**Classification of Living Things** 

Scientists estimate that there are between 3 million and 100 million species of organisms on Earth.

**Taxonomists**--biologists who specialize in identifying and classifying life on our planet--have named approximately **1.7 million** species so far.

Each year, about **13,000** <u>new species</u> are added to the list of known organisms.

So, how do scientists **classify** (organize) all these millions of species?

- Animal kingdom classification is an important system for understanding how all living organisms are related. Based on the Linnaeus method, species are arranged grouped based on shared characteristics.
- This system of animal kingdom classification was developed by Swedish botanist <u>Carolus (Carl) Linnaeus</u> in the 1700's. The Linnaeus Method, also known as Linnaean Taxonomy, creates a hierarchy of groupings called taxa, as well as **binomial nomenclature** that gives each animal species a two-word scientific name.
- The primary method of animal classification is:
- Domain
- Kingdom
- Phylum
- Class
- Order
- Suborder
- Animal Families
- Genus
- Species

- All living organisms can be placed in one of six different animal kingdom classifications.
- Animal A kingdom of complex multi-celled organisms that do not produce their own food. This kingdom contains all living and extinct animals. Examples include <u>elephants</u>, and humans.
- **Plants** Complex and multi cellular autotrophic organisms, meaning they produce their own food through photosynthesis. Examples include trees, flowers, and grass.
- **Fungi** Multi-celled organisms that do not produce their own food, unlike plants. Examples include molds, mushrooms, and yeast.
- **Protista** Single celled organisms with more complexity than either eubacteria or archaebacteria. Examples include algae and amoebas
- **Eubacteria** Single celled organisms found in everything from yogurt to your intestines. This kingdom contains all bacteria in the world not considered archaebacteria.
- Archaebacteria The oldest known living organisms. Single-celled and found in hostile and extremely hot areas like thermal vents or hot springs

#### Animal Phylums Explained

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- After animal kingdom, animal species usually fall into one of seven different phylum, or phyla:
- **Protozoa** Unicellular Animals like Amoeba, Paramoecium, Monogystis and Malaria parasite.
- **Porifera** Marine animals more commonly known as sponges and found in <u>every ocean on earth</u>.
- Cnidaria Mostly marine animals that include over 11,000 species. Examples include <u>coral</u>, <u>jellyfish</u>, and anemones
- **Platyhelminthes** Typically parasitic flatworms. Lacking in any respiratory or circulatory systems, oxygen pass through their bodies instead in a process known as diffusion. Examples include tapeworms and flukes.
- **Annelida** More complex than Platyhelminthes, these are segmented and symmetrical worms containing a nervous system, respiratory system, and sense organs. Examples include the common <u>earthworm</u> and leeches.
- Mollusca The second largest phylum by species count, and the largest marine phylum. Invertebrates with soft
  unsegmented bodies. It is estimated almost a quarter of marine life fall in this category. Examples include <u>clams</u>,
  mussels, and <u>snails</u>
- Arthropoda Invertebrate animals with an exoskeleton and segmented bodies. Contains insects, crustaceans, and arachnids. This is the largest phylum by species count. Examples include <u>scorpions</u>, <u>butterflies</u>.
- Chordata Vertebrates. Animals that develop a notochord, a cartilaginous skeletal rod that supports the body in embryo and can often become a spine. Most animals we are familiar with, including <u>dogs</u>, <u>horses</u>, <u>birds</u>, and <u>humans</u> fall in to this category.

#### Animal Classes

- The phylum group is then divided into even smaller groups, known as animal classes. The Chordata phylum splits in to these seven animal classes:
- Agnatha (jaw-less fish)
- Chrondrichtyes (cartilaginous fish)
- Osteichthyes (bony fish)
- Amphibia (amphibians)
- Reptilia (reptiles)
- Aves (birds)
- Mammalia (mammals)

### **2 Types of Cells**

# **3 Domains and 4 Kingdoms**



#### **EUKARYOTES**

organisms with a nuclear membrane

List the similarities and differences between Eukaryotes and Prokaryotes



# The <u>Archaea</u> are one of two groups of <u>prokaryotic organisms</u>, organisms with <u>no nuclear membrane</u>. (Bacteria are the other group.)



Archaea do not require sunlight for photosynthesis, as plants do, and they do not need oxygen. Archaea absorb  $CO_2$ ,  $N_2$ , or  $H_2S$ and give off methane gas as a waste product.

Archaea are best known for **living in extremely hostile environments** (very hot, very acid, or very salty), but they can also be found in less extreme conditions.

### Bacteria – the Most Abundant Organisms









spherical cells e.g., *Streptococcus* 

rod-shaped cells e.g., *Escherichia coli, Vibrio cholerae* 

the smallest cells e.g., Mycoplasma, Spiroplasma

spiral cells e.g., *Treponema* pallidum

Figure 1–17. Molecular Biology of the Cell, 4th Edition.









There are more <u>bacteria</u> in your mouth than there have been people living since the dawn of humans.

# What Good Are Bacteria?

Bacteria are the primary recyclers of materials in the environment particularly **nitrogen**.

### Newsflash!!!

Bacteria discovered that can do photosynthesis!



Bacteria are used to produce **insulin** and other drugs that people need.



# The Domain Eukarya is divided into 4 Kingdoms:



A Protists: Paramecium

A Fungl: Mushrooms

A Plants: Moss

🔺 Animals: Salamander

#### **Classifying Critters activity**

# PROTISTS

Protists are11- eukaryotes
 because they all have a nucleus.

Most have mitochondria

• Many have chloroplasts with which they carry on photosynthesis.

 Many are unicellular and all groups (with one exception) contain some unicellular members.

A better name for Protists would be "Eukaryotes that are neither Animals, Fungi, nor Plants".





Protists

Visit Protist Park

## **FUNGI**



Fungi sometimes look like plants, but they're not!

Fungi can't do photosynthesis, because they don't have chloroplasts; they get their nutrients from the organic material they live in.

- Decomposers, like <u>mushrooms</u>, feed on <u>dead</u> organic material.
- Some fungi feed on <u>living</u> organisms, such as plants, animals and even other fungi. This causes diseases and infections in these organisms (like <u>athlete's foot</u> and <u>ringworm</u> in humans).
- Some fungi live as symbiotic partners with algae. The result: <u>lichen</u> (pronounced "like-n").
  <u>more lichen</u>

**Other differences from plants:** 

- fungi don't have roots, they have a mycelium.
- fungi's cell walls are made of <u>chitin</u>, not cellulose.







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