

Molecules and Their Organization That Make Up a Cell

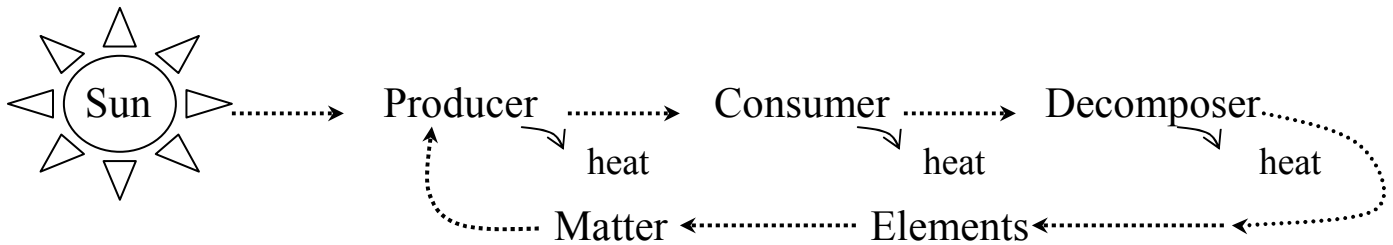
4 Basic Elements

C O H N

4 Basic Organic Macromolecules

P N C L

COHN COHN COH COH



Energy

is

obtained and used

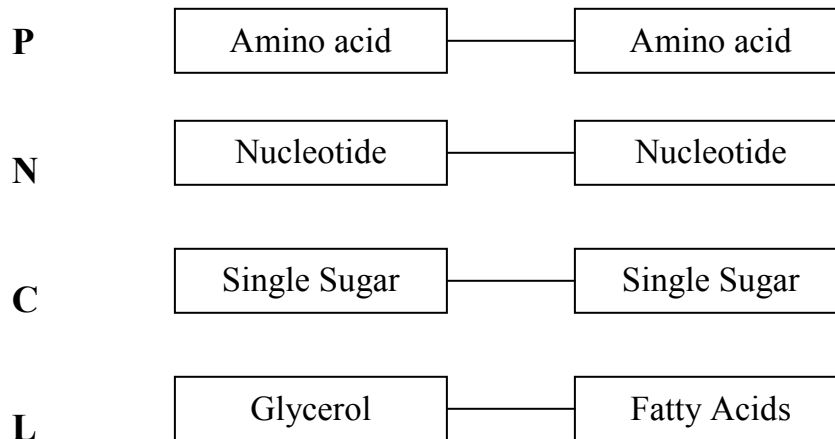
Matter

is

Recycled

Carbon is a central atom - the backbone of organic molecules.

Organic molecules are arranged with organization.



Organic Molecules arrange in patterns that make up the structure of the cell.

With the invention of microscopes Scientists were able to discover things not seen with the naked eye.

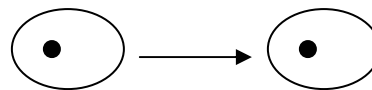
Biologists were able to observe the cell, its structure, and its function.

They would come up with what is know as “The Cell Theory”.

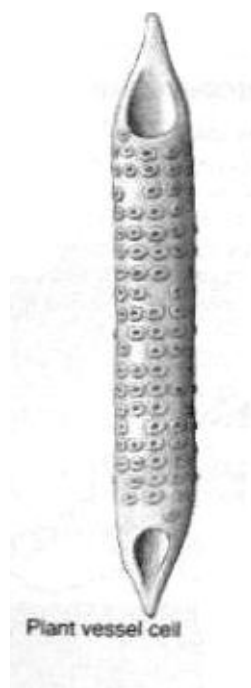
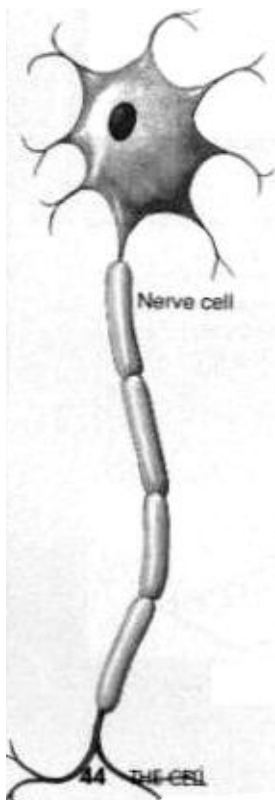
** Remember – theories are explanations of things that happen that have been supported by repeatedly tested hypotheses.

3 Parts of “The Cell Theory”

1. All living things are made up of cells.
2. Cells are the basic units of structure and function.
3. All cells come from pre-existing cells.



Structure - There are many different sizes and shapes of cells.



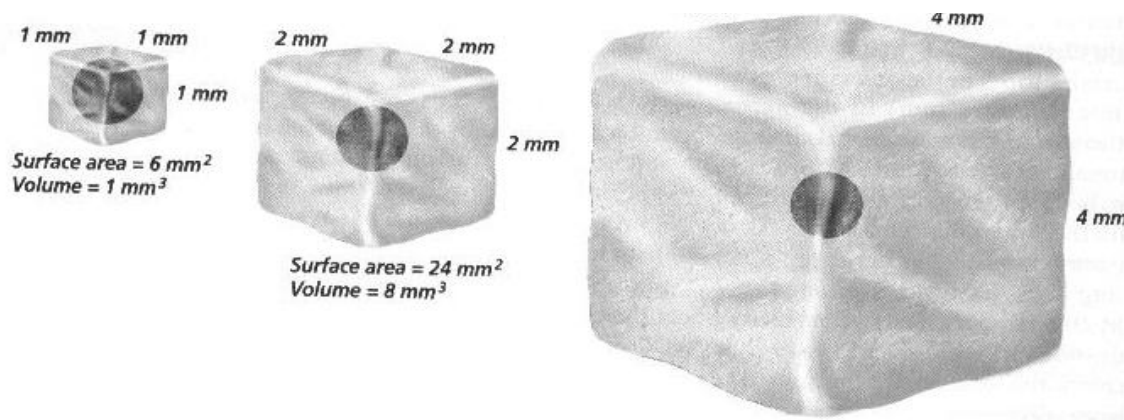
Shapes and Sizes

Elephants are large animals, and yet they are still made up of a bunch of small cells.

So, why aren't cells made as big as hefty trash bags?

Limitations on Cell Size:

1. Surface area-to-volume ratio limits cell size.



- 2. Diffusion** limits cell size: Nutrients and wastes move through the cell membrane.
(e.g., glucose and oxygen enter, while wastes leave)
Within the plasma membrane, these nutrients and wastes move around by diffusion.

Diffusion is fast and efficient over short distances

Diffusion is slow and inefficient with larger distances.

- 3. DNA** limits cell size: DNA are the blueprints for making Cell proteins. Proteins are needed to perform critical cell functions throughout the cell. There is a limit as to how quickly the blueprints can be copied. The more cytoplasm inside the cell, the more proteins and enzymes that are required.

This giant amoeba is a single celled organism with increased cytoplasm. To offset the need for more proteins more than one nucleus has evolved to ensure a sufficient supply. It can have up to 1000 nuclei.

