Name:	
Partner:	

Date:	_
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The Cell as a Factory - The Cell as a City

Now that you have read about how each part of the cell functions, let's look at how the cell as a whole works. In some respects, a eukaryotic cell is very much like a factory. Although cells perform many different functions, one of the most important jobs carried out in the cellular "factory" is making proteins. The picture shows how manufacturing proteins in the cell is manufacturing a product in a factory. The walls and roof of a factory building are supported by steel or concrete beams and columns. Some cells also have a supporting structure—the cytoskeleton.



A factory needs a transportation system to move parts and machines from one end of the building to the other, and so does a cell. This is another function performed by the cytoskeleton. In the same way that the main office controls a large factory, the nucleus is the control center of the cell.

In a factory the main office sends instructions out to the factory floor. In a cell, the nucleus sends a steady stream of RNA and other information-carrying molecules to the rest of the cell. RNA contains instructions that tell the cell what type of protein to make. The instructions travel to ribosomes. Each ribosome is like a factory machine turning out proteins on orders that comes from its "boss"—the nucleus.

From the ribosomes, proteins that will be released from the cell move to the Golgi apparatus which attaches carbohydrates and lipids to that to prepare the proteins for their roles. The Golgi apparatus is a bit like a factory's customization shop, where the finishing touches are put on products before they are ready to leave the factory. From the Golgi apparatus, proteins are then "shipped" to their final destination.

Only one thing remains to complete the

picture of the cell as a busy factory- a source of energy. Cells cannot be hooked up to the local power company; of courser they get their energy from two organelles: mitochondria and chloroplasts. Some cells contain chloroplasts, which use energy from the sun to make food molecules. Thus, chloroplasts are the biological equivalents of solar power plants. Mitochondria then use these molecules produce high-energy compounds that the cell a use immediately. In this way, the mitochondria like a factory's oil-burning furnace.

Directions:

- 1. Using the story, from page 182 in your text, create a cellular city.
- 2. Indicate if you are drawing an animal or plant cell city.
- 3. Include:
 - A. Cell membrane or wall
 - B. Chloroplast
 - C. Endoplasmic Reticulum
 - D. Golgi apparatus

- H Vacuo
- 4. Color your drawings, label and identify your work.
- 5. Name your city and answer the following questions.

Questions:

- 1. What were some of the challenges your group had in deciding on a city?
- 2. What function does the cell wall provide for the cell?
- 3. Do all cells have cell walls?

Why did you choose a plant or animal cell?

- 4. What is the role of the nucleus?
- 5. What can you say about the relationships of the organelles?
- 6. Did you use all of the organelles listed above? Why or why not?
- 7. Which organelles?
- 8. Describe what you have learned.

- E. Lysomes
- F. Mitochondrion
- G. Nucleus
- H. Vacuole