

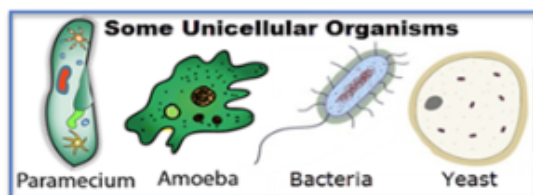
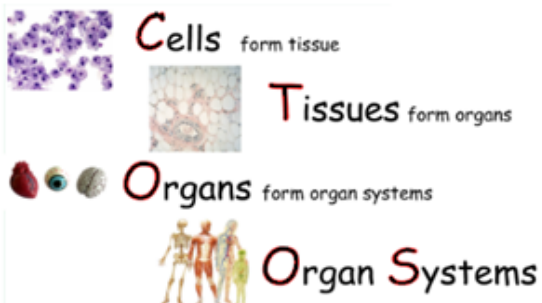
SOL LS.3 - CELLULAR ORGANIZATION

LS.3 Cellular Organization

- a. patterns of cellular organization support life processes;
- b. unicellular and multicellular organisms have comparative structures; and
- c. similar characteristics determine the classification of organisms.

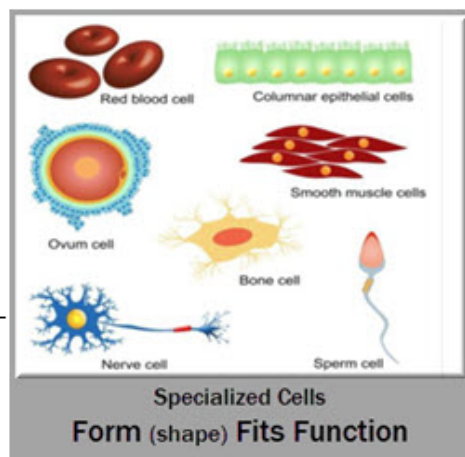
CELLULAR ORGANIZATION

- Organisms range in composition from **unicellular** microorganisms to **multicellular** organisms.



- In **multicellular organisms**, large groups of cells work together to form **systems** of **tissues** and **organs** that are **specialized** and aid the organism in carrying out its **life processes** of growth, reproduction, gas exchange, metabolism, and response.

- **Multicellular** organisms exhibit a hierarchy of **cellular organization** allowing for a **division of labor** when carrying out life processes
- A key concept in science is that **form fits function**.
- In multicellular organisms, cells have **specialized** shapes that enable them to perform **specific roles** within the organism



You should be able to:

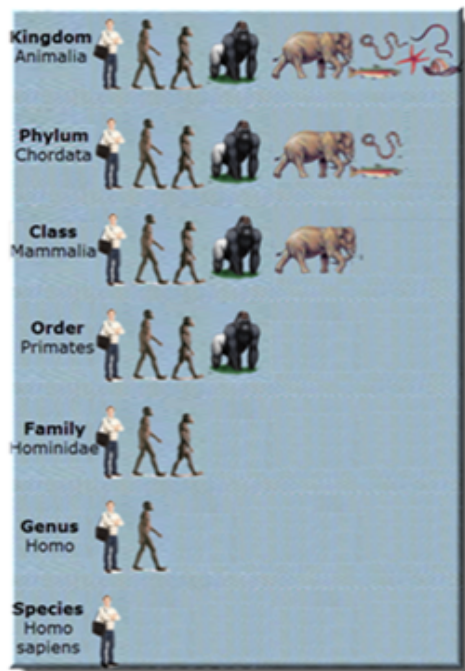
- explain the relationship among **cells, tissue, organs, and organ systems**
- differentiate among common examples of **unicellular and multicellular organisms** and how they perform various life functions,
- provide evidence to support the idea that a **cell's form fits its function** within a multicellular organism (see image)

CLASSIFICATION

- **Classification** is useful in explaining relationships and **organizing objects** or processes into groups.
- **Classification** relies on careful observation of **patterns** of similarities and differences.
- Biological **classification (taxonomy)** uses a systematic method to name, organize, and show relationships among species.

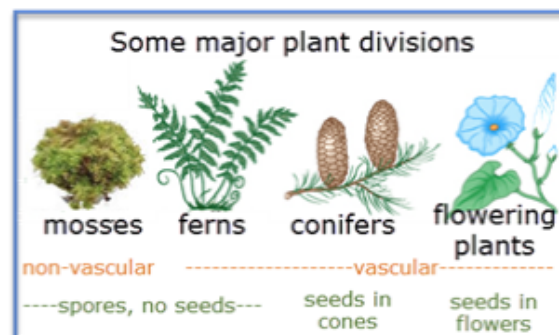


- Any grouping of organisms into **domains** or **kingdoms** is based on several factors, including
 - the presence or absence of cellular structures, such as the **nucleus**, **mitochondria**, or a **cell wall**;
 - whether the organisms exist as **single cells** or are **multicellular**; and
 - how the organisms get their **food**
- The current biological classification system groups organisms into **three domains: Archaea, Bacteria, and Eukarya**
- As living things are investigated, **new attributes** (physical and chemical) are revealed that **affect the relationships** and **taxonomic group** into which an organism is placed.
- Information about the physical features and activities of living things are organized into a **hierarchy of increasing specificity**.
- The levels in this hierarchy include **domain, kingdom, phylum, class, order, family, genus, and species**



Taxonomic Classification System
a hierarchy of increasing specificity

- Classifications** at one scale may not be valid at a different scale. For example, classification of organisms based on physical traits may not be the same as those based on **DNA sequences**.
- A **group of similar-looking organisms that can interbreed** under natural conditions and produce offspring that are capable of reproduction defines a **species** which are differentiated using **binomial nomenclature**



- categorize organisms into the **three domains: Archaea, Bacteria, and Eukarya**
- categorize examples of **four kingdoms of Eukarya: protists, fungi, plants, and animals**
- categorize organisms as representative of major **animal phyla and plant divisions** (see images above)
- recognize scientific names as part of a **binomial nomenclature**
- define what makes a **species**