**All You Need to Know for 4.0**

**4.01- Classification Systems**

* **Taxonomy** is the science of identifying, classifying, and naming living things
* **Classification** is the systematic grouping of organisms based on common characteristics
* **Aristotle’s Classification System** consisted of plants and animals
* **Linnaeus’ Classification System** consisted of an hierarchical system including Kingdom, Phylum, Class, Order, Family, Genus, Species
* **Domain** is a category that is larger than a Kingdom and is divided into Protista, Fungi, Plantae, and Animalia
* **Protists** are eukaryotic organisms that cannot be classified as fungi, plants or animals. Most are unicellular, some are autotrophic, and others are heterotrophic. There are plant-like protist, animal-like protists, fungi-like protists.
* **Dichotomous keys** are used to identify an organism based on observations about an organism

**4.02- Life Functions in Protists**

* **Animal-like Protists** are known as protozoans. They are heterotrophic and hunt and gather food.
* **Flagellum**-a whip like tail or **Pseudopod** used for movement
* **Conjugation** occurs when tow organisms join together and exchange some of their genetic material. This is not considered reproduction because new individuals are not formed. It is considered a sexual process because it results in new combinations of genetic material.
* **Spores** are tiny cells that grow into an organism
* **Plant-like Protists** are described as algae. They contain chlorophyll and are able to conduct photosynthesis
* **Fungi-like Protists** are similar to fungi in that they are heterotrophs, have cell walls, and use spores to reproduce. They absorb nutrients from dead and decaying organic matter
* **Annelid Worms** are segmented worms. They are invertebrates (no backbones) and have a closed circulatory system. Land annelids exchange oxygen through their moist skin, water dwelling annelids breathe through gills. Annelids reproduce asexually and some use external fertilization.
* **Insects (Arthropods)** are organisms with a segmented body, tough exoskeleton, and jointed appendages. They usually have six legs and a pair of antennae and two pair of wings. Insects go through metamorphosis starting as a tiny egg-nymph-adult (incomplete metamorphosis) or egg-larva-pupa-adult (complete metamorphosis)
* **Amphibians** are vertebrates that are ectothermic (environment controls internal body temperature). Eggs are fertilized externally, water is needed to transport sperm from males to females. Amphibians breathe through gills and later develop lungs. They have a three chambered heart.
* **Mammals** are vertebrates that have mammary glands that produce milk for their young. Mammals have a four chambered heart that separates oxygen rich from oxygen poor blood. They are endotherms (maintain a stable internal temperature). They have internal fertilization and reproduce sexually.
* **Nonvascular plants** do not have vascular tissue. Water and nutrients travel from one cell to another by osmosis and diffusion. They are short and live in moist habitats.
* **Vascular tissue** is a system of tubes that transport food, water, and minerals throughout the plant. Vascular tissue provides strength and stability to the plant and can grow tall.
* **Gymnosperms** is a seed plant that usually produces cones. Many gymnosperms have needle-like or scale-like leaves (example: pine tree).
* **Angiosperms** is a seed plant that produces flowers and has seeds that are enclosed in fruits. The reproductive structure is the flower. Seeds are dispersed through fruits
* **Pollen** can be carried by wind or animals

**4.03-Adaptations**

* **Plant Adaptations** include vascular tissue, roots, stems, and leaves. These allow plants to live on land. The stems support the plants, transports materials within the plant, and hold up flowers for pollination and hold leaves in position for photosynthesis. Leaves are the site of photosynthesis and they control the exchange of gases and water.
* **Animal Adaptations** include predator adaptations that increase and animal’s chance of capturing prey like speed or toxins. Prey adaptations include mimicry that enables some animals to look like more dangerous animals. Camouflage allows animals to blend in with their surroundings as well as bright colors that serve as a warning to predators to stay away.
* **Coevolution** is the process by which two species evolve in response to changes in each other. This occurs when the two species are dependent on each other in some way.
* **Pathogen** is an organism that causes disease
* **Toxins** are poisons that travel through the body interfering with normal processes.
* **Viruses** cannot survive alone. The can reproduce only when they are inside living cells. Viruses are responsible for many human diseases like colds, measles, rabies and chicken pox.

**4.04- Factors Affecting Health and Disease**

* **Non-communicable diseases** cannot be transmitted from one person to another.
* **Communicable diseases** can be spread from one person to another. If the disease spreads quickly and easily it is considered contagious
* **Parasitic Diseases** are caused by parasites like malaria, roundworm, pinworms, and sleeping sickness
* **Immune System** protects the body from diseases. The first line of defense is the skin that acts as a barrier. White blood cells attack the pathogens by engulfing and killing the pathogen. T cells and B cells attack and kill infected cells.
* **Nutrition** is a way of maintaining health and preventing disease. Vitamins and minerals are essential to the body for normal growth and activity.

**4.05- Animal Behavior**

* **Behavior**is an action or group of actions performed by an animal in response to some stimulus.
* **Innate behavior** is a behavior that is performed correctly the first time an animal does it. The animal does not have to be taught the behavior like suckling for food after it is born.
* **Learned Behaviors** are habituation, classical conditioning, operant conditioning and insight learning.
* **Habituation** is a process in which an animal stops responding to a stimulus if doing so does not reward or harm the animal
* **Classical conditioning** occurs when an animal makes a mental connection between a stimulus and some kind of reward or punishment (example: Pavlov’s dog and the ringing bell signaled food)
* **Operant conditioning** occurs when an animal learns to repeat behaviors that result in reward and avoid behaviors that result in punishment
* **Insight learning** is the most complicated form of learning. It occurs when an animal applies something its already learned to a new situation.
* **Social behavior** is exhibited when animals interact with members of their own species. These animals cooperate with each other. This membership offers advantages and protection from predators. The social behaviors benefit the entire group like bees in a hive or ants.