

Absolute dating (radiometric dating)

Summary

This lesson introduces absolute dating and a few ways in which scientists accomplish it. The majority of the lesson focuses on radiometric dating, including an activity where students date their own "rocks and fossils".

Time Frame

1 class periods of 60 minutes each

Group Size

Pairs

Materials

Powerpoint introduction is attached.

Each pair of students will receive a baggie with some ratio of one thing to another, for instance, 20 white beans and 30 red beans, or 45 screws and 27 washers.

Background for Teachers

Basic understanding of how radiometric dating works is useful.

http://en.wikipedia.org/wiki/Radiometric_dating

This lesson is highly simplified, and the powerpoint describes everything the student will need to know for the activity.

Student Prior Knowledge

The students should know how absolute dating differs from relative dating, and should have some perspective on why absolute dating is important in dating the earth.

Intended Learning Outcomes

3. Demonstrate Understanding of Science Concepts and Principles
 - a. Know and explain science information specified for their grade level.
4. Communicate Effectively Using Science Language and Reasoning
 - e. Use mathematical reasoning to communicate information.

Instructional Procedures

Begin the lesson with discussing the difference between relative and absolute dating. In my class, we used people age as an example. For instance, the students are relatively younger than I am, but by how much they don't know.

Discuss with the students different ways in which scientists can put dates on things, such as tree rings, then begin going through the powerpoint. The idea of radioactive dating can be broken down into a relatively simple concept of half-lives that the students should be able to grasp. In my class, terminology was the most difficult part (i.e., isotopes, radioactive, stable, unstable, parent, daughter, etc.). It was easy to get caught up in the nomenclature, even though the things they describe should be familiar. If you can think of a way to separate the concept of radioactive decay from the terminology to begin with, you may see better results.

Once you get through the concepts of radiometric dating, there are a few practice problems in the powerpoint you should go through as a class. These will help the students with their activity.

The activity is simple. Each pair of students should receive a baggie with a ratio of two different things

(our class used red and white beans, so students got bags full of, say, 38 white beans and 53 red beans). The baggies should be labeled with "what they are sampling". For instance, "Fossil Fish with Carbon; Carbon half life = 6,000 yrs.". You can be creative with what they are sampling, but this label helps with misconceptions, such as that fossil fish have their own half lives, and not the carbon in them.

In our class the students had just enough time to do one sample, but depending on your time frame you may have students switch samples to do more than one.

Assessment Plan

The attached worksheet helps the students work through the activity, and assesses their ability to analyze a ratio of "elements" and be able to calculate an absolute age of a sample.

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