EVIDENCE FOR EVOLUTION

Modern day organisms provide evidence for evolution. **The three major types of evidence that organisms have changed over time include fossils, patterns of early development, and similar body structures.** Evolutionary biologists compare organisms to determine how closely related they are. They do this by comparing body structures, development in the uterus, and DNA sequences to determine evolutionary relationships.

One way that scientists find evidence for evolutionary relationships is by comparing the early development of organisms. An adult opossum, chicken, salamander and fish look quite different; however, during early development these four organisms are similar. These similarities suggest that these vertebrate species are related and share a common **ancestor.** An ancestor is an early form of an organism.

An organism’s **body structure** is its basic body plan, which includes how its bones are arranged and the location of major organs. Fishes, amphibians, reptiles, birds, and mammals all have a similar body structure – an internal skeleton with a backbone. This is why scientists classify all five groups of organisms together as **vertebrates.** Scientists assume that these five groups all inherited these similarities from a similar early vertebrate ancestor that they all share. Similar structures that related organisms share from a common ancestor are called **homologous structures.** Sometimes, scientists find fossil evidence that supports the clues provide by homologous structures.

Scientists suppose that species with similar body structures and development patterns inherited many of the same **genes** from a common ancestor. Genes are short segments of DNA, the molecule that holds all of our genetic information. By comparing the sequences of genes of different species, scientists can deduce how closely related they are. The more similar the sequences of DNA, the more closely related the species are. In most cases, these relationships between DNA of different species have further confirmed evidence from body structure, fossils, and homologous structures.

Scientists use the combined evidence of fossils, patterns of development body structures, and DNA sequences to construct branching trees. A **branching tree** is a diagram that shows how scientists think different groups of organisms are related.
REVIEW – EVIDENCE FOR EVOLUTION

1. What three things provide scientists with evidence that organisms have changed over time?

2. What do similarities in the early development of mammals, birds, fishes and reptiles suggest?

3. Similar body structures that related species have inherited from the same ancestor are called ____________________.

4. Why do scientists classify fish, amphibians, reptiles, birds, and mammals together in one group?

5. Use the diagram below to answer the following questions.

a. What is this type of diagram called?

b. Are birds more closely related to mammals or reptiles? Explain your answer.

c. Did amphibians evolve from reptiles? Give evidence for your answer.

d. What is the common ancestor of mammals, birds and snakes?