



# Evidence of Evolution

**Honors Biology**  
**Facilitator: Mr. Lee**  
**Room 320**



# Objectives

- ▶ **Identify the evidence of Evolution**
- ▶ **Define fossils**
- ▶ **Explain the law of superposition**

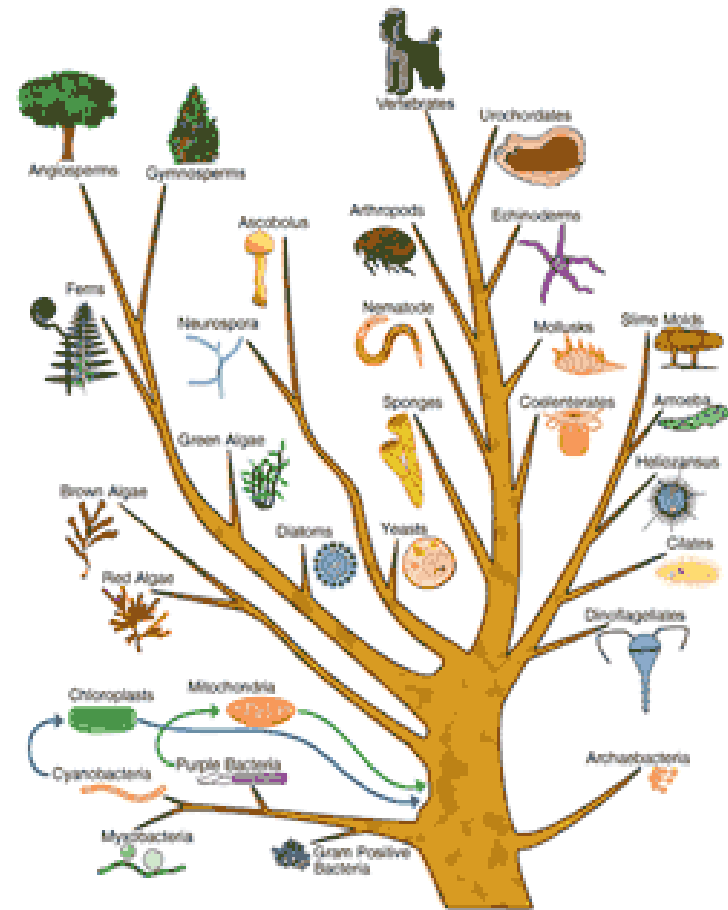


# Introduction

- ▶ **Evolution is the scientific explanation that accounts for the diversity of life on Earth**
- ▶ **Evolution theory is based on a collection of scientific facts, observations, and hypotheses**
- ▶ **Scientific theory is a well-supported testable explanation of phenomena that have occurred in nature**

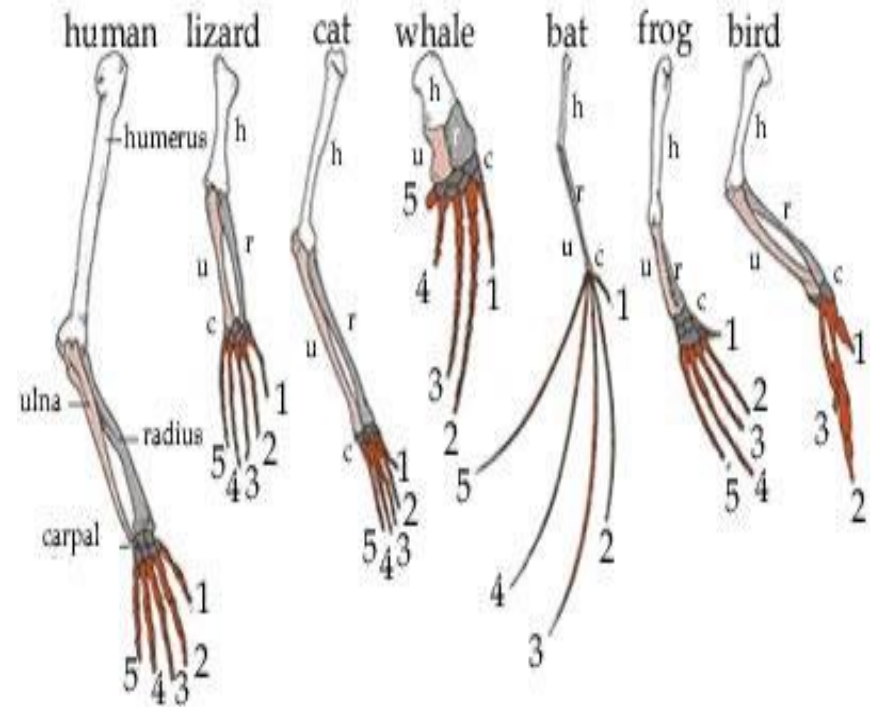
# Evidence of Evolution

- ▶ Homologous body structures
- ▶ Similarities in embryology
- ▶ Similarities in microbiology
- ▶ Geographic distribution of living species
- ▶ The fossil record



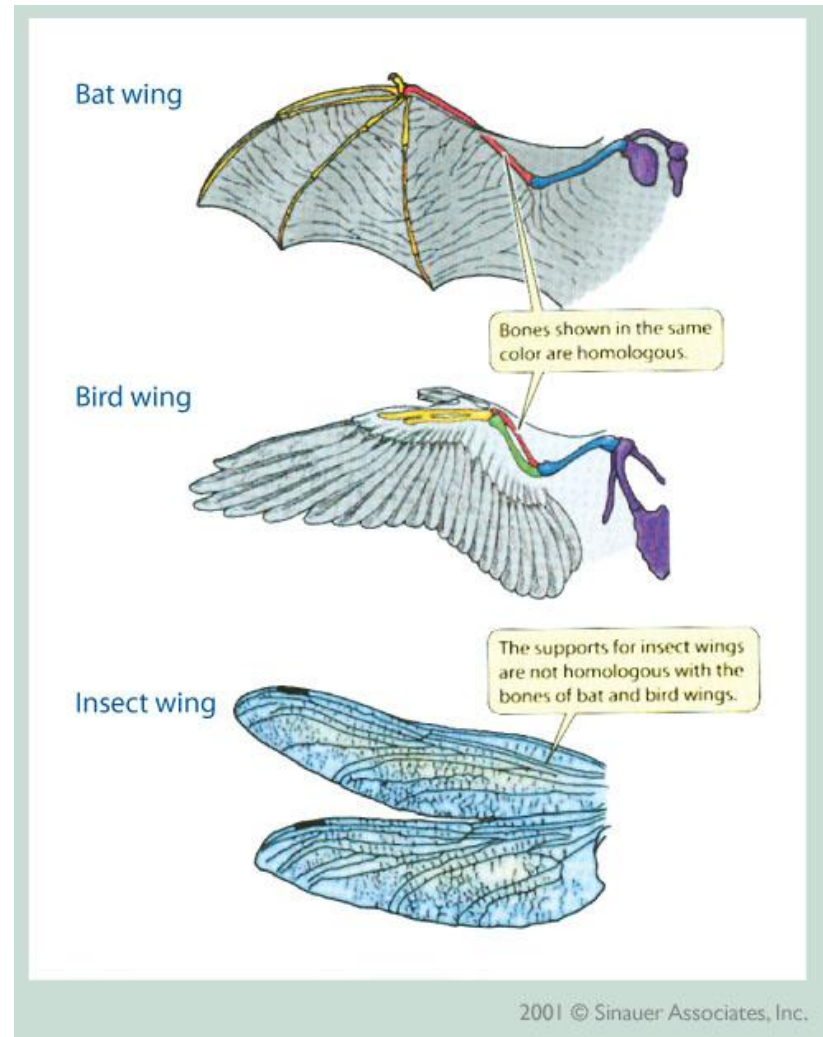
# Homologous Structures

- ▶ Are similar features that originated in a shared ancestor
- ▶ Are similar in skeletal structure
- ▶ Are derived from the same structures in the embryo
- ▶ They may have different functions (bat wing & human arm)



# Analogous Structures

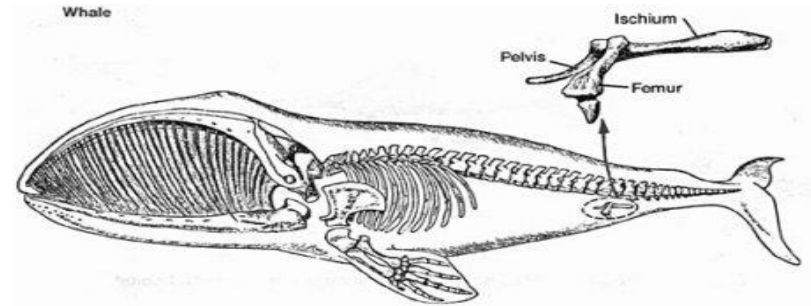
- ▶ Share identical functions
- ▶ Look alike
- ▶ They have very different embryological development
- ▶ May have very different internal anatomy
- ▶ An example is the wings of a bird and an insect



# Vestigial Structures

- ▶ These are structures that no longer serve a useful purpose, such as:

- ▶ **Human tail bone**
- ▶ **Human appendix**
- ▶ **Some snakes have tiny pelvic bones and limb bones**
- ▶ **Whales have pelvic bones and a four-chamber stomach like a cow**
- ▶ **Vestigial structures are evidence that the structure was functional in an ancestor**



# Similarities in Embryology

- ▶ Early stages of different vertebrate embryos are very similar to each other
- ▶ Many vertebrates have gill like structures at some point as an embryo





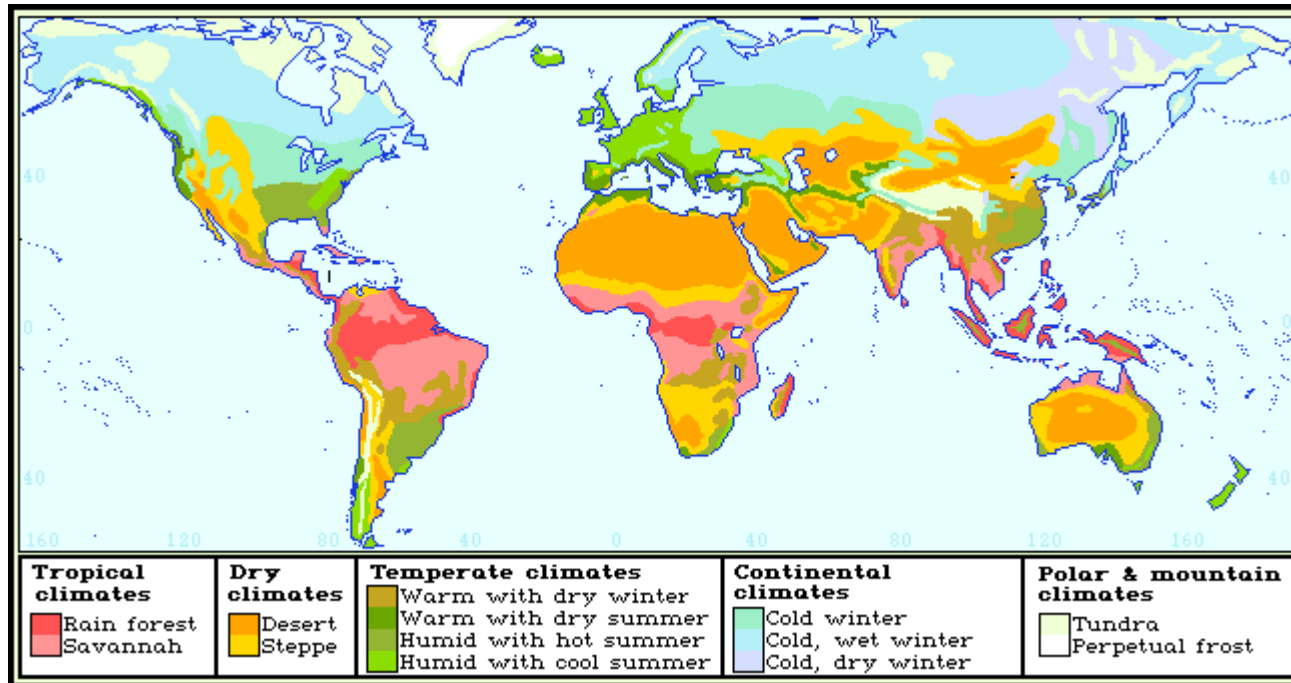
# Similarities in Macromolecules



- ▶ There are similarities in RNA and DNA from one organism to another
- ▶ Many species have the red-blood-cell protein hemoglobin
  - ▶ Amino acid sequence differs by one amino acid between a human and a gorilla
  - ▶ Amino acid sequence differs by 67 amino acids between a human and a frog
- ▶ Molecular biology can be used to confirm evolutionary histories suggested by fossils and anatomy

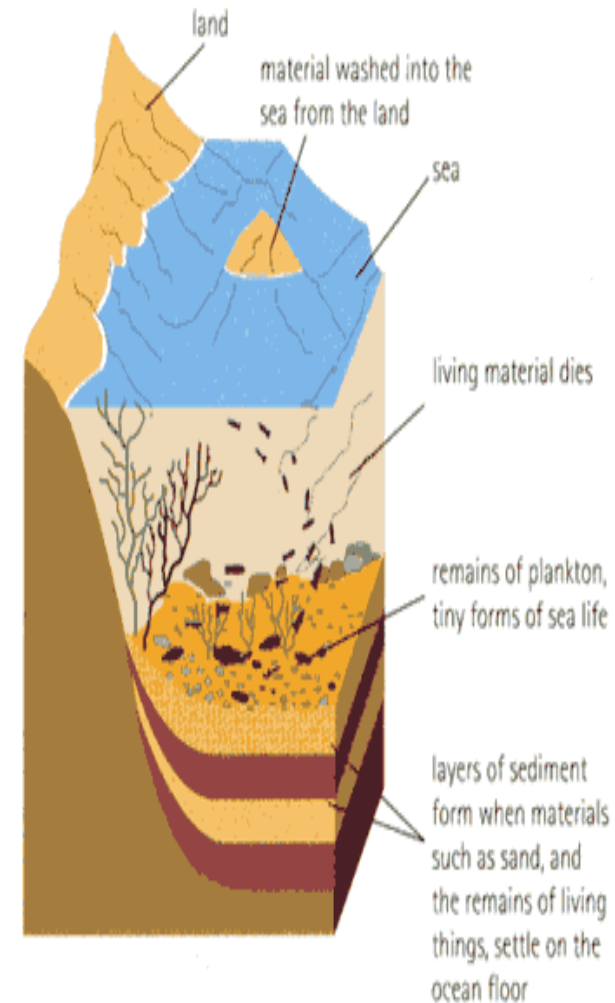
# Geographic Distribution of Living Species

- ▶ In response to the environment, different unrelated species have evolved to look similar to each other



# Fossils and Ancient Life

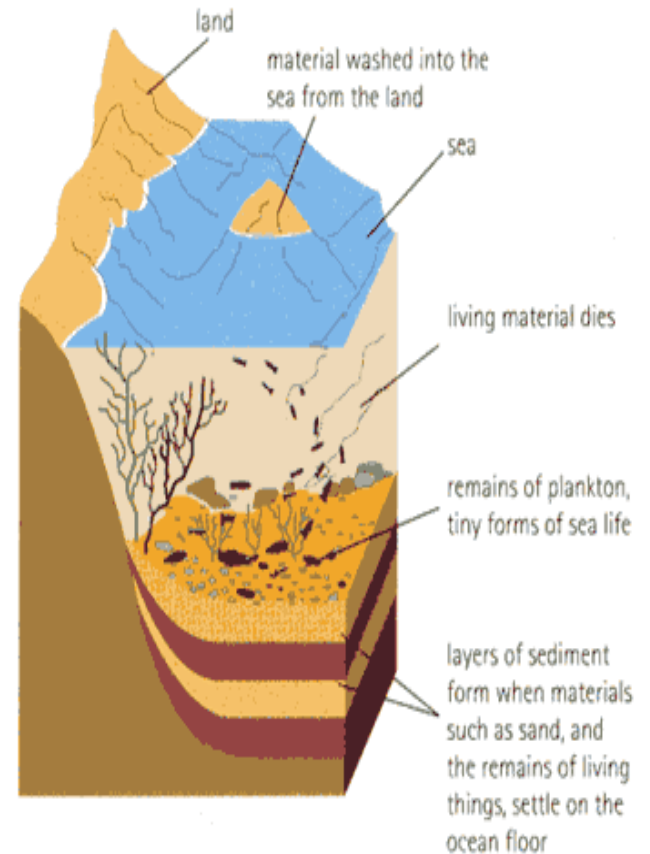
- ▶ Paleontologist are scientist who study fossils
- ▶ Nature of Fossils:
  - ▶ Fossils are traces of organisms that have been dead for a long time
  - ▶ Fossils are often found in sedimentary rock
  - ▶ Over time, hard minerals can replace hard body parts or tissue
- ▶ The fossil record provides evidence about the history of life on Earth



# Fossils and Ancient Life...

## ▶ Robert Hooke:

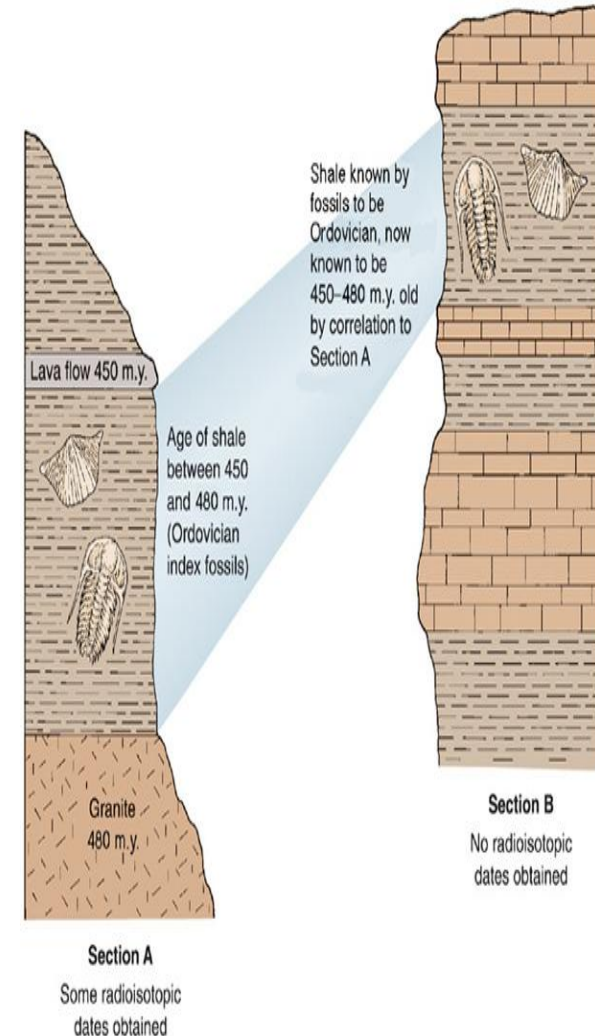
- ▶ **Concluded that fossils are remains of plants and animals (1668)**
- ▶ **Hypothesized that living things were turned to rock**





# Succession of Forms

- ▶ Fossil-bearing strata can show us when a species:
  - ▶ Appeared
  - ▶ How long they survived
  - ▶ If and when they went extinct
- ▶ We know from the fossil records there have been several mass extinctions, caused by:
  - ▶ Drastic changes in the environment
  - ▶ Volcanic activity
  - ▶ Collisions with asteroids

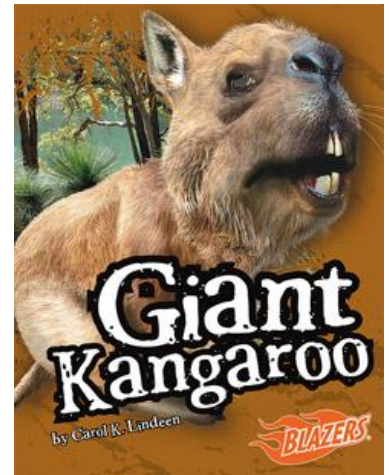




# Biogeography



- ▶ Is the study of the geographical distribution of fossils and of living organisms
- ▶ Helps us to see that new organisms arise in areas where similar forms already lived
- ▶ Organisms are compared with fossils in the area; similar in forms
- ▶ Modern kangaroos only live in Australia where the extinct giant kangaroo lived





# Review

- ▶ **Identify the evidence of Evolution:**
  - ▶ **Homologous body structures**
  - ▶ **Similarities in embryology**
  - ▶ **Similarities in microbiology**
  - ▶ **Geographic distribution of living species**
  - ▶ **The fossil record**



# Review



- ▶ **Define fossils**
  - ▶ **Fossils are traces of organisms that have been dead for a long time**
- ▶ **Explain the law of superposition**
  - ▶ **States that successive layers of rock and soil were deposited on top of each other by wind or water**
  - ▶ **The lowest stratum is the oldest, and the top stratum is the newest**



Learn Long  
Live Long