Station 1: the Cell theory

KEY CONCEPT Cells are the basic unit of life.

The invention of the microscope in the late 1500s revealed to early scientists a whole new world of tiny cells. Most cells are so small that they cannot be seen without a microscope. The discoveries of scientists from the 1600s through the 1800s led to the cell theory, which is a unifying concept of biology.

Both living and non-living things are composed of molecules made from chemical elements such as Carbon, Hydrogen, Oxygen, and Nitrogen. The organization of these molecules into cells is one feature that distinguishes living things from all other matter. The cell is the smallest unit of matter that can carry on all the processes of life.

1 Every living thing - from the tiniest bacterium to the largest whale - is made of one or more cells.
2 Before the 17^{th} century, no one knew that cells existed, since they are too small to be seen with the naked eye. The invention of the microscope enabled Robert Hooke, (1665) and Anton van Leuwenhoek (1675) to see and draw the first 'cells', a word coined by Hooke to describe the cells in a thin slice of cork, which reminded him of the rooms where monks lived.
3 The idea that all living things are made of cells was put forward in about 1840 and in 1855 came 'Cell Theory' – i.e. 'cells only come from other cells' – contradicting the earlier theory of 'Spontaneous Generation'

Recap: The Cell Theory consists of three principles:
a. All living things are composed/made of one or more cells.
b. Cells are the basic units of structure and function in an organism.
c. Cells come only from the replication (mitosis/meiosis) of existing cells.

CELL DIVERSITY

Not all cells are alike. Even cells within the same organism show enormous diversity in size, shape, and internal organization. Remember, different cells have different functions/jobs within an organism. Each cell's job is important to ensuring the organisms can continue to live.

Picture from & more info @ http://www.youtube.com/watch?v=4OpBylwH9DU
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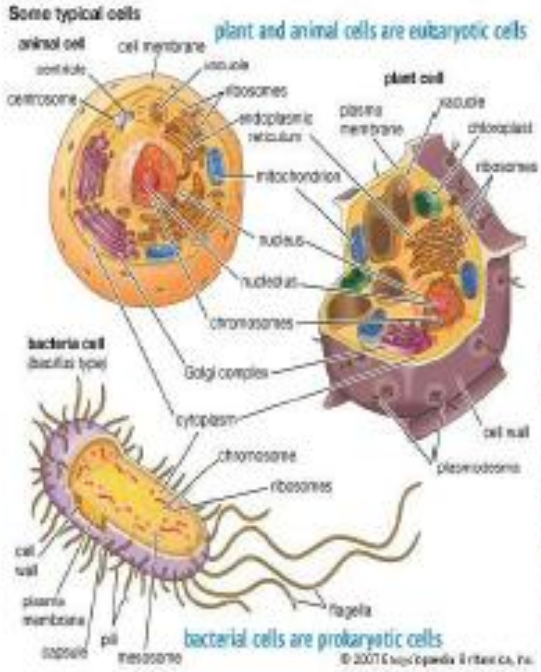
Station 2: Prokaryotic vs. Eukaryotic

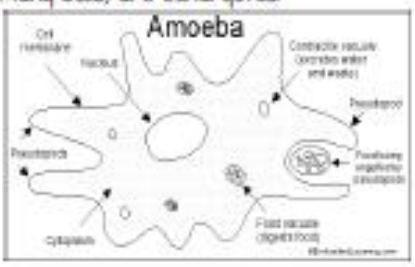
All cells can be divided into two major groups: prokaryotic cells or eukaryotic cells. The main differences between the two kinds of cells are in their structure:



- Eukaryotic cells have a nucleus defined by a membrane, while prokaryotic cells have no nucleus.
- In eukaryotic cells, the DNA, or genetic information, is found in the nucleus. In prokaryotic cells, the DNA is found in the cytoplasm, the jellylike substance that fills both types of cells.
- Eukaryotic cells have organelles, structures that perform jobs for a cell. Most organelles are surrounded by membranes. Prokaryotic cells do not have organelles surrounded by membranes.

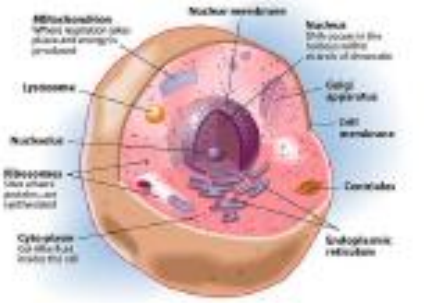
Prokaryotic cells make up organisms called prokaryotes. All prokaryotes are tiny and consist of single cells. Bacteria are prokaryotic cells. Eukaryotic cells make up eukaryotes. You are a eukaryote, as are plants and some types of single-celled organisms. All multicellular organisms, or organisms that have many cells, are eukaryotes.

Examples of prokaryotic cells (single-celled organisms) include amoeba, euglena and algae.



Examples of eukaryotic cells (multi-cellular organisms) include humans, animals, worms, insects, birds, fish, etc.

In terms of making or obtaining food, cells can be either an autotroph or a heterotroph. An autotroph can "automatically" make its own food through its own processes (like photosynthesis). A heterotroph must consume, or eat, other organisms to obtain food.



Information via

https://www.biologycorner.com/Academic/Classic/highschool/science/resources/Worksheets/20Academic%20Biology/Cell%20Theory%20Scientists%20Types%20Reinforcement%20Worksheet.doc

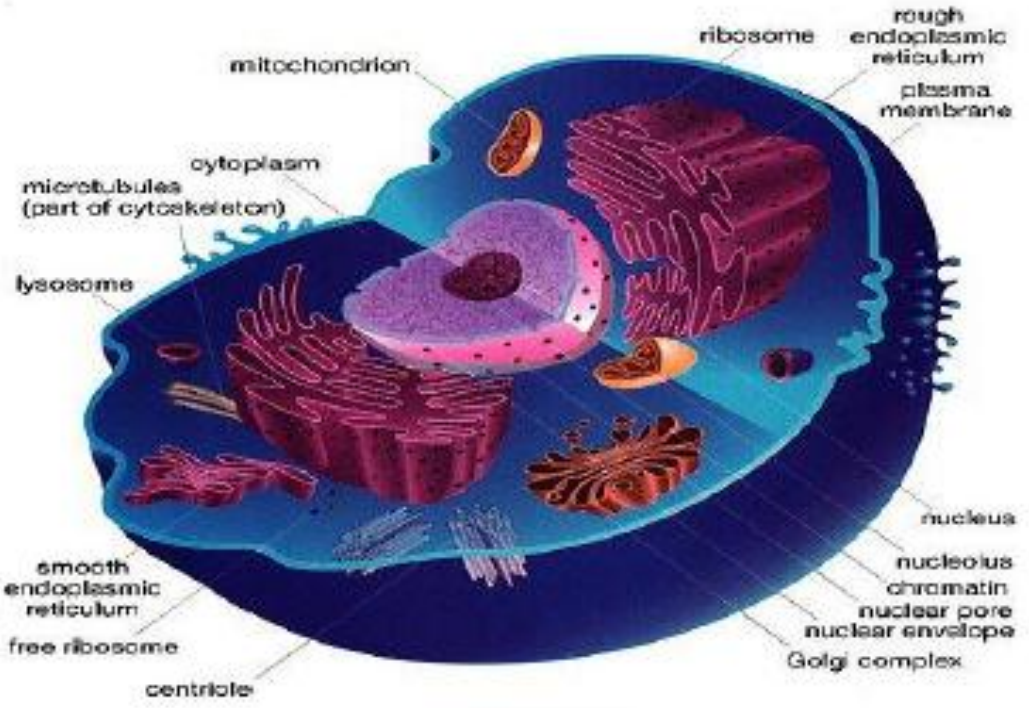
Station 3: Organelles

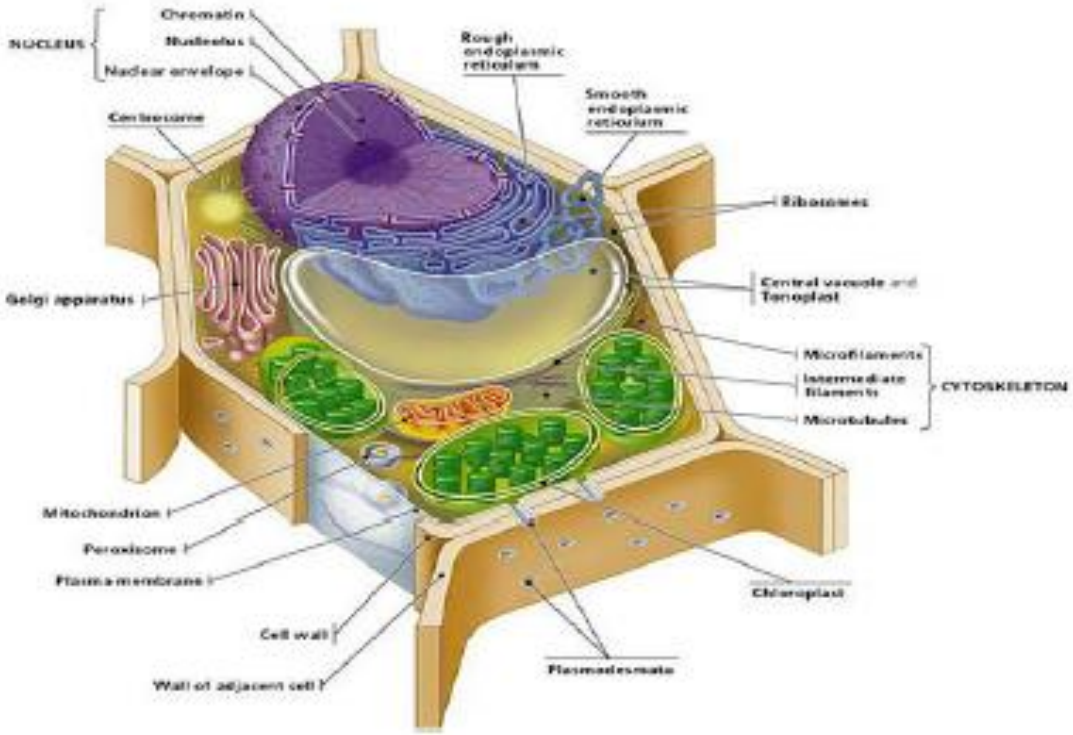
Use the table and pictures to complete your worksheet.

Organelle	Description	Function (it's role/job for the cell)	Animal, Plant or Both
CELL WALL	Rigid, tough, made of cellulose	Protects and supports the cell	Plant
CELL MEMBRANE	Thin, covering, protects cells, contains a phospholipid bilayer	Protects the cell, performs active transport and passive transport, moves materials in and out of the cell, communication	Both
CYTOPLASM	Jelly like substance that contains organelles	Pads and supports organelles inside the cell – protects them	Both
NUCLEUS	Dense, ball shaped structure, contains DNA	Controls all of the cell's activities	Both
NUCLEAR MEMBRANE	Thin covering over the nucleus	Covers and protects the nucleus	Both
NUCLELOUS	Small dark area in the nucleus	Produces ribosomes	Both
CHROMATIN	In the nucleus, made of DNA and protein, contains genes	Provides instructions for the cells activities, (growth, reproduction)	Both
ENDOPLASMIC RETICULUM	Clear, tubular system of tunnels throughout the cell	Transports materials like proteins around the cell	Both
RIBOSOME	Small specks/bumps made of RNA. Found in cytoplasm or on the endoplasmic reticulum	Makes proteins	Both
MITOCHONDRIA	Location in the cytoplasm, bean shaped	Supplies energy or ATP for the cell through cell respiration using glucose and oxygen	Both
VACUOLE	Large open storage area, smaller in animal cells	Storage tank for food, water, wastes or enzymes	Both
CHLOROPLAST	Green structures that contain chlorophyll	Captures sunlight and uses it to produce food through photosynthesis	Plant
GOLGI BODY	Small bags with tubes connecting them	Packages and secrets proteins for use in and out of the cell	Both
LYOSOME	Small, round structures, containing enzymes	Digests older cell parts, food or other objects like viruses	Both
CENTRIOLE	Small cylindrical	Used with the spindle apparatus during mitosis	Animal

Information From: http://edocs.com/download/11d26e7427641103...

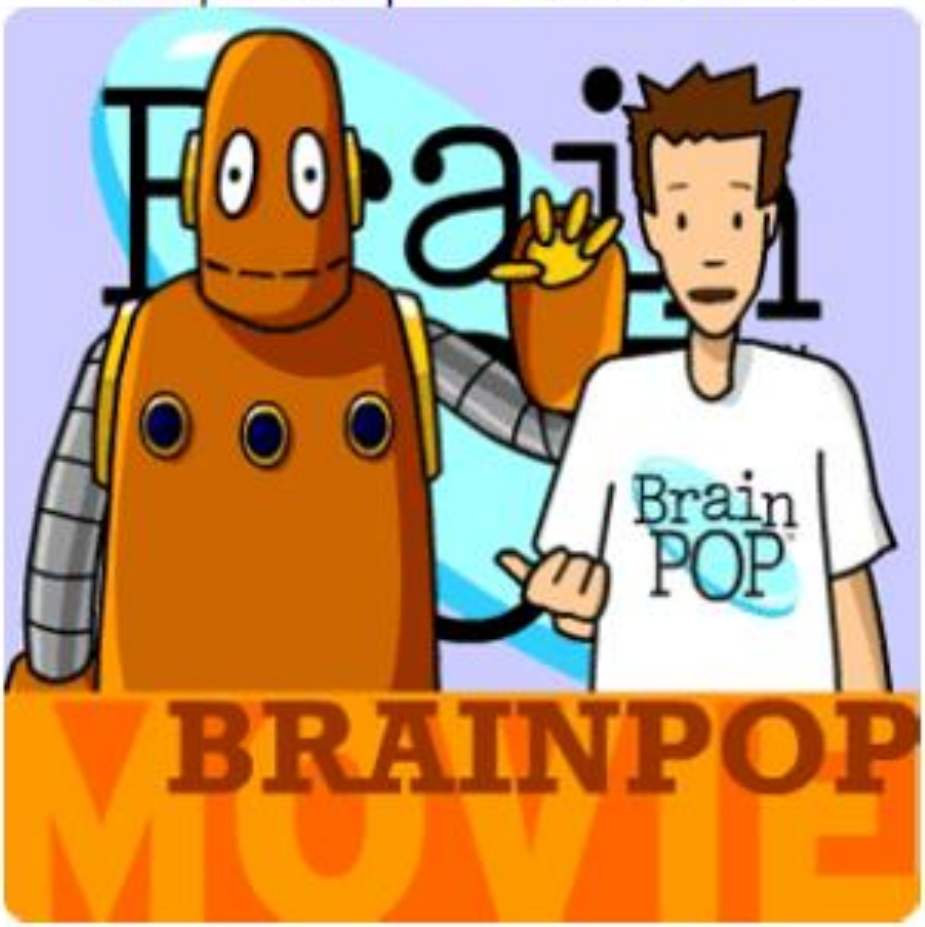
Station 3: Organelles





Station 4: Cellular Respiration

Watch the BrainPop clip on Cellular Respiration. As you watch, be sure to complete your worksheet.



Station 5: Connecting Concepts

Complete the concept map using the words and phases below. Some words have already been completed for you. You will have to draw arrows to some words to connect concepts.

prokaryotic	eukaryotic	cellular respiration
plant cell	animal cell	autotroph
photosynthesis	heterotroph	can make own food
must eat other organisms for food		mitosis/meiosis
mitochondria	nucleus	euglena
amoeba	chloroplast	ribosomes