

## Notes Outline

Wednesday, May 19th

### Topic: Multicellular Animals

- I. The overall theme we will examine today is that multicellular organisms are more complex. Because they are more complex, they are able to divide their functions amongst their different parts.
- II. Cellular Specialization
  - A. Cells are specialized; they take on a certain job
    1. Blood cells carry oxygen
    2. Nerve cells send and receive signals
  - B. The cells are organized in a certain way to enable the organism to survive
- III. Multicellular organisms are organized.
  - A. The cells must work together.
    1. Cells working together are called tissues.
      - a) Examples: muscle tissue, connective tissue, etc.
    2. Tissues working together are called organs
      - a) Examples: heart, lung, kidneys
    3. Organs working together are called organ systems
- IV. Organ systems and the organism
  - A. Different organ systems take care of specific needs
    1. Nervous system enables a response to changing conditions
    2. Muscular system produces movement and supplies heat
  - B. Different organ systems work together.
    1. Ex: the respiratory system and circulatory system work together to deliver oxygen and remove carbon dioxide.
- V. Multicellular organisms are adapted
  - A. An adaptation is any inherited characteristic that increases the chance of an organism's survival and producing offspring that also reproduce.
    1. May do with the way an organism gets its energy
    2. May relate to the shape or structure of an organism's body
    3. Can be a form of behavior
    4. A differences between offspring and parents
  - B. Adaptations are the result of differences in genetic material.
- VI. Sexual reproduction leads to diversity
  - A. Most multicellular organisms reproduce through sexual reproduction
    1. Genetic material of two parents combines to form an offspring with different genetic material.
      - a) This leads to diversity because the offspring's DNA will be different than, albeit a combination of, the parent's DNA.

2. Two processes are involved in sexual reproduction.
    - a) Meiosis: cell division that forms the egg and sperm cells.
      - (1) Each cell only contains one copy of DNA. Most cells contain two copies.
    - b) Fertilization: when the sperm and egg cell combine.
      - (1) A fertilized egg is a single cell with DNA from both parents.
  3. Differences in genetic material produce differences in offspring -> diversity
- B. Many multicellular organisms reproduce through asexual reproduction
1. A single parent produces offspring
    - a) Example: a sponge goes through budding
  2. Asexual reproduction does not lead to diversity because the genetic information will be the same (parent -> offspring)

### Topic: Animals are Consumers

- I. Animals obtain energy and materials from food
  - A. Animals are consumers; they eat to survive.
  - B. Animals are heterotrophs; they eat to survive.
  - C. Animals have many ways to get their food.
    1. Sponges filter feed
    2. Horses graze on grass
  - D. Animals eat a variety of food and can be grouped by the food they eat
    1. Herbivores: plants and algae
    2. Carnivores: other animals
    3. Omnivores: both plants and animals
    4. Scavengers: remains of once living things
  - E. To obtain energy from food, they must digest it.
    1. Cells break down complex carbon compounds (carbohydrates) into simple compounds.
    2. Digestion is the process that breaks food down into pieces small enough to be absorbed by cells.
    3. Digestion uses both physical and chemical activity to break down food.
    4. Many animals have a tubelike digestive system.
  - F. Animals must release energy and store it.
    1. Cellular respiration releases energy stored in sugar.
      - a) Animal needs oxygen for this to happen.
    2. Animals do not continuously feed, so they need to store their food.
      - a) This can be stored as fat.
- II. Animals interact with the environment and with organisms
  - A. Animals are subjected to stimuli, something that causes a reaction.
    1. They can react to changes in the environment or other organisms
  - B. An observable reaction to a stimulus is a behavior.
    1. Behaviors can be inherited or learned.

- C. All behaviors fall into three categories:
  - 1. Individual behaviors
    - a) Cleaning, responding to hunger, nursing a wound
  - 2. Same species (social behaviors)
    - a) Grooming each other, mating, protecting young
  - 3. Different species
    - a) Hunting
      - (1) Predator hunts, prey is hunted
    - b) Cleaning other organisms (eating bugs off back of antelope)
- D. Animals respond to season changes
  - 1. Through migration: moving to a different region in response to changes in the environment.
  - 2. Through hibernation: a sleeplike state that lasts for an extended period of time.
    - a) This reduces the need for large amounts of energy