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Decay Ratios

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TI lesson plan
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Objective: Students will be able to examine the ratios of parent material to decay product and by knowing this ratio will be able to determine the age of the material by referring to the half life of the material and the aforementioned ratio.

The concept for this lesson will be to determine the ratio of parent to decay product. This concept is mainly taught by having the students construct a graph and from the graph determine the half life number. The TI calculator should demonstrate (model) this graph nicely. We will use the graphing function and table function on the overhead to create a graph which will function to serve as an analogy to the half life concept..

Background:
Students are learning about relative aging of rocks, fossils, etc. and are beginning the next topic of absolute aging

To motivate the students about the topic and assess their prior knowledge of the concept about decay ratios and age I ask them; how can you tell how old a piece of bread is in your pantry?
Answers will vary, however, the conversation should form around the fact that older bread will have a greater percentage of mold to bread than newer bread. On the board, students create a chart which demonstrated each variable, time, percent of material. I elaborate around this new concept demonstrating on the overhead, using the TI 84 that a graph can be plotted with time on the x axis and percent remaining on the y axis using the chart previously created. (horiXontal and Yertical)
Time: about 20 minutes; Students will be participating and I will be constructing the graph leading the conversation.

I then give notes on what absolute aging and half life~~is~~ and how this can determined using a similar method as we have done with the bread.
Time: about 15 minutes; students are hanging on my every word as I give notes and demonstrate the concept referring back to the graph created.

To close this lesson and test for student understanding the students will be given questions based upon the graph created. Each question demonstrates the basic principle of reading a graph and determining an answer based on that reading.
After I have modeled how such questions may be answered using the graph, the students are broken up into their lab teams (I use teams of three). Each group is now given a graph of percent of original/parent material and the percent of the decay product and must answer additional questions based on these graphs.
During this time and for the remainder of class, the students will be working in their groups trying to determine ages of materials based upon the ratios of each material.