

5. What substance is found inside the chloroplasts? _____
   protoplasm, chlorophyll

6. What is the substance inside the chloroplasts used for? _____
   food-making, excretion

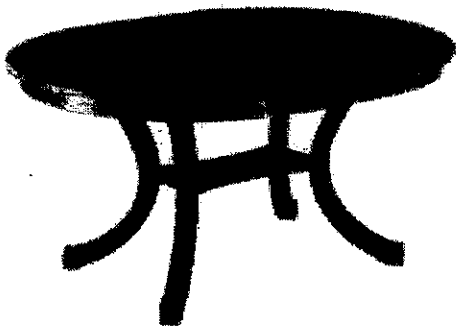
COMPLETE THE CHART

Answer the questions by putting a "YES" or "NO" in the space provided.

	Animal Cell	Plant Cell
1. Does it have a nucleus?		
2. Does it have ribosomes?		
3. Does it have mitochondria?		
4. Does it have a cell membrane?		
5. Does it have a cell wall?		
6. Does it have cytoplasm?		
7. Does it have chloroplasts?		
8. Does it have an endoplasmic reticulum?		
9. Does it have chlorophyll?		
10. Does it have many small vacuoles?		

(20)

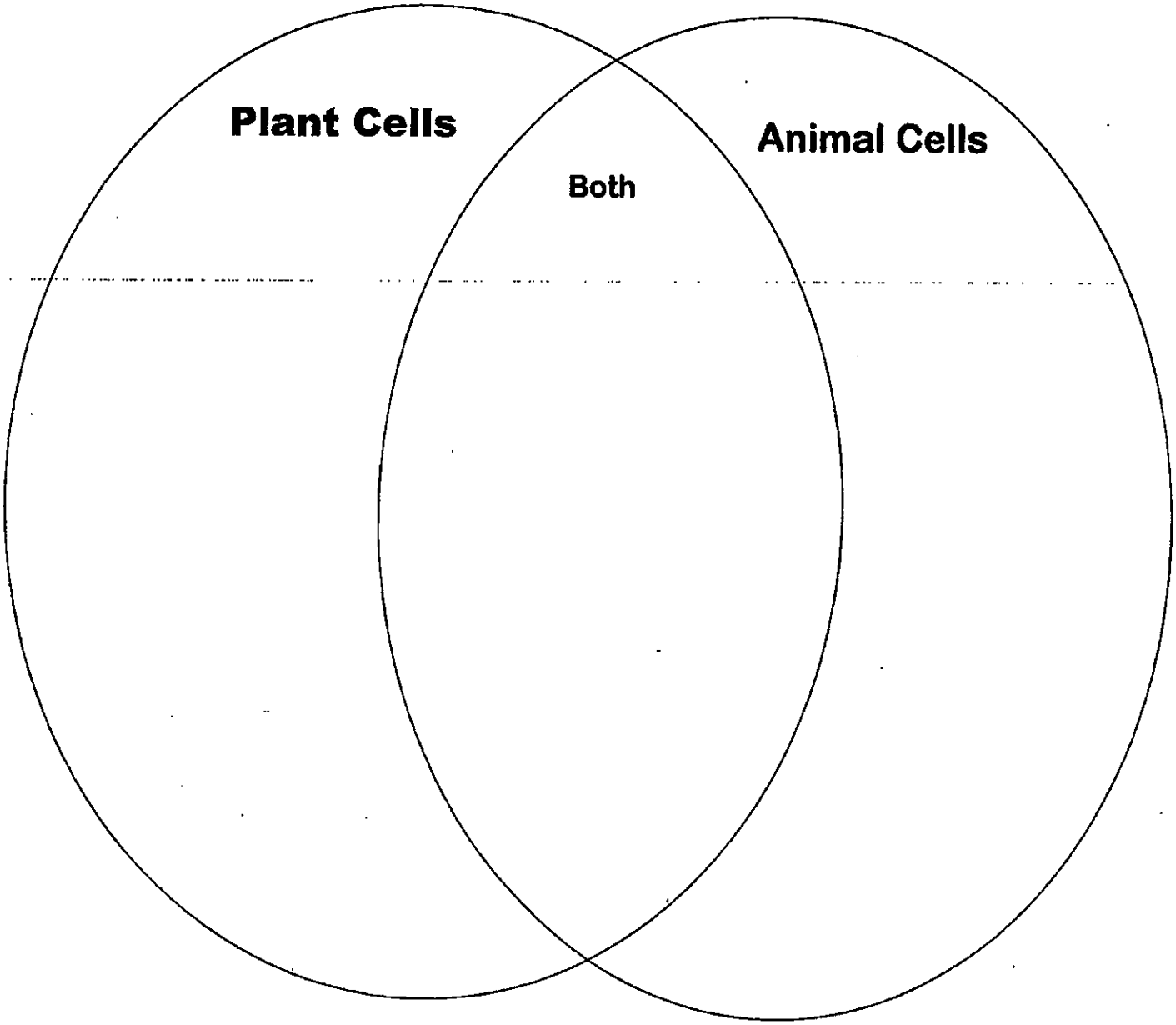
Cell Organelle Table



organelle	Description	Function
	Large, oval and near the center of the cell.	Controls all cell functions, especially reproduction
	Clear Jelly-like substance.	All organelles are suspended in this and all life functions take place here.
	Bean shaped and has inner membranes	Breaks down sugar molecules to make energy.
	Double layer, rigid (stiff), made of cellulose, non-living. Found in all plants.	Gives shape, protection and **support** to cell
	Green, oval shaped structures. Filled with chlorophyll.	Uses energy from the sun to make food for the plant. Does the process of photosynthesis.
	Single lipid layer, semi or selectively permeable	Surrounds the cell, only lets certain materials in and out of the cell.
	Empty chamber in the cell. Can be filled with food, water or waste	Used to store food, water or waste.

Name:_____ (20)

Differences between Plant and animal

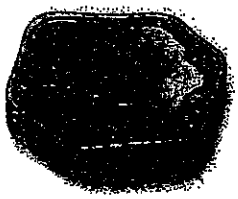


Organelles:

Nucleus	Cell wall	cytoplasm
Nuclear membrane	cell membrane	Large Vacuole
Mitochondria	lysosome	small vacuole
Chloroplast	Golgi bodies	
Ribosome	Nucleolus	

(22)

Name _____ Period _____ Date _____



The Adventures of Microscope Man!

Directions: Read the following story about the adventures of microscope man, an explorer who has journeyed into the inside of a plant cell, and answer the questions that follow.

Just when I thought I could not continue, my axe finally chopped through the last of the thick cellulose of the cell wall. Just inside was a beautiful, thin, glistening membrane that contained a clear, jellylike substance. I was glad my air tank was fully charged. I reached out my hand and pressed on the membrane. It was elastic, like a balloon. I pulled out my hunting knife and sliced a neat slit in the membrane. Jelly began to ooze out. Quickly, I forced myself into the slit and into the ll. I turned and pressed the cut edges together. The membrane sealed instantly.

I pushed my way through the jelly and came to a strange collection of membranes. It looked like large plastic sheets set up to channel the wind, and proteins were flowing down the channels. The end of the membrane channels were smooth, but as I followed them further I began to notice small round objects stuck to the sides of the membrane. Proteins poured out of these round objects. I untangled my arms and legs, shaking them free of the masses of tangled protein strings, and continued on my journey.

As I emerged from the membrane channels, I began to feel an intense heat. I could see a large, bean-shaped organelle nearby. It looked like sugar molecules were entering it. There was some kind of chemical fire inside and small molecules were coming out. The small molecules contained so much energy that it hurt to look at them. I changed directions and swam toward a large, green object to my left.

As I swam toward the green object, I noticed the jelly becoming sweeter and sweeter. Sugar was oozing out of the rough, green organelle. I could see bubbles of carbon dioxide going into the object and a stream of water was entering it on the opposite side. This area of the cell was very bright. As the light hit the green object, all the carbon dioxide and water were energized into a ·rious dance. I couldn't tell what was happening. The light seemed to be changing the water and ·arbon dioxide into something else! Bubbles began to appear, and the jelly suddenly became sweeter. I grabbed a bubble and tasted it. Pure oxygen! I squeezed several bubbles into my air tank and moved closer to my goal.

As I swam along, I suddenly popped through a very thin, almost invisible membrane. Swimming got easier. Instead of jelly, I was swimming in water. After three fast strokes, I plunged through another membrane and back into the jelly.

In the center of the cell, I finally spotted a huge, round object. This object was my goal. The interior of this sphere was very dark and scary looking. I approached, swimming more slowly. It looked barely large enough for me to squeeze through. I forced my feet and legs into the dark interior of the sphere and wiggled my body inside. I moved my shoulders up and down until my arms came free. I used my arms to push on the inside of the sphere. Finally, my head popped free. I turned on my flashlight and looked around. My goal at last!

I moved toward the center of the sphere and located long, coiled molecules. I opened my sample case pouch and took out a pair of scissors. I clipped a long portion of these molecules and stuffed it into my pouch. My commander would be pleased! I dropped my flashlight, sealed my pouch, and forced myself out of the sphere.

I swam toward the outside of the cell in the growing darkness. My journey had taken longer than I had planned. I swam through the jelly until I finally reached the cell membrane. But where was the hole I had made in the cell wall? How could I find it in the dark? How could I escape the cell without my flashlight and my axe?

Questions:

1. What kind of cell was Microscope Man in? How could you tell?

_____

_____

2. What membrane did he cross in paragraph 1? _____

3. What was the jellylike substance that Microscope Man swam through? _____

4. What were the membrane channels and the round objects that were stuck to these channels in paragraph 2?

_____

(24)

5. What was the large, bean-shaped organelle that made energy in paragraph 3?

_____

6. What was the green organelle described in paragraph 4 that made sugar molecules for the cell?

_____

7. In paragraph 5, what was the large water filled organelle that was very easy for Microscope Man to swim through?

_____

8. What was the large round organelle in the center of the cell that Microscope Man was so excited to find?

_____

Bonus!

What were the long, coiled molecules that Microscope Man put into his pouch? Why do you suppose he wanted them?

_____

_____