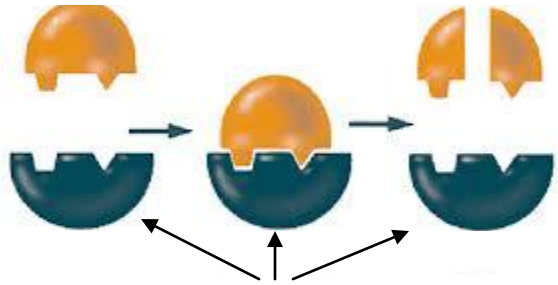
# ***If You See……Look For…….***

## Biochemistry:

Organic Compounds
- Carbon & Hydrogen

Enzymes
- Catalysts
- Affect the rate of chemical reactions

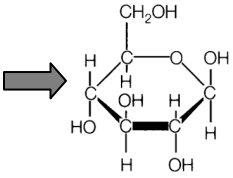


- Remain the same in a reaction

Rate of chemical reactions
- Enzymes or catalysts

DNA
- Nucleic acid
- Nucleotides
- Genetic information

Carbohydrates
- Sugar
- Glucose
- The "RING"



Lipids
- Oils & fats
- Fatty acids

Water
- Inorganic

Protein
- Amino acid

Shape of a protein
- Kind and sequence of amino acids

## Ecology:

Ecology
- *Interactions* between living organisms and their environment.
- *Interactions* between physical and living factors.
- *Interactions* between living and nonliving factors.
- *Interactions* between biotic and abiotic factors.

The Sun
- Energy needed to maintain an ecosystem.
- Primary source of energy

Ecosystem
- Can be altered, then it can recover back to a point of stability.
- Cycled between organisms and the environment
- Must have organisms that carry out autotrophic nutrition
- Population of predators is dependent on the population of their prey

Bacteria & Fungi & yeast & mold

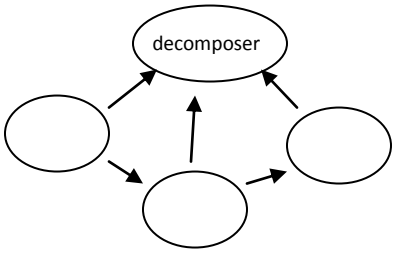
- Nutrient resulting from decomposition.
- Breakdown dead organisms

Fungus can be harmful & beneficial

- Parasite & decomposer

Decomposer in a food web

- Always have *all arrows pointing to it* and *no arrows coming from it*




Biodiversity

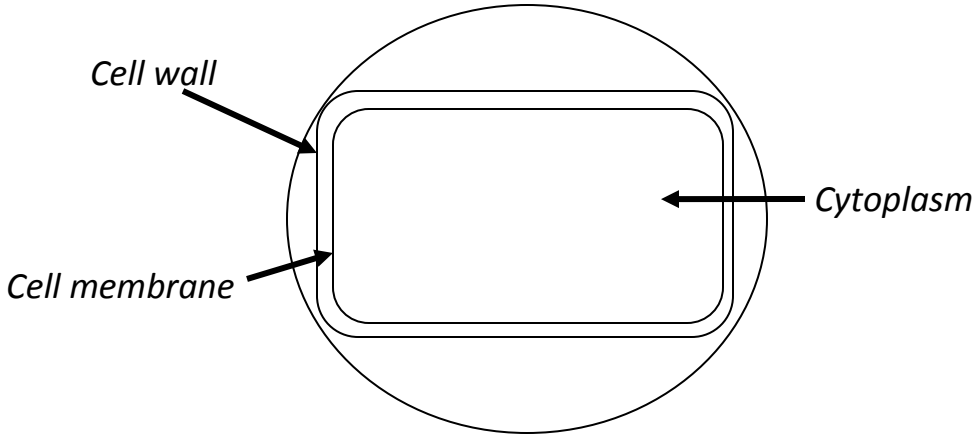
- Natural forest

Scavenger

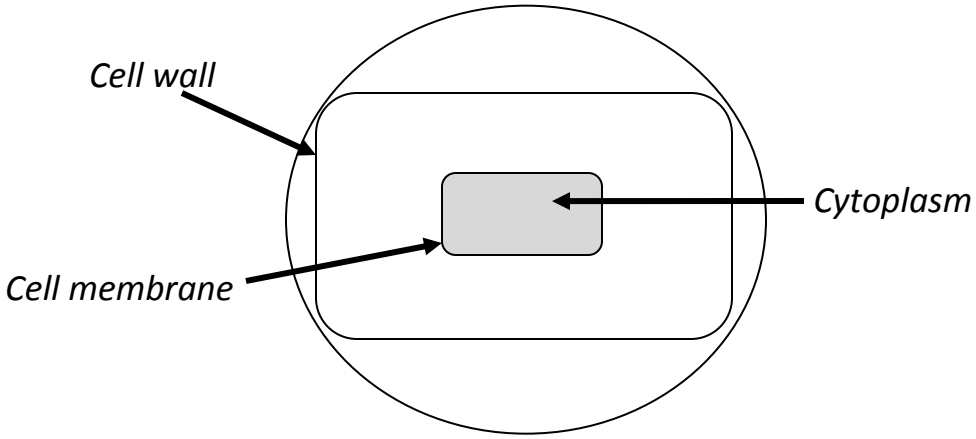
- Eats dead organisms

# The Cell

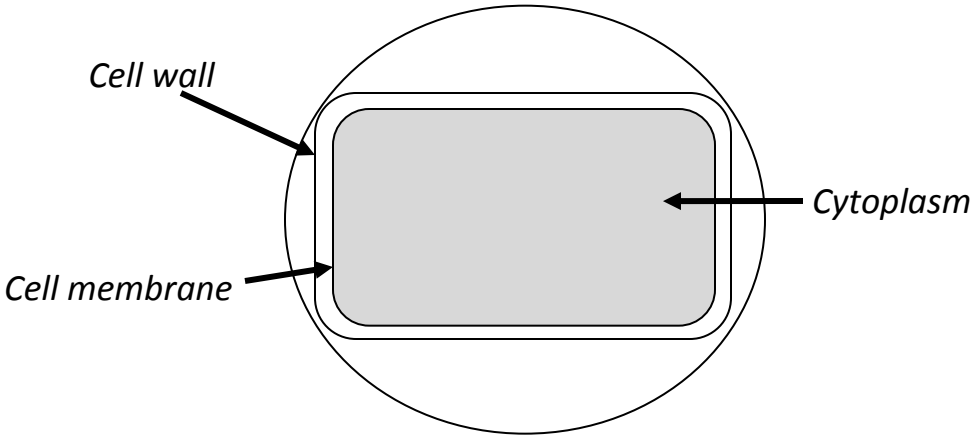
A *normal onion cell* would look like this:



An *onion cell in SALT SOLUTION* would look like this:




An *onion cell in DISTILLED WATER* would look like this:




Exceptions to Cell Theory

- Mitochondria & chloroplasts
- Virus

Cell Theory

- Cells arise of pre-existing cells
- Light microscope

Virus
- Exception to cell theory
- Contains genetic material
- Ability to reproduce within a cell

Cell → tissue → organs → organ system
- Simplest to most complex

Ribosome
- Protein
- Enzyme
- Amino Acids
- Ultracentrifuge

Ultracentrifuge
- Separation of organelles
- Density

Centrioles
- Cell division

Plant Cell
- Cell wall
- Large vacuole

Cell Membrane
- In and out of a cell
- Passage
- Nutrition
- Excretion
- Similar to the lungs

Plasma membrane & cytoplasm
- Every living cell

Mitochondria
- Energy
- ATP
- Self-duplicating

Photosynthesis
- Plant cell
- Chloroplasts

Organelle
- Specialized function
- Inside of cell
- Maintain homeostasis

Chromosomes
- DNA
- Hereditary information

Vacuole
- Storage

## Cellular Transport

Active transport
- Molecules are “pumped”

Osmosis
- Concentration of water molecules
- Water inside and outside of the cell

## Cellular Respiration

Mitochondria
- Cellular respiration

Lactic acid
- Muscle fatigue
- Anaerobic respiration

ATP
- Usable energy
- Direct source of energy
- Cellular activities

Aerobic respiration
- Oxygen
- respiration

Anaerobic respiration
- Carbon dioxide
- Fermentation
- yeast & glucose

## Photosynthesis

Photosynthesis
- autotrophic nutrition
- movement of carbon dioxide, water, solar energy
- producing glucose
- releasing oxygen
- store energy in glucose
- primary source of energy is the Sun

Autotrophs underwater
- dissolved carbon dioxide
- oxygen bubbles
- amount of light
- close to surface

Guard Cells
- stomata
- respiration and photosynthesis
- regulate gas exchange
- maintaining homeostasis

## Asexual Reproduction & Mitosis

Planarian
- regeneration
- asexual reproduction

Release of spores
- asexual reproduction
- sporulation
- bread

Cell Cycle
- cells contain same genetic information

A picture of a plant
- Vegetative propagation
- Fruits

Budding
- Hydra
- Mitosis

Anaphase
- Ensure that the daughter cells have the same number of chromosomes the parent cells

Uncontrolled division of cells
- Cancer

# Sexual Reproduction

Urethra
- Delivery of sperm
- Movement of sperm out of body
- Reproductive system & Excretory system

Sperm
- Transport genetic material
- ½ number of chromosomes

Mother & fetus
- Separate blood systems

Estrogen
- Changes in uterus

Identical twins
- One egg, one sperm

Fraternal twins
- Two eggs, two sperm

Order of events in human development
- Zygote….tissues….organs….fetus
- Mitosis…..differentiation….growth

Meiosis
- Sperm with ½ number of chromosomes
- Egg with ½ number of chromosomes

Formation and development of embryo
- Meiosis……fertilization…….mitosis

External fertilization
- Fish
- Amphibians

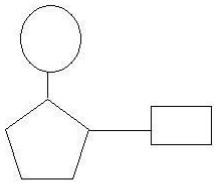
Placenta
- Essential materials needed for development

Uterus
- Development of embryo

## DNA & Protein Synthesis

DNA replication
- Mitosis

Nucleic Acid



DNA
- Template for mRNA
- Template for protein synthesis
- Sequence of nitrogenous bases
- Deoxyribose
- Watson & Crick

Transfer RNA (tRNA)
- Single strand
- Pick up amino acids
- Transport amino acids

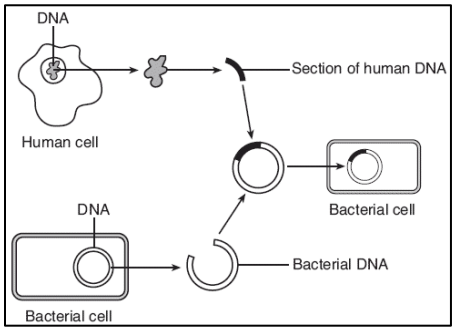
# Biotechnology & Genetic Engineering

## Cutting of DNA

- Enzymes

## Clones

- Same # of chromosomes
- Same types of genes
- Little variation
- Same sexes




- Genetic engineering
- Production of insulin
- Production of human hormones
- Structure of DNA molecule

## Selective Breeding

- Desirable traits
- Combining two plants to get a better plant

## Gel Electrophoresis

- Banding
- DNA analysis
- Determining relationships

# Evolution

Natural selection
- Diversity of organisms
- Adaptations

Evolution
- Inherited behaviors from parents
- More complex cells develop over time
- Process of change
- Differences in structure
- Differences in function and behavior
- Physical variations

# Life Functions

Transport
- Distribution/distributing
- Absorption/absorbing

Nutrition
- Obtain materials
- Ingest, digest, egest

Respiration
- Usable energy
- Converts energy
- Energy

Metabolism
- Characteristic of a living thing
- Living organisms
- Survival
- All chemical reactions

Synthesis
- Function of all living things
- Chemically combined
- - form complex materials

Feedback mechanism
- Sweating
- Homeostasis

Homeostasis
- Feedback mechanism
- Sweating
- Keep blood sugar levels

Excretion
- Substances eliminated
- Remove metabolic waste

Regulation
- Coordination & control

Reproduction
- Not needed for survival

Egestion
- Removes food that cannot be digested