Our Place in Time

Totally New
about 1 to 10 years old

Pretty Young
about 10 to 100 years old

Somewhat Young
about 100 to 5000 years old

Medium Age
5000 to 100 million years old

Somewhat Old
100 million to 4 billion years old

Very Old
4 billion to 10 billion years old

Really Ancient
More than 10 billion years old

How We Know

Scientists use a variety of techniques to determine the age of an object, astronomical or otherwise. Here are just a few examples:

Dendrochronology – Tree rings.Trees typically produce one new ring a year, the type and thickness of the ring often dictated by local climate that year. A line of rings then becomes a unique fingerprint to that era in time, so that the rings of the tree can be compared to known tree ages to find the age of the oldest ring.

Records/Histories – Records and histories are a powerful tool to use in estimating the ages of objects in recent time.They also can provide the basis for comparing the 'fingerprints' of two objects together to get their relative ages. For example, comparing a new tree ring core to one that is already in the archives.

Style, Form and Function – Anthopologists and Sociologists use a variety of techniques and methods to estimate the ages of objects that have been created or changed by human activity. The change in styles of pottery can be traced over time so that a piece of pottery from a given site can be assigned a probable age. Knowledge of carpentry practices can allow a sociologist to estimate when a table or door might have been constructed. Changes in symbols in common use in art or fabric work can give clues as to when certain items were made.

Radiometric Dating – Radiometric dating allows us to 'hear' the ticking of the atomic clocks trapped inside rocks. Such systems are based on the idea that the chemical composition of objects changes with time. Many atoms themselves are not stable, and over time will change into something else. For example, imagine an ancient lava rock from Hawaii. Some long time ago it was molten lava, flowing out of a volcano. It hardened and became a solid rock. When did that happen? As it turns out, potassium is a common element in lava rocks. Some potassium turns into the gas argon with time, and it does so in a very predictable fashion. Scientists know exactly how long that takes, and can measure in the laboratory how much potassium and argon are in the rock now. So they can work backwards to find out much time must have elapsed since the rock first cooled. Many such systems exist, and not just rocks can be dated with them. Carbon 14 is a radiometric dating system, along with Potassium-Argon, Uranium-Lead, and others.

Superposition – The concept of superposition is simple but very powerful, especially in geology and archaeology. Whatever is on top is likely to be younger or have happened more recently than whatever is on the bottom.

Crater Counting – Counting the number and size of impact craters on a planet can give scientists a good idea of its age. Surfaces in the solar system collect craters over time, and generally, the more and larger craters a surface has, the older it is.

Stratigraphy – Geologists use stratigraphy to help them estimate the age of rocks in a given layer. The various layers of rocks on earth have been dated by radiometric means, and by the identification of fossils within those layers. So if an ancient impact crater is found buried between rock layers, an estimate of its age can be made.

Models of Stellar Interiors – Our models about how stars burn their internal fuel can allow us to estimate their age. Large stars burn bright,hot and fast, small stars burn slowly and are more cool. Therefore large, hot blue stars live brilliant, short lives, whereas small cool red stars are dull but live a long, long time. Some are almost as old as the universe!

Big Bang 13.7 Billion Years
Hydrogen First atoms formed in Big Bang,13.4 Billion years
Galaxies first began forming 13.1 Billion years
Hubble Deep field Galaxies 12 Billion Years or more
Milky Way Galaxy 10 Billion Years
Oldest parts of meteorites 4.56 Billion years
Sun, Earth, Moon and Planets about 4.5 Billion years
Earliest Life on Earth 3.8 Billion years?
Dinosaurs 250 to 65 Million years

Tycho Crater on the Moon 100 Million years
Pleiades 80 Million Years
Stars in the Eagle Nebula 5.5 Million years
Grand Canyon About 1 million years
Meteor Crater 40,000 Years
Pyramids 4500 years
Great Wall 2700 years
Hoover Dam 70 years
St. Louis Arch 40 years