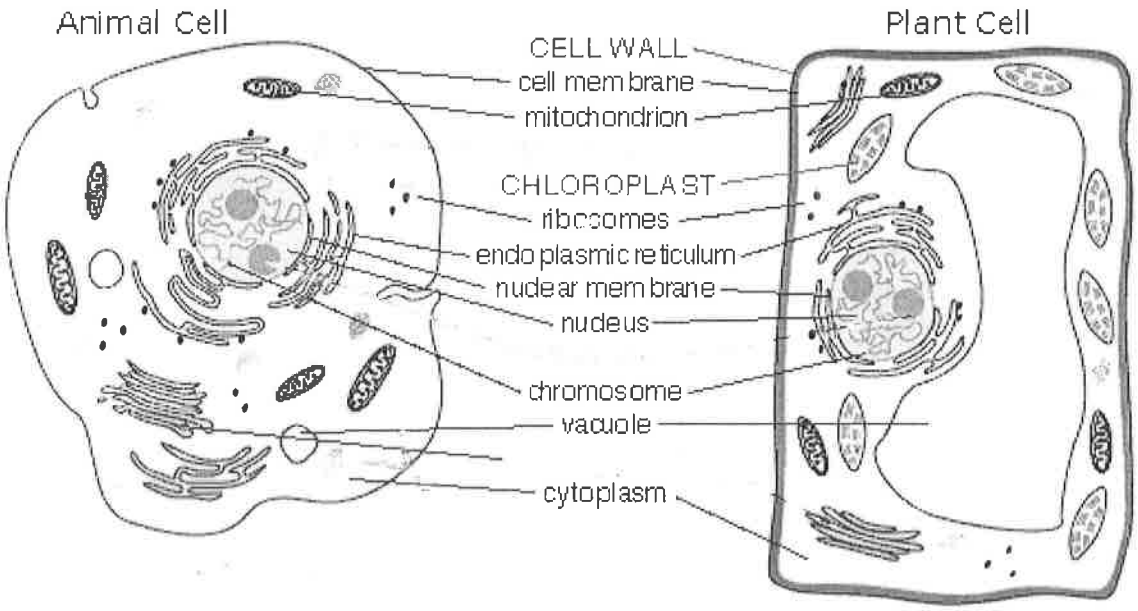
Name _____ Period _____

Due date _____

CELLS

PROJECT



In this project you will examine animal & plant cells and explore some of their cellular processes.

PART 1: PLANT CELL MODELS

DIRECTIONS – Using the **PLASTIC CELL MODELS** in the back of the room, the above diagrams, and your Packet on Cells & Processes, write the name of each labeled cell part below.

ANIMAL CELL

A. _____

B. _____

C. _____

D. _____

PLANT CELL

A. _____

B. _____

C. _____

D. _____

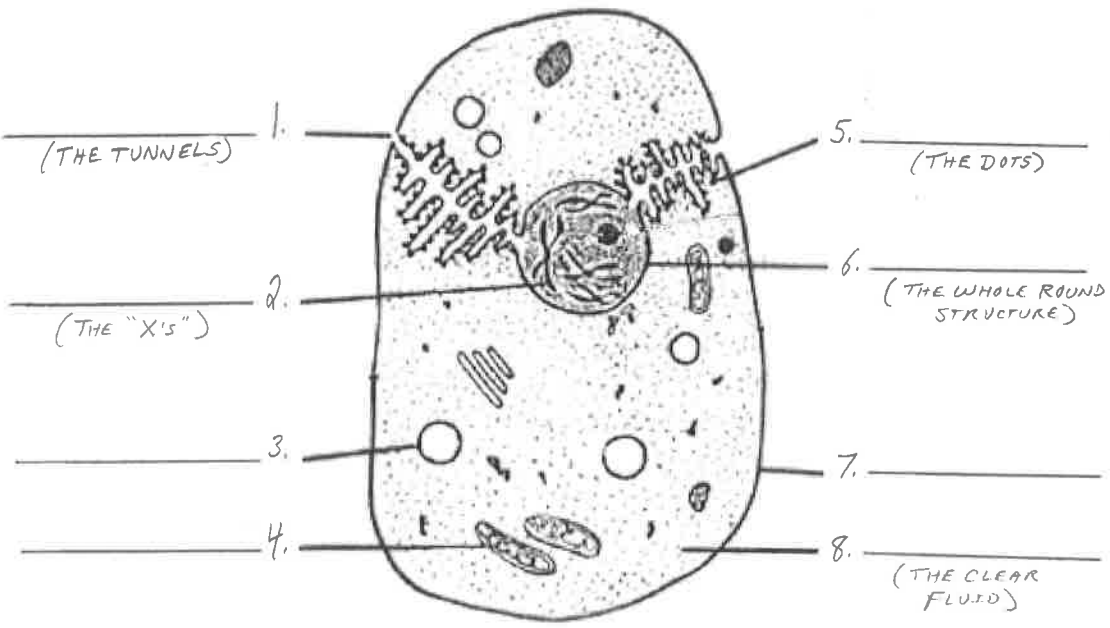
E. _____

F. _____

G. _____

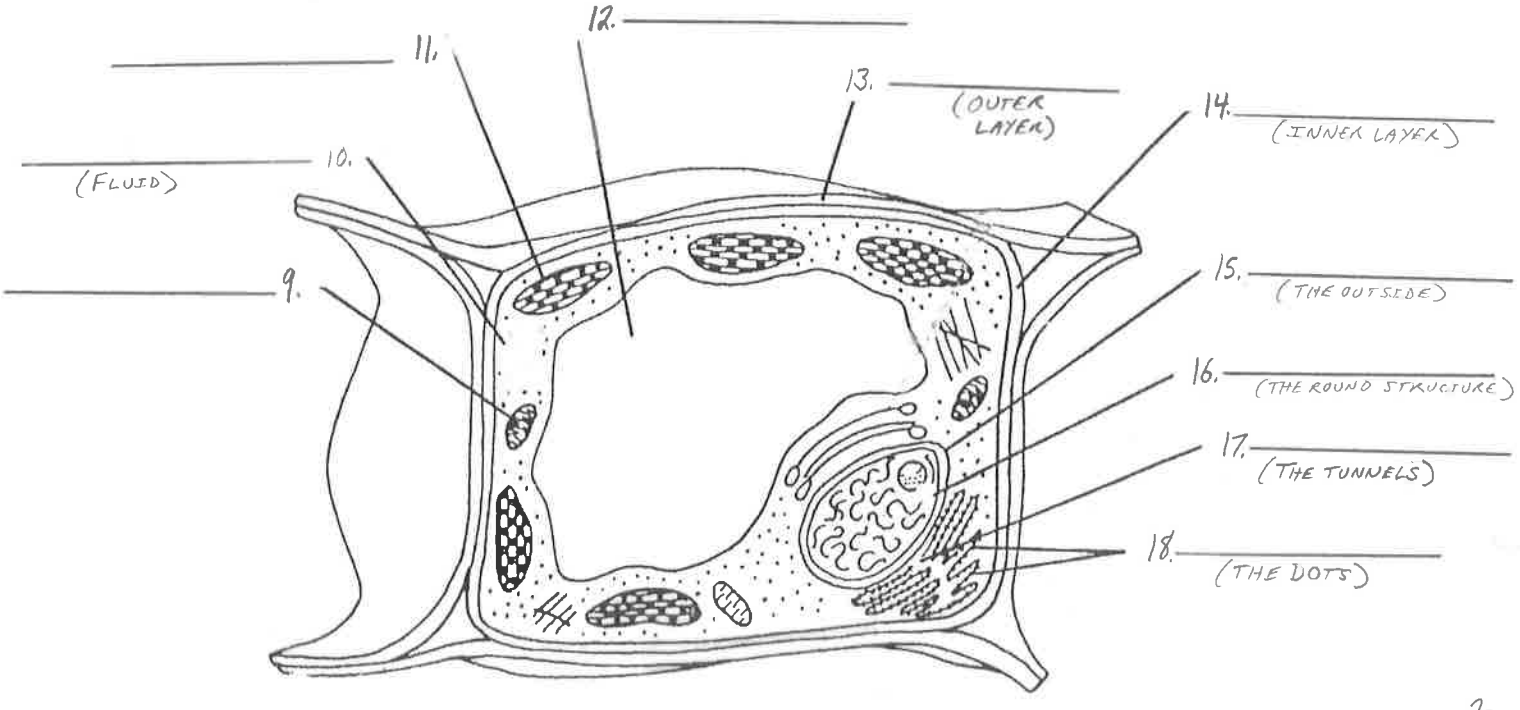
Label the **ANIMAL CELL** using the Word Bank:

Cell membrane
Chromosome
Cytoplasm
Endoplasmic reticulum
Mitochondrion
Nucleus
Ribosome
Vacuole



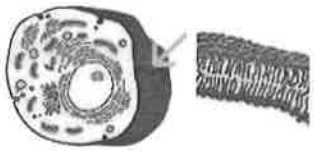
Label the **PLANT CELL** using the Word Bank:

Cell membrane
Cell wall
Chloroplast
Cytoplasm
Endoplasmic reticulum
Mitochondrion
Nuclear membrane
Nucleus
Ribosomes
Vacuole



PART 2: CELLS TABLE

DIRECTIONS – Cut out each picture and function from the last page of this project, then glue them where they belong in the table below. Also, put a checkmark (✓) if the organelle is found in an animal cell and/or a plant cell. The first organelle is done as an example for you.

ORGANELLE	PICTURE	FUNCTION	Check if found in Animal Cell	Check if found in Plant Cell
Cell Membrane		Regulates what enters and leaves the cell	✓	✓
Cell Wall				
Chloroplast				
Chromsomes				
Cytoplasm				

ORGANELLE	PICTURE	FUNCTION	Check if found in Animal Cell	Check if found in Plant Cell
Endoplasmic Reticulum				
Mitochondrion				
Nuclear Membrane				
Nucleus				
Ribosomes				
Vacuole				

PART 3: PRACTICE QUESTIONS

1. Which organelle is the site of cellular respiration?

A) endoplasmic reticulum
B) mitochondria
C) ribosomes
D) chloroplast function

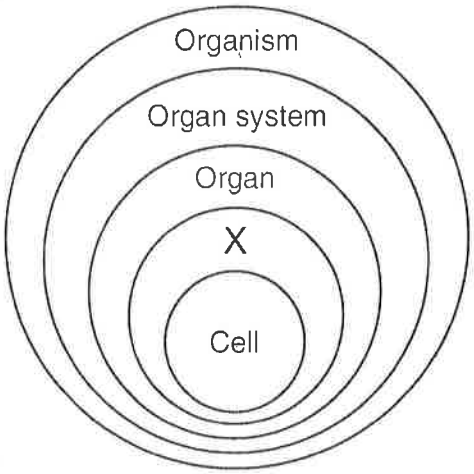
2. Which cell organelle is composed of a series of channels throughout the cytoplasm that functions in the transport of molecules?

A) lysosome
B) chloroplast
C) cell wall
D) endoplasmic reticulum

3. What is the main function of a vacuole in a cell?

A) storage
B) coordination
C) synthesis of molecules
D) release of energy

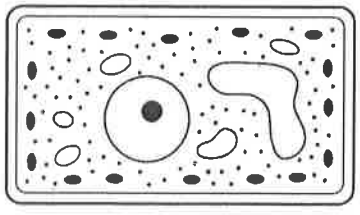
Base your answer to the following question on The diagram below represents levels of organization in living things.



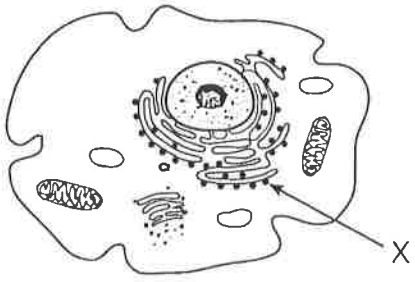
7. Which term would best represent *X*?

A) human
B) tissue
C) stomach
D) chloroplast

Base your answers to questions 4 through 6 on on the information below and on your knowledge of biology. The diagrams represent two different cells and some of their parts. The diagrams are not drawn to scale.



Cell A



Cell B

4. Which statement best describes these cells?

A) Cell B lacks vacuoles while cell A has them.
B) DNA would not be found in either cell A or cell B.
C) Both cell A and cell B use energy released from ATP.
D) Both cell A and cell B produce antibiotics.

5. Identify the organelle labeled X in cell B. _____

6. Identify the organelle in Cell A that is the site of photosynthesis _____

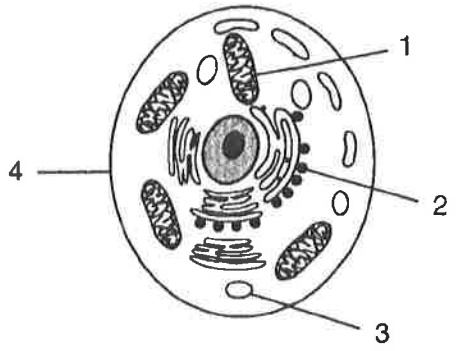
__7.__ Which of the following is listed from SMALLEST to LARGEST structure?

A. Organism, organ system, organ, tissue, cell, organelle
B. Cell, Tissue, organ, organelle, organ system, organism
C. Organelle, cell, tissue, organ, organ system, organism
D. Organism, cell, tissue, organelle, organ, organ system

__8.__ Cell membranes are said to be selectively permeable. Which statement best explains what selectively permeable means?

(1) The cell membrane prevents any harmful substance from entering the cell.
(2) The cell membrane lets certain substances enter the cell and keeps certain substances out of the cell.
(3) The cell membrane allows only large molecules to diffuse into the cell.
(4) The cell membrane has pores that let only water and glucose into the cell and carbon dioxide out.

__9.__ Within which structure shown in the diagram below are energy-rich organic compounds used to produce ATP?

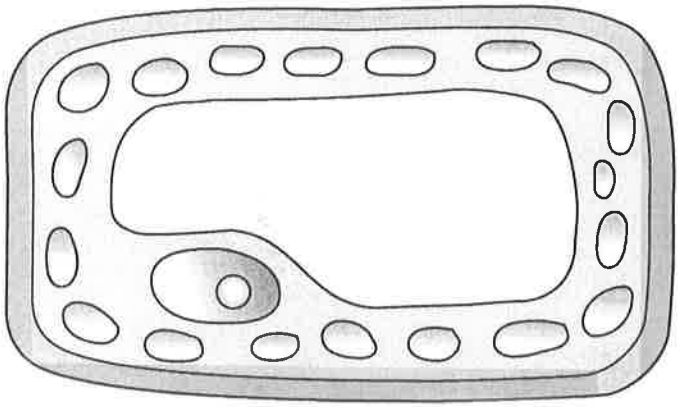


A) 1 B) 2 C) 3 D) 4

__10.__ The nucleus is the cell as

A) the bones are to a human
B) the heart is to human
C) the muscles are to a human
D) the brain is to a human

__12.__ Draw an arrow to indicate, *one* part of the plant cell below that would *not* be found in an animal cell. The tip of the arrow must touch the part being identified.



__13.__ In a multicellular organism, organs carry out a variety of life functions. In a single-celled organism, these functions are performed by

A) tissues B) organelles
C) organ systems D) organs

__11.__ Which row in the chart below contains a cell structure paired with its primary function?

Row	Cell Structure	Function
(1)	ribosome	protein synthesis
(2)	vacuole	production of genetic information
(3)	nucleus	carbohydrate synthesis
(4)	mitochondrion	waste disposal

A) 1 B) 2 C) 3 D) 4

PART 4: ONLINE VIDEOS

DIRECTIONS – Watch each of the following YOUTUBE video clips and answer the corresponding questions.

"Introduction to Cells" (2:55) Frank Gregorio

_____ 1. How many sizes and shapes of cells are there?

A. Dozens B. Hundreds C. Thousands

_____ 2. How many cells does the human body have?

A. Over 100 of them B. Over 100 million of them C. Over 100 trillion of them

_____ 3. Our cells undergo over 500 quadrillion chemical reactions every

A. Second B. Hour C. Day

4. TRUE or FALSE: Our science barely understands cells _____

"GCSE Science Revision – Cells" (7:03) JamJarMMX

_____ 5. Which structure controls what goes into and out of the cell?

A. Cell wall B. Cell membrane C. Cytoplasm

_____ 6. What does the nucleus do?

A. Controls what the cell does
B. Speeds up chemical reactions
C. Fills up the cell

_____ 7. What does it mean that cells are "specialized?"

A. They are found in different places
B. They have different jobs
C. They come in different colors

_____ 8. Which structure in a plant cell contains the cell sap?

A. Cell wall B. Vacuole C. Chloroplast

_____ 9. Which structure in a plant cell helps it keep a rigid shape?

A. Cell wall B. Vacuole C. Chloroplast

_____ 10. Which structure in a plant cell enables it to make its own food?

A. Cell wall B. Vacuole C. Chloroplast

11. FILL-IN-THE-BLANKS:

DIFFUSION – Movement of a substance from an area of _____ concentration to an area of _____ concentration

_____ 12. Which substances are too large to fit through the cell membrane?

A. Glucose & oxygen B. Starch & protein

13. Fill in the missing term: Cells → _____ → Organs → Organ System → Organisms

****** STOP the video at 6:00 minutes ******

"Human Body Cells Tissues and Skin" (22:59) qprmarsh

14. Which is bigger? (circle one) SPERM CELL NERVE CELL

15. TRUE or FALSE: Ameba and paramecium are single celled organisms _____

_____ 16. What is the other term for the "plasma membrane?"

A. Cell membrane B. Cell wall C. Endoplasmic Reticulum

_____ 17. What is the semi-fluid liquid that surrounds the organelles?

A. Nucleus B.Mitochondria C. Cytoplasm

_____ 18. What are the big transporter molecules in the cell membrane made of?

A. Glucose B. Starch C. Protein

_____ 19. What is it called when diffusion causes molecules to spread out equally?

A. Equilibrium B. Osmosis C. Active transport

_____ 20. In which direction do oxygen molecules move?

A. Outside the cell to inside B. Inside the cell to outside

_____ 21. In which direction to carbon dioxide molecules move?

A. Outside the cell to inside B. Inside the cell to outside

****** SKIP from 7:00 minutes to 11:30 ******

_____ 22. The endoplasmic reticulum is a series of

A. Spikes B. Hairs C. Canals

_____ 23. Ribosomes are responsible for synthesizing

A. Proteins B. Starches C. Fats

_____ 24. Mitochondria supply the cell with

A. Glucose B. ATP energy C. Proteins

_____ 25. DNA in the nucleus condenses into

A. Cytoplasm B. Chromosomes C. Chloroplasts

_____ 26. What is the end result of all the stages of mitosis?

A. 2 daughter cells with identical genes B. Sperm & egg cells with different genes

_____ 27. What is it called when different genes get expressed in different cells?

A. Meiosis B. Differentiation C. Mitosis

_____ 28. The skin is a(an): A. Cell B. Tissue C. Organ

_____ 29. Melanocyte cells produce the pigment

A. Melanin B. Chlorophyll C. Keratin

30. TRUE or FALSE: Cells, tissues, and organs are interdependent _____

PART 5: DIFFUSION & OSMOSIS

DIRECTIONS - Read each passage below, answer the corresponding questions, then perform the activities.

A water solution that contains nutrients, wastes, gases, salts and other substances surrounds cells. This is the **external environment** of a cell. The cell's outer surface of the cell (plasma) membrane is in contact with this external environment, while the inner surface is in contact with the cytoplasm. Thus, the cell membrane controls what enters and leaves the cell.

The membrane permits the passage of some materials, but not all. The cell membrane is said to be **selectively permeable**. Small molecules, for example, may pass through the membrane. If no energy is required for substances to pass through the membrane, the process is called **passive transport**. We will discuss two examples of passive transport in this tutorial: **diffusion** and **osmosis**.

1. In the space below, draw a cell. LABEL:
   - Cell (plasma) membrane
   - External environment
   - Internal environment
   - Cytoplasm

Diffusion

Although you may not know what diffusion is, you have experienced the process. Can you remember walking into the front door of your home and smelling a pleasant aroma coming from the kitchen? It was diffusion of molecules from the kitchen to the front door of the house that allowed you to detect the odors.

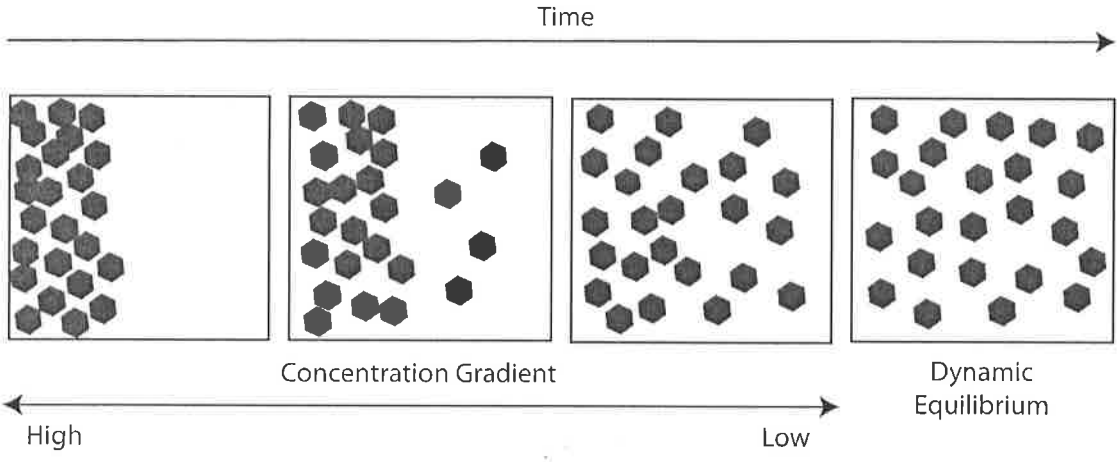
Diffusion is defined as the net movement of molecules from an area of greater concentration to an area of lesser concentration.

The molecules in a gas, a liquid or a solid are in constant motion due to their **kinetic energy**. Molecules are in constant movement and collide with each other. These collisions cause the molecules to move in random directions. Over time, however, more molecules will be propelled into the less concentrated area. Thus, the net movement of molecules is always from more tightly packed areas to less tightly packed areas. Many things can diffuse. Odors diffuse through the air, salt diffuses through water and nutrients diffuse from the blood to the body tissues.

2. Diffusion is the movement of molecules from _____ concentration to
   (lesser, greater)
   an area of _____ concentration.
   (lesser, greater)

3. Name 3 items listed that diffuse: _____ _____ _____

This spread of particles through random motion from an area of high concentration to an area of lower concentration is known as diffusion. This unequal distribution of molecules is called a **concentration gradient**. Once the molecules become uniformly distributed, **dynamic equilibrium** exists. The equilibrium is said to be dynamic because molecules continue to move, but despite this change, there is no net change in concentration over time. Both living and nonliving systems experience the process of diffusion. In living systems, diffusion is responsible for the movement of a large number of substances, such as gases and small uncharged molecules, into and out of cells.



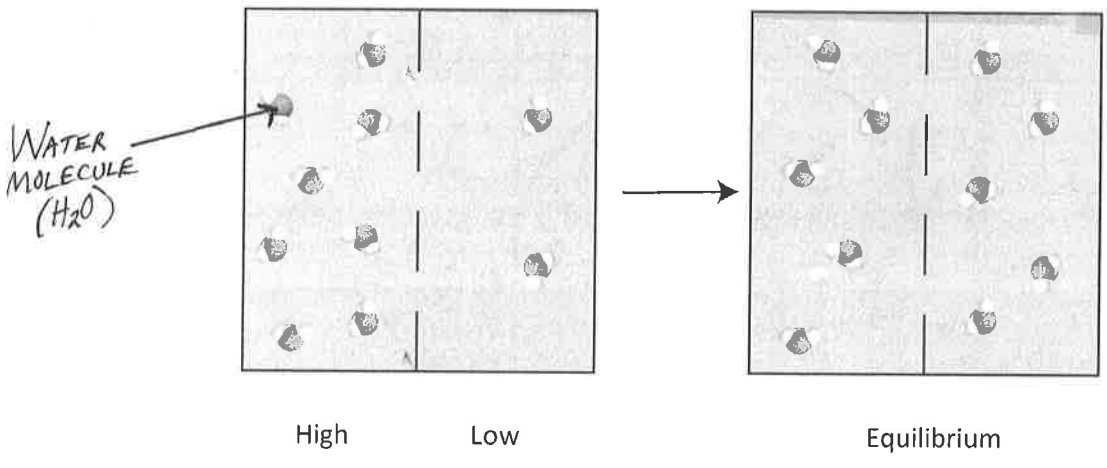
4. TRUE or FALSE: Once the molecules have diffused equally, all movement stops _____

5. MATCHING:

_____ Selectively permeable	A. An unequal distribution of molecules
_____ Concentration gradient	B. A membrane that allows passage of some materials, but not all
_____ Dynamic equilibrium	C. Molecules move without any net change in concentration over time

Osmosis

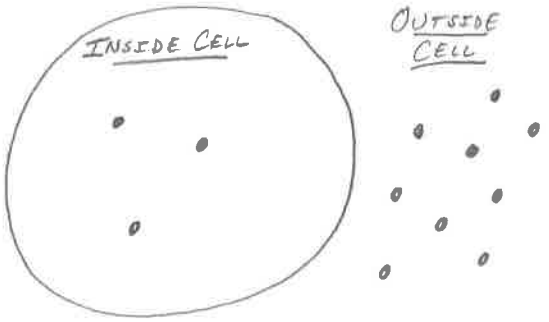
Osmosis is a specific type of diffusion; it is the passage of water from a region of high water concentration through a semi-permeable membrane to a region of low water concentration.



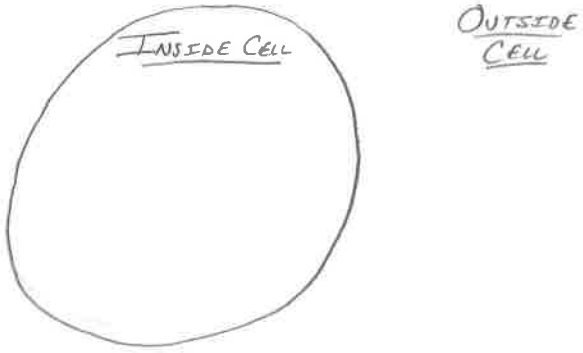
6. TRUE or FALSE: Osmosis is the diffusion of water _____

7. Using the cell below, draw the # of water molecules inside the cell, and outside the cell, once dynamic equilibrium has been reached.

BEFORE



DYNAMIC EQUILIBRIUM



_____ 8. Diffusion and osmosis require no ATP energy so they are called:

A. Active transport
B. Energy transport
C. Lazy transport
D. Passive transport

ACTIVITY: WATCHING DIFFUSION

1. **Fill the small glass beaker with water and let the beaker stand until the water is very still.**

2. **Carefully add one drop of food coloring to the surface of the water. Observe what happens.**

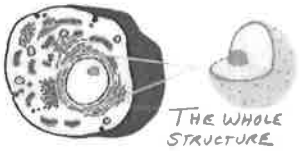
3. **Draw what happens in the beakers below:**

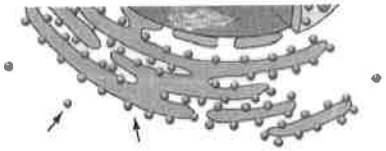
IMMEDIATELY

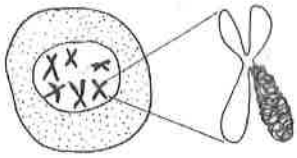
AFTER 2 MINUTES

AFTER 5 MORE MINUTES

CUT-OUT PICTURES & FUNCTIONS FOR PART 2







Genetic information for making the organism

Storage area for water

Contains green chlorophyll to do photosynthesis

Jelly-like fluid of the cell that holds organelles

Surrounds the nucleus

Controls the cell

System of tunnels for transport of materials

Supports the cell

Does cellular respiration to make ATP energy

Synthesize proteins like hair & enzymes