**Chapter 4 Notes: Introduction to Animals**

Lesson 1: What is an animal?

Animal Functions:

* Obtain food and oxygen
* Keep internal conditions stable
* Move in some way
* Reproduce

Animals have ADAPTATIONS that allow them to survive.

* ADAPTATION: structures and behaviors that allow animals to perform functions
  + Examples: Teeth to chew food, wings to fly, horns to fight off predators

Animal Classification

* Grouped according to how they are related to other animals, which has been determined by
  + Body structure
  + Development
  + DNA

Lesson 2: Animal Body Plans

Animal cells are organized into higher levels of structure:

Cells 🡪 Tissues 🡪 Organs 🡪 Organ systems 🡪 Organism

* All organ systems work together to keep animals alive!!
* Example #1: The cardiovascular system pumps blood to the rest of the body. The blood carries nutrients and oxygen that the cells of other systems need.
* Example #2: The kidneys filter blood and remove the waste that is created through cellular respiration. They then work with the rest of the excretory system to remove the waste from the body.

Different Body Plans

Animals can have no symmetry (asymmetrical), radial symmetry or bilateral symmetry.

* Radial symmetry: many imaginary lines can be drawn through a central point on the animal to divide it into two mirror images.
  + Examples: jellyfish, starfish
* Bilateral symmetry: only one line of symmetry can be drawn to divide it into halves that are mirror images.
  + Example: elephant, dog, human

Characteristics of each type of symmetry

* No symmetry
  + Few specialized cells
  + No tissues
  + Simple body organization
* Radial symmetry
  + Live in water
  + Move slowly on ocean floor or stay in one spot as adults
  + No front or back end
  + No head with specialized sense organs
* Bilateral symmetry
  + Larger and more complex
  + Complex organ systems
  + Streamlined bodies for quick movement
  + Have head at front end of body
  + Most have specialized sense organs on head
  + Nervous tissue concentrated in animal’s head

Lesson 3: Introduction to Invertebrates

INVERTEBRATE: an animal without a backbone

Groups of invertebrates

* Sponges
  + Asymmetrical body plan
  + Some specialized cells, but NO tissues or organs!
  + Adults do not move
* Cnidarians
  + Have stinging cells and take food into a central body cavity.
  + Radial symmetry
  + Have some tissues but NO organs
  + Example: Jellyfish, corals
* Worms
  + Bilateral symmetry
  + Have tissues, organs and organ systems
  + Get broken down into three major phyla
    - Flatworms: flat, soft bodies with some having eye spots on their heads to detect light
    - Roundworms: smooth, thin tubes with two body openings – mouth and anus
    - Segmented worms: many linked body segments, simplest animal with a brain
* Mollusks
  + Soft, unsegmented bodies that are often protected by a hard shell
  + Have a mantle: thin layer of tissue that covers internal organs
  + Most have a foot – used for digging, crawling, or catching prey
  + Three major groups
    - Gastropods: single shell or no shell and distinct head
      * Example: Snail
    - Bivalves: two shells and simple nervous system
      * Clam
    - Cephalopods: internal or external shell OR no shell at all, good vision and large brains.
      * Squid
* Arthropods
  + Invertebrates with hard outer coverings, segmented bodies, and pairs of jointed appendages (legs, wings, antennae)
  + EXOSKELETON: outer covering
  + Bilateral symmetry
  + 3 groups
    - Crustaceans: example – crabs
    - Arachnids: example – spiders
    - Includes centipedes, millipedes, and insects
* Echinoderms
  + Invertebrate with internal skeleton (ENDOSKELETON) and fluid-filled tubes.
  + Radial symmetry
  + Include: sea stars, sea urchins, sea cucumbers
  + Use tubes to move and obtain food and oxygen

Lesson 4: Introduction to Vertebrates

Chordate Characteristics

* Notochord: flexible rod that supports a chordate’s back
* Nerve cord: runs down their back and connects brain to nerves in other parts of the body.
* Throat pouches: Most disappear before birth, but some become gills like in fishes.
* Most chordates have a backbone
  + Backbone will replace the notochord.
  + Made up of vertebrae that have a hole in the center for spinal cord
    - Serves as protection for spinal cord.

Controlling Body Temperature

Vertebrate groups differ in how they control body temperature

* Ectotherm: produces little internal body heat so its temperature changes with environmental changes
* Endotherm: controls internal body heat it produces and regulates its own temperature
  + Have sweat glands, fur, and feathers to help maintain temp

Lesson 5: Vertebrate Diversity

Major Vertebrate Groups

* Fishes
  + Live in water and use fins to move
  + Most are ectotherms
  + Have scales and get oxygen through gills
  + Largest group of vertebrates
  + Organized into three groups
    - Jawless fish: no jaws or scales, have skeletons made of cartilage
    - Cartilaginous fishes: have jaws, scales and skeletons made of cartilage
    - Bony fishes: have jaws, scales, and pocket on each side of head that holds gills, have hard bones.
* Amphibians
  + Ectothermic
  + Spends early life in water and adult life on land
  + Usually return to water to lay eggs and reproduce
  + Examples: toads, frogs, salamanders
* Reptiles
  + Ectothermic
  + Scaly skin
  + Lungs
  + Lays eggs on land
  + Most live on land, but some swim a lot
  + Have kidneys to help conserve water
* Birds
  + Endothermic
  + Lays eggs
  + Feathers
  + Four-chambered heart
  + Have wings and nearly hollow bones for flight
  + Only modern animal with feathers
* Mammals
  + Endothermic
  + Skin with hair or fur
  + Four-chambered heart
  + Feed young with milk produced by organs called MAMMARY GLANDS
  + Separated into three groups based on young development
    - Monotremes: lay eggs
    - Marsupials: born at early stage in development and develop in a pouch on mother’s body
    - Placental mammal: develops inside mother’s body until its body systems can function independently.