

Unit 4: Cells, Tissues, Organs & Systems

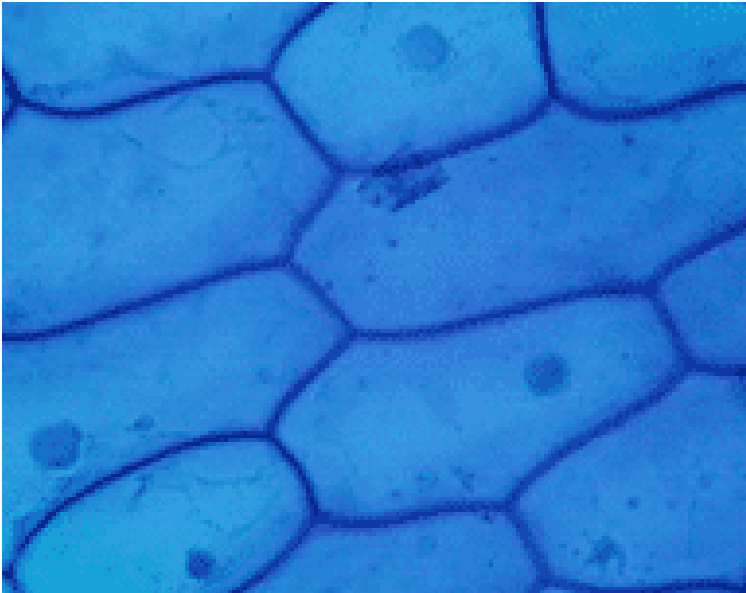
Chapter 10: ***“The cell is
the basic unit of life.”***

Cells & Living Things

What are living things made of?

Early idea: all living things are made of air, fire and water

Now: all living things are
made of cells (cell theory)



Cell: *the
basic,
functional
unit of life*

Characteristics of Living Things

All living things...

1. Grow
2. Move
3. Respond to stimuli
4. Reproduce

Growth

- A result of the cells in your body increasing in number
- New cells will grow to replace old cells that die.

Movement

- A change in position, shape or **location (locomotion)**



Respond to Stimuli

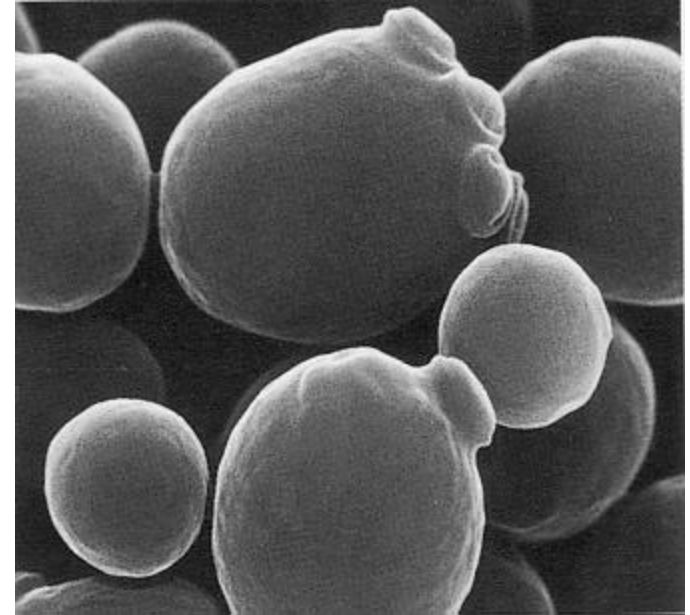
- **Stimulus**: anything that causes an organism to react.
- Maybe external or internal



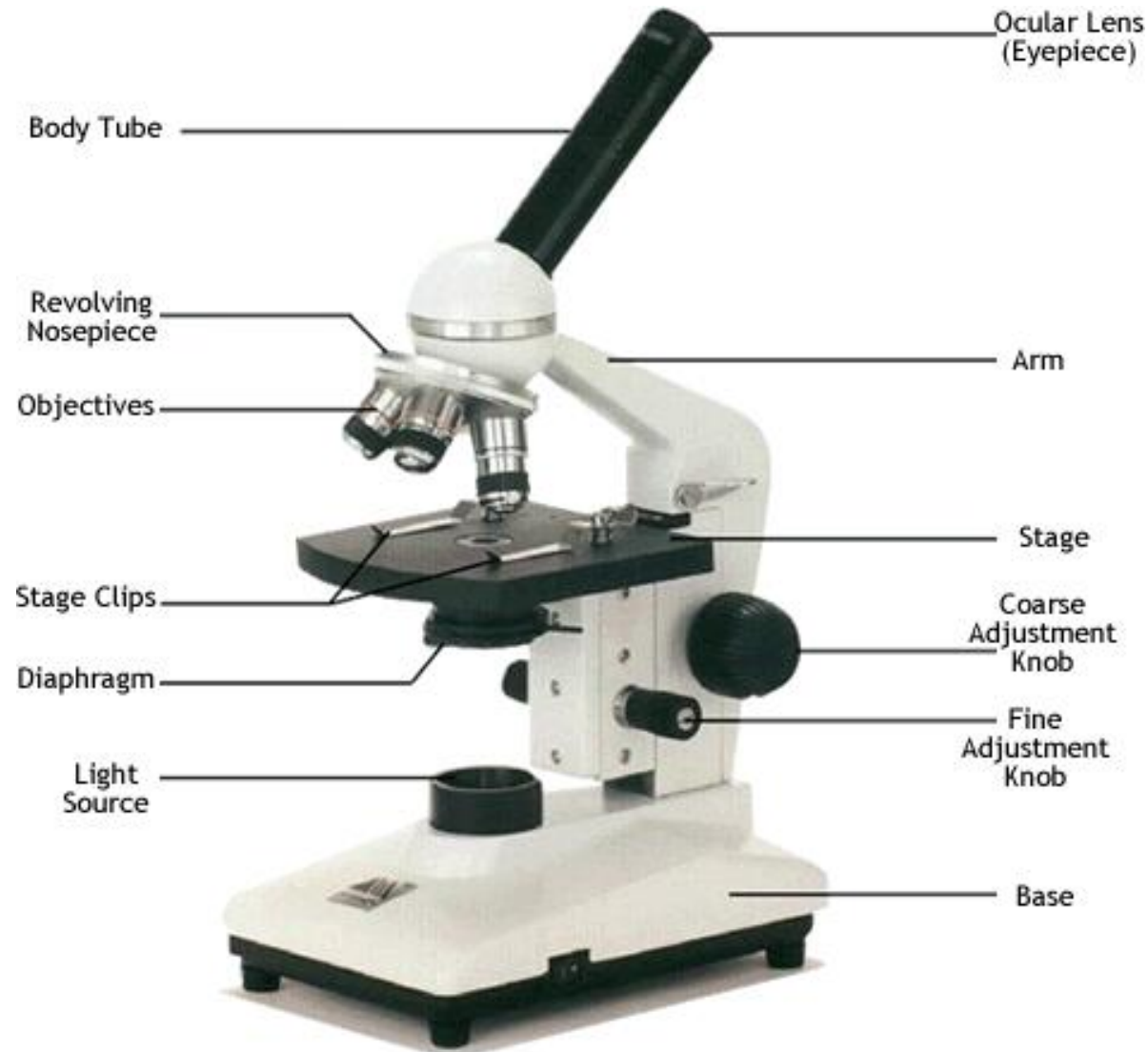
Identify the stimulus & response

Reproduction

- Producing more of the same kind (offspring)



The Compound Light Microscope



1.

2.

3.

4.

5.

6.

7.

8.

9.

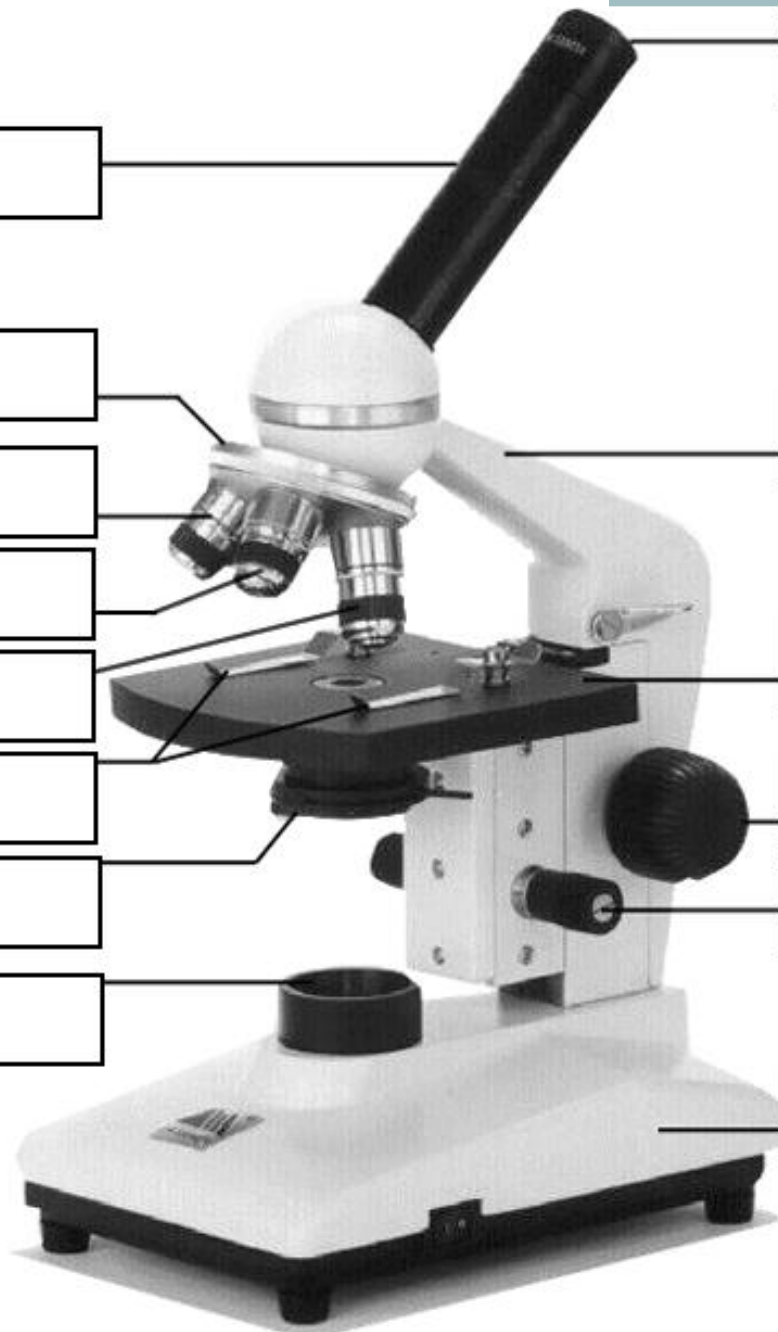
10.

11.

12.

13.

14.



The Compound Light Microscope

PART	FUNCTION
Eyepiece	
Body tube (barrel)	
Coarse adjustment knob	
Fine adjustment knob	
Objective lenses	
Revolving nosepiece	
Stage	
Iris diaphragm	
Light source	
Base	
Arm	

Total Magnification...

power of objective lens



power of eyepiece lens

Core Lab Activity 10-1A

*Setting Up and
Using a Microscope*

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The Cell Theory states:

- The cell is the basic unit of life.
- All living things are made of one or more cells.
- All cells come from other living cells.

Cell Organelles...

Cell membrane:

- Found in both plant and animal cells
- Surrounds and protects the contents of the cell
- Controls the movement of materials in and out of the cell

Cytoplasm:

- Found in both plant and animal cells
- Jell-like fluid that in which the organelles float
- Helps to move materials like food to different parts of the cell

Cell wall:

- Found only in plant cells
- Tough, rigid structure that give plant cells their box-like shape
- Made mostly of cellulose

Nucleus:

- Found in both plant and animal cells
- Large round structure often visible
- Contains the chromosomes
- The “control centre” of the cell

Vacuole:













- Balloon-like spaces in the cytoplasm
- Store materials that can not be used right away
- Found in both plant and animal cells (smaller and more numerous in animal cells)

Mitochondrion:

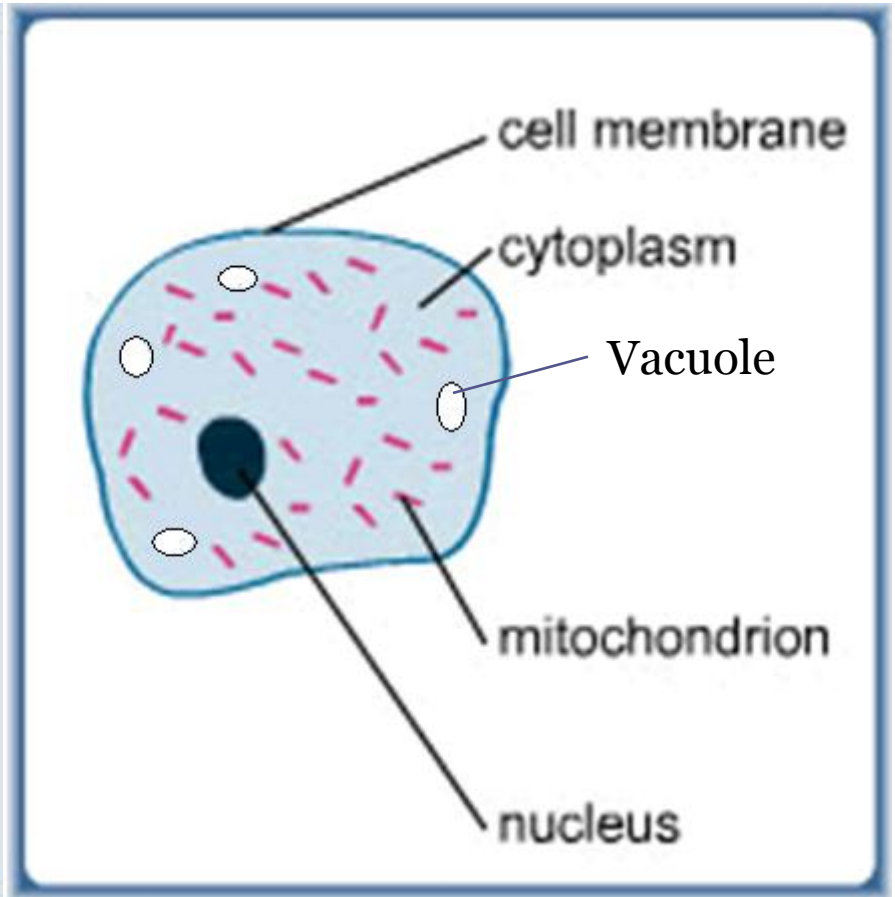
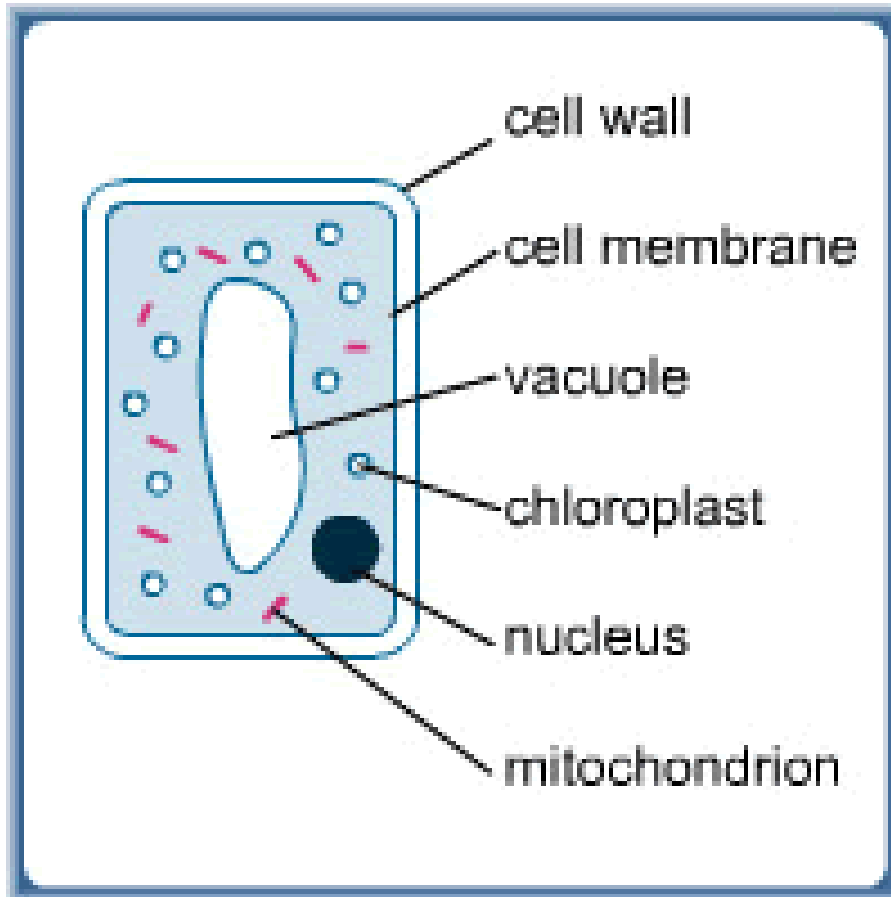
- Oval, bean-like structures
- Produces energy by breaking down food particles
- Found in both plant and animal cells

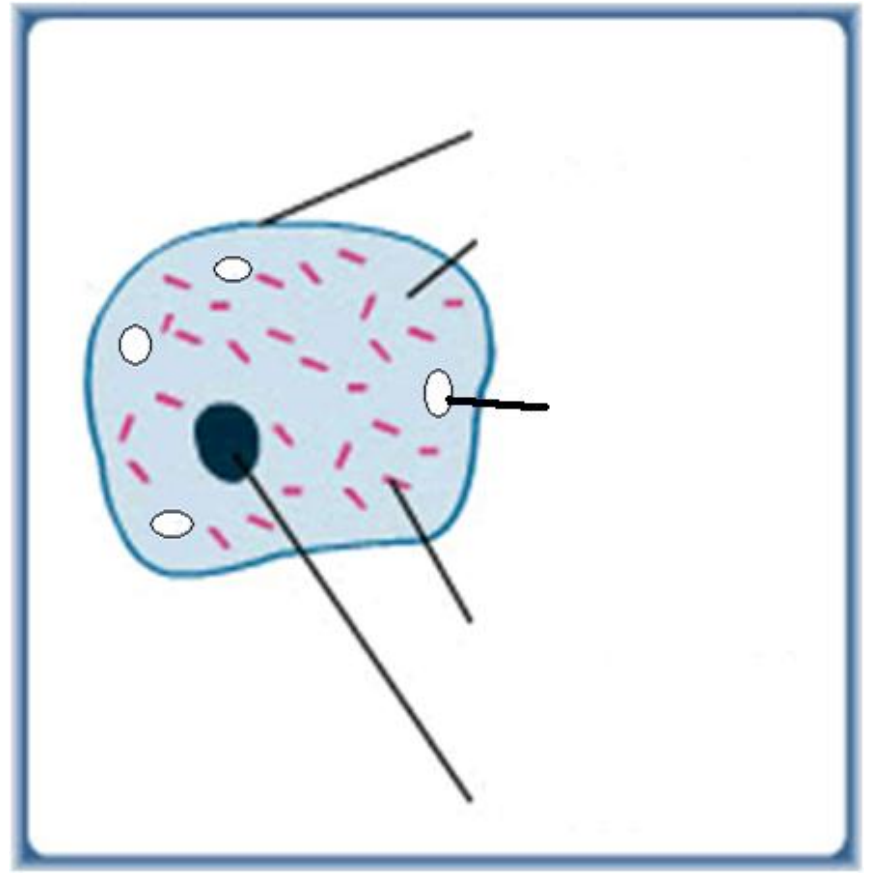
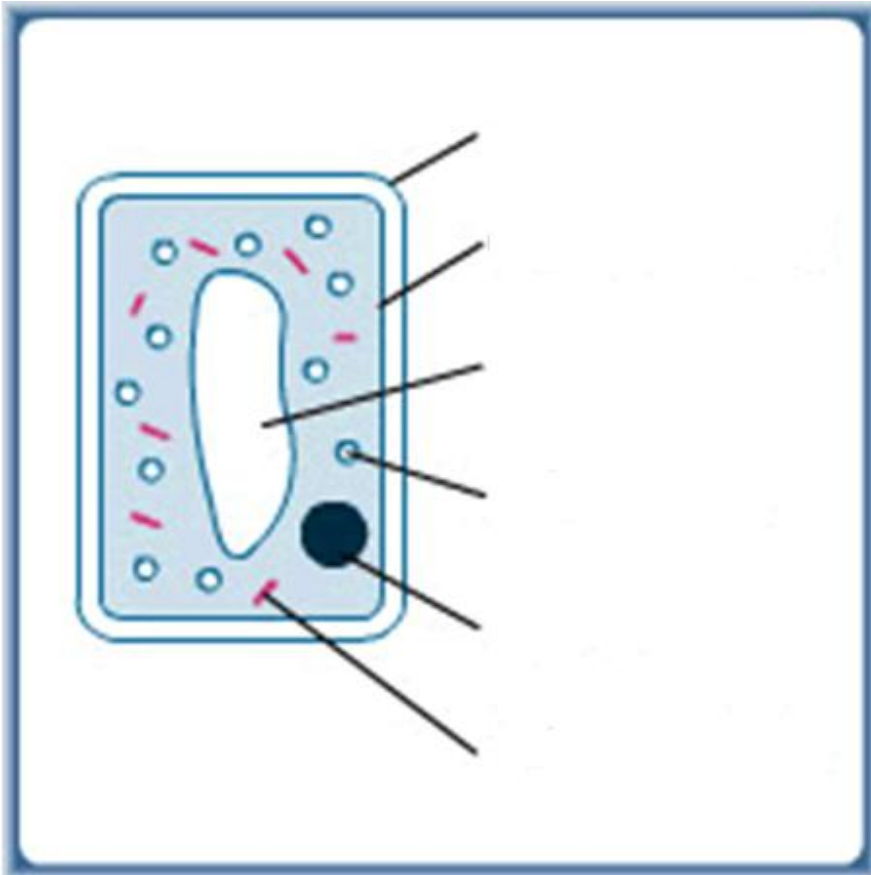
Chloroplast:

- Green structures that contain chlorophyll
- Capture the sun's energy for photosynthesis
- Found only in plant cells

	PLANT	ANIMAL
Cell membrane		
Cytoplasm		
Cell wall	 Brick shape	Round shape
Nucleus		
Vacuole	 Large & few	 Small & many
Mitochondrion		
Chloroplast		

Plant vs. Animal Cells





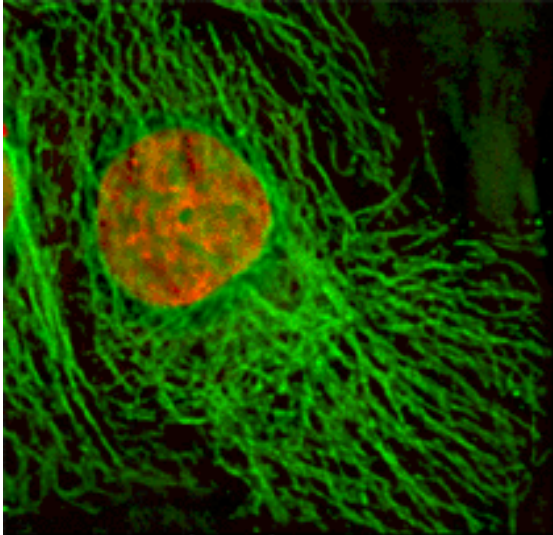
Dividing Cells

- Necessary for growth and reproduction
- Will replace cells that are dead or in need of repair
- How does this happen?

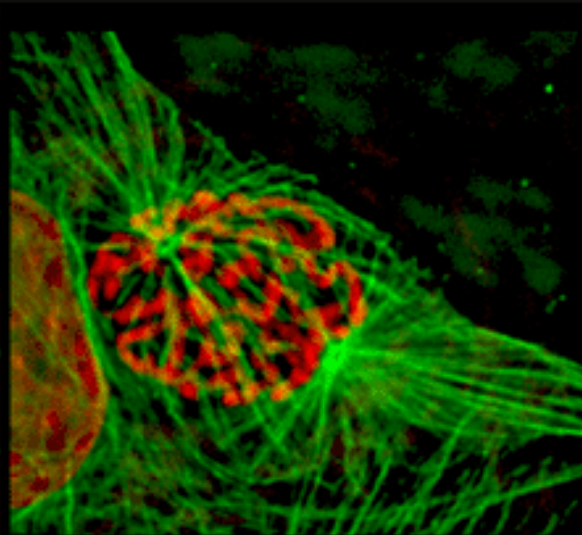
Mitosis

- Occurs in body cells (**somatic** cells) not in sex cells (egg and sperm cells)
- Bacteria cells reproduce in this manner

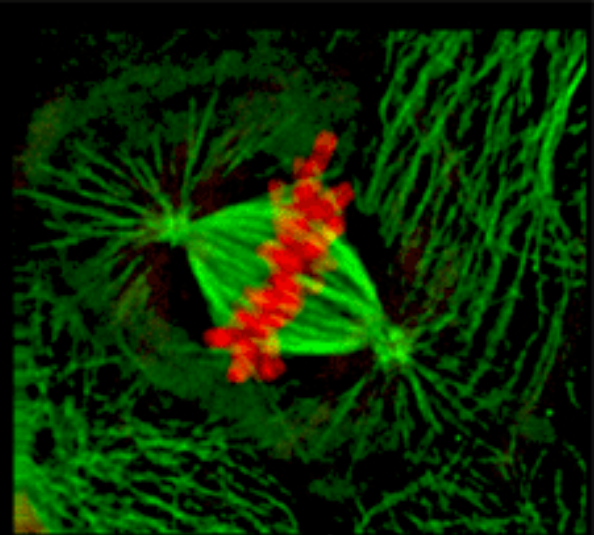




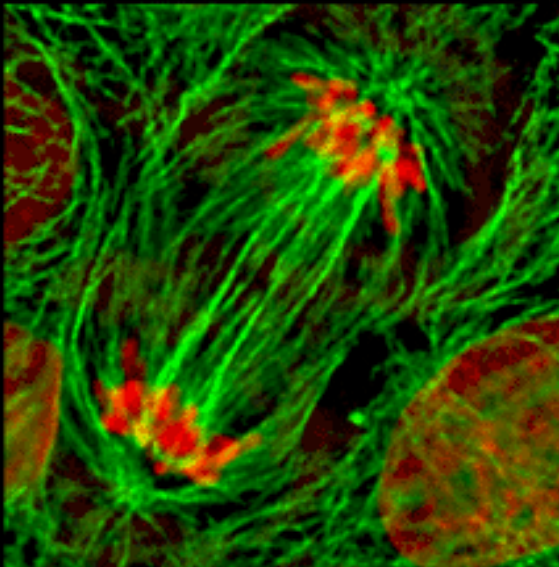
interphase



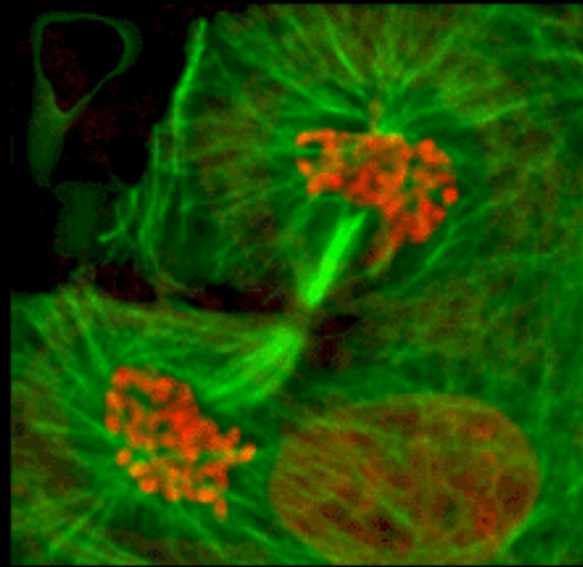
prophase



metaphase



anaphase



cytokinesis

Energy for Cells

- Cells need energy for all life processes.
- Energy is stored in food called **glucose** (a type of sugar)

- To release energy cells must carry out **cellular respiration**. Here the energy is converted to another form of energy.
- Takes place in the **mitochondrion**.

- Most energy is released as heat.
- **Oxygen** is necessary for cellular respiration.
- **Carbon dioxide** and **water vapour** are waste gases produced. These are removed from the cell.