



Paleontology Notes: Fossils & Radioactive Dating

Fossils are the preserved remains or traces of living things. They give us evidence of how life has changed over time. Most fossils are formed when living things die and are buried by the buildup of sediment. This is why most fossils are found in sedimentary rock. The scientists that study these fossils have a special name: they are called paleontologists.

There are multiple kinds of fossils. Petrified fossils are fossils that are formed when minerals take the place of all or part of an organism. A great example of a petrified fossil is petrified wood. Molds and casts are the most common fossils. A mold is a hollow area in sediment in the shape of an organism - like an impression. Because a mold is an empty space, sometimes casts are formed afterward. A cast is formed when dissolved minerals seep into the empty space of a mold and make a 3D copy of the shape of an organism. A trace fossil is evidence left by a living thing, like a footprint or trail of an animal. The remains of living things may be preserved in ways other than being covered by sediment. Organisms can become trapped in tar - a very sticky oil that seeps from Earth's surface - or even amber (tree sap). Some organisms have even been frozen in the extremely cold regions of Alaska and Siberia.

Because fossils can show us how things have changed over vast periods of time, we have a special name for that time: evolution. Evolution is the gradual change in living things over long periods of time.

The fossil record shows us that different groups of organisms have changed over time. Evolution is a scientific theory, which means that it is a well-tested concept and explains a wide range of observations. This means that a scientific theory is researched very well and is much more than "just a theory." Some fossils show us about organisms that are longer present on Earth and will never return. We call these extinct. Another cool thing about fossils: they tell us all about the past climates of an area. If you find lots of fossils of shells and other sea creatures on top of a mountain, what does that say to you about what the region looked like in the past?

Everything in the world is made up of matter - everything you can touch! Every bit of matter is made up of tiny particles called atoms. When all of the atoms in a specific type of matter are the same, it's called an element. Elements are what we find on the periodic table. Carbon is a very common element - it is found in all living things! Most elements are stable, but some aren't. Over time, the unstable elements break down and release particles. This is called radioactive decay. As an element undergoes radioactive decay, it changes from one element to another at a constant rate - this is called the half life. A half life is the amount of time it takes for a certain element to decay by half. The rate never changes.

Scientists use a specific type of radioactive dating called Carbon-14 dating for sedimentary rocks, and potassium-argon dating for igneous rocks. Carbon-14 dating is used for living things (think fossils!), and potassium-argon dating is more frequently for rocks based strictly on the elements included. These types of dating are used to date rocks from the past.