

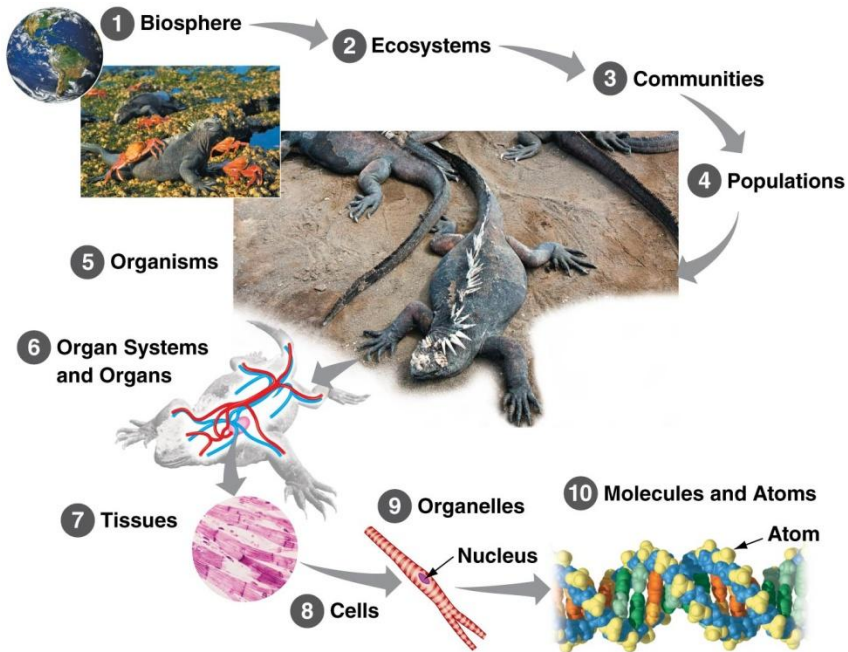
# Themes of Biology

Section 1-1 (p. 5-10)

# Essential Question(s)

1. List and briefly describe the five major themes in Biology. (Related to Essential Skill 1-1. Characteristics of Life.)

# The Study of Life



- **Biology** is the study of life
  - **Organism** – a living thing
- The Scope of Biology ranges from:
  - Microscopic structures to
  - Global interactions of millions of organisms

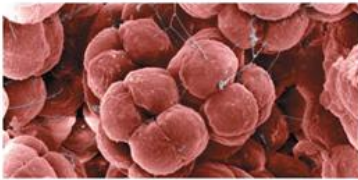
# Major Themes of Biology

These themes connect all life-forms:

1. Cell structure & function
2. Stability & Homeostasis
3. Reproduction & Inheritance
4. Evolution
5. Interdependence of Organisms
6. Matter, Energy & Organization



# Cell Structure & Function



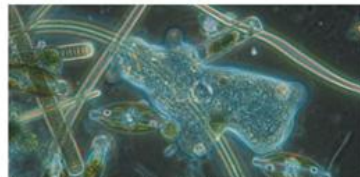
Kingdom Plantae



Kingdom Fungi



Kingdom Animalia

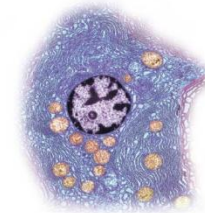


Protists (multiple kingdoms)

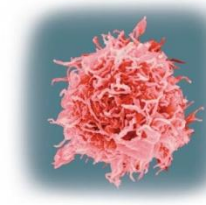
- **Cells** are the basic unit of life (all organisms are made of cells)!
  - **Unicellular organisms** have only one cell
  - **Multicellular organisms** have many cells
- All cells:
  - Are surrounded by a membrane
  - Contain genetic information

# Different Types of Cells

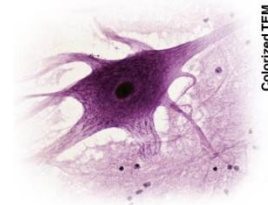
- Multicellular organisms are made up of many different types of cells
  - **Differentiation** is the process by which cells become different from one another
  - Examples: muscle cells, nerve cells, blood cells, etc



Pancreas cell



White blood cell



Nerve cell

Gene for a glycolysis enzyme



Antibody gene



Insulin gene



Hemoglobin gene

© 2013 Pearson Education, Inc.

# Stability & Homeostasis



**(b) Regulation**

© 2013 Pearson Education, Inc.

- **Homeostasis** is the maintenance of relatively stable internal conditions
- All organisms maintain homeostasis
  - Examples: water balance, body temperature, blood sugar levels, etc.

# Reproduction & Inheritances

- All organisms produce new offspring like themselves
  - **Reproduction** is the process of creating new offspring
- During reproduction, organisms pass on hereditary information
  - **DNA** is the molecule that holds hereditary information
  - A **gene** is a segment of DNA that codes for a specific trait



**(f) Reproduction**

© 2013 Pearson Education, Inc.

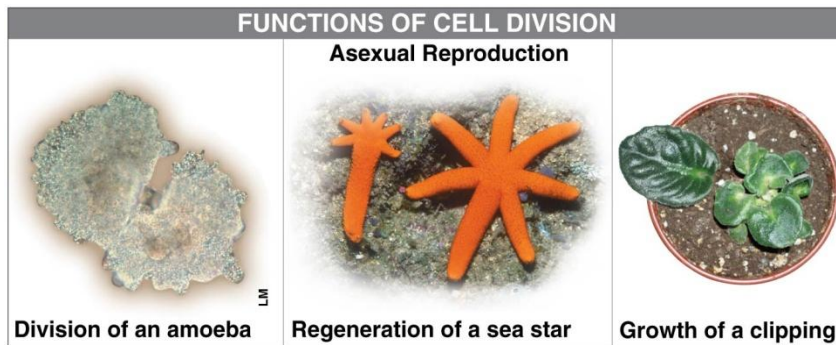


# Types of Reproduction



© 2013 Pearson Education, Inc.

- **Sexual reproduction** occurs when hereditary information from two individuals is combined
- **Asexual reproduction** occurs when a single organism produces an offspring identical to itself



© 2013 Pearson Education, Inc.

# Evolution

- **Evolution** is a change in a population over time
  - Populations evolve, not single organisms
- **Natural selection** is the driving force of evolution
  - Organisms with traits that are best suited to their environment are more likely to survive & reproduce



**(g) Evolution**

© 2013 Pearson Education, Inc.

# Interdependence of Organisms



## 2 Ecosystems

- **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

# Matter, Energy & Organization

- Organisms must obtain & use energy to survive
  - Most of the energy on Earth comes from the sun through
    - **Photosynthesis** is the process of capturing energy from the sun to produce food
- Organisms get energy in different ways:
  - **Autotrophs** produce their own food through photosynthesis
  - **Heterotrophs** consume other organisms for food

