**What is the Theory of Evolution?**  Author: Ms. Alison H. Gaede

Charles Darwin authored the theory of evolution in his book, “Origin of Species.” He discovered that natural selection is probably the mechanism of evolution. Natural selection explains how populations adapt to changes in the environment and why some species become extinct. Natural Selection is the process of organisms best adapted to an environment surviving in that environment. Traits are a form of inherited characteristics. An adaptation is a characteristic that helps an organism survive and reproduce in its environment. Genetic variation is a measure of how much individuals in a population differ genetically. Genetic variability between individuals of a population or species is caused by random mutations and/or sexual reproduction.

Evolution can be defined as the change in the gene pool of a population over time. One way that humans can select plants or animals for breeding based on desired traits is called Artificial Selection. Artificial Selection is also called Selective Breeding as found in dog or horse breeding.

Evidence that supports the theory of evolution can include comparative anatomy, embryology, fossils and even molecular genetics. Homologous structures such as human arm, dog’s leg, bird’s wing, or a whale’s fin all point to a common ancestor. Key features of the theory are that organisms in a population are genetically unique; offspring compete with one another for limited resources; each species produces more offspring that can survive; and the offspring with the most favorable traits are the most likely to survive and pass on their genes.

Fossils help us because they show us remains or imprints of once-living organisms. A group of organisms that can mate with each other to produce fertile offspring are called species. Speciation can occur through reproductive isolation and then the related species will not be able to reproduce anymore.

The fossil record in the Earth’s crust indicates a history of life on Earth. This fossil record can explain how organisms in an environment have changed over time. The event by which dinosaurs became extinct is called a mass extinction and has happened to organisms several times during the history of our Earth.