



Chapter 4

Dating Methods

by Roger Patterson on January 6, 2011

Most scientists and many Christians believe that the radiometric dating methods prove that the earth is 4.5 billion years old. Recent research shows otherwise.

What You Will Learn

Most scientists and many Christians believe that the radiometric dating methods prove that the earth is 4.5 billion years old. The textbooks speak of the radiometric dating techniques, and the dates themselves, as factual information. Far from being data, these dates are actually interpretations of the data. As discussed before, the assumptions influence the interpretation of the data. There are three main assumptions that must be made to accept radiometric dating methods. These must be accepted on faith in uniformitarian and naturalistic frameworks.

Recent research by a team of creation scientists known as the RATE (Radioisotopes and the Age of The Earth) group has demonstrated the unreliability of radiometric dating techniques. Even the use of isochron dating, which is supposed to eliminate some initial condition assumptions, produces dates that are not reliable. Despite the fact that there are many scientific problems with radiometric dating, there is a more significant problem. The Bible gives a much different picture and explains that relying on man's reasoning is foolishness. A fear of God and reverence for His Word is the beginning of wisdom. Starting with the Bible and developing a model for dating events in earth history will lead us to the truth. The Bible gives us a much more reliable history of the earth as it was recorded by God.

What Your Textbook Says about Dating Methods

Evolutionary Concept	Prentice Hall	Glencoe	Holt	Articles
Radioisotope dating shows the earth to be billions of years old.	39, T64C, 348–350, 354–355	387, 550, T552D, 562–563, T563, T578, 578–579, 648, T755, T769, T793	T183C–T183D, 193, 194–195, 212, T642, 642	4:1, 4:3, 5:1
Carbon-14 dating can be used to find the ages of some items.	T38, 350	563	196	4:2, 4:3, 5:1
Tree rings and varves can be used to date events, changes in the environment, and sediments.	351	564–565, 648	192, 641	4:4, 4:5

Note: Page numbers preceded by "T" indicate items from the teacher notes found in the margins of the Teacher's Edition.

What We Really Know about Dating Methods

When someone mentions scientific dating methods, the first thing to come to mind for most people is carbon dating. However, there are many methods that can be used to determine the age of the earth or other objects. The textbooks focus on relative dating, based on the layering of the rocks, and radiometric dating.

Relative ages are assigned to rocks based on the idea that rock layers lower in the strata were deposited before rock layers that are higher. Creationists do not necessarily disagree with this concept, but it can only be applied to layers that are found in one location and/or can be determined to have been deposited in a continuous layer over a very wide area. There is also a difference in the timescale used to explain the layers. Determining the relative age of a rock layer is based on the assumption that you know the ages of the rocks surrounding it. Uniformitarian geologists use so-called *absolute* dating methods to determine the ages of the surrounding rocks.

Certain types of rocks, especially those that form from magma (igneous), contain radioactive isotopes of different elements. It is possible to measure the ratio of the different radioactive parent isotopes and their daughter isotopes in a rock, but the ratios are not dates or ages. The dates must be inferred based on assumptions about the ratios. Some of the common isotope pairs used are K-Ar, Rb-Sr, Pb-Pb, and U-Pb.

Radiometric Dating

Using ratios of isotopes produced in radioactive decay to calculate an age of the specimen based on assumed rates of decay and other assumptions.

Carbon-14 dating is another common technique, but it can only be used on carbon-containing things that were once alive. The method of calculating radiometric dates is like using an hourglass. You can use the hourglass to tell time if you know several things: the amount of sand in the top of the hourglass when it started flowing, the rate that the sand flows through the hole in the middle, and that the quantity of sand in each chamber has not been tampered with. If any of these three conditions is not accurately known, the hourglass will give an inaccurate measure of time.

Radiometric dating is based on the fact that radioactive isotopes decay to form isotopes of different elements. The starting isotope is called the parent and the end-product is called the daughter. The time it takes for one half of the parent atoms to decay to the daughter atoms is called the half-life. If certain things are known, it is possible to calculate the amount of time since the parent isotope began to decay. For example, if you began with 1 gram of carbon-14, after 5,730 years you would be left with 0.50 g and only 0.25 g after 11,460 years. The reason this age may not be a true age—even though it is commonly called an absolute age—is that it is based on several crucial assumptions. Most radiometric dating techniques must make three assumptions:

1. The rate of radioactive decay is known and has been constant since the rock formed.
2. There has been no loss or gain of the parent or daughter isotopes from the rock.
3. The amounts of parent and daughter isotopes present when the rock formed are known.

The major problem with the first assumption is that there is no way to prove that the decay rate was not different at some point in the past. The claimed “fact” that decay rates have always been constant is actually an inference based on a uniformitarian assumption. It is true that radioisotope decay rates are stable today and are not largely affected by external conditions like change in temperature and pressure, but that does not mean that the rate has always been constant.

Recent research by a creation science group known as RATE (Radioisotopes and the Age of The Earth) has produced evidence of accelerated rates of decay at some point (or points) in the past. Creation scientists suggest that there are two possible times that God supernaturally intervened on a global scale—during Creation Week and the Flood. It is not unreasonable to assume that God used the energy of accelerated radioactive decay to initiate and drive the major geologic changes in the earth that accompanied the Flood.

Evidence for the period of accelerated decay is found in zircon crystals. Zircon crystals in granite contain radioactive uranium-238, which decays into lead over time. As the uranium decays, helium is produced in the crystals. Helium escapes from the crystals at a known, measurable rate. If those rocks were over a billion years old, as evolutionists claim, the helium should have leaked out of the rock. The presence of lots of helium in the crystals is evidence in support of a young earth.

Other important findings of the RATE project include detecting carbon-14 in coal and diamonds. If these substances were really millions or billions of years old respectively, there should be no carbon-14 left in them. Carbon-14 has a half-life of 5,730 years. With the most accurate mass spectrometers, the oldest calculated age of items containing carbon-14 is about 80,000 years. Diamonds are assumed to be many billions of years old and should contain no detectable carbon-14 as it would have all decayed to nitrogen-14 long ago. The same is true of coal which was supposedly deposited hundreds of millions of years ago, according to the evolutionary model. The presence of carbon-14 in these materials clearly supports the idea of a young earth as described by the Bible.



Using an hourglass to tell time is much like using radiometric dating to tell the age of rocks. There are key assumptions that we must accept in order for the method to be reliable.



Fossils and rocks do not come with dates stamped on them. The dates must be interpreted based on the evidence. Biblical geologists start with the assumptions laid out in the Bible and conclude that the rocks must be less than 6,000 years old. Evolutionists reject the authority of the Bible and conclude that the rocks must be millions or billions of years old.

The assumption that there has been no loss or gain of the isotopes in the rock (assumption 2) does not take into account the impact of weathering by surface and ground waters and the diffusion of gases. It is impossible to know to what degree the parent and daughter products have been added to or removed from the rocks over the alleged millions or billions of years.

The final assumption (assumption 3) does not take into account the fact that isotopes can be inherited from the source areas of magmas and/or from surrounding rocks as the magmas pass through the mantle and crust of the earth. Uniformitarian geologists do make efforts to eliminate errors, but the fact that rocks of known recent age give dates of millions, and even billions, of years supports the claim that radiometric dating cannot provide accurate “absolute” dates. Also, samples taken a few feet apart can give ages that differ by many hundreds of millions of years.

Many people do not realize that fossils themselves are usually not directly dated. Instead, layers that contain datable igneous rocks above or below a fossil-bearing layer are used to estimate the age of the

fossil. The age of the fossil can be estimated within the range of the layers above and below it. In some cases, the ages are correlated to other rock layers of supposedly known age or by using index fossils. These methods assume that the distribution of index fossils and the correlation of strata are well understood on a global scale.

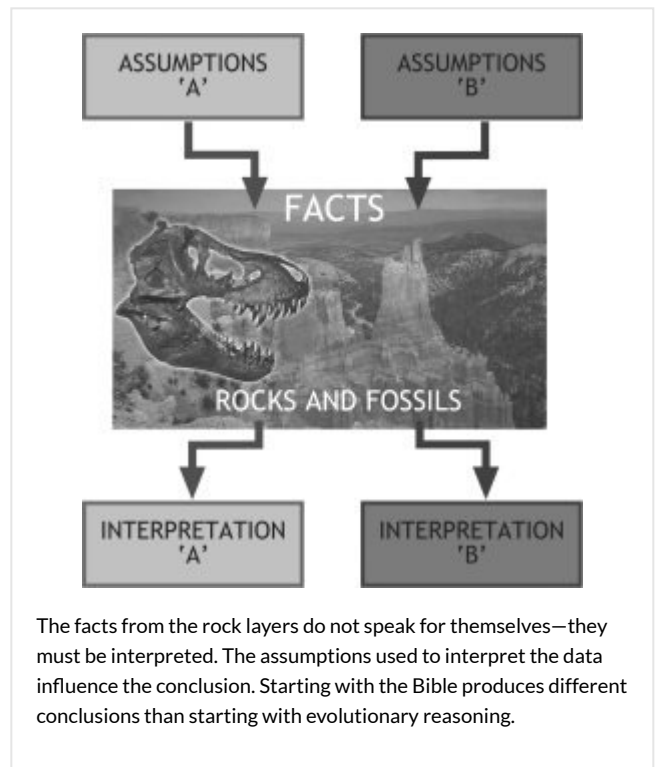
Another finding of the RATE team is very intriguing. The team took samples of diabase, an igneous rock, and tested them using various radiometric dating techniques. If the dating methods are all objective and reliable, then they should give similar dates. The rocks were tested as whole-rock samples using K-Ar dating and also separated into individual minerals. The whole-rock and separated mineral samples allow a method known as isochron dating to be done. This method is supposed to eliminate the assumption that the initial concentration of the daughter element is zero.

Despite removing this assumption, the RATE team has shown that this method is not reliable. Dating the Cardenas Basalt, a layer near the bottom of Grand Canyon, and a volcanic layer from near the top of Grand Canyon produced an amazing result. Based on the law of superposition, the lower layers in the canyon should be older than the upper layers (unless there was an intrusion or other event that changed the order). Using isochron dating from a respected lab, the lower rocks were dated at 1.07 billion years and the upper, and presumably younger rocks, were dated at 1.34 billion years. There is an obvious discordance (disagreement) in the data. So the question becomes, “Can we trust the dates given in the textbooks if the techniques are not objective?” (More information on the RATE research can be found in article 4:3.)

Because these dates are based on methods with multiple assumptions, and are contrary to the Bible, we must reject that they are accurate. Despite the fact that a majority of scientists and even many theologians accept the dates, God’s Word must be our ultimate authority.

There are many other methods that can be used to establish ages for parts of the earth and the solar system. These methods will be discussed in the following chapter. Regardless of what method we use, we must start with assumptions and interpret the facts accordingly.

Understanding what those assumptions are is important. If we are not aware of the assumptions that are being used, we can easily be deceived. We should always start with the Bible, the ultimate source of truth.



When we try to use man's ideas and assumptions to understand nature, we are forgetting that Proverbs 2:1–6 tells us:

*My son, if you receive my words, and treasure my commands within you,
So that you incline your ear to wisdom, and apply your heart to
understanding;
Yes, if you cry out for discernment, and lift up your voice for
understanding,
If you seek her as silver, and search for her as for hidden treasures;
Then you will understand the fear of the Lord, and find the knowledge of
God.*

Reference Article Summaries

4:1 Does radiometric dating prove the earth is old?

Riddle, www.answersingenesis.org/articles/nab/does-radiometric-dating-prove

Proponents of evolution suggest that radiometric dating has proven that the earth is between 4.5 and 4.6 billion years old. But what is this age based on? A straightforward reading of the Bible shows that the earth was created in six days about 6,000 years ago. Radiometric dating uses ratios of isotopes in rocks to infer the age of the rock.

Scientists use a mix of observational data and assumptions about the past to determine the radiometric age of a rock. Comparing the amount of a parent isotope to the amount of its daughter isotope and knowing the rate of change from parent into daughter (known as the half-life), the age of the rock can be determined. However, there are several assumptions that must be made in this process.

The three critical assumptions are:

1. The initial conditions of the rock sample are accurately known.
2. The amount of parent or daughter elements in a sample has not been altered by processes other than radioactive decay.
3. The decay rate (or half-life) of the parent isotope has remained constant since the rock was formed.

An hourglass can be used as an analogy to explain the assumptions. An hourglass can be used to tell time only if we know how much sand was in each chamber at the beginning, that there was no sand added or removed from either chamber, and that the sand falls at a constant rate. If any of these factors is not known, the time given may not be accurate. The same goes for the dating of rocks using radioisotopes. Assumption 1 was proven false when scientists from the RATE group had rocks of known age dated. These rocks were dated at up to 3.5 million years old when none of them were older than 70 years. How can we trust this method to tell us the age of rocks when the data do not match with observations?

Isochron dating is supposed to remove the assumption of initial conditions, but some different assumptions are necessary. If radiometric dating techniques are objective and accurate, then comparing the single-sample dates to the isochron dates should give similar results. In the RATE report there were dates that differed by up to a billion years. One volcanic rock layer from the top of Grand Canyon was dated 270 million years older than the oldest rocks below it near the bottom of the canyon.

Other case studies by the RATE group show dates that vary greatly depending on the sample and dating technique used. The most reasonable explanation seems to be that the rates of decay have been different at some point in the past. This is supported by the presence of large amounts of helium in some minerals. If there had been more than a billion years since the rocks had formed, the helium should have leaked out of the rocks by now. The presence of helium seems to support the recent accelerated decay of the isotopes, leaving a large amount of helium trapped in the rocks.

The Bible presents a very different picture of the age of the earth when compared to radiometric dating using evolutionary assumptions. It is better to use the infallible Word of God for our scientific assumptions than to compromise it with man's ideas.

4:2 Doesn't carbon-14 dating disprove the Bible?

<https://answersingenesis.org/age-of-the-earth/dating-methods/>

Riddle, www.answersingenesis.org/articles/nab/does-c14-disprove-the-bible

Radiometric dating is a technique that uses the change of one isotope, the parent, to another, the daughter, to determine the amount of time since the decay began. Carbon-14 is supposed to allow dating of objects up to 60,000 years. If these dates were true, they would seem to discredit the biblical account of a young earth of about 6,000 years.

Since the Bible is the inspired Word of God, we should examine the validity of the standard interpretation of carbon-14 dating by asking several questions:

1. Is the explanation of the data derived from empirical, observational science, or an interpretation of past events (historical science)?
2. Are there any assumptions involved in the dating method?
3. Are the dates provided by carbon-14 dating consistent with what we observe?
4. Do all scientists accept the carbon-14 dating method as reliable and accurate?

Carbon-14 dating is used to date things that were once living. The unstable carbon-14 decays to stable nitrogen-14 as one of its neutrons is converted to a proton through beta decay. Carbon-14 is constantly supplied as high energy neutrons collide with nitrogen-14 in the upper atmosphere. This carbon-14 combines with oxygen to form carbon dioxide and is taken in by plants and then animals. Each living thing should have roughly the same ratio of radioactive carbon-14 to normal carbon-12.

When an organism dies, it no longer takes in carbon-14, and the decay process begins. Assuming that the rate of decay and the starting amount of carbon-14 is known, this decay process can be used as a clock. However, the ratio of carbon isotopes is not constant and can be affected by the earth's magnetic field strength and the amount of plant and animal matter in the biosphere. The plants and animals buried in the recent Flood could account for a large change in the ratios and demonstrate the false assumption of carbon equilibrium.

The RATE group has also documented carbon-14 in coal and diamonds that are supposed to be millions to billions of years old. If these items were truly more than 100,000 years old, there should be no detectable carbon-14 present in them. These findings point to the age of the earth being much younger than evolutionary scientists would suggest.

4:3 Radioisotopes and the age of the earth

Snelling, www.answersingenesis.org/articles/aid/v2/n1/radioisotopes-earth

A long-term research project involving several creation scientists has produced intriguing new evidence in support of an earth that is thousands of years old rather than many billions. Some of the findings are summarized below.

The presence of fission tracks and radiohalos in crystals demonstrates that hundreds of millions of years worth of radioactive decay has occurred in a very short period. Because the Bible indicates the earth is young (about 6,000 years old), this large quantity of nuclear decay must have occurred at much faster rates than those measured today.

Using various radiometric dating methods to measure the ages of rock samples consistently produced ages that varied greatly. This may be explained by the different parent atoms having decayed at different rates in the past—an explanation not allowed by evolutionists. These changes in decay rates could be accounted for by very small changes in the binding forces within the nuclei of the parent atoms.

Research has been done to demonstrate that many of the assumptions used in radiometric dating are false. Starting from biblical assumptions regarding the Flood and Creation can provide a new framework for interpreting current scientific data.

4:4 Tree rings and biblical chronology

Lorey, www.icr.org/article/381

Bristlecone pines are the oldest living things on the earth. Native to the mountains of California and Nevada, the oldest tree has been dated at 4,600 years old. By correlating the rings with dead wood found near the trees and beams from local buildings, a chronology of 11,300 rings has been suggested. However, this does not necessarily correlate to years because multiple rings can grow in one year.

The 4,600 year age of the oldest tree, named Methuselah, corresponds to the date of the Flood given by Ussher and others. If Methuselah began growing shortly after the Flood, then it stands as a record that confirms the Bible.

4:5 Are there half a million years in the sediments of Lake Van?

Oard, www.answersingenesis.org/articles/aid/v2/n1/sediments-lake-van

Lake Van is a salt lake in Turkey that uniformitarian scientists believe holds a record of the last 800,000 years of the earth's climate. The layers of sediment are up to 400 meters thick and were supposedly laid down one layer at a time each year. Evolutionists assume the layers, called varves, roughly correspond to years based on assumptions about present processes.

Varves are also used to date other lakes around the world to the time of the last ice age—supposedly 10,000 years ago. Many other alleged varve deposits challenge the biblical timescale and must be reinterpreted within the creationist framework. The repeating layers should be referred to as rhythmites and simply represent successive deposits over time. These different layers can be deposited as particles of different size and density settle out of flowing water. Studies at Lake Walensee, Switzerland, showed over 300 layers forming in 160 years. Different areas had different patterns and were not able to be correlated directly.

Other studies have shown multiple layers forming as the result of light rainfall, increasing river flow, and increased snowmelt. Underwater turbidity currents are often interpreted as varves, but they form many layers rapidly. It is common, therefore, for multiple layers to form in a single year.

All of these layers can be explained within the Flood model as catastrophic melting and drainage events deposited many layers over a short period of time during localized residual catastrophism in the immediate aftermath of the Flood. Uniformitarian geologists assume the slow rate of deposition as observed today for the past. However, in many cases they really have not observed the present sedimentation rate, and in some cases where they have used sediment traps, not all the deposition has been recorded. Creationists, on the other hand, can postulate much higher rates in the past due to the Flood, localized residual post-Flood catastrophism, and/or a rapid post-Flood Ice Age—the rate tapering off to the present slow rate.

Questions to Consider

1. Do radiometric dating techniques always show that rocks lower in the geologic layers are older than rocks that are higher?
2. If radiometric dating on rocks known to be only a few years old yields dates of millions of years, why should we trust that the techniques can be used to accurately date rocks of unknown ages?
3. In radiometric dating techniques, how do we know how much parent material the sample started with? How do we know none of the parent or daughter isotope was added or removed? How do we know the decay rate is constant?
4. When items are carbon-14 dated, how do we know how much carbon-14 was initially present in the sample? Could the ratio of carbon-14 to carbon-12 have been different at different times in earth's history? How can scientists accurately adjust their calculations if the isotope ratios were never observed and recorded?
5. What assumptions are involved in radiometric dating?

Tools for Digging Deeper

Evolution: The Fossils Still Say No! by Duane Gish

The Geology Book by John Morris

The New Answers Book by Ken Ham et al.

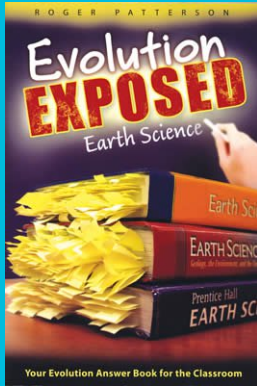
The New Answers Book 2 by Ken Ham et al.

Radioisotopes and the Age of the Earth Volume 1 (Technical) by ICR

Radioisotopes and the Age of the Earth Volume 2 (Technical) by ICR

Thousands . . . Not Billions by Don DeYoung

www.answersingenesis.org/go/dating



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