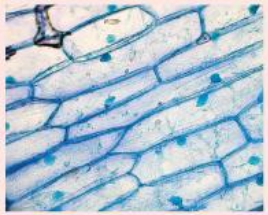
WHAT DO BIOLOGY MEAN?

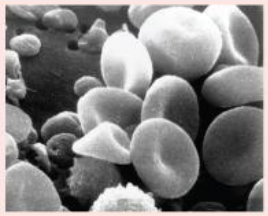
- **Etymology**
  - **bios**=life
  - **logos**= argument

- **Biology: natural science concerned with the study of life and living organisms**

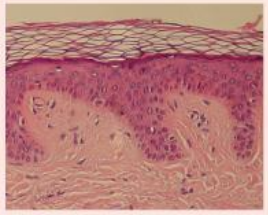
The biological levels of organization of living things



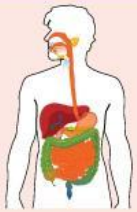
Organelles: The nucleus, dyed blue in these onion cells, is an example of an organelle.



Cells: Human blood cells.



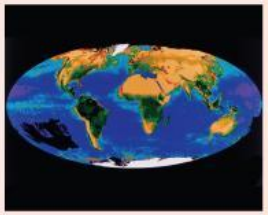
Tissues: Human skin tissue.



Organs and Organ Systems: Organs, such as the stomach and intestine, make up the human digestive system.

Organisms, Populations, and Communities: In a forest, each pine tree is an organism. Together, all the pine trees make up a population. All the plant and animal species in the forest comprise a community.

Ecosystems: This coastal ecosystem in the southeastern United States includes living organisms and the environment in which they live.

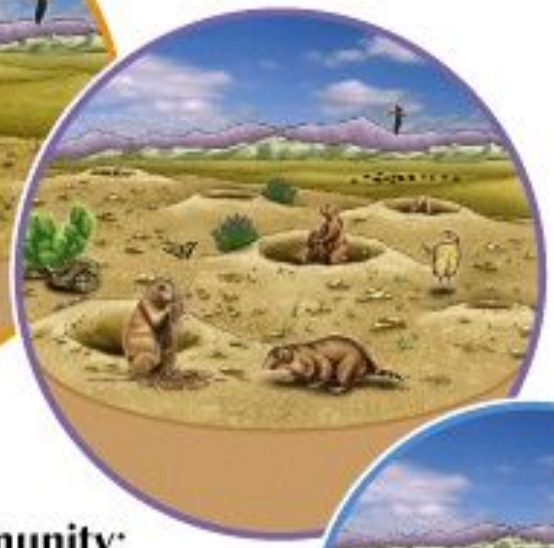


The Biosphere: Encompasses all the ecosystems on Earth.

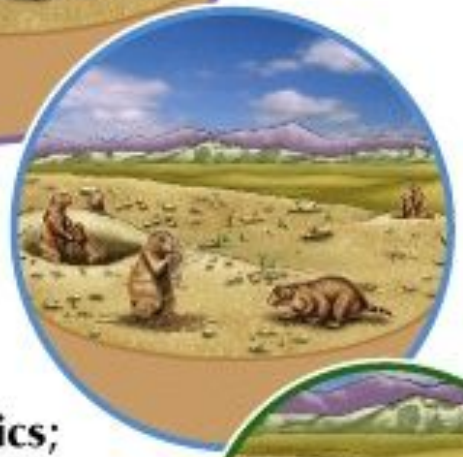
From a single organelle to the entire biosphere, living organisms are parts of a highly structured hierarchy

Biosphere:
Global processes

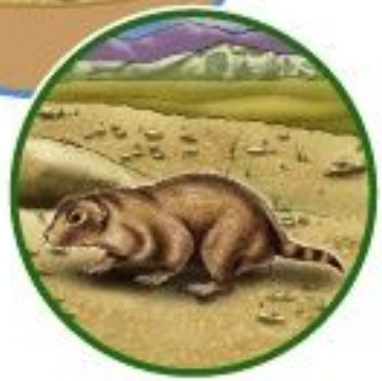
Ecosystem:
Energy flux and cycling of nutrients



Community:
Interactions among populations



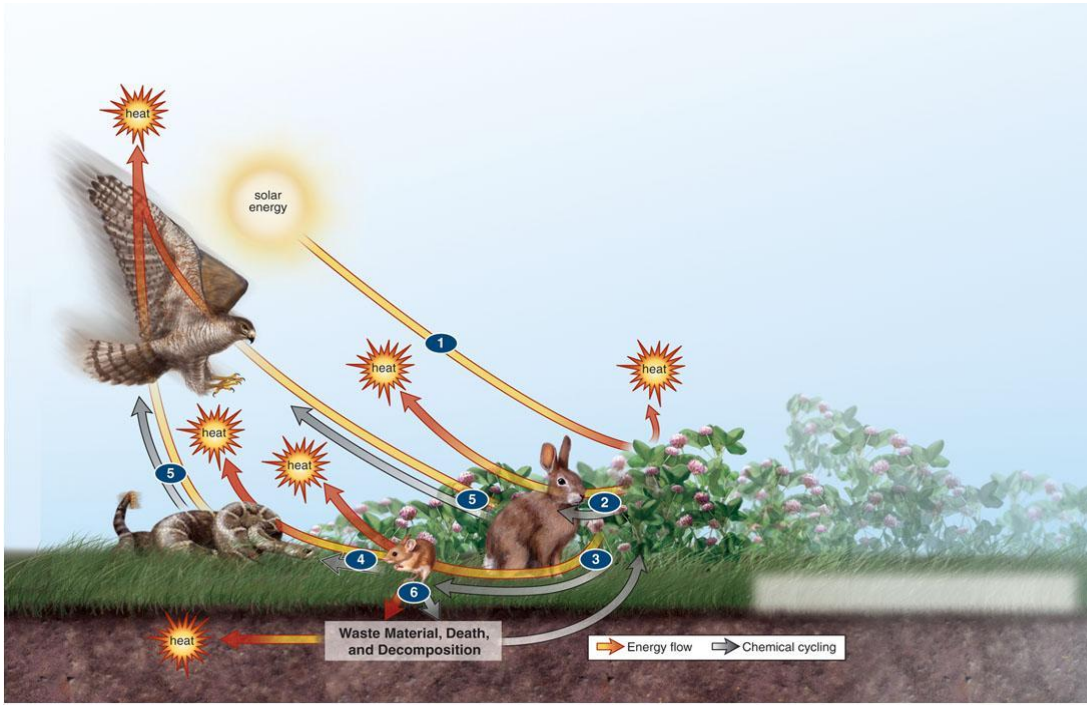
Population:
Population dynamics; the unit of evolution



Organism:
Survival and reproduction; the unit of natural selection

The Biosphere

The most complex level of organization composed of



- **Populations:** all members of one species in one area
- **Communities:** the populations of various organisms in an area
- **Ecosystem:** the communities interacting with their physical environment

4.Acquisition of Materials and Energy

- **Producers, Consumers, and Decomposers in the Forest Community.**

- **Organisms need nutrients and energy to live through food**
- **Nutrients**, the building blocks of cells;
- **Energy**, the capacity to do work, our fuel;
- **Metabolism**: all chemical reactions that occur in a cell;
- **Photosynthesis**: plant process that transforms solar energy into chemical used by organisms.

Producers

- **A: Producers:** Photosynthesizing organisms
- Producers are any kind of green plant.
- Green plants make their food by taking sunlight and using the energy to make sugar.
- The plant uses this sugar, also called glucose to make many things, such as wood, leaves, roots, and bark.

Consumers

Figure: Living things acquire materials and energy through food and they reproduce

- Cannot make their own food.
- They get energy and nutrients by feeding on other organisms.
- Animals are consumers

Taxonomy

The discipline of identifying and classifying organisms according to their evolutionary history and relationships.

Organisms are grouped together into **taxa** (singular: taxon) and these groups are given a **taxonomic rank.**

<u>Levels of classification (specific to general):</u>

Species (вид),

Genus (род),

Family (семейство),

Order (Ряд),

Class (класс),

Phylum (тип),

Kingdom (царство),

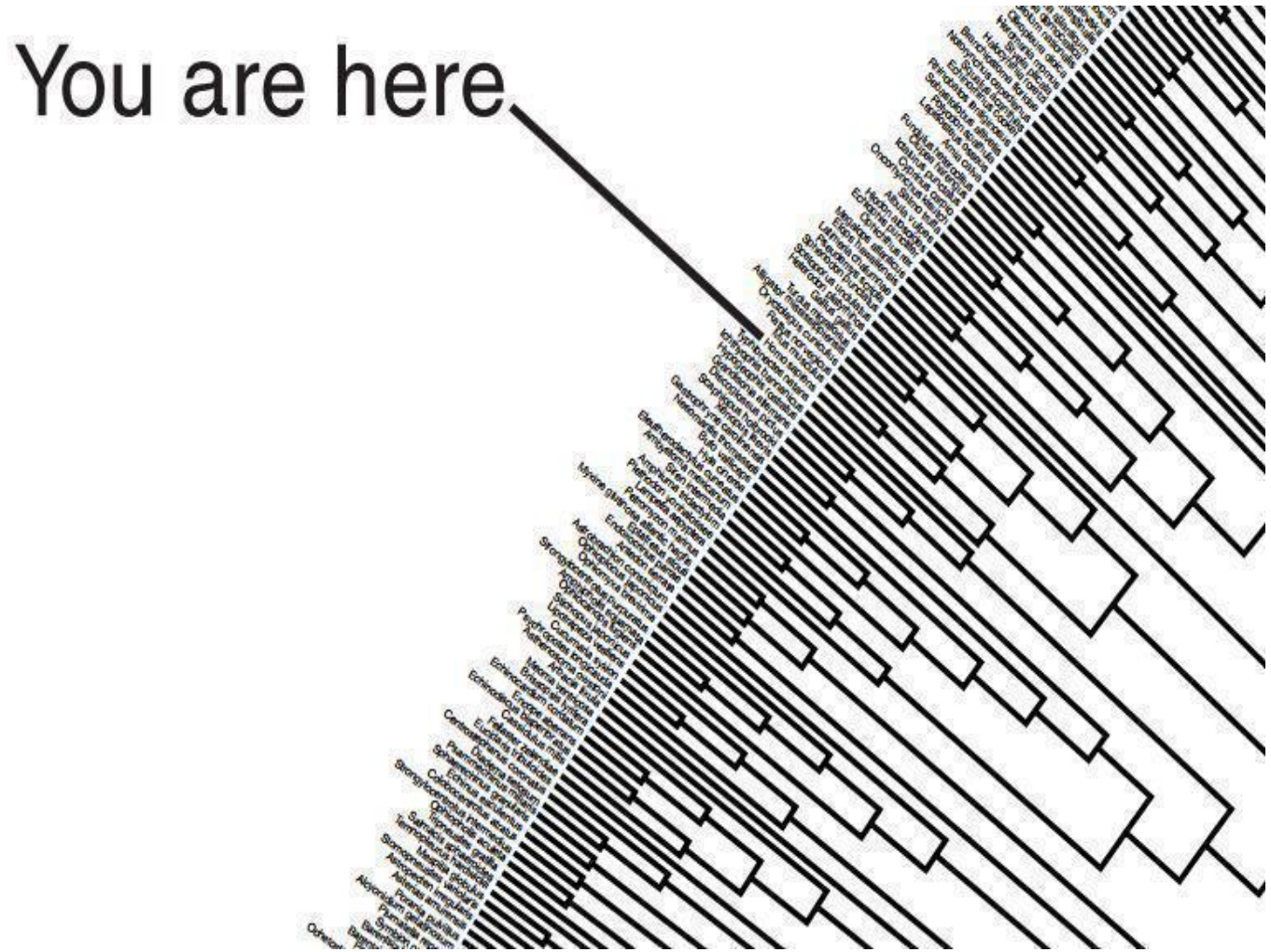
Domain (надцарство)

Table 1.4
Levels of
Classification

TABLE 1.4 Levels of Classification

Category	Human	Corn
Domain	Eukarya	Eukarya
Kingdom	Animalia	Plantae
Phylum	Chordata	Anthophyta
Class	Mammalia	Monocotyledones
Order	Primates	Commelinales
Family	Hominidae	Poaceae
Genus	*Homo*	*Zea*
Species*	*H. sapiens*	*Z. mays*

*To specify an organism, you must use the full binomial name, such as *Homo sapiens*.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Domain

In Nature we find Three domains:

- **Bacteria**
- **Archea**
- **Eukarya**

Bacteria and Archaea are **prokaryotes** single cell organism in which the DNA is not contained in a nucleus

Eukarya are **eukaryotes** and have membrane-bound nucleus

Figure. Domain Archaea: *Methanosarcina mazei*, an archaeon

Figure. *Domain Bacteria:* Escherichia coli, a bacterium.

Four Steps of the Scientific Methods

- **Observation:** what scientists can sense in the world around them
- **Hypothesis:** a proposed explanation for an observation of how a natural process works.
- **Testing:** using either observation or experimentation to disprove a hypothesis
- **Conclusion:** the results are analyzed and the hypothesis is supported or rejected

Terminology

- Control group – In an experiment, a group to which one or more experimental groups can be compared.
- Experiment – A test carried out under controlled conditions that the researcher can manipulate.
- Experimental group- A group of objects or individuals that display or are exposed to a variable under investigation
- Variable (va'riabl)- a characteristic or event that differs among individuals.
- Sampling error- Distortion of experimental results, often because the sample size is too small.