Mr. Stone

The Nature of Life

The words "living" or "life" are not easy to define. However, biologists agree that all living things have certain features in common. We will call these features "the eight features of life". With few exceptions, something must possess all eight features to be considered alive.

8 Features of Living Things

1. Reproduction – living things form offspring similar to the parents
   → sexual / asexual (binary fission, budding etc.)
   (does not imply sexual intercourse is necessary)
2. Growth – living things change size by becoming bigger or larger through increases in amounts of living material
3. Development – living things change shape or form as they move through their life cycle from "birth" to death
4. Nutrition – living things require food to provide them with the nutrients, or materials, needed for growth, energy, and life processes.
   living things must ingest (eat or take in) food and digest (break down) food
   Nutrition = ingestion + digestion
   - Nutrition is the complete process of ingestion and digestion of food material
   (producer) autotroph / (consumer) heterotroph
   photo / chemo
   (herbivore / omnivore / carnivore) animal terms!
5. Use of Energy – living things must use energy, this gives them the ability to do work, all living things perform work
   Respiration – aerobic / anaerobic
   Photosynthesis / chemosynthesis
6. Made of Cells – living things are made of one or more cells
   - cells are the basic units of structure and function in living things
   - living things can be either unicellular (made of only one cell) or multicellular (made of more than one cell).

7. Response - living things respond to changes in their environment

response - a reaction to a change in the environment

stimulus - a change in the environment that causes a living thing to respond

environment - all of the living and non-living things that surround another living thing

8. Adaptation - living things are adapted to their environment

adaptation - a trait or characteristic that makes a living thing better able to survive in its environment

other imp. processes → Transport/Excretion (Homeostasis)

Needs of Living things

Living things get all of the things they need from their environment.

Living things have 5 basic needs:

1. water - the life processes of living things depend on water
2. nutrients - living things need food for energy and building materials
3. air - important life processes depend upon components of air such as oxygen and carbon dioxide
4. proper temperature - the speed at which life processes occur depend upon the temperature
5. living space - living things need the proper amount of space to live in so that they can recieve enough of their other needs from their environment

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Major Life Processes

Note: Each of the following processes are related to the features of life previously discussed in class.

The following processes are related to <u>nutrition</u> :

Digestion- process involving how an organism breaks food down into useable forms

Ingestion- process involving how an organism takes food into its "body" from its environment.

Autotroph (producer)- an organism which is capable of making its own food molecules to satisfy it's energy requirements

2 types of autotrophs:

1. **photoautotroph**
2. **chemoautotroph**

Heterotroph (consumer) - an organism which cannot make its own food and must "eat" other living or once living things

3 types of heterotrophs: {note- these are animal terms}

1. **herbivore**
2. **omnivore**
3. **carnivore**

The following terms are related to use of <u>energy</u> : saprophyte

Respiration - process involving how an organism releases energy trapped in food

2 types of respiration:

1. **anaerobic** - does not use oxygen
2. **aerobic** - requires oxygen

Photosynthesis - process involving how an organism produces food molecules by trapping the energy of sunlight

Chemosynthesis - process involving how an organism produces food molecules by using chemical energy

The following terms are related to reproduction :

Sexual - involves exchange of genetic information between parents; and , in most cases, involves the use of sex cells (gametes)

[note: does not mean that sexual intercourse is necessary]

Asexual - does not involve the exchange of genetic information between parents

Types of asexual reproduction:

1. **binary fission**
2. **budding**
3. **vegetative propagation**

OTHER IMPORTANT PROCESSES:

Transport - process involving how an organism moves nutrients, wastes, and other materials throughout its cell(s) / body

Excretion - process involving how an organism removes wastes and excess materials from its cell(s) / body

Homeostasis - process of how an organism maintains a biological balance with its immediate environment