

Three Assumptions of Radiometric Dating

When utilizing radiometric dating to determine the age of an object, there are **three assumptions** that must be made in order to get a usable age estimate:

1. **Constant Rate:** the rate of radioactive decay, the half-life, has remained constant over the life of the sample.
2. **Known Initial Conditions:** we can accurately estimate the amounts of parent and daughter isotopes present when the rock or mineral specimen being dated was formed.
3. **Closed System:** there has been no gain or loss of parent or daughter material over the life of the sample.

Scientists are careful to try to collect samples that minimize the possibility of open system behavior, but natural materials are complex. Therefore, filters, standards, and control measurements are required to decide when to accept or reject an age.



Selecting seeds for radiocarbon analysis, White Sands National Park, New Mexico, USA

Image: National Park Service, Public Domain