

PhET Radioactive Dating Game Activity

http://phet.colorado.edu/simulations/sims.php?sim=Radioactive_Dating_Game

Purpose: You will use the radioactive decay rate and original-daughter element ratios of carbon-14 and uranium-238 to determine the ages of different objects.

Procedure:

1. Load PhET *Radioactive Dating Game*
2. Click on the *Measurement* tab.
3. Under *Probe Type*, select *Uranium-238* and *Objects*. Under *Choose an Object*, select *Rock*.
4. Click on *Erupt Volcano*. Let the simulation run until you reach 1 half-life. What % of the original uranium remains? _____. How many years did this take? _____
5. Under *Probe Type*, select *Carbon-14* and *Objects*. Under *Choose an Object*, select *Tree*.
6. Click on *Plant Tree*. Let the simulation run until you reach 1 half-life. What % of the original carbon remains? _____. How many years did this take? _____
7. Explain why uranium-238 is used to measure the age of rocks while carbon-14 is used to measure the age of the tree trunk?
8. Click on *Dating Game* tab. There are objects on the surface and in the five layers beneath the surface. There are both rocks and fossils in each layer.
9. Select the *Carbon-14* detector. Move the Geiger counter to each fossil and record the % of original in the table below
10. On the $\frac{1}{2}$ life graph, move the green arrow right or left until the % of original matches the reading on the detector. Record your estimated age for each fossil in the table.
11. Repeat Steps 9 and 10 using the Uranium-238 detector to estimate the rock ages. For fossils with no remaining C-14 signal, use the rock ages to estimate fossil ages in the same dating layer.
12. Summarize how C-14 and U-238 dating together can be used to determine fossil ages.

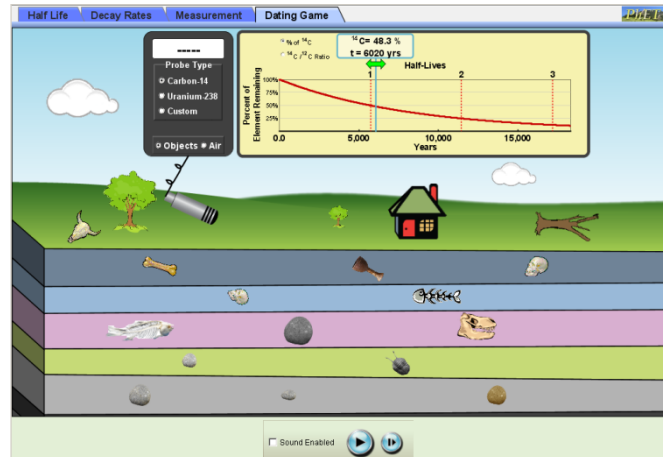
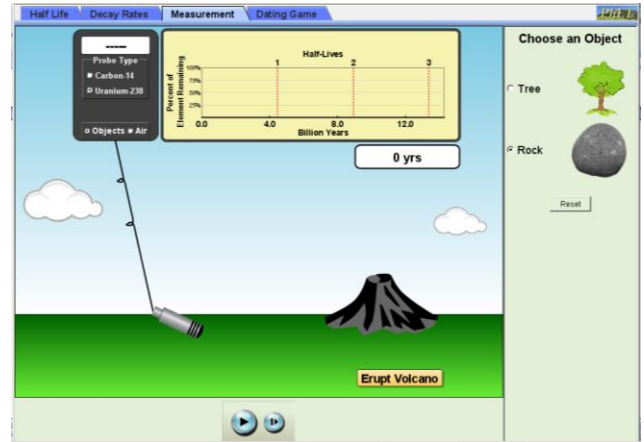


Table: *Radiometric Ages for Various Objects*

Object	Measured using C-14 or U-238?	% of Original	Guessed Age	Measured Age
Animal Skull				
Living Tree				
Distant Living Tree				
House				
Dead Tree				
Bone				
Wooden Cup				
1 st human skull				
2 nd human skull <i>The half-life of C-14 is 5730 years</i>				
Fish Bones				
Fish Fossil 1				
Rock 1				
Dinosaur Skull				
Rock 2				
Trilobite				
Rock 3				
Rock 4				
Rock 5				