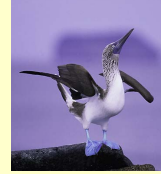


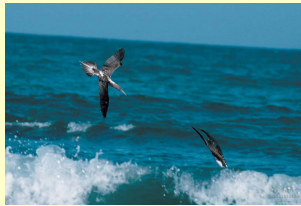
Evolution - Classification

Clown, Fool, or Simply Well Adapted?



Presentation adapted from: Campbell, N., Reece, J., Mitchell, L., Taylor, M., 2003. *Biology: Concepts and Connections*. Powerpoint lectures: Pearson Education, Inc. publishing as Benjamin Cummings

- ❖ All organisms have evolutionary adaptations
 - ♦ Inherited characteristics that enhance their ability to survive and reproduce



A sea voyage helped Darwin frame his theory of evolution

- ❖ Aristotle and the Judeo-Christian culture believed that species are fixed
- ❖ Fossils suggested that life forms change

❖ Charles Darwin observed

- ♦ similarities between living and fossil organisms
- ♦ the diversity of life on the Galápagos Islands



Figure 13.1A

❖ The voyage of the *Beagle*



Figure 13.1B

- ❖ Darwin became convinced the Earth was old and continually changing

- ♦ He concluded that:

- living things also change, or evolve over generations
- living species descended from earlier life-forms: descent with modification

Fossils: evidence for evolution

- ❖ Fossils and the fossil record strongly support the theory of evolution

- ♦ Hominid skull



- ♦ Petrified trees



Figure 13.2A, B

- ♦ Ammonite casts



- ♦ Fossilized organic matter in a leaf

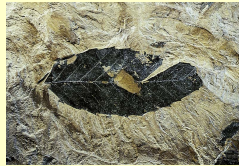


Figure 13.2C, D

- ❖ Fossil perch



Figure 13.2x1

- ❖ Mammoth tusks



Figure 13.2x4

- ♦ Scorpion in amber



- ♦ "Ice Man"



Figure 13.2E, F

- ❖ The fossil record shows that organisms have appeared in a historical sequence

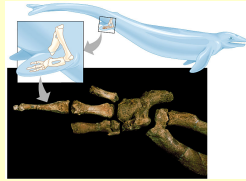
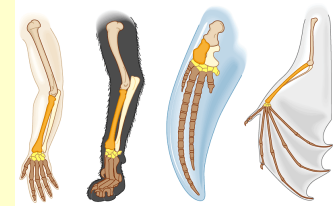


Figure 13.2G, H

A mass of evidence validates the evolutionary view of life

- ❖ Other evidence for evolution comes from

- ♦ Biogeography
- ♦ Comparative anatomy
- ♦ Comparative embryology



Human Cat Whale Bat

Figure 13.3A

- ♦ Molecular biology

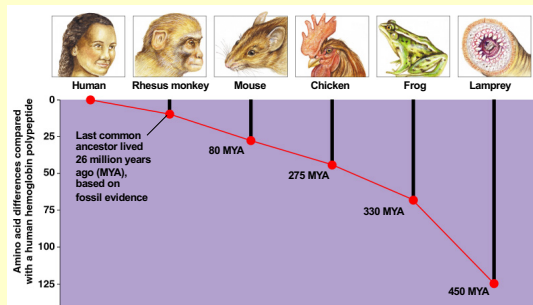


Figure 13.3B

Rapid evolution

- ❖ Galapagos finches



Figure 14.4A



Photos: D. McPhail

- ❖ Three-spine sticklebacks - B.C.



What is a species?

- ❖ Linnaeus

- ♦ used physical appearance to identify species
- ♦ developed the *binomial* system of naming organisms: binomial nomenclature

- ♦ *Felis catus*



- ♦ Taxonomy

❖ Different species - similar looking

- ♦ Eastern and western meadowlarks



Figure 14.1A

- ♦ Same species - different-looking



Figure 14.1B

❖ Biological species definition

- ♦ a population or group of populations whose members can interbreed and produce fertile offspring

❖ Taxonomists assign a two-part name to each species

- ♦ Genus - *Felis* (cats)
- ♦ Species - *catus* (domestic cat)



Photo: David Bleivins

❖ Genera are grouped into larger categories

CLASSIFICATION OF THE DOMESTIC CAT

Category	Domestic Cat
Domain	Eukarya
Kingdom	Animalia (animals)
Phylum	Chordata (chordates)
(Subphylum)	Vertebrata (vertebrates)
Class	Mammalia (mammals)
Order	Carnivora (carnivores)
Family	Felidae (cats)
Genus	<i>Felis</i>
Specific name	<i>catus</i> (domestic cats)

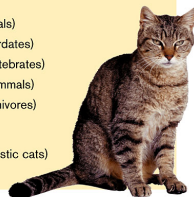


Table 15.10

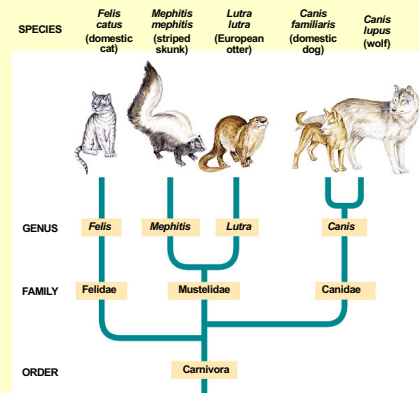


Figure 15.10

Arranging life into kingdoms is a work in progress

- ❖ For several decades, systematists have classified life into five kingdoms

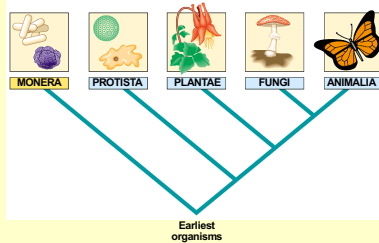


Figure 15.14A

❖ Three domains

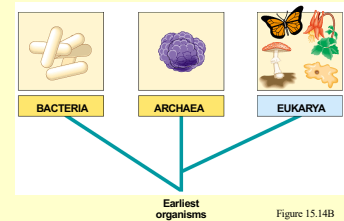
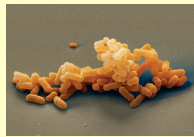


Figure 15.14B

- ❖ The broadest group is *domains*

♦ Domain Bacteria



♦ Domain Archaea

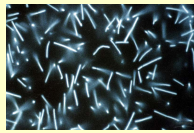


Figure 1.4A, B

♦ Domain Eukarya



Figure 1.4C-F

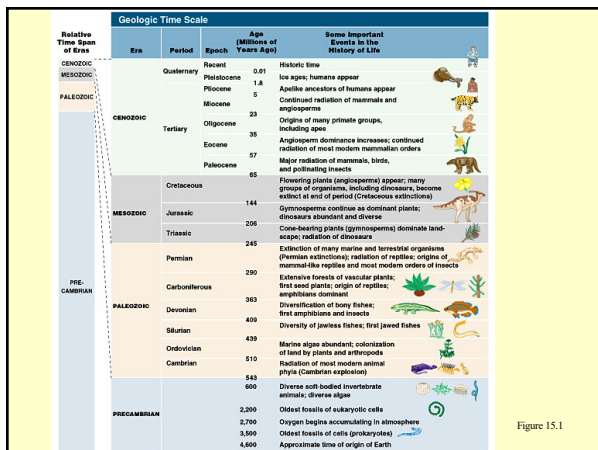


Figure 15.1

Dichotomous keys

