NAME _____ Period _____ Date _____

How the Cell Operates

A1 Biology – 432

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

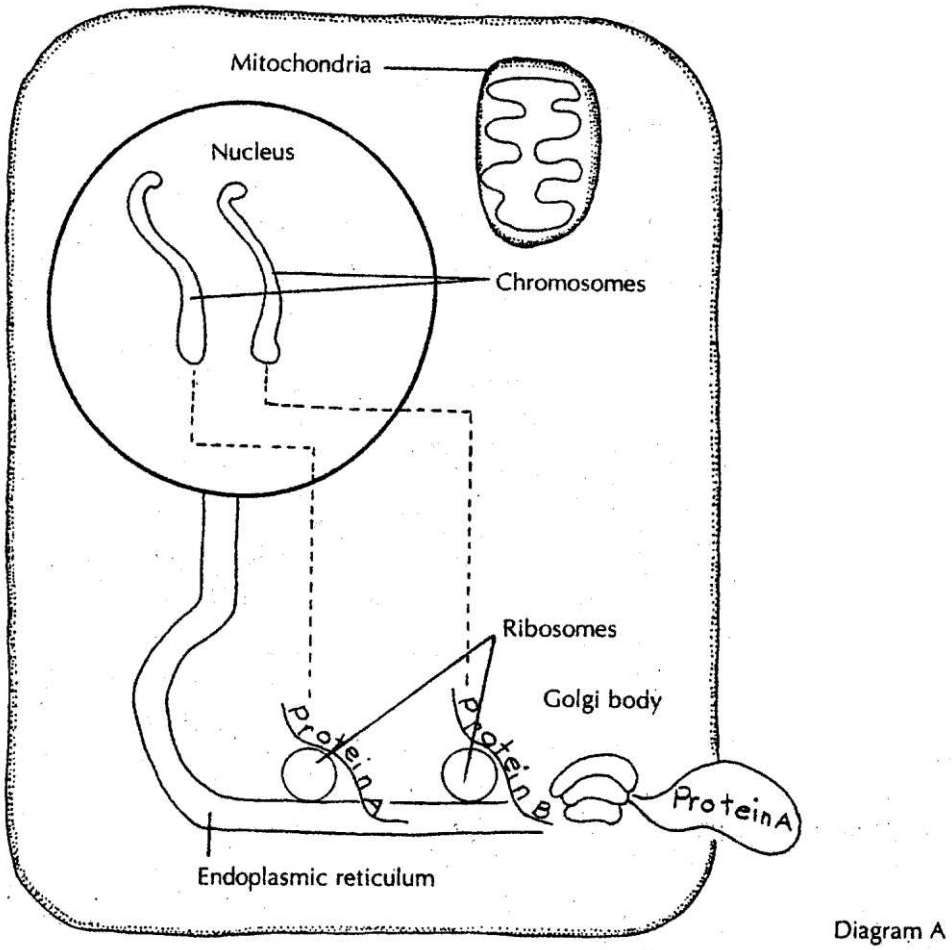

Diagram A

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 into 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.

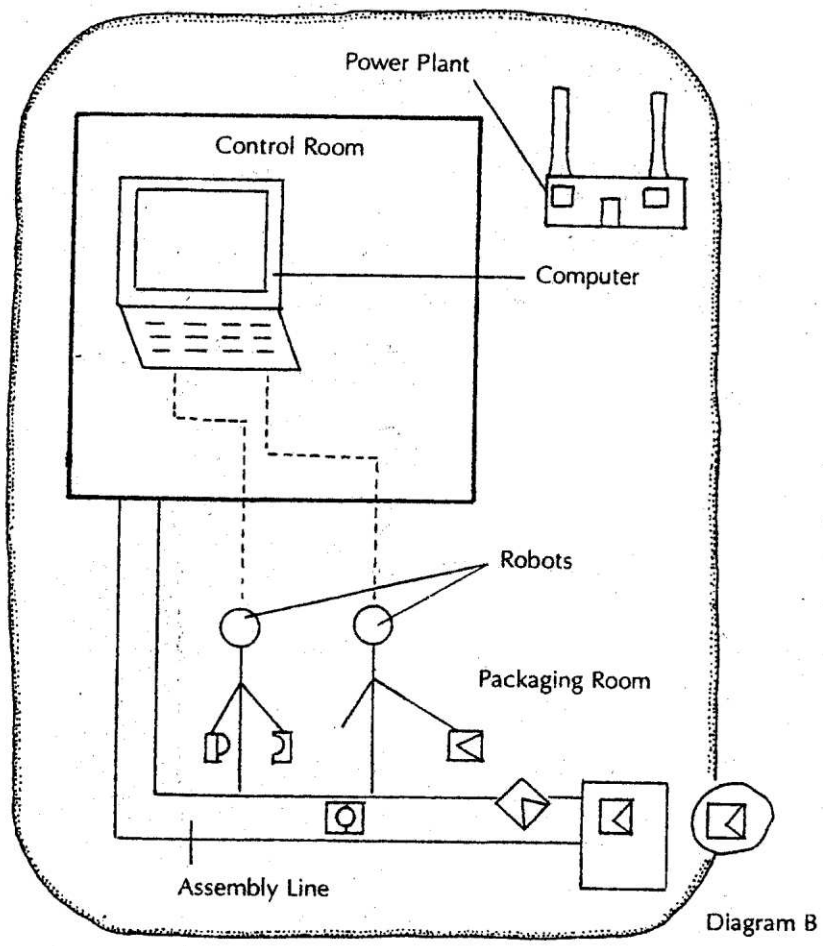

Diagram B

Section 1: To complete this project –

Obtain a set of colored 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.

Section 2:

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

_____

_____

2. How are the functions of the mitochondria and the power plant similar?_____

_____

3. What is the form of the energy that the mitochondria produce for the cell?_____

_____

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

_____

_____

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

_____

_____

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 _____.

Section 3: 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						

Section 4:

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

2. Read in a biology text book about cells in the stomach lining. 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? _____

5. What is the function of the 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. Organelles that function as storage sacs are _____ .

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

16. When assembling proteins and performing other functions, the cell uses a source of energy called _____

_____

17. The organelle that produces the chemical used directly by the cell for energy is the _____

_____

Section 5. Matching. Match the part of the cell with its function. Write the letter of the cell part in the space provided. Use the cell part that BEST fits the description. Each cell part will only be used once.

_____ 1. Controls passage of substances in and out of the cell
_____ 2. Most cellular life processes occur here
_____ 3. Involved in cell reproduction
_____ 4. Provides energy for the cell by breaking down glucose
_____ 5. Transports substances throughout the cytoplasm
_____ 6. Controls passage of substances between the cytoplasm and the nucleus
_____ 7. Controls heredity in the organism.
_____ 8. Cytoplasmic organelles that manufacture proteins.
_____ 9. Contains enzymes to break down "cellular trash"
_____ 10. "Control center" of the cell
_____ 11. Nuclear organelles involved in making ribosomes
_____ 12. Stores cell wastes or usable substances
_____ 13. Contains pigments necessary for photosynthesis
_____ 14. Protects the plant cell and gives it shape

Word Bank

A	cell membrane	H	lysosomes
B	cell wall	I	mitochondria
C	centriole	J	nuclear membrane
D	chloroplast	K	nucleolus
E	chromosomes	L	nucleus
F	cytoplasm	M	ribosomes
G	endoplasmic reticulum	N	vacuoles

Section 6. Label and color the following drawing. If possible, use the same color key as the first two diagrams that you completed.