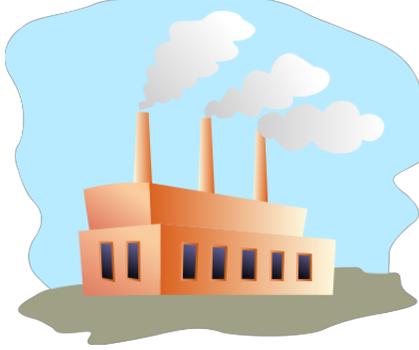


The Cell as a Factory



Name

Per.

Warning! This assignment will
about how a cell really works!

require you to think

Parts of a Factory

1. Front office - Stores blueprints for all products as well as instructions to operate the factory.
2. Product blueprints - specific instructions used by each worker to build one specific product
3. Factory floor - Physical area where the main product is made. Location of the workers
4. Production workers - Build the basic product
5. Production line - the site of many of the machines used by the workers
6. Customizing of product - modifies basic product (different options, colors)
7. Packing and shipping supplies - Boxes, crates holding finished product
8. Shipping / Receiving - accept deliveries of supplies and raw material, Ships packages of completed products
9. Warehouse - storage of excess raw material or product until needed
10. Waste recycling - recycles materials back into raw materials for reuse
11. Generator room - delivers power for all functions in the factory
12. Solar collectors (used only in very advanced modern factories!) - Use sunlight to charge special batteries
13. Batteries -for storing collected solar energy until used
14. Personnel department - hires new production workers when an increase in production is needed
15. Foreman - used to deliver blueprints to workers
16. Waste disposal - removes all materials that cannot be used or recycled

DIRECTIONS: In the table at left is a list of components and functions in a factory. You will be comparing a eukaryotic cell to such a factory.

Cells are very complex systems designed to produce products quickly and efficiently. The immediate products of cells are usually proteins (though these are frequently only a means to some other end). It is possible to understand cells a little bit better by comparing them to other "production- oriented" systems, such as factories.

Prokaryotic cells are relatively simple, one room factories. They might be compared to an artisan's cottage, where all the processes take place together, often involving just one or a few workers who carry out all aspects of the manufacturing. Artisans need specialized tools, but usually these are relatively few and relatively simple.

Eukaryotic cells are more like modern industrial factories. They involve many different specialized functions going on in different places, but all integrated to produce the final product as efficiently as possible. The work of an artisan may be more original, and the individual product more valuable than a massed produced article, but mass production IS efficient. Consider the functions in the accompanying list that are typical of a modern industrial factory.

On the back side, next to the appropriate number give the name of the organelle or organelles that carry out a similar function in a eukaryotic cell. At the bottom of the backside of this page, identify at least two ways in which the analogy between a cell and a factory breaks down.

It is possible that people may interpret things differently. You might match the organelle to the factory part slightly differently than another person, but most of these have only one logical match. ORGANELLES CAN BE USED MORE THAN ONCE! MANY PARTS DO MULTIPLE JOBS.

Factory Component	Cell Organelle	Similarity (They both...)
1. Front office	Nucleus	
2. Product blueprints	Chromatin (DNA)	
3. Shop floor	Cytoplasm	
4. Production workers	Ribosomes	
5. Production line	ER	
6. Customizing of product	Golgi Apparatus	
7. Packaging	Vacuoles	
8. Shipping / Receiving	Cell Membrane	
9. Warehouse	Vacuole	
10. Waste recycling	Lysosome	
11. Generator room	Mitochondria	
12. Solar collectors	Chloroplasts	
13. Batteries	Sugar	
14. Personnel department	Nucleolus	
15. Foreman	mRNA	

16. Waste disposal	Cell Membrane	where unwanted things are removed.
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In the space provided below, identify at least two ways in which the analogy between a cell and a factory breaks down. (Two things that really do not fit well when comparing an organelle to a factory part.

1.

2.

Factory Drawing

In the groups assigned by the teacher, obtain a large sheet of paper. On that paper, draw a giant cell. It can be plant or animal.

Instead of drawing the organelles, draw the factory parts in their place. Be creative, but make sure that the structures match the organelles in terms of location, size, number and position relative to other structures. DO NOT LABEL ANY OF THE STRUCTURES!!! If you do we cannot hang them up on the walls.