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 _______________ 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 _______________ 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 _______________ 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 _______________. A fossil is a remnant or trace of an organism from the past, such as a _______________ or leaf i__________________, 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 _______________ than the upper layers.

How fossils are formed.
Many fossils are formed from the _______________ parts of an organism’s body like bones and teeth. Fossil formation begins when an organism’s body is quickly _______________ 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 _______________. This process results in a heavy, rock-like copy of the original object—a _______________.

Fossil Record
Fossils provide a historical _______________ 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 _______________ in the fossil record. That is because most ancient species did not _______________. They simply decayed and were lost from the fossil record. Scientists estimate that only a small _______________ of past organisms have been (or will be) found as fossils.