



INTRODUCTION TO BIOLOGY

Mrs. Kornelsen



What is Biology?

- Make your own definition
- Biology – *The science of life and of living organisms, including their structure, function, growth, origin, evolution, and distribution. It includes botany and zoology and all their subdivisions.*



Examples

- Zoology – the study of animals
- Botany – the study of plants
- Ornithology – the study of birds
- Virology – the study of viruses
- Entomology – the study of insects
- Microbiology – the study of bacteria and viruses
- ...and many many more!



Botany



Zoology



Microbiology



Systems of the Human Body

- Respiratory
- Circulatory
- Excretory
- Digestive
- Nervous
- Endocrine
- Reproductive



Think-Pair-Share

So, if Biology is the *study of living things*, what are the characteristics of living things?

Characteristics of Living Things

- *Living things acquire energy and materials from the environment.*
 - Almost all the **energy** available to life on Earth comes from the **sun**.
 - **Light** energy from the sun is captured by green plants and stored in the chemical **bonds** of **sugar** molecules.

Characteristics of Living Things Cont'd

- **Energy** is then available for use
- Once energy is obtained by another **organism**, it is used to fuel other life **processes** (which involve chemical reactions).
- The sum of all **chemical reactions** that occur in the cells of an organism is called **metabolism**.

Characteristics of Living Things Cont'd

- *Living things are organized.*
 - ▣ Living things have various levels of **biological** organization.
 - ▣ **Cells** are generally the smallest units that show the characteristics of life.

- Cells are surrounded by a **membrane** that **selectively** allows **molecules** to flow into or out of them. More advanced cells have structures called **organelles** that specialize in life processes.
- Living things are generally **unicellular** (one cell) or **multi-cellular** (many cells).
- Humans have a high degree of organization where cells are organized into **tissues** and different **tissues** compose **organs** which make up **organ systems**.

- *Living organisms maintain a relatively constant internal environment.*
 - Living things attempt to maintain a **constant internal environment**.
 - The **regulation** of a constant internal environment is called **homeostasis**.
 - This is relatively easy for a bacterial cell but large organisms such as humans must have special **mechanisms** and systems to help them.

□ *Living things reproduce.*


- Living things reproduce either **asexually** or **sexually** and genetic material is passed from parents to offspring.
- The offspring from asexual reproduction are genetically **identical** to the parental cell.
- Sexual reproduction is where two individuals combine their genetic information to form an individual with slightly **different** characteristics than either parent.



□ *Living things grow and develop.*

■ **Growth** is recognized by an increase in size.

■ In multicellular organisms, development is generally defined as an increase in the **number** of cells. But can also include the **repair** of damaged tissue.

- 
- ❑ In humans, development includes all of the **changes** that take place between conception and death.
 - ❑ In plants, **development** includes all of the changes that occur between the **seed** and the adult form.

- *Living things respond to stimuli from their living and non-living environments.*
 - ▣ Living things live in a constant **interaction** with their surroundings or environment.
 - ▣ Any condition in the environment that requires an organism to adjust is called a **stimulus**.
 - ▣ A reaction to the stimulus is called a **response**.

- ❑ Organisms must be able to **adjust** to their environment in order to survive.
- ❑ The distribution of all living things is determined by their **tolerance** for a number of environmental factors.
- ❑ Within a limited geographical area, organisms interact with their physical and biological environments to form an **ecosystem**.

****Note: Non-living things may have one or more of these characteristics, but NOT all.**



Journal

Using examples, explain how we, as humans, fit every requirement to being a *living thing*