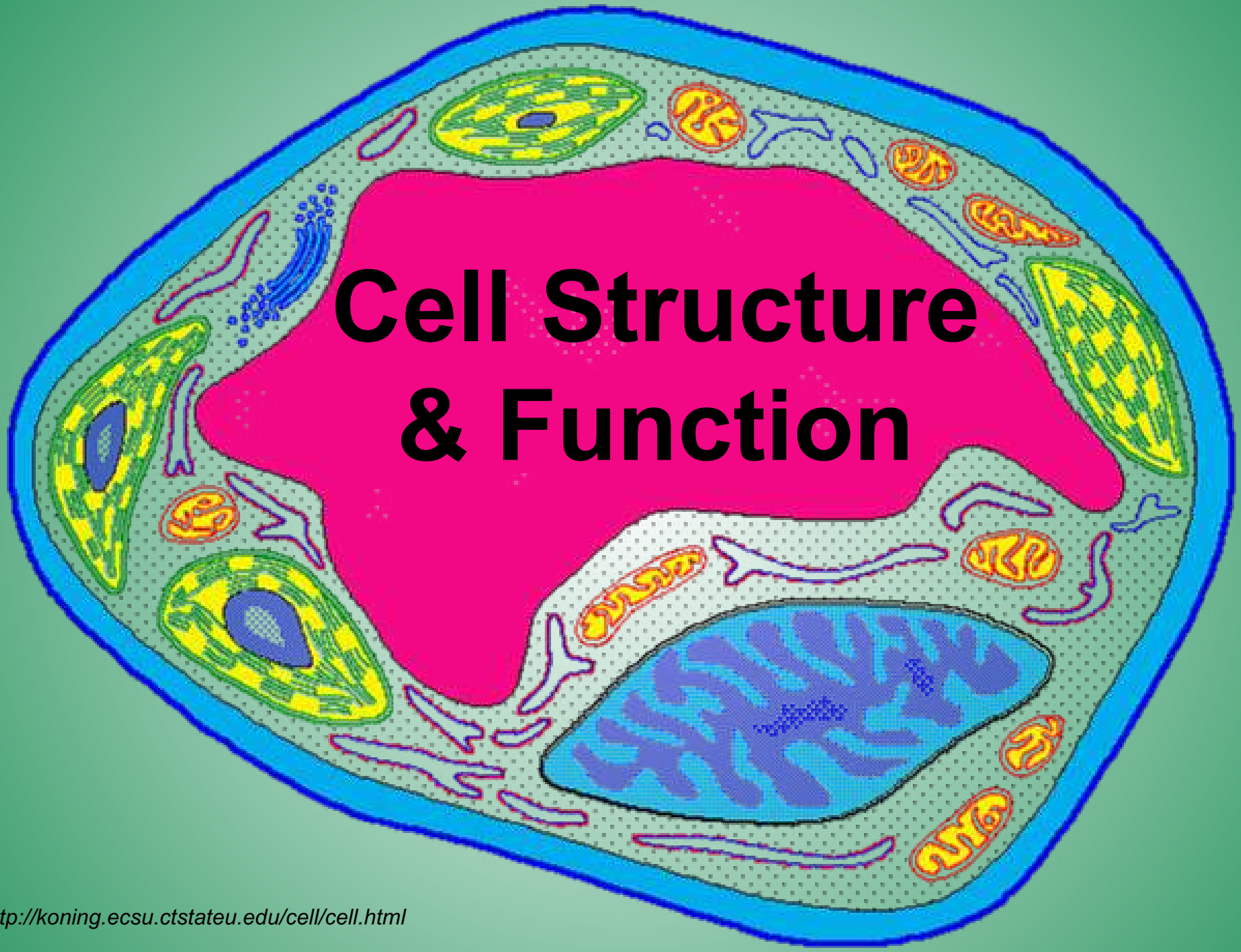


http://koning.ecsu.ctstateu.edu/cell/cell.html

Essential Question:

What is the relationship between the structure and function of cell organelles?

Standard: S7L2b. Relate cell structures (cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria) to basic cell functions.

Cell Facts Review

[see resources]

Read statements about cells to determine whether the statement is True or False. If the statement is False, correct it.

Previously Learned Facts about Cells

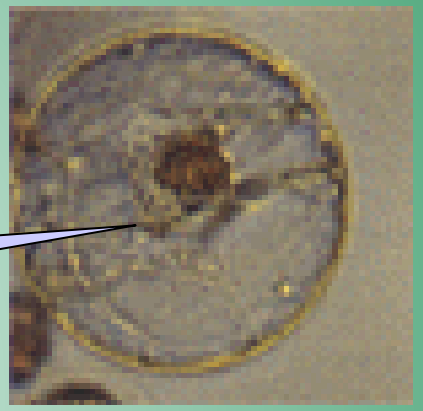
- All living things are made up of cells.
- Cells are the smallest units of all living things.
- Most cells are too small to see with the naked eye, but can be viewed with the aid of a microscope.
  http://learn.genetics.utah.edu/content/cells/scale/
  http://www.cellsalive.com/howbig.htm
- Cells come in various shapes and sizes depending on their function.

Previously Learned Facts about Cells

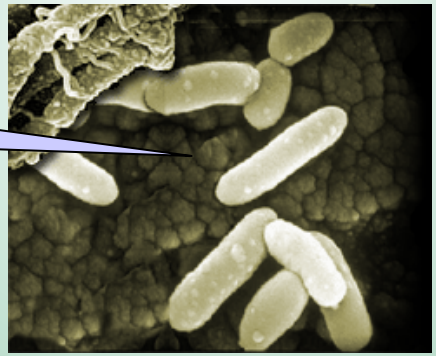
- Most organisms have specialized cells that perform different functions. Thus, most organisms have many types of cells.
- Some organisms consist of a single cell that carries out all life processes needed for survival.
- Other organisms have many cells that carry out life processes.

Examples of Cells

Amoeba Proteus



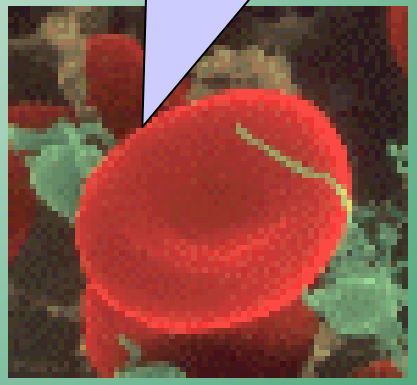
Plant Stem



Bacteria

Nerve Cell

Red Blood Cell



Prokaryote/Eukaryote Comparison

[see resources]

Two Types of Cells

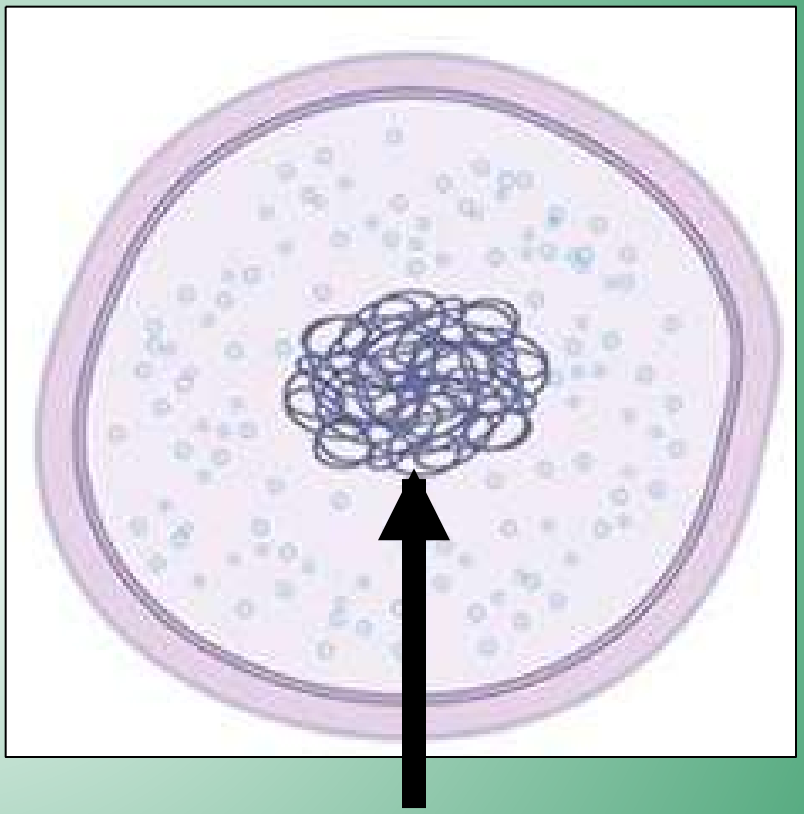
- Scientists separate cells into two broad categories based on the location of the genetic material cells need to reproduce and function.

- Prokaryotic Cell – there is no separate compartment for the genetic material (no nucleus); lack of membrane bound internal organelles

- Eukaryotic Cell – the genetic material is in a structure enclosed by its own membrane (nucleus)

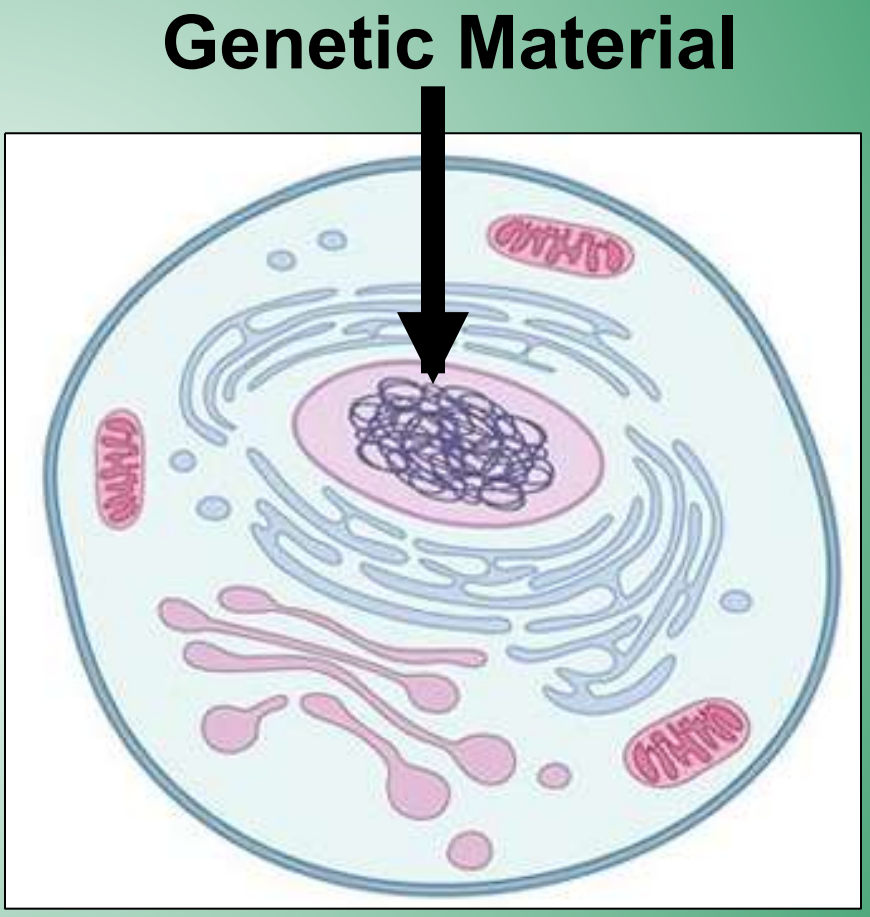
Prokaryotic Cells

- Do not have genetic material or structures surrounded by membranes
- Few internal structures
- One-celled organisms such as Bacteria



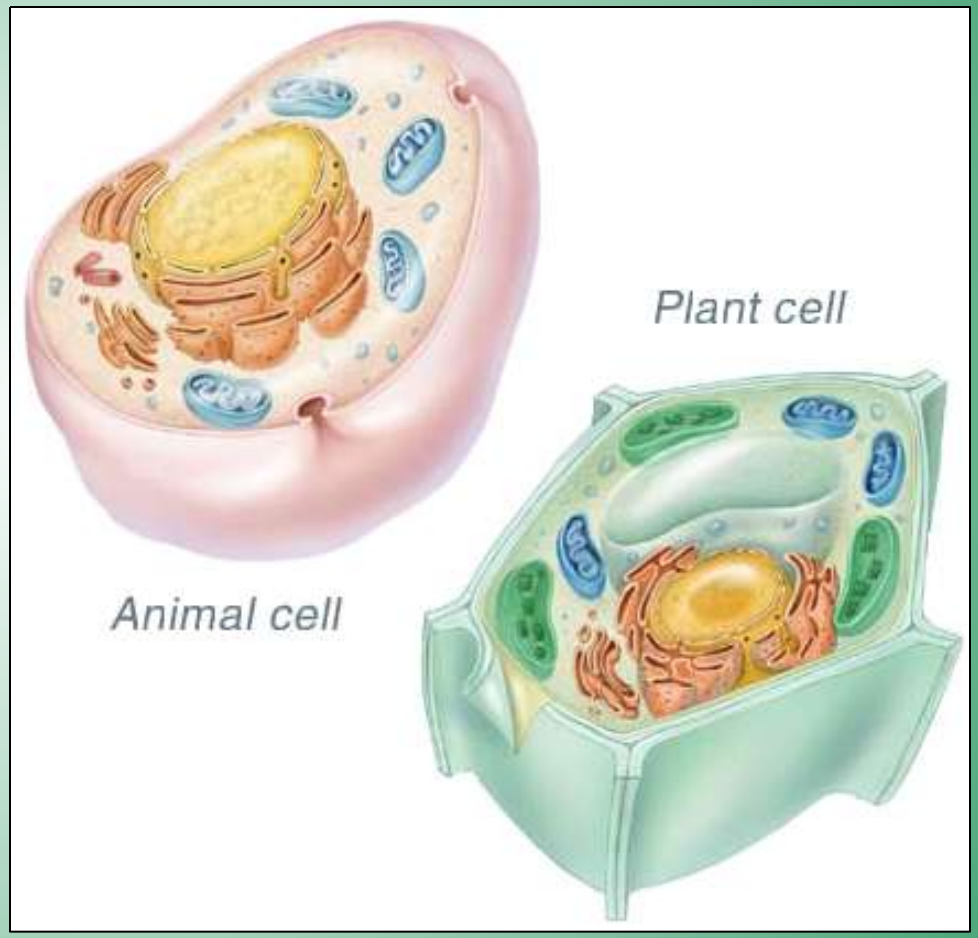
Eukaryotic Cells

- Genetic material is in a structure enclosed by its own membrane
- Contain *organelles* surrounded by membranes
- Most living organisms



Two Types of Eukaryotic Cells

Plant Cells and Animal Cells

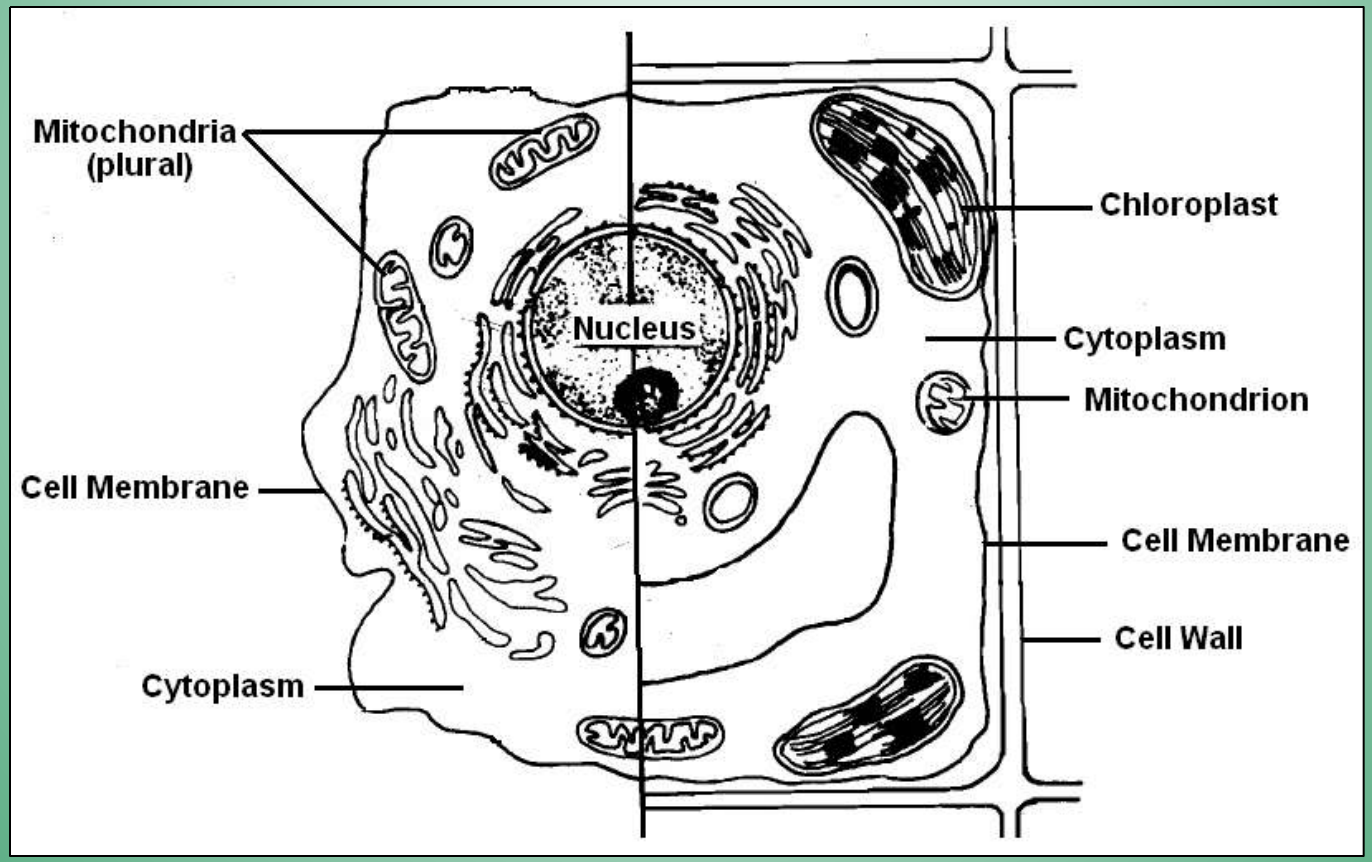


In most diagrams of plant and animal cells, you will notice many organelles (parts).

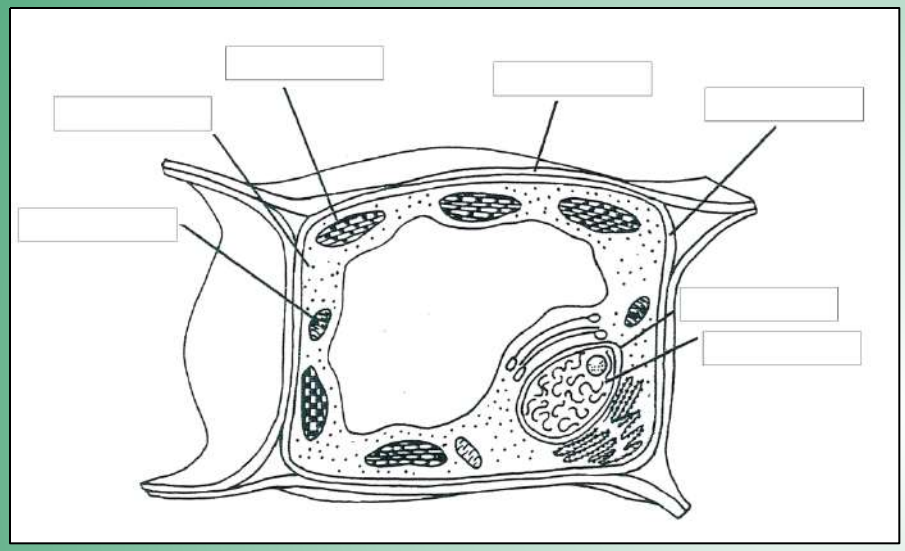
For our lesson on cell organelles, we will focus on just a few organelles.

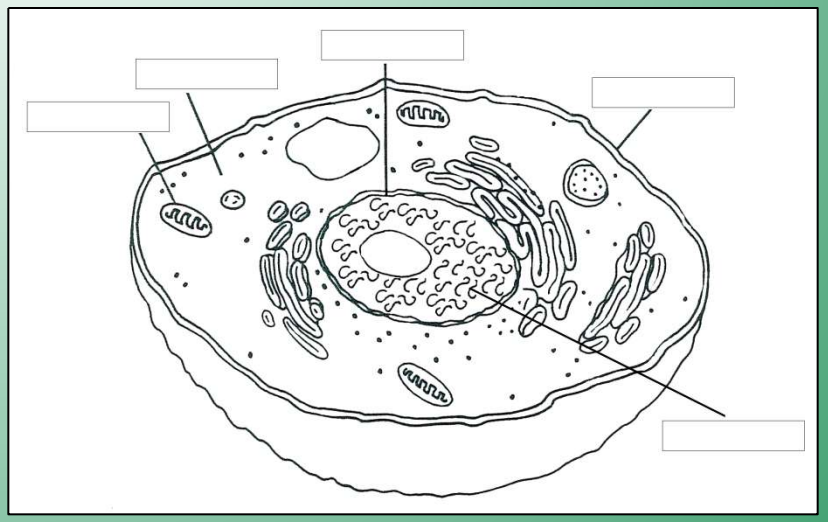
Eukaryotic Cells: Plant & Animal

Plant and Animal cells both contain similar organelles (parts), but there are a few differences.

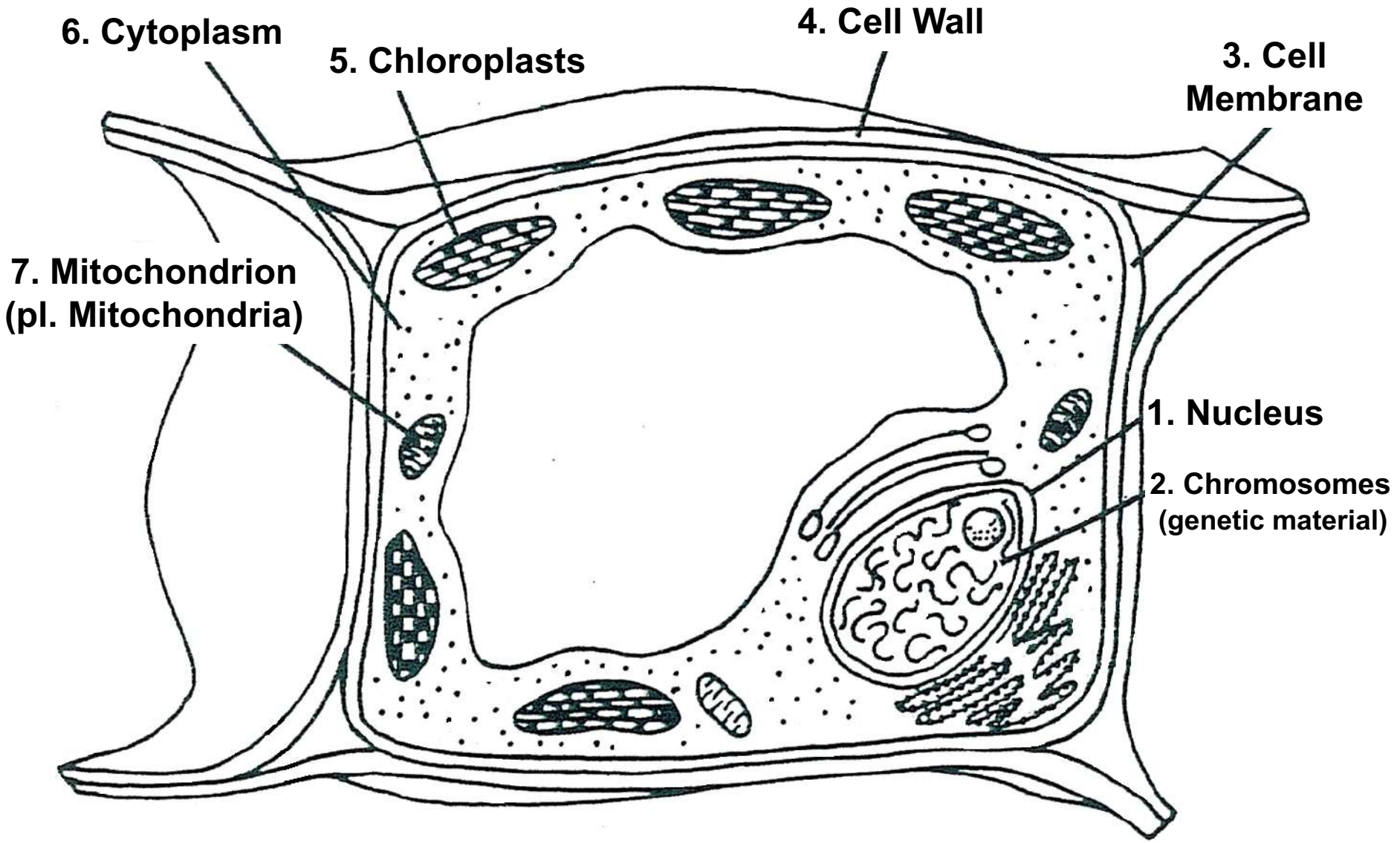


Use the Plant and Animal Cell Diagrams to Label Organelles



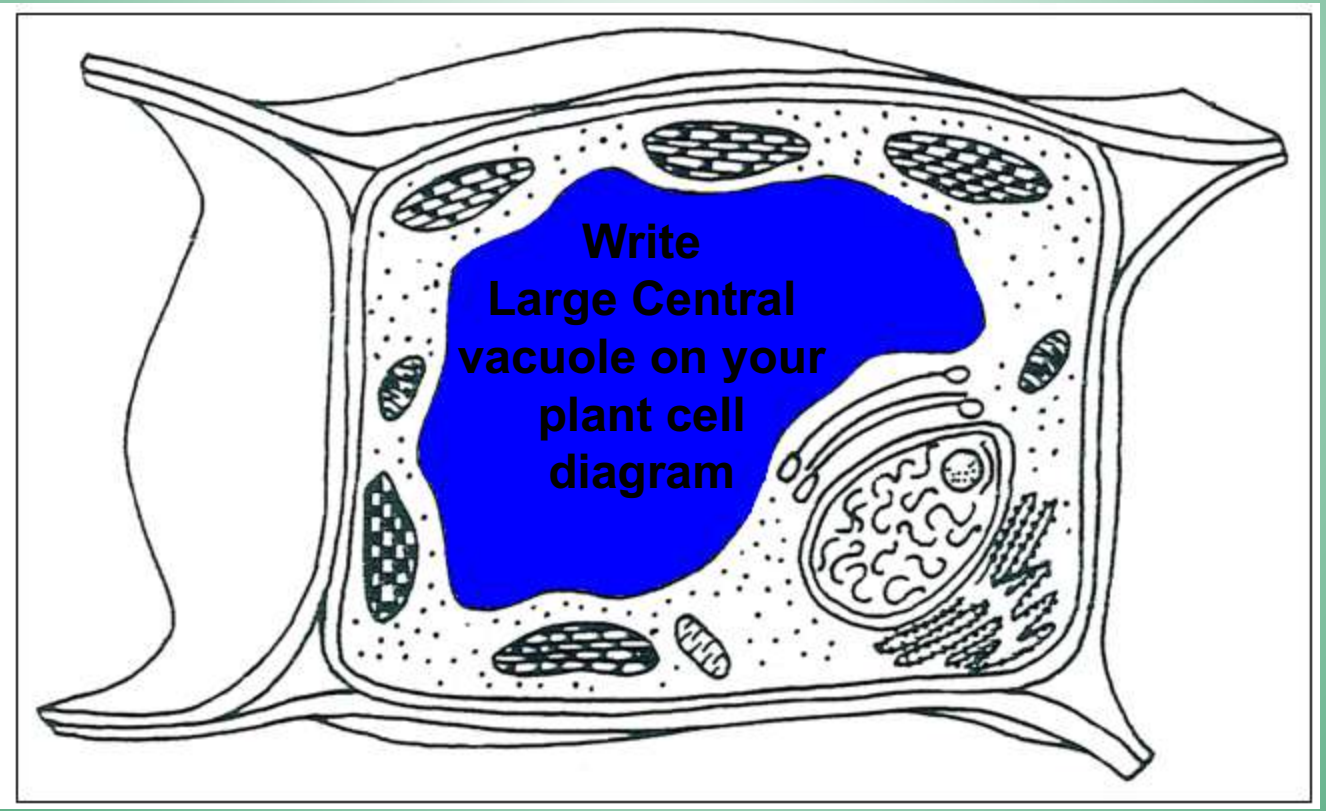


Plant Cell

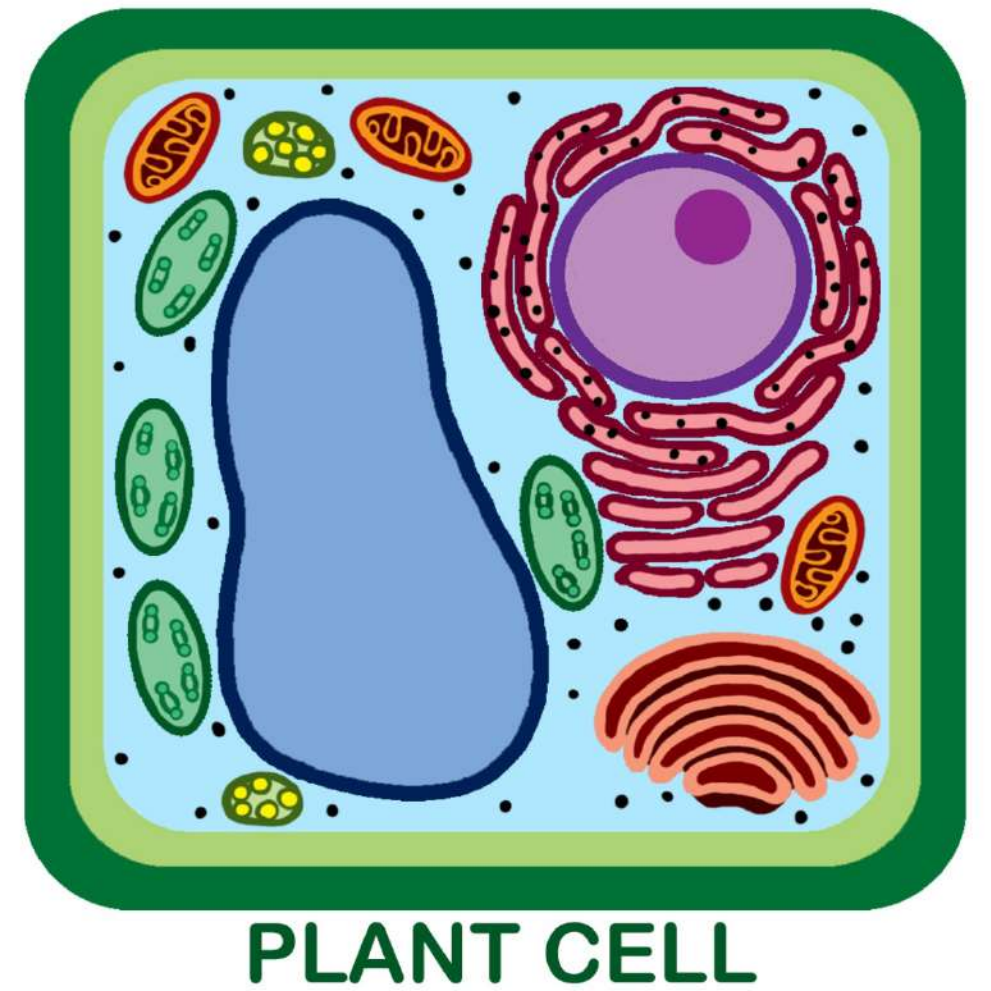

6. Cytoplasm
5. Chloroplasts
4. Cell Wall
3. Cell Membrane
7. Mitochondrion (pl. Mitochondria)
1. Nucleus
2. Chromosomes (genetic material)

Plant Cells have another organelle that varies from animal cells: Large Central Vacuole.

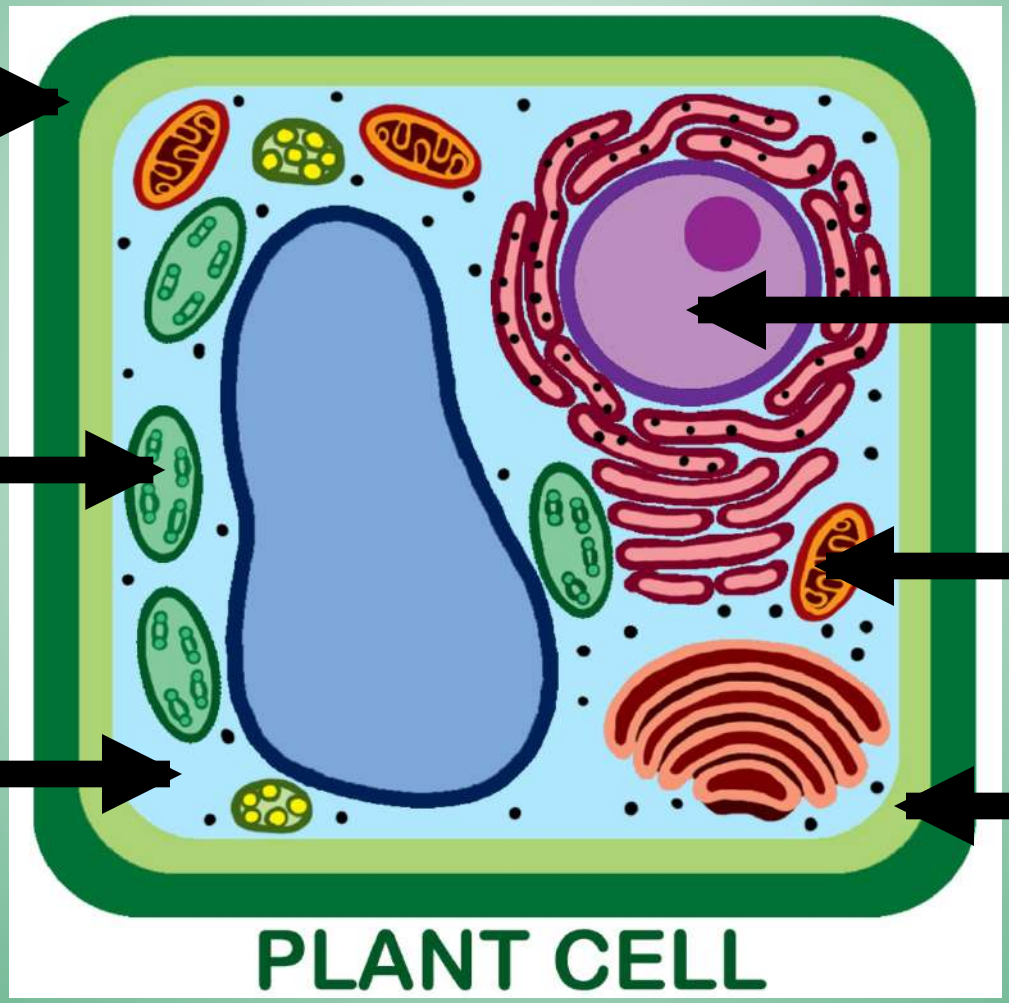
Look at the colored organelle below. Can you guess the function of the Large Central Vacuole?



Cell diagrams often vary. Let's look at another diagram of a Plant Cell for similarities.

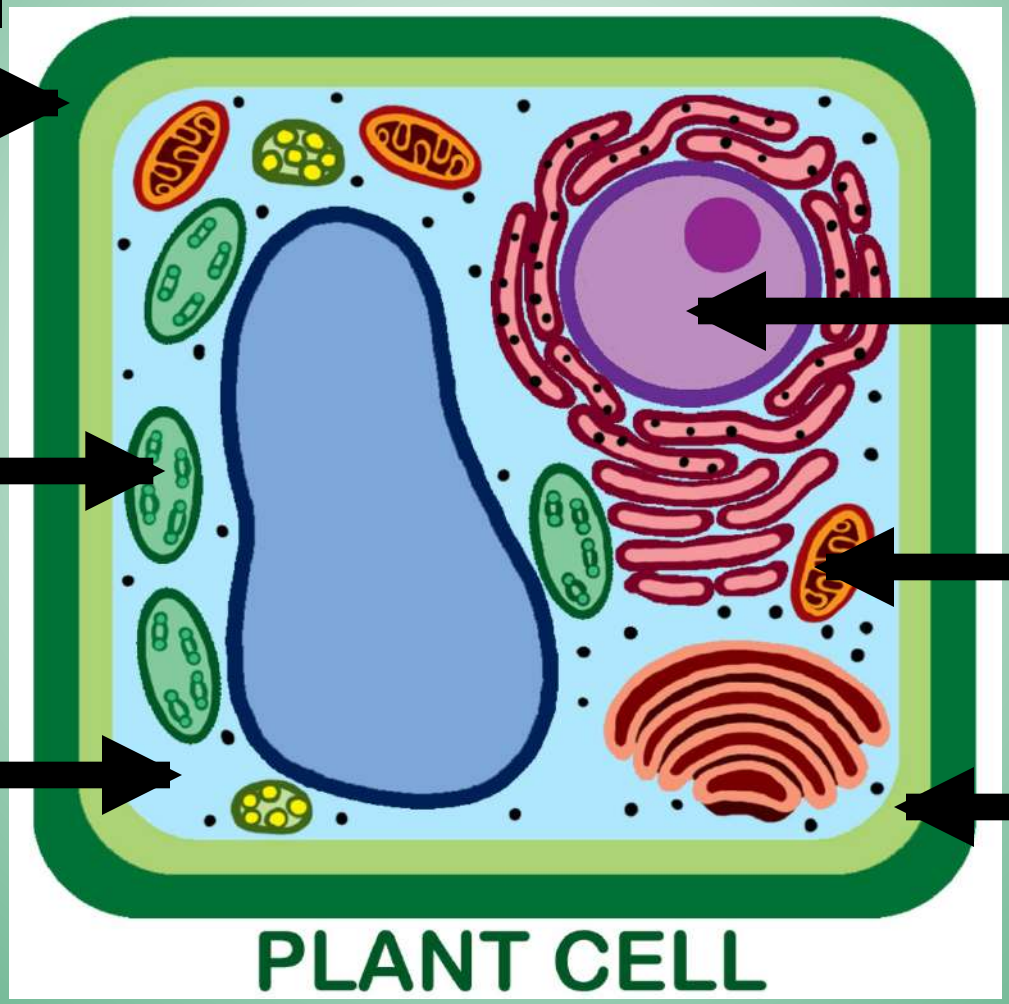


With a seat partner, use your labeled Plant Cell Diagram to identify the organelles of this Plant Cell. Write your answers down.

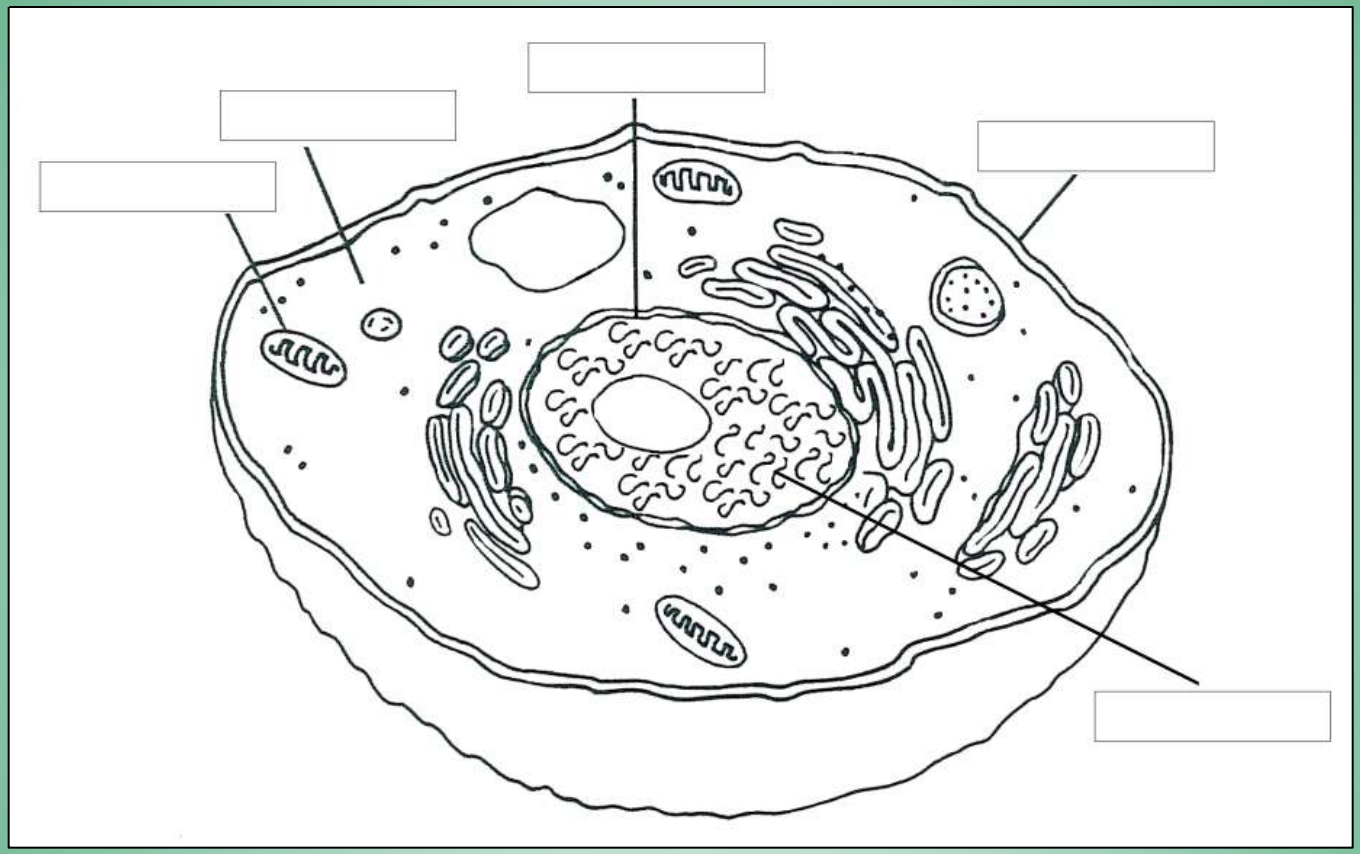


With a seat partner, use your labeled Plant Cell Diagram to identify the organelles of this Plant Cell.
Be ready to explain how you know.

What did we miss?

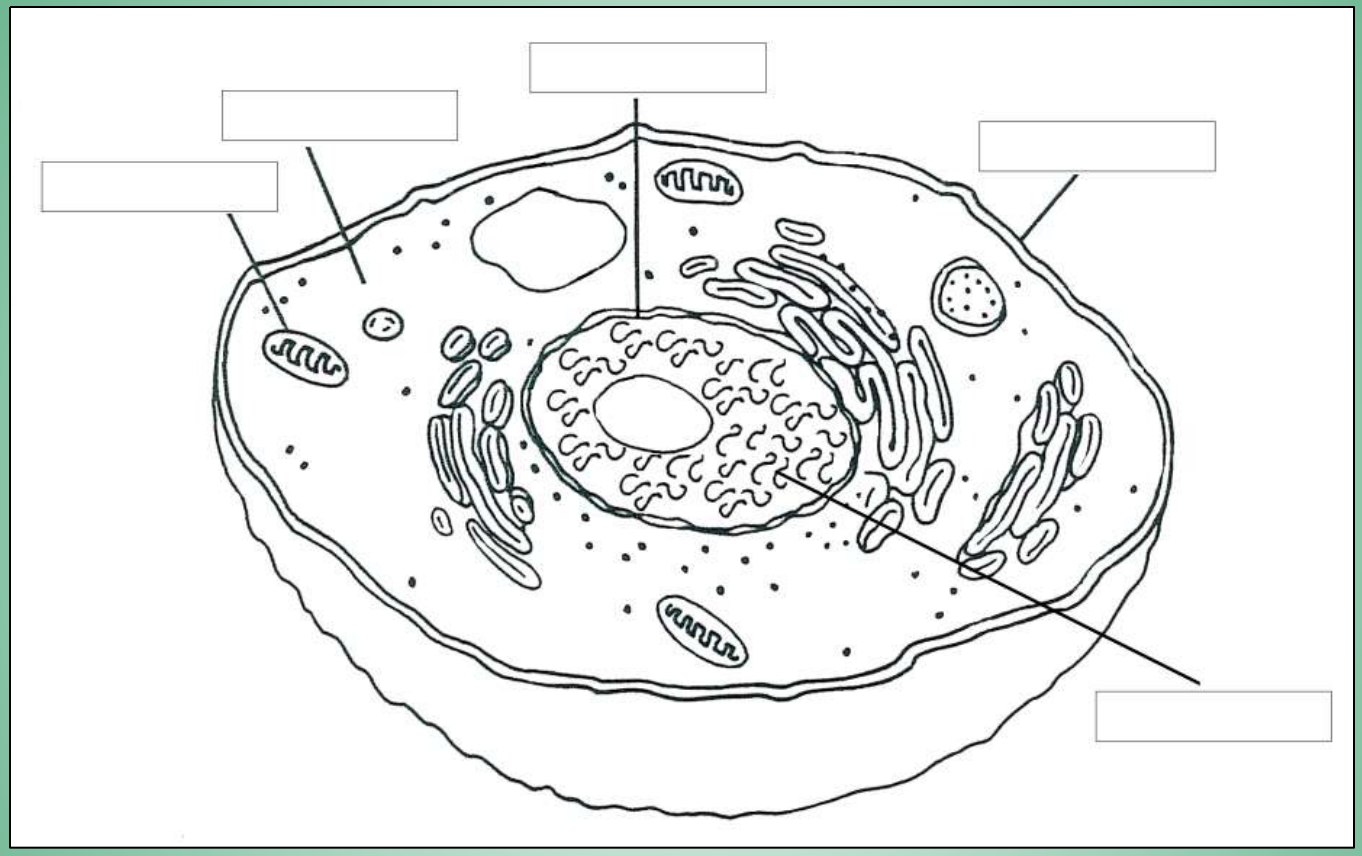


Animal Cell



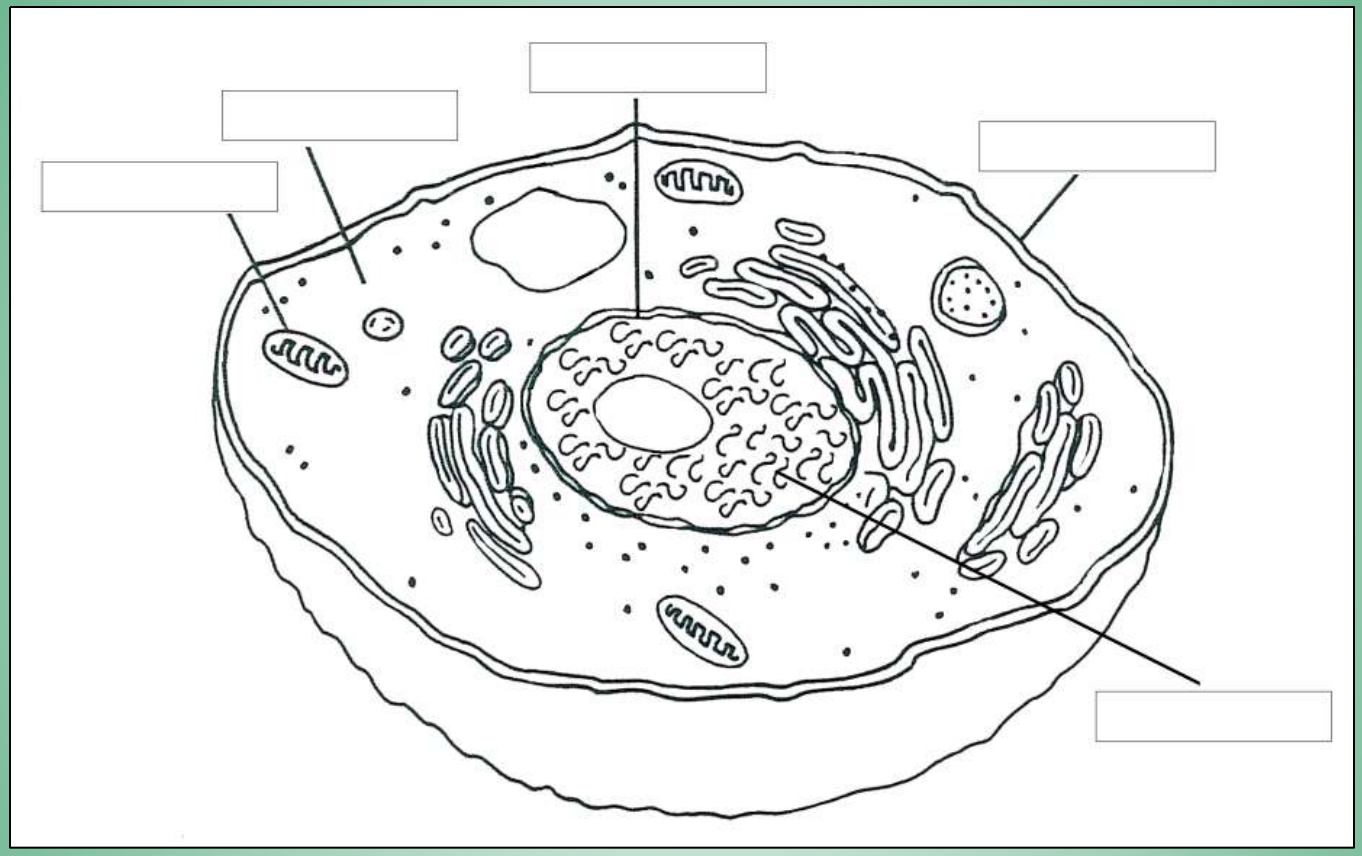
Before we begin to label Animal Cell Organelles, what are some of the similarities with a Plant Cell?

Animal Cell



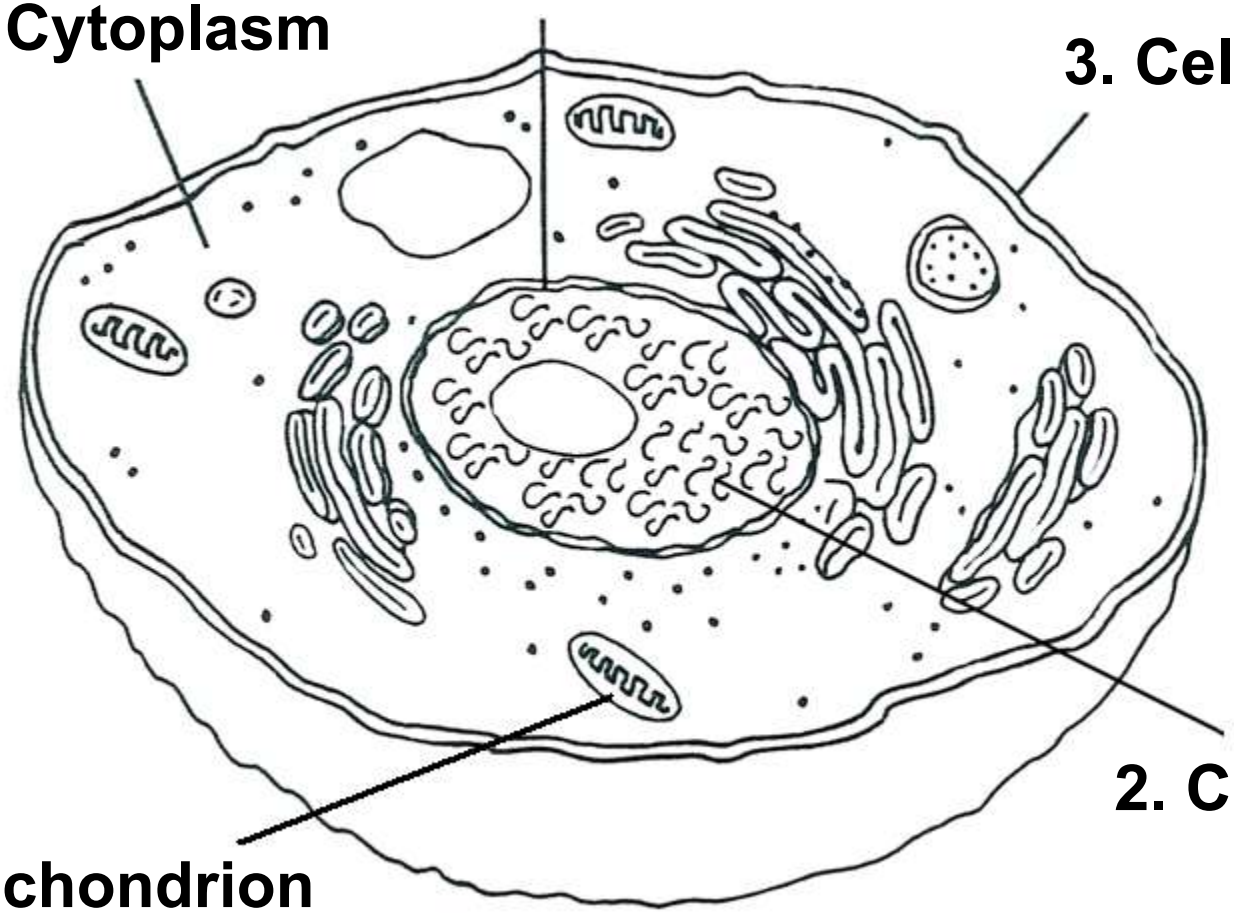
With a PENCIL, write in your guess of the animal cell organelle name.

Animal Cell



Let's Check your Answers.

Animal Cell


1. Nucleus
4. Cytoplasm
3. Cell Membrane
2. Chromosomes
5. Mitochondrion

View Inside a Cell

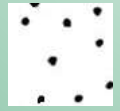
http://learn.genetics.utah.edu/content/cells/insideacell/

Activities for Reviewing Cell Organelles:

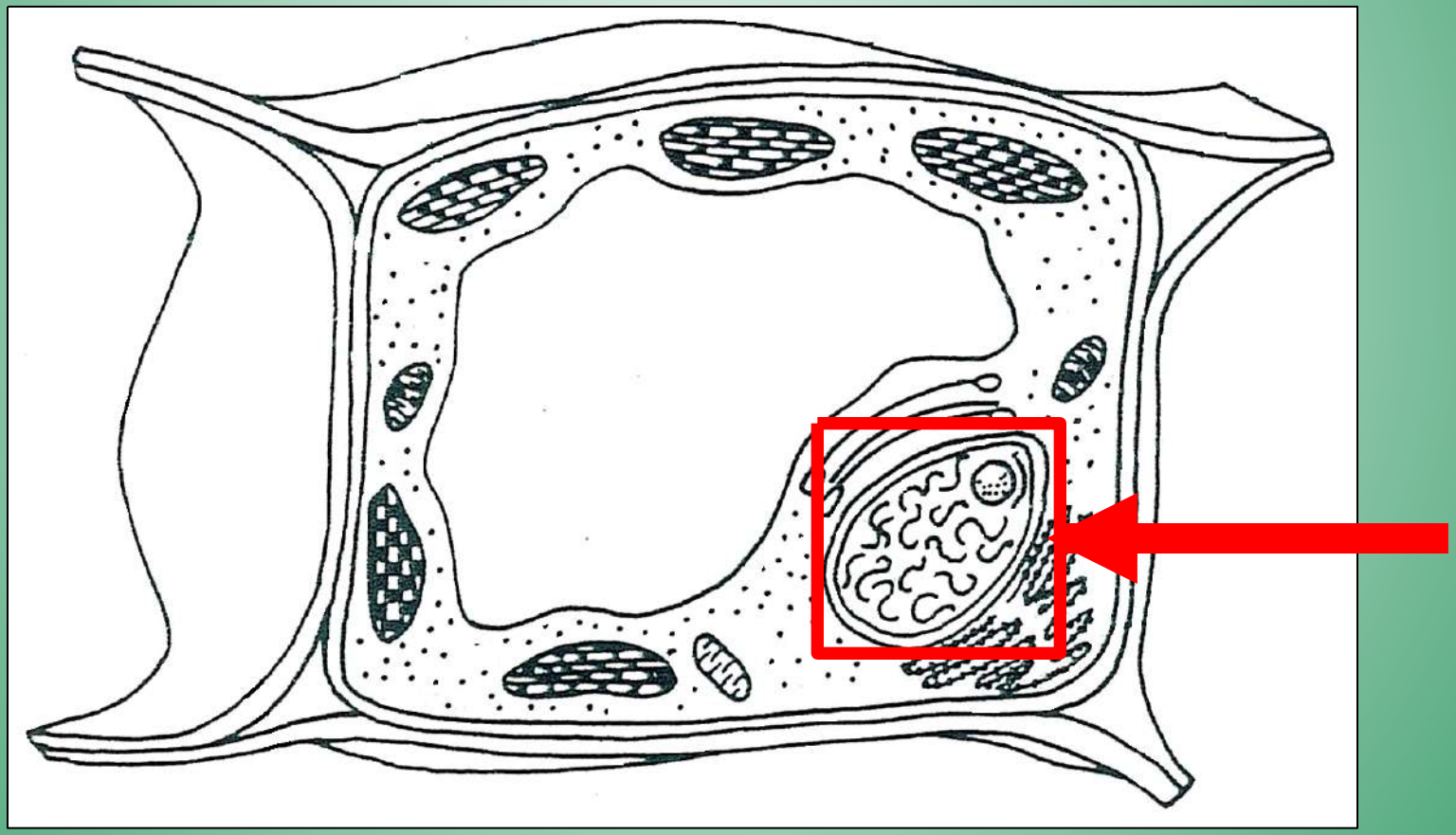
- Onion and Cheek Cell Lab or view microscope slides of cells [if not done with EQ 1]
- Cell Organelle Match
- Cell Diagram Variation Worksheet
- QR Codes Cell Organelle Review
- Give students an unlabeled cell diagram and have them work in pairs to quiz each other
- Cell Organelle Slipcover - Put unlabeled cell diagrams in clear slipcovers. Give each student a slipcover, vis-à-vis or expo marker, and paper towel (a sock is also good and cheaper). Call out cell organelles and have students circle the organelle and hold up their slipcover when instructed.
- Alien Cell Writing Assignment

Use the Cell Organelle Function Chart to record the “job” of each plant cell organelle.

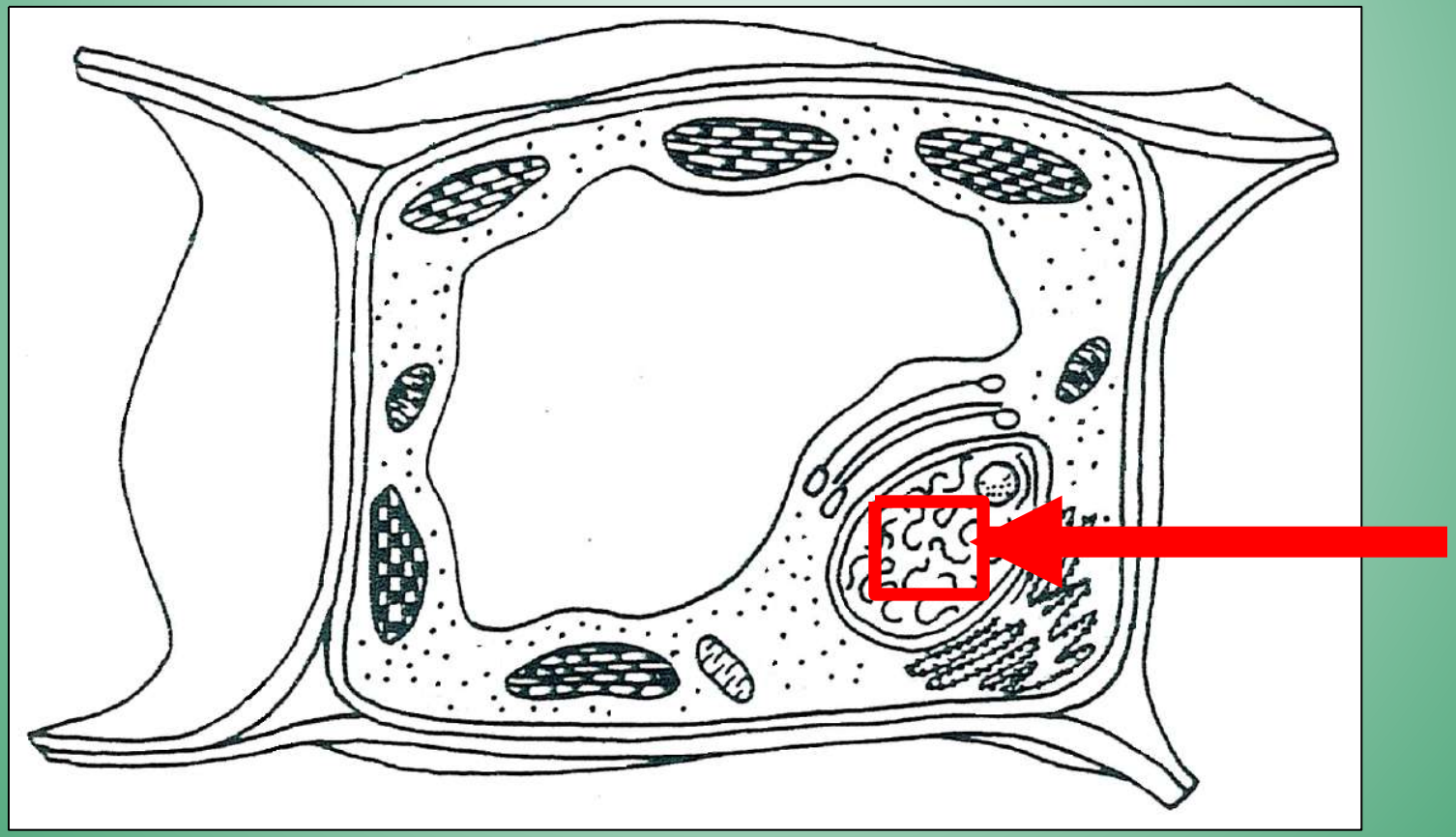
Organization of Living Things: Cell Organelle Functions Name_____ Date _____ Period ____

Cell Organelle	Diagram	Function
Nucleus		
Chromosomes (genetic material)		
Cell Membrane	 **Inside Lining**	
Cell Wall Plant Cells ONLY	 **Outside Lining**	
Chloroplasts Plant Cells ONLY		
Cytoplasm	 **Substance between all organelles**	
Mitochondrion (pl. Mitochondria)		

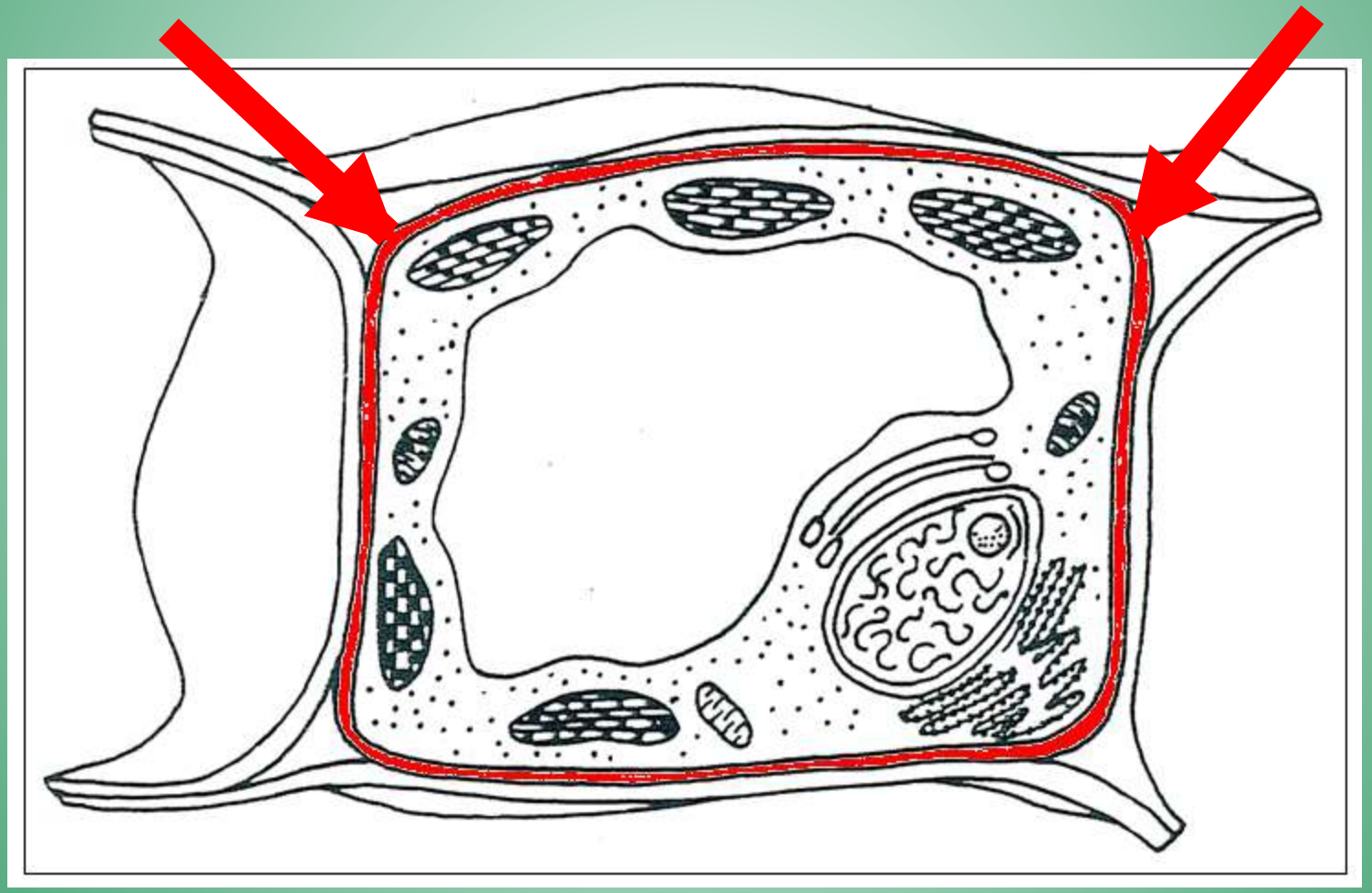
Nucleus – Control Center of the Cell; controls the functions within the cell and contains the genetic material



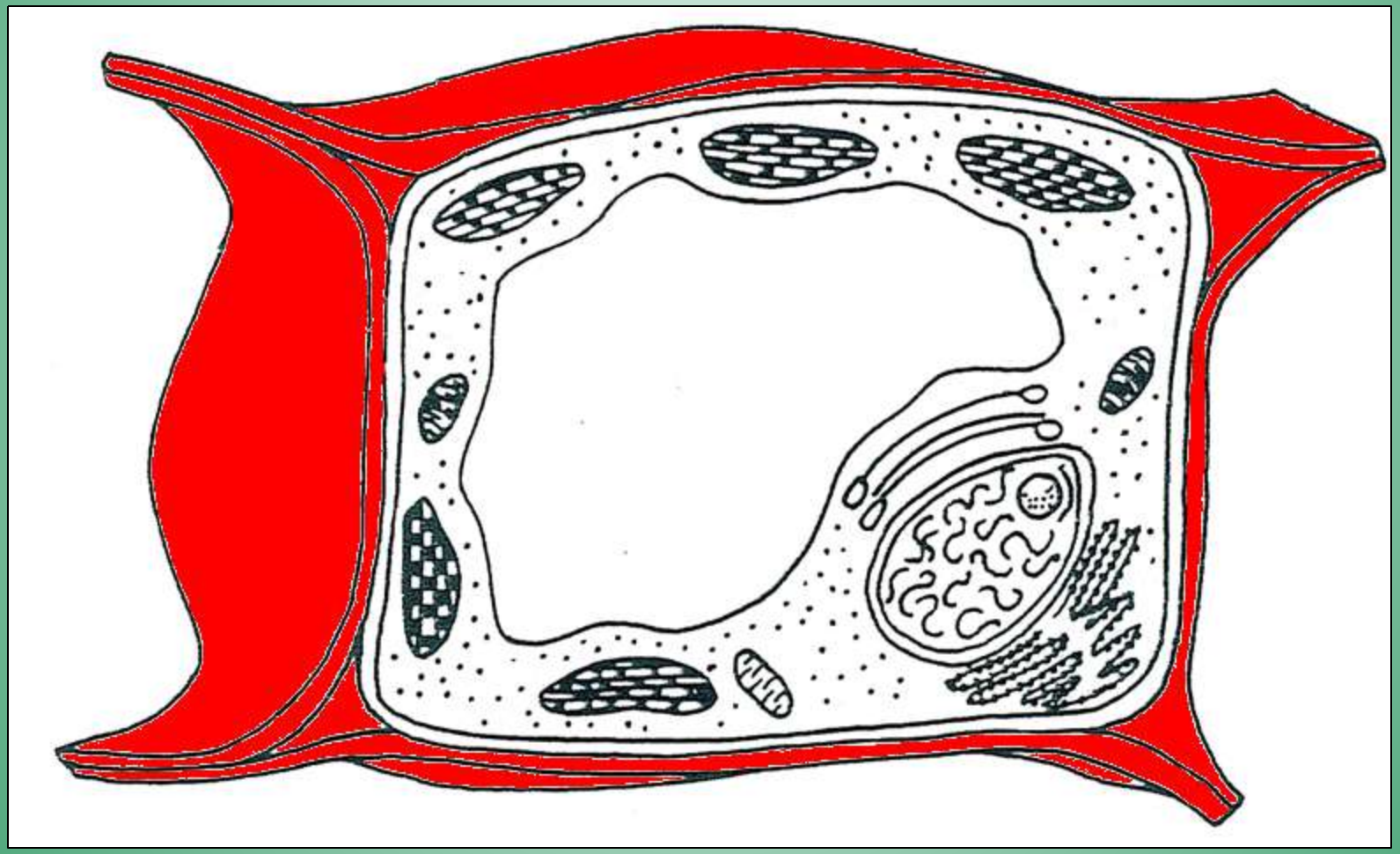
Chromosomes – Physical structures in a cell that contain the cell's genetic material which provides instructions for the cell's functions (more to come in next unit).



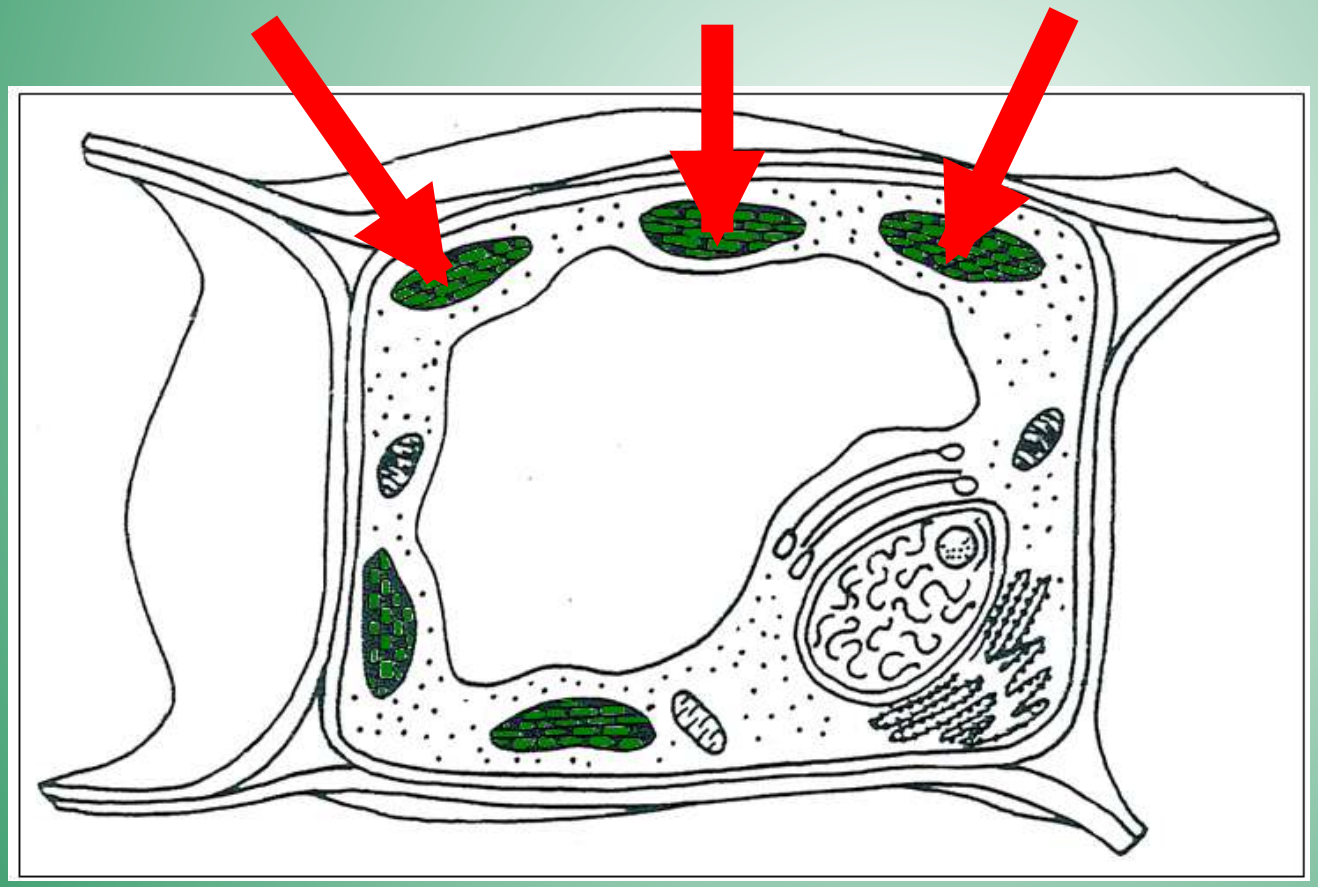
Cell Membrane – semi-permeable membrane that forms the boundary of the cell and controls what comes in and goes out of the cell.



Cell Wall – Provides additional structure and support for cells.



Chloroplast – found in cells that contain chlorophyll and uses light energy to make food for the cell.

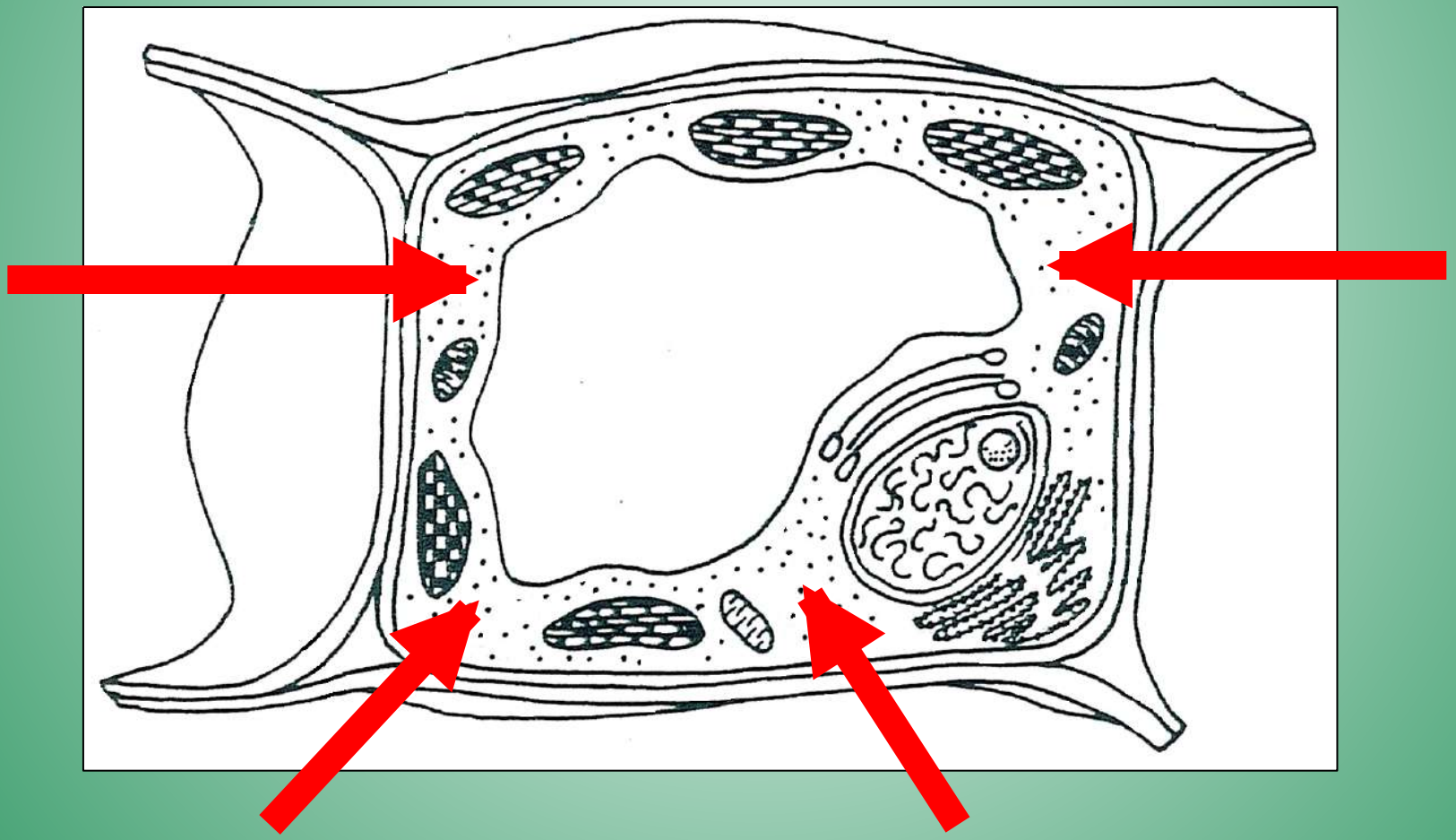


Notice that the Chloroplasts in this diagram are shaded green.

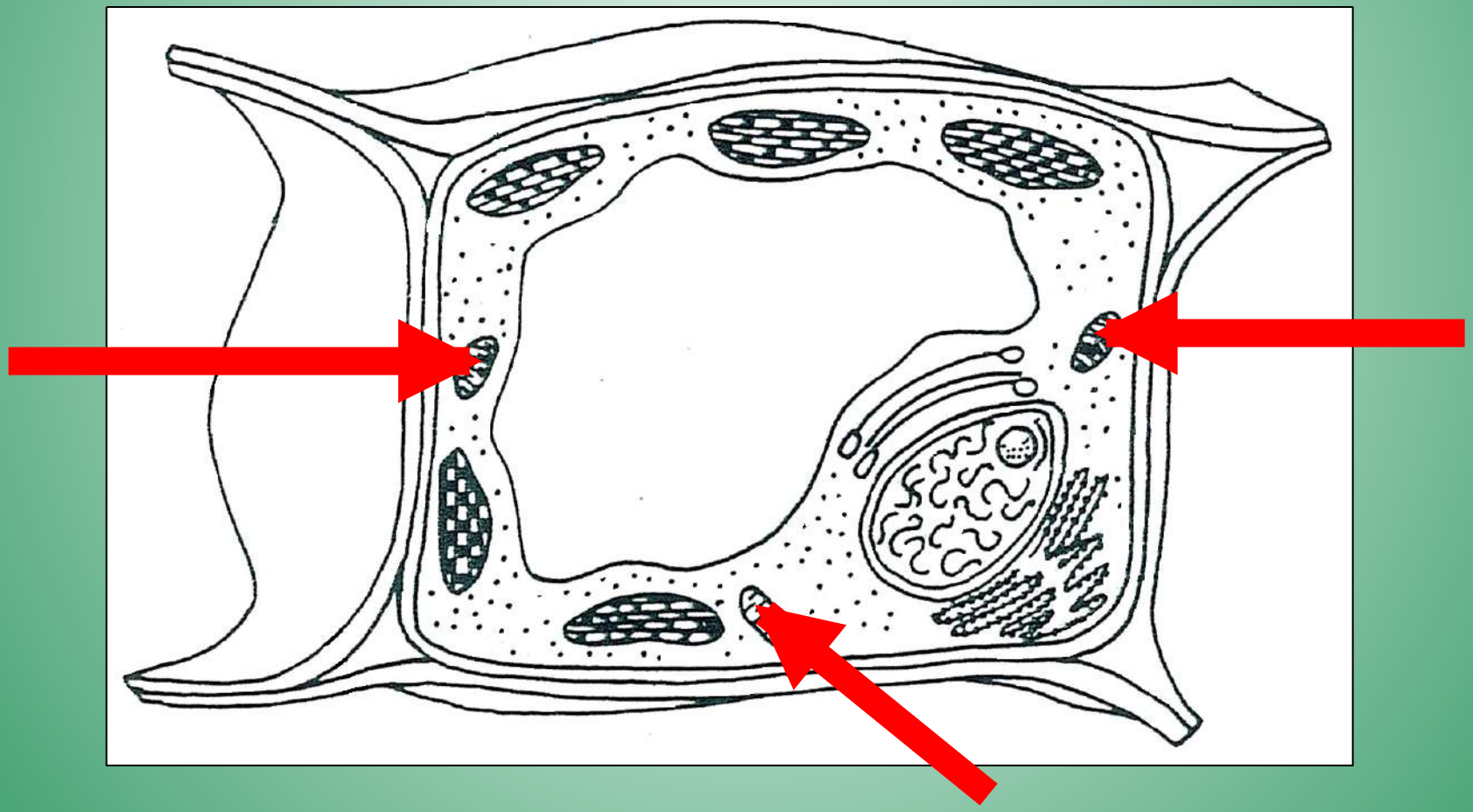
Can anyone tell me why?

The Chlorophyll in the Chloroplasts makes them appear green.

Cytoplasm – Gel-like substance that nutrients move through in the cell and also acts as a shock absorber.



Mitochondria (singular Mitochondrion) Breaks down material and releases energy into the cell.



After recording the function (job) of each cell organelle, come up with a way to help remember each cell organelle and its function. Use the “Idea for Remembering” column to write your ideas.

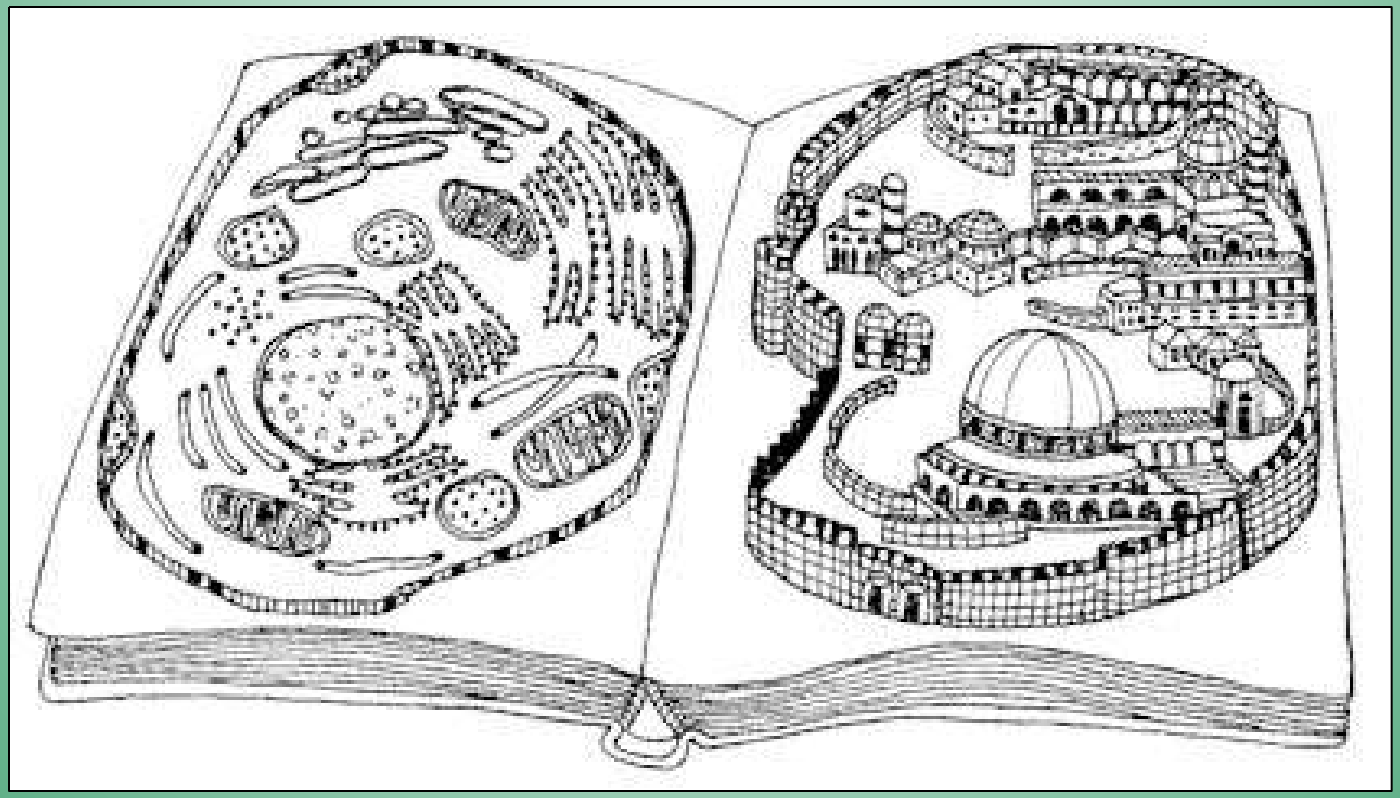
Organization of Living Things: Cell Organelle Functions Name_____ Date _____ Period ____

Cell Organelle	Diagram	Function	Idea for Remembering?
Nucleus			
Chromosomes (genetic material)			
Cell Membrane	 Inside Lining		
Cell Wall Plant Cells ONLY	 Outside Lining		
Chloroplasts Plant Cells ONLY			
Cytoplasm	 Substance between all organelles		
Mitochondrion (pl. Mitochondria)			

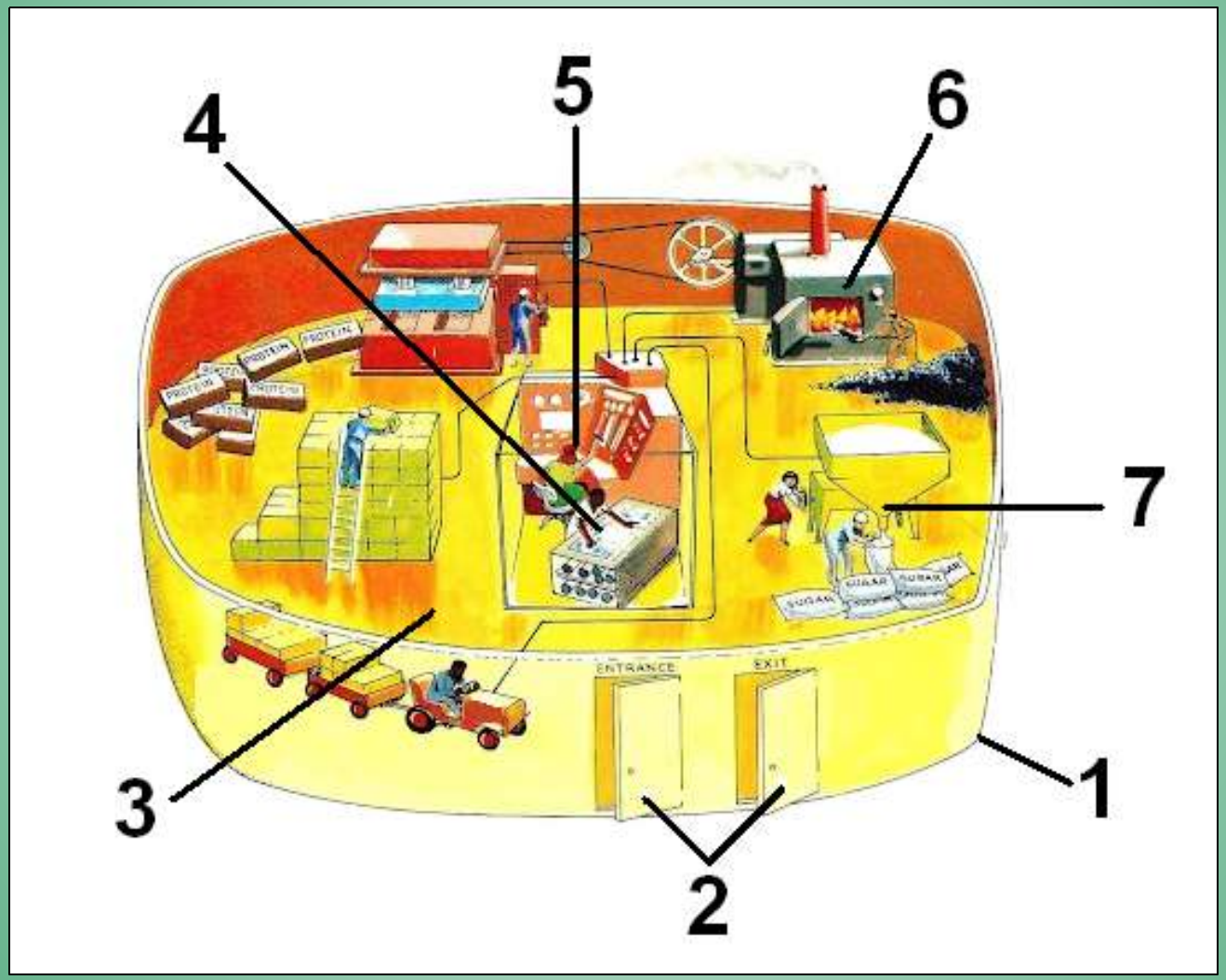
Brain Pop Video on Cell Structures and Function

http://glencoe.mheducation.com/sites/dl/free/0078778425/164155/00035804.html

Cell Analogies are often used to help understand the functions of cell organelles.



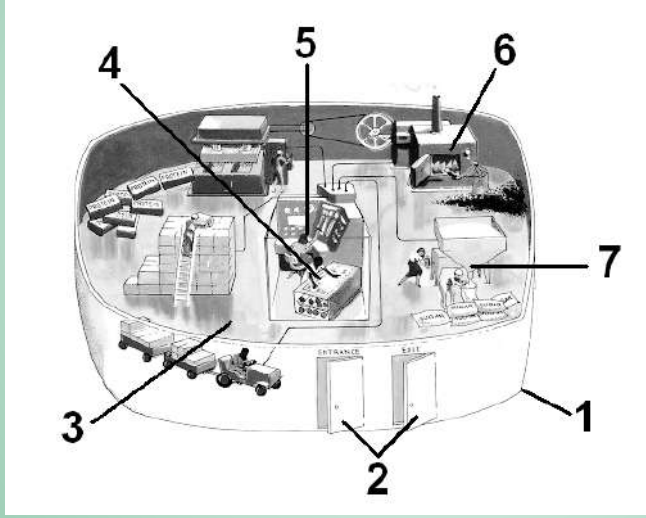
Cell Organelle Analogy: Factory



Use the Cell Analogy Handout to Record your Answers.

Cell Organelle Analogies Name _____ Date _____ Period ___

Part I: With a partner, identify which cell organelle is similar to each factory job.

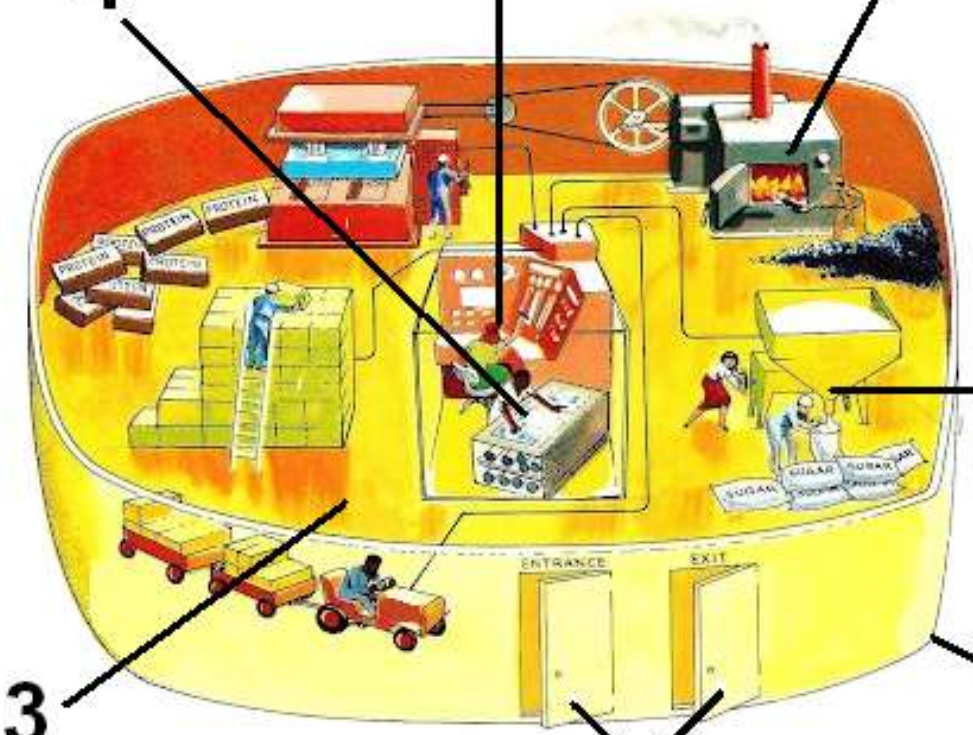


What type of cell? _____

How do you know? _____

Part II: Identify which cell organelle is similar to each part of the “cell city” below.

Cell Organelle Analogy: Factory



Chromosomes

4

Nucleus

5

Mitochondria

6

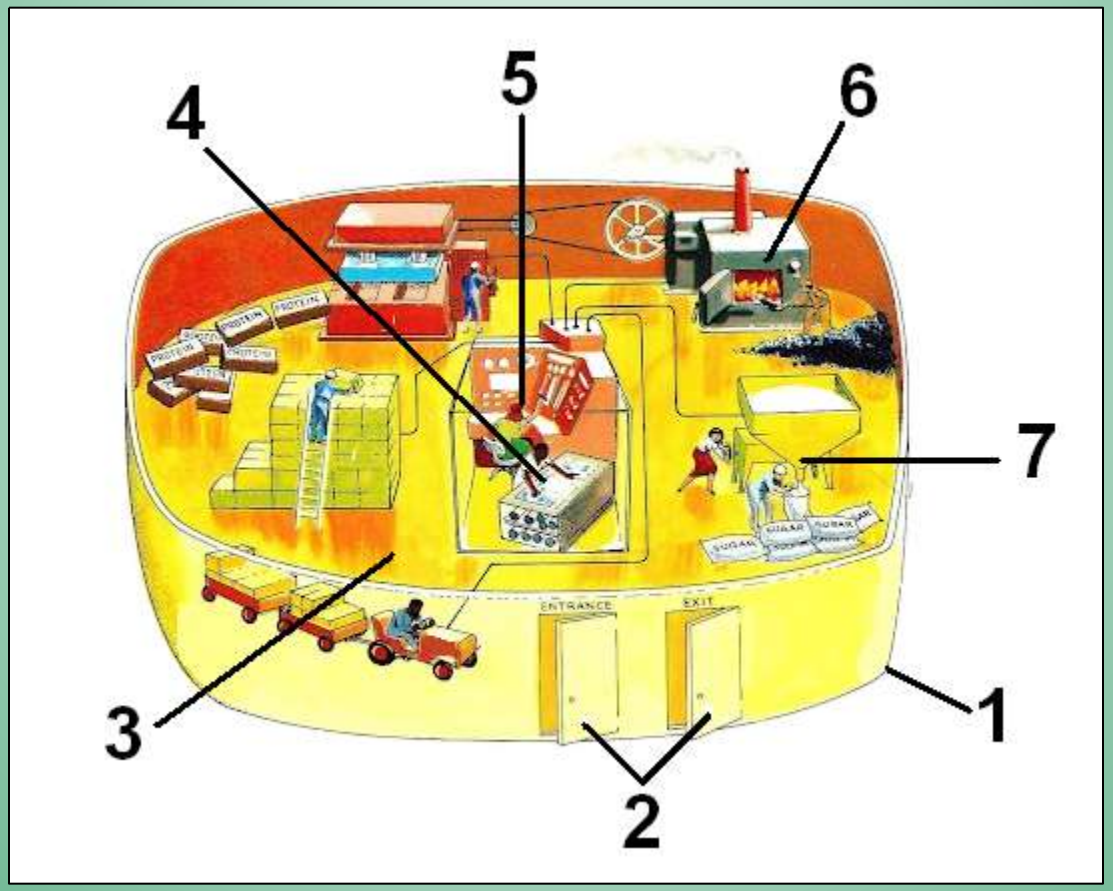
7 Chloroplast

3 Cytoplasm

1 Cell Wall

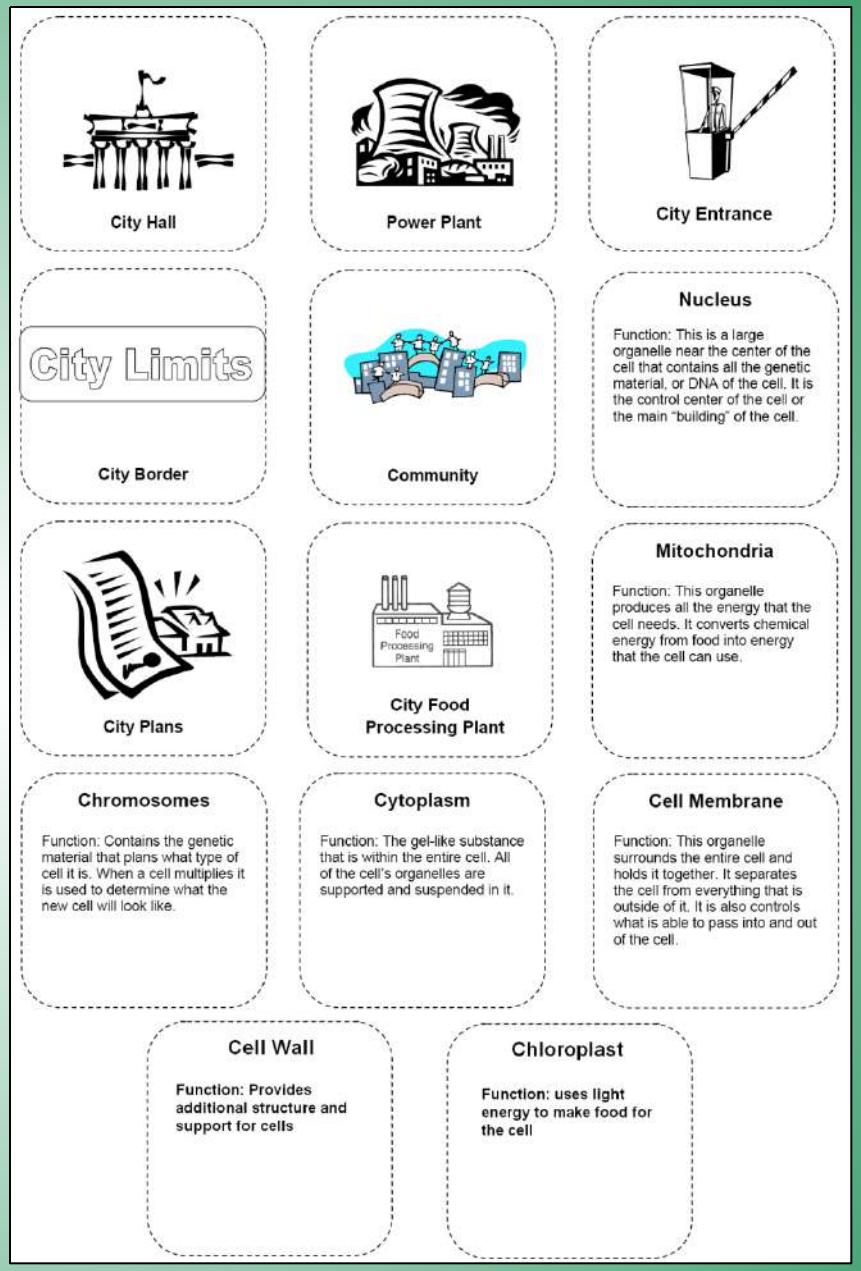
2 Cell Membrane

What type of Cell is this? How do you know?



Cell Organelle Analogy: City Matching Cards Activity

After completing the activity, do Part II of the Cell Analogies handout.



Cell Organelle Songs
[select one or two]

- The Cell Song
- Cells, Cells Parts of the Cell Rap
- http://youtu.be/BTicXXxzQA4
- Cell Song to the tune of “The Lion Sleeps Tonight”

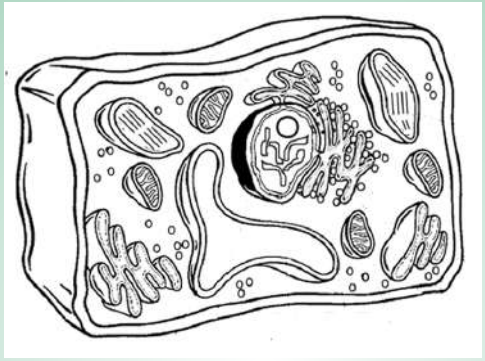
Activities to Review Cell Organelles and Functions

- Cell Organelle Tic-Tac-Toe
- Cell Organelle STUDY [BINGO]
- Cell Ball [see resources]

Cell Organelle Summarizer

Cell Organelle Summarizer Name _____ Date _____ Period ___

Label the following organelles on the diagram below: Cell Wall, Cell Membrane, Nucleus, Chromosomes, Chloroplast, Mitochondrion, Cytoplasm.



Match the organelles below to their correct function.

___ 1. Nucleus	A. Control Center of the Cell
___ 2. Cell Wall	B. Uses light energy to make food for the cell
___ 3. Cytoplasm	C. Provides additional structure and support for cells
___ 4. Chloroplast	D. Breaks down material and releases energy into the cell
___ 5. Mitochondria	E. Gel-like substance that nutrients move through in the cell
___ 6. Chromosomes	F. Physical structures in a cell that contain the cell's genetic material
___ 7. Cell Membrane	G. Forms the boundary of the cell and controls what comes in and goes out of the cell