



Living Things are Highly Organized



Levels of Organization



# Characteristics of Living Things

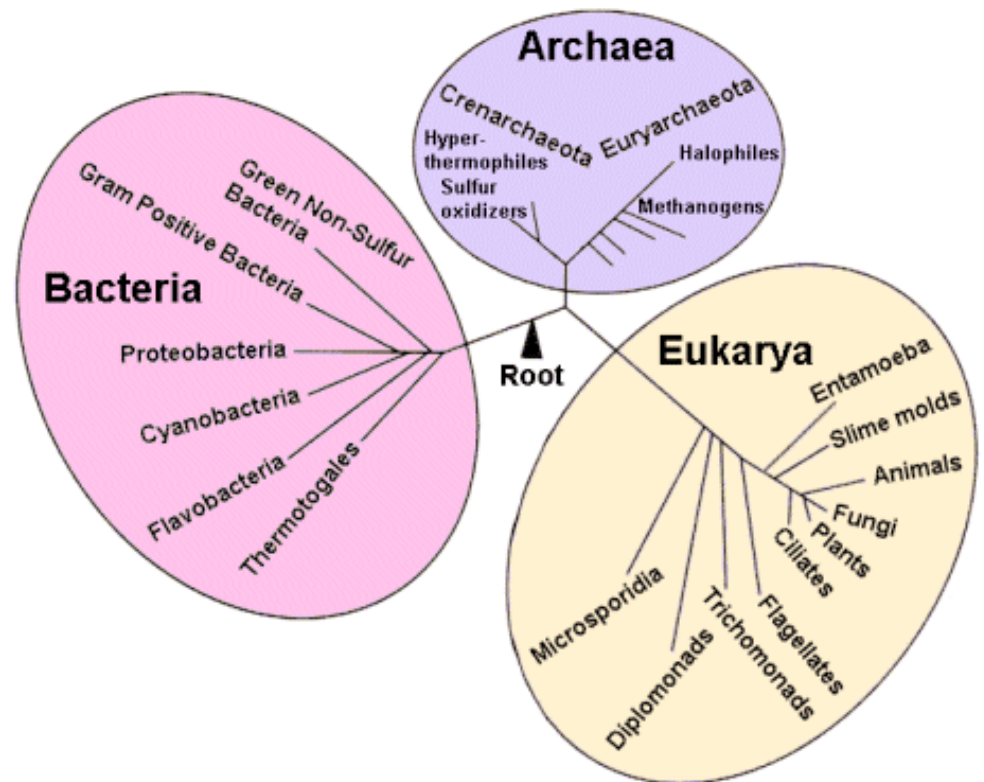
1. Made Up of Cells
2. Reproduction
3. Contains DNA; Living things are based on a universal genetic code.
4. Growth and Development
5. Need for Materials and Energy
6. Response to the Environment
7. Maintaining Internal Balance
8. Evolution

# Characteristics of Living Things

<b>Characteristic</b>	<b>Examples</b>
Living things are made up of units called cells.	Many microorganisms consist of only a single cell. Animals and trees are multicellular.
Living things reproduce.	Maple trees reproduce sexually. A hydra can reproduce asexually by budding.
Living things are based on a universal genetic code. (Contain DNA)	Flies produce flies. Dogs produce dogs. Seeds from maple trees produce maple trees.
Living things grow and develop.	Flies begin life as eggs, then become maggots, and then become adult flies.
Living things obtain and use materials and energy.	Plants obtain their energy from sunlight. Animals obtain their energy from the food they eat.
Living things respond to their environment.	Leaves and stems of plants grow toward light.
Living things maintain a stable internal environment.	Despite changes in the temperature of the environment, a robin maintains a constant body temperature.
Taken as a group, living things change over time.	Plants that live in the desert survive because they have become adapted to the conditions of the desert.

# The 3 Domains of Life

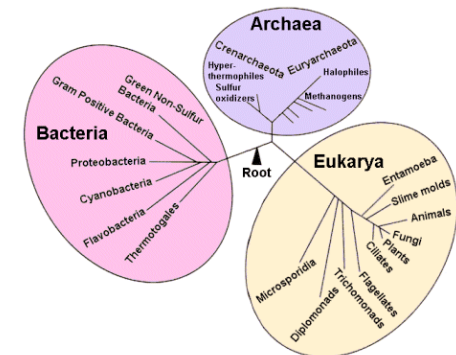
- **Bacteria**
- **Archaea**
- **Eukarya**



# The 3 Domains of Life

- **Bacteria**

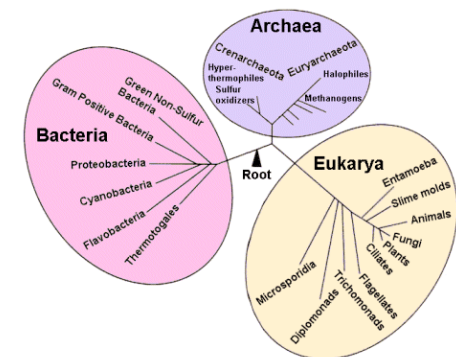
- **Prokaryotic cells**
  - No nucleus
- Great deal of diversity in this domain
- Next to impossible to determine how many species of bacteria exist on the planet.
- More on bacteria next year in Biology



# The 3 Domains of Life

- **Archaea**

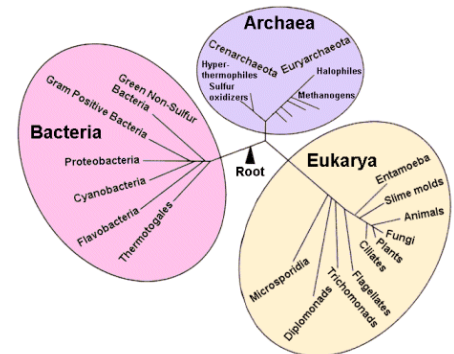
- Prokaryotic cells
  - No nucleus
- Mix of characteristics found in both bacteria and eukaryotes
- More on Archaea next year in Biology



# The 3 Domains of Life

- **Eukarya**

- **Eukaryotic cells**
  - True Nucleus
- Eukaryotes are further grouped:
  - Kingdom Protista (algae, protozoans, etc.),
  - Kingdom Fungi (yeast, mold, etc.),
  - Kingdom Plantae (flowering plants, ferns, etc.)
  - Kingdom Animalia (insects, vertebrates, etc.).
- Not all Eukaryotes have a cell wall.
- While cells are organized into tissues in case of kingdom Plantae as well as kingdom Animalia, the presence of cell walls is only restricted to the members of kingdom Plantae.

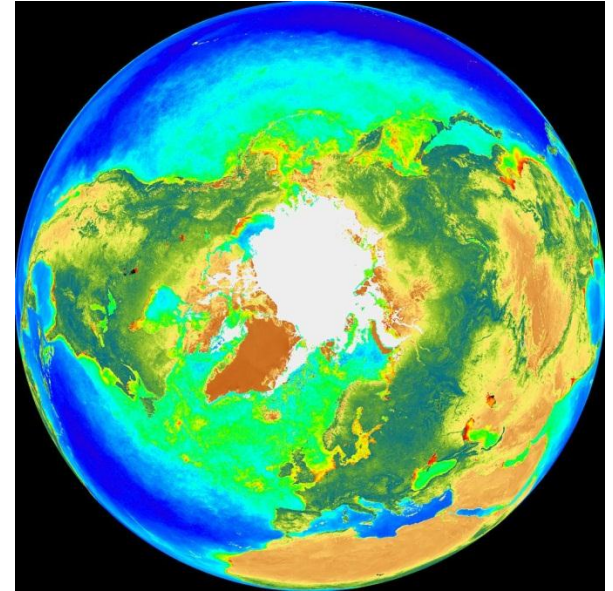


# Levels of Organization

- **Biosphere**
  - **Biomes**
  - **Ecosystem**
  - **Community**
  - **Population**
  - **Organism**
- **Organ System**
  - **Organ**
  - **Tissue**
  - **Cell**
  - **Organelles**
- **Compound/Molecule**
  - **Element**
  - **Atom**



# The Biosphere



- Part of the earth in which life exists.
- Its range = 8 km. above surface to 8 km. below surface of ocean.
- **All living AND non-living things**
- Divided into - Biomes.



# Biomes or Ecospheres

- Specialized regions of the biosphere



# Ecosystems

- All **biotic** (living) and **abiotic** (nonliving) factors that **INTERACT**.
- Biotic factors: Living
- Abiotic factors: soil, water, temperature, elevation, and location on the earth.
- Examples of ecosystems: forest, pond, lake, grassland, and mountain.





# Community

- Groups of many **different** species of organisms interacting in a particular area
- **Only biotic** factors that interact between different species of organisms
- Give me some examples

# Population

- Group of organisms of **ONE** species that **interbreed** and live in the **same place** at the **same time**.
- Give me some examples



# Individual Organism

- Individual living thing
  - You and I are considered individual organisms.
- Can you give me some more examples?



# Organ Systems

- Groups of organs that work together to perform a specific function

- Examples

- Nervous System
- Circulatory System
- Respiratory System
- Etc....



# Organs

- Group of tissues that work together to perform closely related functions

- Examples

- Heart
- Brain
- Lungs
- Etc...





# Tissues

- Groups of similar cells that perform a particular function
  - Examples
    - Cardiac Tissue
    - Skeletal Tissue
    - Etc...



# Cells

- The smallest functional unit of life.
- Two kinds of cells
  - Prokaryote
    - Bacteria
  - Eukaryote
    - Animal
    - Plant



# Organelles

- Small “organs” in the cell
  - Mitochondria
  - Endoplasmic Reticulum
  - Nucleus



# Compounds/Molecules

- Cells are composed of many chemical compounds-Two or more elements interacting



# Elements

- Molecules are made up of element interacting with one another
- Elements are what are found on the periodic table
- The elements C, O, N, and H make up 96% of all living things







# Finally the Atom



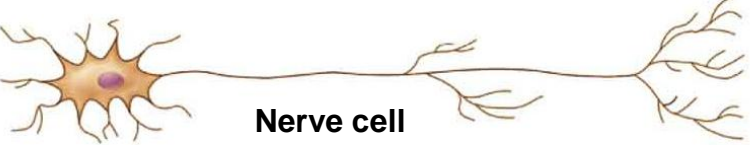

- The **SMALLEST** particle of an element that has the characteristics of that element



# Levels of Organization

Biosphere	The part of Earth that contains all ecosystems	 <p><b>Biosphere</b></p>
Ecosystem	Community and its nonliving surroundings	 <p>Hawk, snake, bison, prairie dog, grass, stream, rocks, air</p>
Community	Populations that live together in a defined area	 <p>Hawk, snake, bison, prairie dog, grass</p>
Population	Group of organisms of one type that live in the same area	 <p><b>Bison herd</b></p>

# Levels of Organization (*cont.*)

Organism	Individual living thing	 <b>Bison</b>
Groups of Cells	Tissues, organs, and organ systems	 <b>Nervous tissue</b> <b>Brain</b> <b>Nervous system</b>
Cells	Smallest functional unit of life	 <b>Nerve cell</b>
Molecules	Groups of atoms; smallest unit of most chemical compounds	 <b>Water</b> <b>DNA</b>