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Radioactive Decay using Stella and AgentSheets


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Challenge Project Abstract

(Ms. Pennella & Mrs. Java)
Bioscience School at Franklin

The topic of our Challenge Project is the half-life of radioactive elements. We chose this topic for several reasons. The 8th grade curriculum includes the investigation of fossils and radioactive elements. Students often have difficulty understanding and relating to this natural event since it cannot be observed. They do not see how it affects their lives today. Mrs. Java and I decided to have at least two of the investigated elements be related to medical procedures.

The students are able to relate what they have learned and see how this information has an impact on peoples' everyday lives. The radioactive elements used for the Challenge Project were: Carbon-14 that changes to Nitrogen; Iodine-131 that changes to Xenon-131; and Technetium-99 that changes to Ruthenium-99. The students were familiar with Carbon-14 since they read about the Ice Man and radiocarbon dating. Iodine-131 is used in medical procedures when diagnosing and treating cancer and thyroid problems. Technetium-99 is used to make images for the skeleton and heart muscle. It is also used for specialized medical studies on many other organs in the body.

We chose to use two programs, Stella and Agent Sheets. Stella is a good program for the students to build models. It demonstrates the exponential decay of the radioactive elements. The students do not have to know a formula to build the model. Stella uses graphs and data tables to display the exponential decay of the elements. They can see the graphs being constructed at a slow pace and the data accumulated. The second program we chose was Agent Sheets. This program is good because the students have the visual representation of the element decaying over time. The students were then able to use the calculators with the Stella Program. They calculated the amount of time each segment on the data table represented in relation to their element's half-life in Stella. The students are also able to calculate the amount of time each click represents when changing the parent element into the daughter element in the Agent Sheets Program.

Exposing the students to new technology and experiences helps them learn in a different and more exciting way. They are able to construct concrete models that represent abstract natural events. Students can then calculate or predict outcomes that may not otherwise be experienced. They are able to see visual representations, learn how the information is applicable, making the concept or idea real to their everyday lives.

