Evidence for Evolution PowerPoint Notes

Biological evolution accounts for the diversity of species developed through gradual processes over many generations. Independent lines of evidence from geology, fossils, and comparative anatomy provide the bases for the theory of evolution.

Evolution
Evolution is a scientific _____________ that explains how life changes through time. A theory is based on scientific evidence gathered from _____________ and _____________. Many lines of evidence provide the basis for the theory of evolution. These include comparative anatomy, DNA analysis, and the fossil record.

Comparative Anatomy – Homologous and Analogous Structures
Comparative anatomy is the study of _______________ similarities and differences among _______________. For example, what does your arm have in common with the wing of a bird, the flipper of a porpoise, and the forelimb of an elephant?

__________________ structures have a common _______________, but do not necessarily perform the same _______________. The structures in the limbs below indicate that the organisms are related by a _______________ ancestor.

__________________ structures serve the same _______________ but come from different _______________. Though structurally similar, they do not arise from a common _______________. An example of analogous structures is the wing of an insect and the wing of a bird.

Comparative Anatomy – Embryos
Another way to compare the anatomy of different species is to compare their _______________. Comparative anatomists have discovered similarities in embryos of _______________. Vertebrates are animals with a _______________. You are a vertebrate. So are other mammals, birds, reptiles, and fish. Adult vertebrates also share many similarities in their _______________ and _______________. This is evidence that all vertebrates descended from a _______________ ancestor.
**DNA – Similar Base Sequences**

All species of organisms have DNA as their hereditary material. Scientists compare the DNA sequences of different species to determine evolutionary relationships. Species that share more similarities in their DNA base sequences are more closely related than those that share fewer similarities. Scientists hypothesize that if two species have similarities in their base sequences, they share a common ancestor.

The diagram compares the DNA base sequences in the gene that codes for hemoglobin in vertebrates. The greater the number of differences in base sequences, the farther the evolutionary distance from humans.

**Fossils**

Much of the evidence for evolution comes from studying fossils. A fossil is a remnant or trace of an organism from the past, such as a bone or leaf, embedded and preserved in Earth’s crust. Earth’s crust is its outermost layer made mostly of rock.

Most fossils are dug up from rock layers. Sedimentary rock is rock that has formed from sediments, like sand, mud, or small pieces of rock. Over long periods of time, sediments are squeezed together as they are buried under more and more layers that pile up. Eventually, those sediments are compressed into sedimentary rock. The layers that are farther down in Earth’s crust are older than the upper layers.

**How fossils are formed.**

Many fossils are formed from the body parts of an organism’s body like bones and teeth. Fossil formation begins when an organism’s body is quickly buried in sediments from an event like a mudslide or a sand storm. Over time, more and more sediments cover the remains. The body parts that do not rot are buried under layers of sediments. After a long time, the chemicals in the body parts are replaced with rock-like minerals. This process results in a heavy, rock-like copy of the original object—a fossil.

**Fossil Record**

Fossils provide a historical record of life on Earth known as the fossil record. Fossils found in the (newer) sedimentary layers more closely resemble present-day organisms than fossils found in (older) layers. Although scientists have collected thousands of fossils, there are many gaps in the fossil record. That is because most ancient species did not survive. They simply decayed and were lost from the fossil record. Scientists estimate that only a small percentage of past organisms have been (or will be) found as fossils.