

Name:

Period:

Characteristics of Life

Key Terms

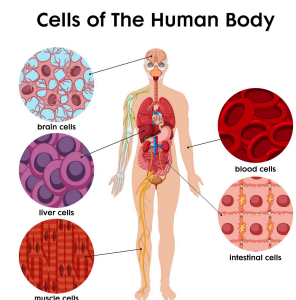
- Biology = the study of **life**
 - Biologists have struggled to define “life” for centuries!
- Organism = an individual living thing
- Biotic = **living**
 - Examples: fungi, plants, bacteria, and animals.
- Abiotic = **non-living**
 - Examples: rocks, water, sand, and air.

All organisms share 7 characteristics:

1. Organization
2. Response to Stimuli
3. Reproduction
4. Growth and Development
5. Regulation
6. Metabolism
7. Evolution

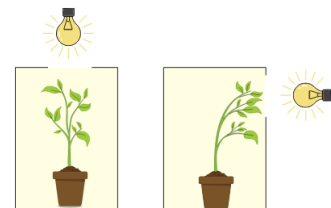
Organization

- Organisms are highly organized structures that contain one or more cells.
- **Cell** = the smallest unit of life
- Unicellular = made of one cell
 - Examples include bacteria and amoebae.
- Multicellular = made of more than one cell
 - Multicellular organisms can range from a few cells (like some algae) to **trillions** of cells (like a human).
 - The human body contains about **35** trillion cells!
 - In multicellular organisms, similar cells will group up to form **tissues** and organs.



Response to Stimuli

- Stimulus (plural - stimuli) = a **change** in an organism’s internal or external environment
- Organisms must respond to changes in their environment in order to survive.
- Positive response = movement **toward** a stimulus
 - Example: Phototropism is the growth of a plant toward a light source.
- Negative response = movement **away** from a stimulus
 - Example: When deer see a threat, their instinct is to run away.

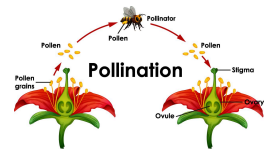
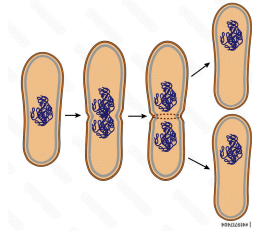


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Reproduction

- Reproduction = the process by which organisms create **offspring** (children)
- Reproduction enables a species to survive and pass on beneficial **traits** to the next generation.
- Asexual reproduction = the process by which an individual organism generates offspring that are genetically **identical** to the parent
 - Creates **clones**!
 - Performed by many species, including bacteria and yeast.
- Sexual reproduction = the process by which **two** individuals combine genetic information to produce unique offspring
 - The offspring have a **mixture** of genetics from both parents.
 - Performed by most plants and animals.
- Some organisms use both asexual and sexual reproduction, like **starfish**!



Growth and Development

- All organisms grow and develop, as instructed by their genes.
- **Growth** = increase in size and mass
- Development = progressive **changes** in structure and function throughout an organism's life
- Adult humans are not just large infants; they have to grow AND develop!
- Metamorphosis = dramatic **transformation** of an organism during development
 - Common in insects (like butterflies) and amphibians (like frogs).



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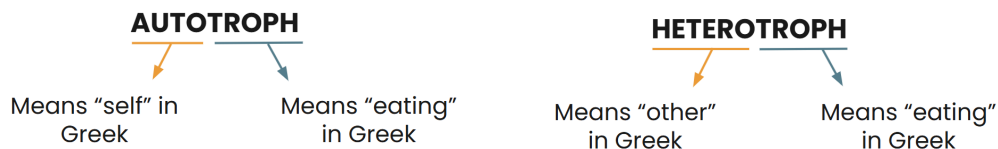
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Regulation

- All organisms, regardless of their size, need to be able to regulate their **internal** environment.
 - This includes temperature, moisture, waste removal, and more.
- Homeostasis = the ability for an organism to **maintain** its internal conditions
- For example, the human body must stay around **98.6°F** for our cells to function properly.
 - If the body gets too warm, skin cells will produce **sweat** to cool off via evaporation.
 - If the body gets too cold, muscle cells will cause the body to **shiver** to produce heat.

Metabolism

- Metabolism = **energy** processing
 - All organisms use energy to maintain life.
- Autotroph = an organism that **produces** its own food for energy
 - Examples include plants and some bacteria.
- Heterotroph = an organism that must **eat** other organisms for energy
 - Examples include animals, fungi, and most bacteria.



Evolution

- The diversity of life on Earth is a result of **mutations** in genetic material.
 - Mutation = a random genetic change
- Mutations allow organisms to adapt to an environment over **generations**.
- Adaptation = a trait that helps an organism **survive** and reproduce
 - Example: Camouflage in leaf insects.
- Eventually, adaptations become more common in the population as more offspring receive the trait.
- Evolution does NOT happen over an organism's lifetime - it happens over **generations!**

