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| **Regents**  **Biology**  Off Site  Learning Packet  Assignment #1: \_\_\_\_\_  Assignment #2: \_\_\_\_\_  Assignment #3: \_\_\_\_\_  Assignment #4: \_\_\_\_\_  Assignment #5: \_\_\_\_\_  Assignment #6: \_\_\_\_\_  Crossword Puzzle: \_\_\_\_\_ | **North Salem High School**  **MISSION**: *Engage students to continuously learn, question, define and solve problems through critical and creative thinking.*  **Cell**  **Transport**  *(pp.77 - 90)* | |
| ***If you have any problems – please sign up for extra help after school.*** | | **Collea / Sharpe**  **Room W-19** |

**Assignment #1**

Go to Collea’s Corner to watch the video Homeostasis by the Amoeba Sisters video and then answers the questions that follow.



# *Homeostasis*

# - Amoeba Sisters

**1.** Define the term **HOMEOSTASIS** in your own words.

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**2.** This video places a lot of emphasis on the importance of the cell membrane in maintaining homeostasis. Based upon your definition of homeostasis above, why is the cell membrane so important for maintaining homeostasis?

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**3.**  Your body, which contains billions of cells, must maintain homeostasis. Cells make up tissues in your body. Tissues make up organs in your body. The organs in your body make up different organ systems that have to work together to maintain homeostasis. In space below, write how your body would respond in order to maintain homeostasis in the scenarios listed.

**(a)** You are outside on a very cold day, and you have no coat. You feel very cold!

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**(b)** You went out running on a hot day. After your run, you sit down and feel very warm.

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**Assignment #2**

**Directions**: Read pages **90 - 94** in your textbook and then answer the following questions.

**1.** What substances pass easily through the cell membrane and WHY?

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**2.** Define each of the following terms:

**(a) permeability** - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**(b) diffusion** - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**(c) concentration gradient -** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Assignment #3**

Go to Collea’s Corner to watch the below mentioned Ted-Ed video and then answers the questions that follow.

# *Making Waves: The Power of Concentration Gradients*

# - Sasha Wright

**Background Information:**

The constant motion of our oceans represents a vast and complicated system involving many different drivers. Sasha Wright explains the physics behind one of those drivers known as **concentration gradients** - and illustrates how our oceans are continually engaging in a universal struggle for space and **equilibrium**

**1.** Define *equilibrium*.

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**2.** What effect does hot and warm temperatures have on the movement of molecules?

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**3.** What happens to the oxygen in the air we breathe in?

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**4.** Substances in nature tend to move -

**(a)** from low to high concentration. **(c)** randomly regardless of concentration.

**(b)** from high to low concentration. **(d)** not at all – substances don’t move.

**Assignment #4**

Go to Collea’s Corner to watch the below mentioned Ted-Ed video and then answers the questions that follow.

***Insights into Cell Membranes via Dish Detergent***

- Ethan Perlstein

**Background Information:**

The cell membrane, like a good jacket, protects the cell from everything outside of it. How is it simultaneously sturdy, flexible, and capable of allowing the right things to pass through? Ethan Perlstein rediscovers the scientists and their research that have changed the way we study the membrane and the cell as a whole.

**1.** Every cell in your body is separated from the cells around it by its outer most layer called the -

**(a)** cell wall. **(b)** mitochondria. **(c)** cell membrane. **(d)** ribosome.

**2.** What were Gorter and Grendel trying to prove?

**(a)** Red blood cells are constructed as a bilayer

**(b)** Every species of animal has a distinct monolayer or bilayer construction of their red blood cells.

**(c)** When a red blood cell bilayer is "unstacked," it yields a monolayer twice its size

**(d)** Both A and C

**3.** A cell membrane's construction can be likened to a metal jacket. It's strong and sturdy, keeping all the contents of a cell securely in tact.

**(a)** True **(b)** False

**4.** In the space below, draw, color and label a picture of a cell membrane.

*(Look at question 7 in Assignment 3 for assistance.)*

**Assignment #5**

Go to Collea’s Corner to watch the video below and then answers the questions that follow.



# *Biomolecules*

# - Amoeba Sisters

**1.** List the four biomolecules discussed in this video:

**(a)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(c)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(b)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(d)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2.** **Monomers** are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**3.** Foods heavy in carbohydrates are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**4.** **Carbohydrates** are an important source of quick \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**5.** The monomers that are the building blocks of carbohydrates are called –

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**6.** **Lipids** are also known as \_\_\_\_\_\_\_\_\_\_.

**7.** The 2 building blocks that make up lipids are: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**8.** Examples of lipids include \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**9.** Lipids, like blubber are great for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**10.** Lipids are also a great source of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**11.** Lipids also make up \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**12.** The monomers of proteins are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**13.** **Proteins** are used in the development of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**14.** Other functions of proteins include:

**(a)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(b)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**15.** \_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_ codes for proteins.

**16.** The two types of Nucleic Acids are \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_.

**17.** The monomers of nucleic acids are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Biomolecules Summary:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Biomolecule** | **Monomers (Building Blocks)** | **Function(s)** | **Example (s)** |
| **Carbohydrates**  *(polysaccharides)* |  |  |  |
| **Lipids (fats)** |  |  |  |
| **Proteins**  *(polypeptides)* |  |  |  |
| **Nucleis Acids** |  |  |  |

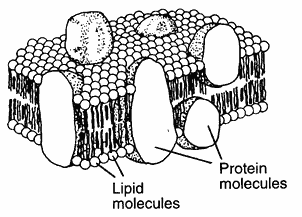
**Assignment #6**

**Directions**: Answer each of the following questions as accurately as possible

**\_\_\_1.** Which structure is most directly responsible for maintaining homeostasis in all cells?

**(a)** chloroplast **(c)** cell membrane

**(b)** mitochondria **(d)** cell wall



**\_\_\_2.** Which cell structure is represented by

the three-dimensional diagram to the

right?

**(a)** chloroplast

**(b)** mitochondria

**(c)** plasma membrane

**(d)** chromosome

**\_\_\_3.** The fluid-mosaic model of the cell membrane suggests that the membrane is primarily composed of -

**(a)** proteins and starches. **(c)** carbohydrates and lipids.

**(b)** sugars and proteins. **(d)** proteins and lipids.

**\_\_\_4.** Which statement regarding the functioning of the cell membrane of all organisms is **not** correct?

**(a)** The cell membrane forms a boundary that separates the cellular contents from the outside environment.

**(b)** The cell membrane is capable of receiving and recognizing chemical signals.

**(c)** The cell membrane forms a barrier that keeps all substances that might harm the

cell from entering the cell.

**(d)** The cell membrane controls the movement of molecules into and out of the cell.

**\_\_\_5.** A secondary function of cell membranes in humans is the -

**(a)** synthesis of the amino acids. **(c)** production of energy.

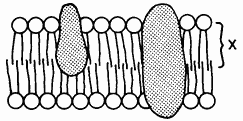
**(b)** replication of genetic material. **(d)** recognition of certain chemicals.

**\_\_\_6.** In the human body, oxygen is absorbed by the lungs and nutrients are absorbed by the small intestine. In a single-celled organism, this absorption directly involves the -

**(a)** nucleus . **(c)** chloroplasts.

**(b)** cell membrane. **(d)** chromosomes.

**\_\_\_7.** The diagram below represents a section of a plasma membrane.

 What does structure X represent?

**(a)** a protein

**(b)** glucose

**(c)** a lipid

**(d)** glycogen

**\_\_\_8.** Plasma membranes are selectively permeable. This means that -

**(a)** anything can pass into or out of a cell

**(b)** the plasma membrane allows some substances to enter or leave a cell more easily than others.

**(c)** glucose cannot enter the cell.

**(d)** the plasma membranes must be very thick.

**\_\_\_9.** Which of the following statements regarding membrane function is *false*?

**(a)** The plasma membrane forms a selective barrier around the cell.

**(b)** The plasma membrane plays a role in signal transduction.

**(c)** The plasma membrane has receptors for chemical messages.

**(d)** The plasma membrane is the control center of the cell.

**\_\_\_10.** Oxygen crosses a plasma membrane by -

**(a)** osmosis. **(c)** active transport.

**(b)** pinocytosis. **(d)** passive transport.

**\_\_\_11.** Osmosis can be defined as -

**(a)** the diffusion of water. **(c)** the diffusion of glucose.

**(b)** the diffusion of fats. **(d)** the diffusion of salt.

**\_\_\_12.** You are adrift in the Atlantic Ocean, and, being thirsty, drink the surrounding seawater. As a result -

**(a)** you quench your thirst. **(c)** your cells become turgid.

**(b)** you dehydrate yourself. **(d)** your cells lyse from excessive water intake.

**\_\_\_13**. Which of the following processes can move a substance against its concentration gradient?

**(a)** osmosis **(c)** passive transport

**(b)** diffusion **(d)** active transport

**\_\_\_14.** The process of a white blood cell engulfing a bacterium is called -

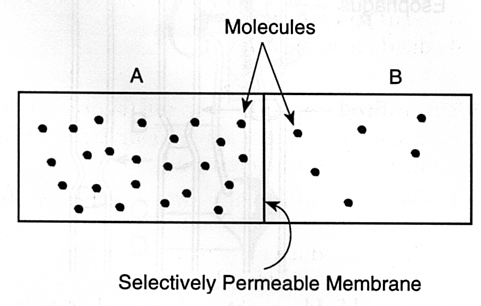
**(a)** diffusion. **(c)** pinocytosis.

**(b)** osmosis. **(d)** phagocytosis.

**\_\_\_15.** Phagocytosis is to eating as pinocytosis is to -

**(a)** osmosis. **(c)** drinking.

**(b)** chewing. **(d)** lysis.

 Base your answers to questions 16 - 18 on the diagram below shows the same type of molecule in area A and area B.

**\_\_\_16.** This movement of molecules from area A to area B is the result of the process of -

**(a)** osmosis. **(c)** passive transport.

**(b)** diffusion. **(d)** active transport.

**\_\_\_17.** This movement of molecules from side B to Side A is the result of the process of -

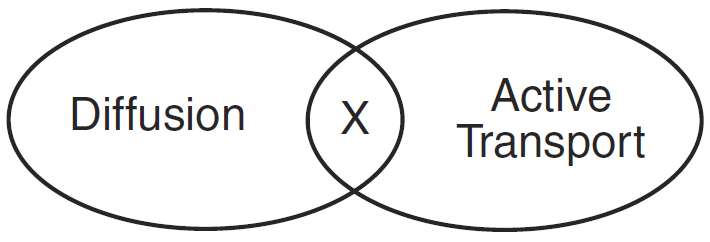
**(a)** osmosis. **(c)** passive transport.

**(b)** diffusion. **(d)** active transport.

**\_\_\_18.** This movement of molecules from side B to Side A requires -

**(a)** sunlight. **(d)** salt

**(b)** water. **(d)** ATP

**\_\_\_19.** The diagram below represents two processes that occur in organisms.

A characteristic that the two processes have in common is that each process -

**(a)** uses ATP. **(c)** requires enzymes.

**(b)** uses oxygen. **(d)** moves molecules.

**\_\_\_20.** Molecules A and B come in contact with the cell membrane of the same cell. Molecule A passes through the membrane readily, but molecule B does not.

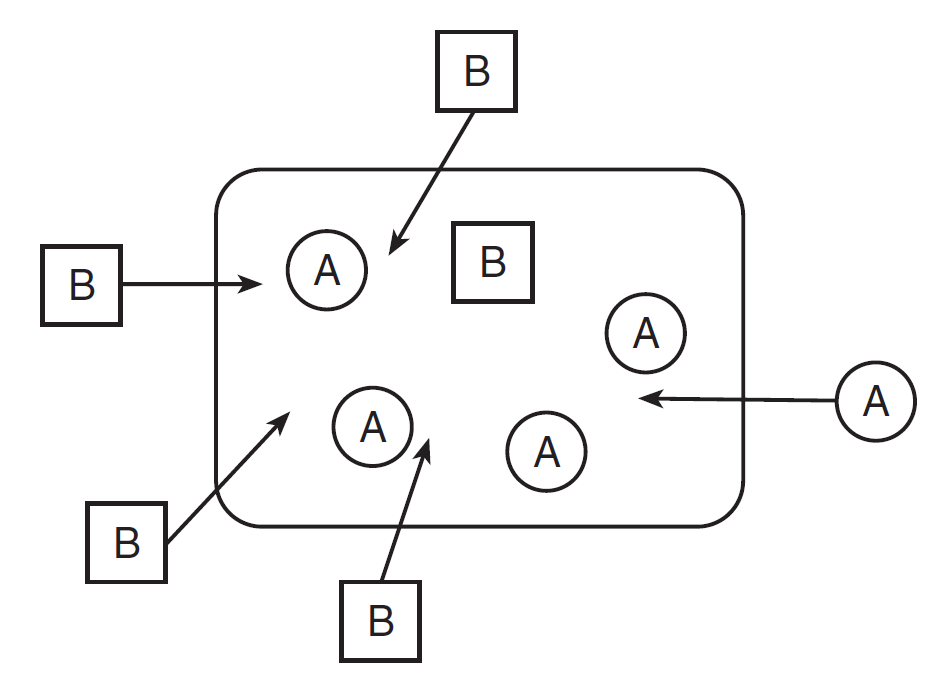
Which statement could describe molecules A and B?

**(a)** Molecule A is a protein, and molecule B is a fat.

**(b)** Molecule A is a starch, and molecule B is a simple sugar.

**(c)** Molecule A is an amino acid, and molecule B is a simple sugar.

**(d)** Molecule A is a simple sugar, and molecule B is a starch.

Base your answers to questions **21 - 23** on

the diagram to the right representing a cell and

molecules A and B in its environment.

**\_\_\_21.** ATP is most likely being used for -

**(a)** substance A to enter the cell.

**(b)** substance B to enter the cell.

**(c)** both substances to enter the cell.

**(d)** neither substance to enter the cell.

**\_\_\_22.** This movement of molecules B is the result of the process of -

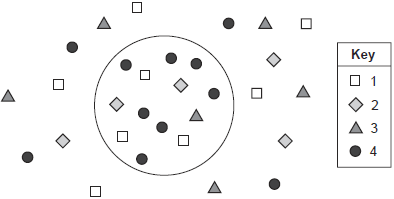
**(a)** osmosis. **(c)** passive transport.

**(b)** diffusion. **(d)** active transport.

**\_\_\_23.** This movement of molecules A is the result of the process of -

**(a)** osmosis. **(c)** passive transport.

**(b)** diffusion. **(d)** active transport.

Base your answers to questions **24 – 26**

on the diagram to the right representing a

cell and some molecules in its environment.

**\_\_\_24.** Which molecule(s) would require

the use of energy in order to be brought into the cell?

**(a)** 1 only **(c)** 2 and 3

**(b)** 1 and 2 **(d)** 4 only

**\_\_\_25.** Which molecule(s) would not require the use of energy in order to be brought into the cell?

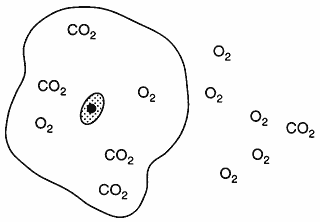
**(a)** 1 **(b)** 1 and 2 **(c)** 1, 2 and 3 **(d)** 1, 2, 3 and 4

**\_\_\_26.** Which molecule(s) would require the use of energy in order to be brought out of the cell?

**(a)** 1 **(b)** 1 and 2 **(c)** 1, 2 and 3 **(d)** 1, 2, 3 and 4

**\_\_\_27.** Which molecule(s) would not require the use of energy in order to be brought out of the cell?

**(a)** 1 **(b)** 1 and 2 **(c)** 3 and 4 **(d)** 4 only



**\_\_\_28.** The diagram to the right represents a cell in water. Formulas of molecules that can move freely across the cell membrane are shown. Some molecules are located inside the cell and others are in the water outside the cell.

Based on the distribution of these molecules, what would most likely happen after a period of time?

**(a)** The concentration of O2 will increase inside the cell.

**(b)** The concentration of CO2 will remain the same inside the cell.

**(c)** The concentration of O2 will remain the same outside the cell.

**(d)** The concentration of CO2 will decrease outside the cell.

**Crossword Puzzle**