

Unifying Themes in Biology



Introduction

Biology derived from two Greek words, 'bio' = 'life' and 'logo' = 'study'

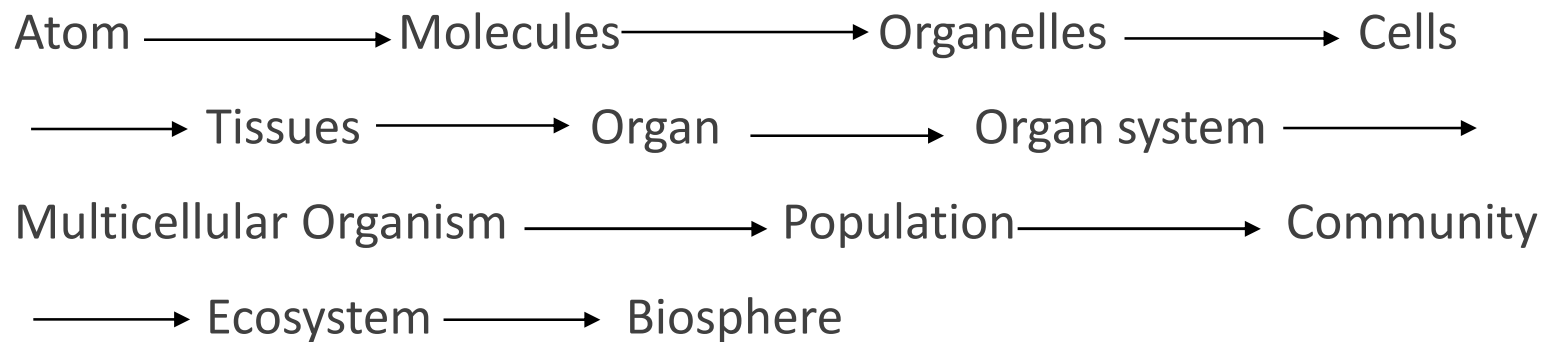
- ❑ Biology is the study of life
- ❑ All forms of living thing and life are studied
- ❑ Biology studies the structure, function, growth, origin, evolution and distribution of living things
- ❑ The adventure of Biology takes us:
 - ❑ Into a variety of environments to investigate ecosystems
 - ❑ To the laboratory to examine how organism work
 - ❑ Into the microscopic world to explore cells and the submicroscopic to explore molecules in cells
 - ❑ Back in time to investigate the history of life

Unifying themes
connect concepts from
many fields of biology



Concept common to all things

□ Hierarchy of Organization



Concept common to all things cont.

□ Cellular bases of Life

- Cells are the smallest basic unit of life
- Discovered in 1665 by Robert Hooke
- Schlenden M.J. and Schwann T proposed the Cell Theory
- Prokaryotic (archaea and bacteria) and Eukaryotic cells (Protista, Fungi, Plant, Animal)

Concept common to all things cont.

□ Interaction between organisms and their environment

- Organisms interact with each other as individuals and as population
- Organisms interact with their environment
- Organisms are open systems that exchange materials and energy with their surrounding
- Organisms must obtain and use energy to survive

Concept common to all things cont.

□ There is a correlation between the structure and function

- Structure determines function
- Structure is the shape or composition of something
- Function is what something is used for or role
- Organs used for absorption have structures to perform that function which would not be found in an organ used for contraction
- Different species have different anatomical structures for different functions

Concept common to all things cont.

□ Biological information is inherited

- Genetic information is encoded the nucleotide sequence called **DNA**
- DNA (deoxyribonucleic acid) is the molecule that holds hereditary information which is inherited by offspring from their parents
- The gene is a segment of the DNA that codes for specific trait

Concept common to all things cont.

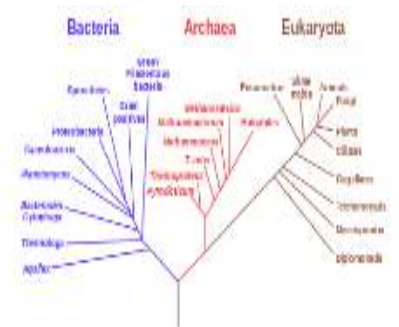
□ Unity in diversity

- Organisms are diverse in nature
- All organisms share a universal genetic coding system
- The more related two species are, the more characters they share

Concept common to all things cont.

□ Evolution

- Change in living things over time
- Evolution can occur through natural selection of adaptations
- Change in environment may be favourable to some or all of the mutations or other forms.
- Adaptations are beneficial inherited traits that are passed to future generation
- Evolution accounts for both the diversity and unity of life



Concept common to all things cont.

□ Homeostasis

- Homeostasis is the maintenance of relatively stable internal conditions
- All living organisms maintain homeostasis

Concept common to all things cont.

□ Interdependency of Organisms

- Ecology is the study of how organisms interact with each other & the environment
- An **ecosystem** is an environmental community
- Humans have an affect on environments all over the world

Organization of Life

