

## Topic 1: Biodiversity

KINGDOMS	Prokaryote or Eukaryote	Mode of Nutrition	Cell Number	Cell Reproduction
Eubacteria				
Archaeobacteria				
Protists				
Fungi				
Plantae				
Animalia				

What are viruses?

## CLASSIFICATION

(Domain - kingdom - phylum - class - order - family - genus - species)

Know Three Domains:

1. Bacteria (Kingdom Eubacteria - oldest)
2. Archaea (Kingdom Archaeobacteria)
3. Eukarya (Kingdoms: Protista, Fungi, Plantae, Animalia)

## Topic 2: Chemistry of Life

	Elements	Monomer	Function	Examples
Carbohydrates				
Lipids				
Proteins				
Nucleic Acids				

Recognize what these molecules look like!

Don't forget **SPONCH!**

### ENZYMES:

- Lock and key
- Active site
- Reusable
- Denature (lose shape) @ high temp, extreme pH

## Topic 3: Ecology

### ECOLOGY:

- (species - population - community - ecosystem - biome - biosphere)
- Birth rate, death rate, immigration + emigration = population size
  
- Define SPECIES
  
- Define Biodiversity
  
- Explain how populations can change (speciation + extinction) due to:
  - Natural causes
  - Human activity
  - Invasive, Non-native species being introduced
- Trophic levels
  - Autotroph or \_\_\_\_\_
  - Heterotroph or \_\_\_\_\_
    - Primary consumer
    - Secondary consumer
    - Top level consumers
    - Decomposers
  
- Food Chains (no more than five levels)
  - Explain the flow of energy through the ecosystem
  
- Food Webs
- Symbiosis (give examples)
  - Parasitism
  - Mutualism
  - Commensalism
- Biogeochemical Cycles (cycle SPONCH) through the ecosystem
  - Water Cycle
  - Carbon cycle
  - Nitrogen Cycle

★Relate photosynthesis and cellular respiration to these cycles!!!

## Topic 4: Cell structure and Function

# ORGANELLES:

1. Nucleus
2. ER
3. Mitochondrion
4. Chloroplast
5. Lysosome
6. Ribosome
7. Golgi Body
8. vacuole
9. cilia
10. flagellum
11. cell wall
12. pseudopod (amoeba)
13. Cytoskeleton
14. Cell Membrane
15. centrioles

### KNOW:

- Difference between plant and animal cells
- Difference between prokaryotic (bacteria) and eukaryotic cell


## Cellular Transport:

### Passive Transport vs. Active Transport

- Diffusion
- Osmosis
- Facilitated Diffusion
- Endocytosis
  - Phagocytosis
  - Pinocytosis
- Exocytosis

## Cell Energy:

Know Photosynthesis equation:

Know Cellular Respiration equation:

Know how photosynthesis + cellular respiration make a cycle:

Know what ATP is, where it is made and what it is needed for.

## Topic 5: Cellular Division

### Cell Reproduction:

Cell Cycle ( $G_1 \rightarrow S \rightarrow G_2 \rightarrow M$ )

### MITOSIS + Cytokinesis

- Purpose: growth, repair, asexual reproduction
- Diploid cell  $\rightarrow$  2 diploid cells

### MEIOSIS

- Purpose: produce gametes (1/2 DNA - haploid)
- Diploid cell  $\rightarrow$  4 haploid cells
- Sperm + egg  $\rightarrow$  (fertilization)  $\rightarrow$  zygote (diploid)  
(both haploid) grows by mitosis  
made by meiosis

## Topic 6: Genetics

Mendel's Laws:

1. Law of Dominance
2. Law of Segregation
3. Law of Independent Segregation

Types of Inheritance

Dominance

Codominance

Incomplete dominance

Polygenic

Multiple alleles

### SEX-LINKED TRAITS

Remember:

Punnett Squares

Blood types - A, AB, B + O

Predicting outcomes of crosses:

$$Aa \times Aa \rightarrow 3:1$$

$$Aa \times aa \rightarrow 1:1$$

$$AaBb \times AaBb \rightarrow 9:3:3:1$$

$$AaBb \times aabb \rightarrow 1:1:1:1$$

**Genetics problems.**

1. Show a cross between two heterozygous tall plants. Tall (T) is dominant to short(t).

2. Show a cross between a person heterozygous for A type blood with one that has O type blood.

3. Show the cross between a couple in which the female is a carrier for hemophilia (sex linked, recessive) and a male who is normal for blood clotting.

4. If tribbles show codominance in fur color, crossing a red with a blue tribble produces a tribble that looks purple but really has both red and blue fur. What would the cross between two purple tribbles produce?

## Topic 7: DNA

DNA → RNA → protein (polypeptide chain)

Replication

Transcription

Translation

A (adenine) pairs with \_\_\_\_\_

G (Guanine) pairs with \_\_\_\_\_

DNA has \_\_\_\_\_ shape

# Topic 8: Evolution

## Evolution

= changes in a **POPULATION** over time

### Big ideas:

#### Evidence of Evolution

- Fossil evidence
- Homologous structures
- comparative anatomy
  - o vestigial structures
- Embryology
- Biogeography

- Unrelated organisms may have similar structures (analogous) because these organisms have acquired similar adaptations to a similar location (climate, etc.) Example: sugar glider of Australia (marsupial) and flying squirrel of North America (rodent)

#### - Natural Selection

- organisms have inheritable traits
- organisms tend to have more offspring than can be supported by the environment
- struggle for existence
- organisms with best adaptations survive (survival of the fittest)
- those organisms that survive can reproduce
- following generations will have a higher frequency of the successful adaptation

#### Examples of Natural Selection

1. Darwin's finches
  
2. Antibiotic resistant bacteria
  
3. Artificial Selection in cattle, dog breeds, etc.

# Topic 9: Human Systems

## Human Anatomy

atoms → organelles → cells → tissues → organs → organ systems

## Organ systems

1. Circulatory
  - a. heart
  - b. veins (blood to heart)
  - c. arteries (blood away from heart)
  - d. capillaries
  - e. Blood (plasma + cells -RBCs, white and platelets)
2. Respiratory
  - a. trachea → bronchi → lungs (alveoli)
  - b. diffusion ( $O_2 \rightarrow \leftarrow CO_2$ )
3. Nervous
  - a. neurons
  - b. dendrites → cell body → axon → terminal knobs
  - c. electrical impulses
4. Digestive
  - a. mouth (salivary amylase)
  - b. stomach (proteins)
  - c. small intestine (all nutrients absorbed here)
  - d. large intestine (just water absorbed)
5. Muscle
6. Skin (Integumentary)

## Homeostasis

Consider how the systems work together to maintain homeostasis.

- a. A person running a marathon
- b. eating a spicy chicken patty sandwich
- c. a virus entering a cell