INTRODUCTION TO BIOLOGY

1. BIOCHEMISTRY

inorganic molecule - lacks carbon

organic molecule - with carbon

carbohydrates (CHO) - sugars & starches
- energy, structure in plants

lipids (CHO) - fats & oils
- energy, structure in animals

proteins (CHON) - amino acids
- structure in animals
- enzymes control & speed chemical reactions

nucleic acids (CHONPS) - genetics

2. CELLS

cells - microscopic, trillions in body

cell theory
1. cells are fundamental unit of life
2. all life is composed of cells
3. cells only arise from other cells

cell cycle - growth followed by…
- cell division to 2 daughter cells

cell division - 2 different types
- mitosis in most cells in body
  - with full set of chromosomes
- meiosis in sperms & eggs only
  - with half set of chromosomes

3. CELL STRUCTURE

cytoplasm - gelatinous fluid

cell membrane - surrounds cell

cell wall - outside cell membrane in **plants**

cilia - many short hair-like

flagellum - 1-2 long whip-like

organelles - internal structures

nucleus - contains chromosomes

mitochondria - releases energy

chloroplast - photosynthesis in **plants** only

4. KINGDOMS OF LIFE

5 kingdoms - based on cells & source of food

Monera - bacteria, blue-green algae
- simple unicell (few organelles)

Protista - protozoans & other algae
- complex unicell (many organelles)

Plantae - multicell, photosynthesis
- cell wall plus chloroplasts

[Fungi] - multicellular, absorptive
- cell wall but no chloroplasts
- rare in oceans

Animalia - multicellular, ingestive
- no cell wall or chloroplasts

5. ORIGIN OF LIFE

oldest life - marine bacteria 3.4 b.y.?

primordial soup experiment
- lab recreate ancient environment
- H^+, CH4, NH4, H2O, plus energy
- produced all organic molecules
- later protenoid microspheres

chemical evolution hypothesis
- long time leads to origin of cells
- at ocean surface or deep-sea hydrothermal vents?

hypersea ‘hypothesis’ - internal fluid in land organisms still interconnected to oceans