

Anatomy/Physiology

THE CELL PACKET

NAME: _____

DUE: _____

The enclosed packet consists of 4 sections/activities, WHICH ARE ALL DUE ON THE DATE ABOVE.

The 4 sections are as follows:

- (1) Section 2-2 “HOW THE CELL OPERATES”
- (2) Section 2-4 “THE ANATOMY OF THE CELL”
- (3) DIFFUSION AND OSMOSIS
- (4) Quick Lab “HOW CAN YOU MODEL PERMEABILITY IN CELLS?”

YOU CAN START WORKING ON SECTIONS 1-3 NOW! You will need colored pencils for sections 1 and 2. All the information you need is in your notes or in the packet itself.

WE WILL COMPLETE SECTION 4 ON THURSDAY, 9/8/11.

You will complete the Quick Lab in class. After completing the activity in section 4, you will be able to answer the questions in section 4.

IF YOU HAVE ANY QUESTIONS, OR NEED MY HELP, PLEASE DO NOT HESITATE TO ASK!

(SECTION 1)

2-2. HOW THE CELL OPERATES

Instructions: (1.) Read the text carefully. (2.) Complete the project. (3.) Use the text and the project to help you to answer the questions.

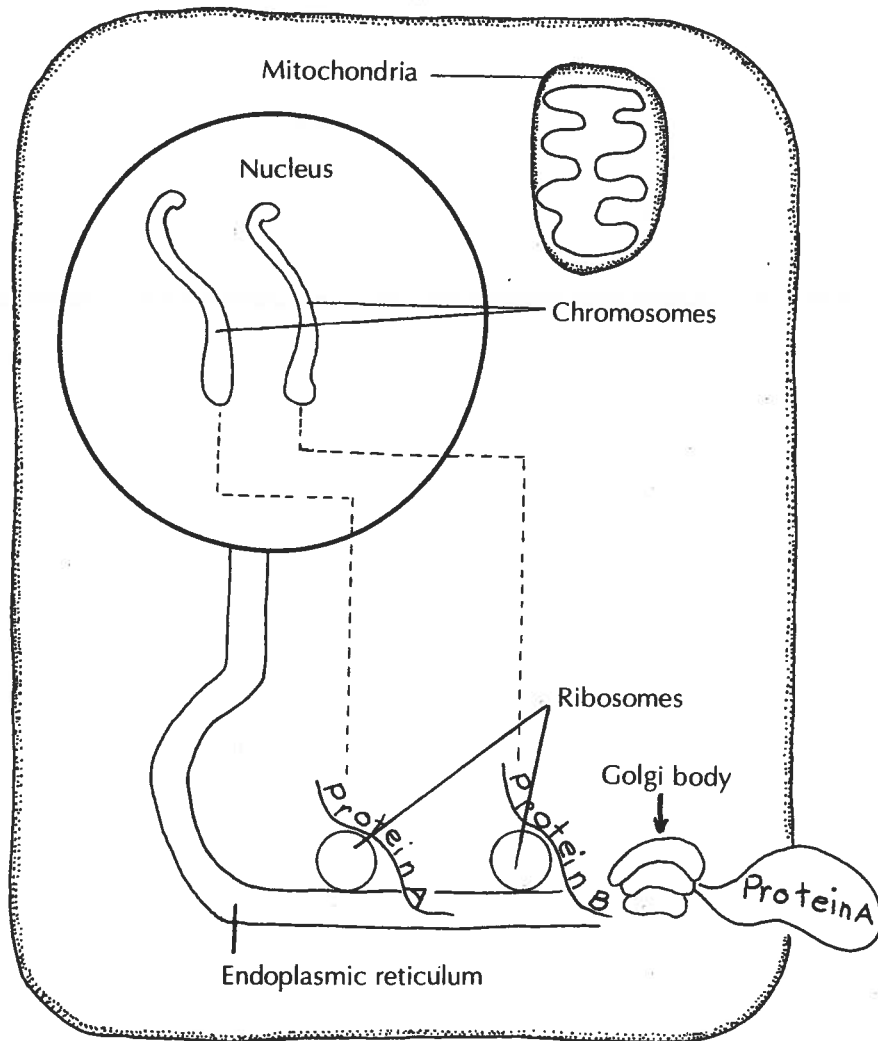


Diagram A

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Many cells in your body act like factories, assembling molecules into various beneficial secretions. The cells that line your mouth, for example, assemble molecules into the slippery mucus that prevents bacteria and other germs from entering your body.

Diagram A shows an actual cell that produces molecules for the body. Diagram B shows a factory—a make-believe cell—in which a computer, power plant, and robots are used to represent actual structures in a real cell. By comparing Diagram A with Diagram B, you will learn how the organelles of an actual cell work together to produce molecules for the body.

2-2. HOW THE CELL OPERATES, continued

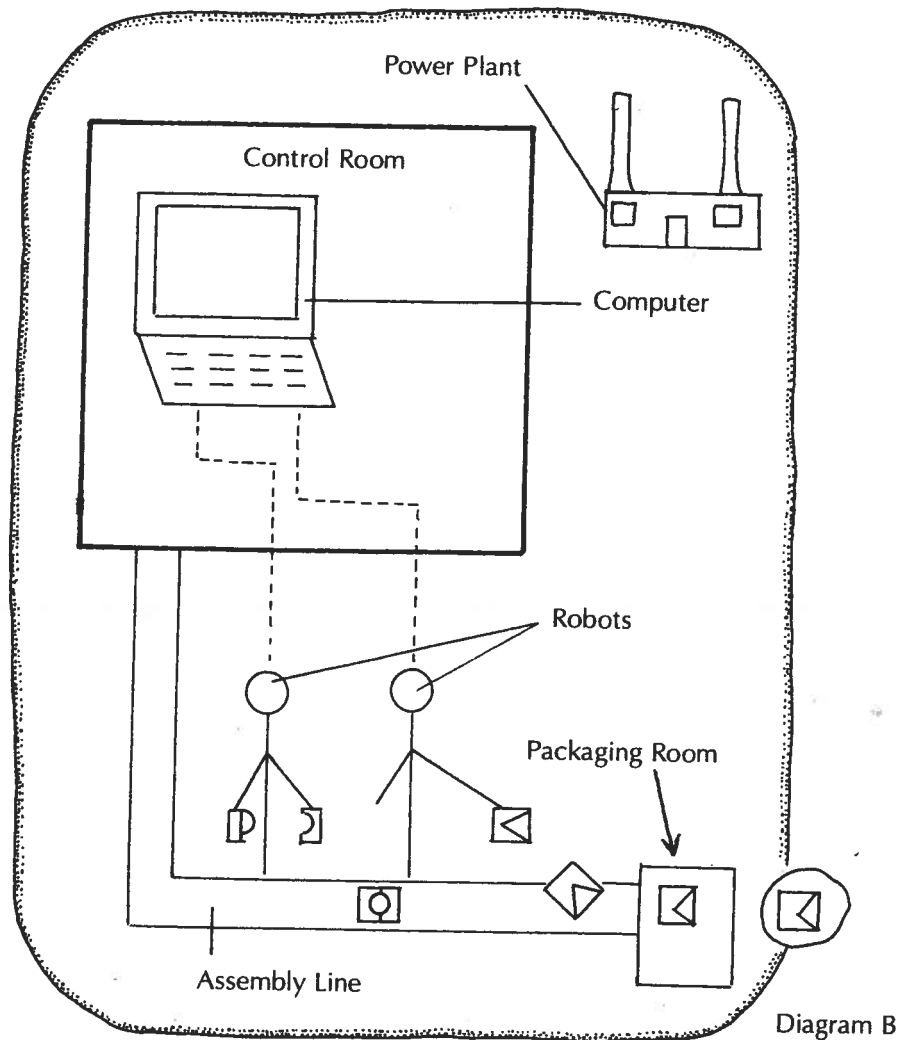


Diagram B

To complete this project—

Obtain a set of map pencils and use them to color-code Diagrams A and B as follows:

- In Diagram A, color the chromosomes orange.
- In Diagram B, color the computer orange.
- In Diagram A, color the nucleus brown.
- In Diagram B, color the control room brown.
- In Diagram A, color the mitochondria yellow.
- In Diagram B, color the power plant yellow.
- In Diagram A, color the endoplasmic reticulum blue.
- In Diagram B, color the assembly line blue.
- In Diagram A, color the ribosomes green.
- In Diagram B, color the robots green.
- In Diagram A, color the Golgi body red.
- In Diagram B, color the packaging room red.

2-2. HOW THE CELL OPERATES , continued

Level One Questions:

1. How did you show that the organelles in Diagram A are similar to the structures in Diagram B?

2. Do the mitochondria and the power plant have similar functions? (*Hint: match the colors.*)

3. The job of the power plant is to produce energy for the factory. If the mitochondrion has a similar function, what is its job?

4. Which structures in Diagram A are similar to the computer in Diagram B?

5. Which organelles in Diagram A are similar to the robots in Diagram B?

6. If the job of the computer is to control the robots, what do the chromosomes control?

7. If the job of the robots is to make boxes, what do the ribosomes produce?

8. Which organelle in Diagram A is similar to the packaging room in Diagram B?

9. If the job of the packaging room is to wrap the boxes so that they can leave the factory, what is the job of the Golgi body?

10. To reach the packaging room, the boxes travel on the assembly _____; to reach the Golgi body in the actual cell, the chemicals must travel through the _____.

2-2. HOW THE CELL OPERATES , continued

Level Two Question:

11. Complete the chart by placing a check in the box that shows the function of the organelle.

STRUCTURE	STORES INFORMATION	RELEASES ENZYMES	CONTROL CENTER	TRANSPORTS MATERIALS	ASSEMBLES PROTEINS	PACKAGES MATERIALS
NUCLEUS						
CHROMOSOME						
ENDOPLASMIC RETICULUM						
GOLGI BODY						
LYSOSOME						
RIBOSOME						

ONLY ONE FUNCTION PER STRUCTURE

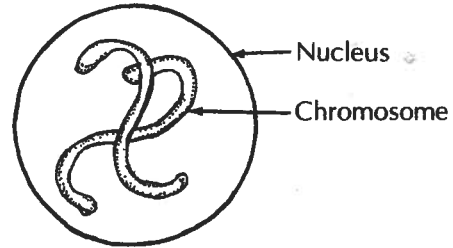
(SECTION 2) 2-4. THE ANATOMY OF THE CELL

Instructions: (1.) Read the text. (2.) Complete the project. (3.) Use the text and the project to help you to answer the questions.

Every cell in your body has at least one special job to do. A few examples: The cells in the outer layers of your skin are designed to protect you from your external environment, certain cells in your stomach make chemical substances to digest the food you eat, and other cells are specially designed to carry electrochemical impulses that make your muscles contract.

Even though your body cells have different jobs to do, certain aspects of their internal anatomies (structures) are similar. While doing this project, you will learn the internal anatomy of a generalized cell.

The job of the nucleus is to be the control center of the cell. The nucleus of each human cell contains 46 chromosomes, which store instructions for the cell's activities. The nucleus is the most obvious structure in the generalized cell. The following diagram shows what the nucleus and the chromosomes look like. For simplicity, the diagram contains only two chromosomes.



- 1. Color the nucleus brown.
- 2. Color the chromosomes blue.

One of the ways in which the nucleus directs the cell's activities is by sending instructions to the ribosomes, where proteins are assembled. The following diagram shows what a ribosome looks like.



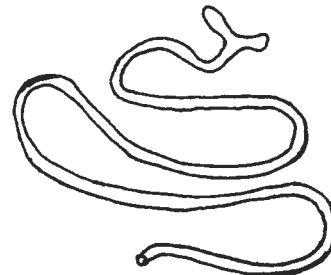
- 3. Color this ribosome green.

Ribosomes receive instructions from the chromosomes by molecules called "messenger RNA." A round structure found within the nucleus assists in the production and storage of RNA. This structure is called the "nucleolus." The diagram below shows the nucleolus; dashed lines are used to represent molecules of RNA.



- 4. Color this nucleolus yellow.
- 5. Color the RNA molecules pink.

Once proteins are made, they are sometimes transported through the cells by a system of tubes called the "endoplasmic reticulum." The following diagram shows what the endoplasmic reticulum looks like.



- 6. Color this endoplasmic reticulum blue.

2-4. THE ANATOMY OF THE CELL, continued

The endoplasmic reticulum delivers many types of proteins to the Golgi body. The function of the Golgi body is to coat protein with a molecular layer that allows the protein to leave the cell. The diagram below shows what the Golgi body looks like.

7. Color this Golgi body yellow.



Lysosomes contain chemical substances called "enzymes." Lysosomes use these enzymes to break certain nutrients called "proteins" into their building blocks, the amino acids. As a nutrient enters the cell, it attaches to a lysosome. The amino acids that result from that breakdown are used by the ribosomes to make new proteins. The following diagram shows what a lysosome looks like.

8. Color this lysosome red.



Vacuoles are storage sacs where incoming nutrients are stored before they are broken down by lysosomes. The following diagram shows what a vacuole looks like.

9. Color this vacuole any color.



To assemble proteins and to perform other functions, the cell uses energy. The mitochondria act like power houses; that is, they produce energy in a form that the cell can use. The following diagram shows what mitochondria look like.

10. Color this mitochondrion orange.



To complete this project, use what you have learned to label the diagram at the end of this activity.

Level One Questions:

1. The _____ is the fundamental building block of the body.

2. How are certain cells in your stomach specialized?

3. The _____ is the control center of the cell.

4. How many chromosomes are in each human cell? _____

2-4. THE ANATOMY OF THE CELL, continued

5. What is the function of chromosomes?

6. Where are proteins assembled?

7. Where is RNA manufactured?

8. Describe the function of messenger RNA.

9. What structure transports proteins?

10. What is the function of the Golgi body?

11. Lysosomes contain chemical substances called _____.

12. Lysosomes use their enzymes to break proteins into _____.

13. The ribosomes use these amino acids to assemble new _____.

14. _____ are storage sacs.

15. Incoming nutrients are stored in vacuoles before they are broken down by _____.

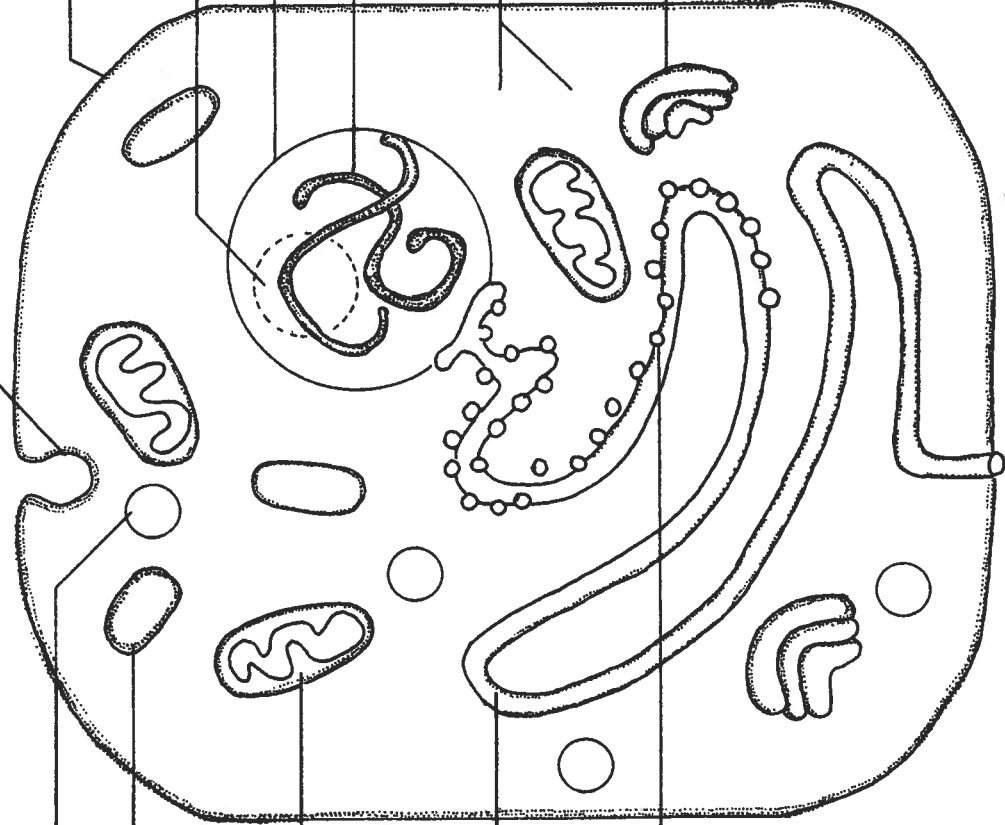
16. To assemble proteins and perform other functions, the cell uses _____.

17. Mitochondria produce _____ in the form that the _____
_____ can use.

FORMING VACUOLE

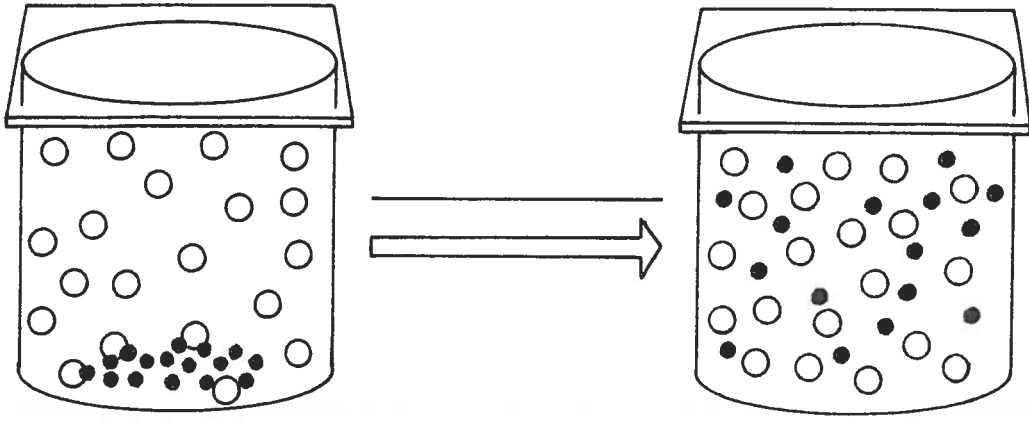
Cell membrane

Cytoplasm

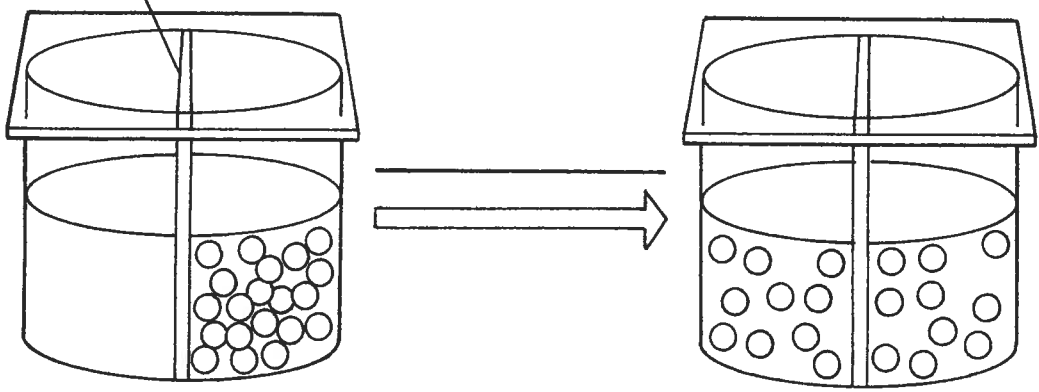


DIFFUSIONS AND OSMOSIS (SECTION 3) Name _____

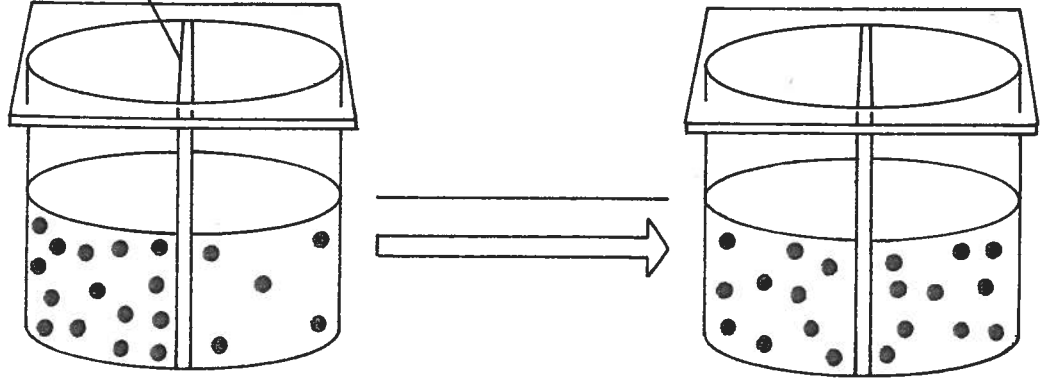
The diagrams below show what each solution would look like after a period of time has passed. Label each as osmosis or diffusion.



semipermeable membrane



semipermeable membrane



Key	
○	= salt molecule
●	= water molecule

SECTION 4: QUICK LAB

“How can you model permeability in cells?”

Background information:

- When iodine and starch solutions mix they turn a blue-black color.
- Standard plastic baggies are permeable to iodine solution, but not to starch solution.

Materials:

Graduated cylinder

Plastic sandwich bag

Starch

500-mL beaker

Iodine

Water

Procedure:

1. Put 5 mL of starch into a plastic sandwich bag. Pour 50 mL of water into the plastic bag. Seal the bag completely, and shake it gently to dissolve the starch in the water.

2. Put on your goggles, gloves, and apron.

3. Pour 250 mL of water into a 500-mL beaker. Add 20 drops of iodine.

CAUTION: Iodine is corrosive and irritating to the skin and can stain skin and clothing. Be careful not to spill it on yourself.

4. Place the sandwich bag of water and starch into the beaker of water and iodine.

5. After 30 minutes look at the sandwich bag in the beaker. Observe any changes that occurred.

6. Answer the questions on the following page about the experiment.

Quick Lab Questions:

ANSWER USING COMPLETE SENTENCES!

1. What cell structure does the plastic bag represent?

2. Describe what the contents of the bag looked like **before** putting it in the beaker, and describe what the contents of the bag looked like **after** spending 30 minutes in the beaker. What did you see happen inside the plastic bag?

3. Describe what the iodine solution in the beaker looked like **before** the plastic bag was put in, and describe what the iodine solution looked like **after** the plastic bag had been in the beaker for 30 minutes. What did you see happen outside the plastic bag?
