Instructor: Marika Foreman (2003 Science Teacher Workshop participant)
School District: Immaculata High School; Somerville
Lesson Title: Sr-90: A Wolf in Sheep's Clothing
Grades: 9, 10, 11, 12
Subjects: Honors Physical Science, Chemistry, Physics
Overview: During three teaching periods, which includes a student evaluation, the textbook material on radioactivity will be enhanced by a discussion of strontium-90 and of how this radioactive isotope fools the human body into believing that it is calcium and the havoc it could cause as a result.
Materials & Resources: Teacher prepared handouts, using the following references:

- U.S. Environmental Protection Agency. Radiation Information: Strontium. www.epa.gov/radiation/radionuclides/strontium.htm
- United States Environmental Protection Agency. EPA Facts About Strontium-90. www.epa.gov/superfund/resources/radiation/index/htm
- Agency for Toxic Substances and Disease Registry. ToxFAQs™ for Strontium. www.atsdr.cdc.gov/tfacts159.html
- CBW Info. Radiological Agent: Strontium-90. www.cbwinfo.com/radiological/sr90.shtml
- Mangano, Joseph J. Radioactive Strontium-90 in Baby Teeth of New Jersey Children
- and the Link with Cancer: A Special Report. Trenton, NJ. May 19, 2003 www.unplugsalem.org/radioactive_strontium.htm
- National Academy of Sciences. Beyond Discovery: Vitamin D's Connection to Calcium Control. www.beyonddiscovery.org/content/view.page.asp?I=436
- WISE News Communique. Cancer-Causing Radioactive Material Found in Children's Teeth. October 29, 1999. www.antenna.nl/wise/520/5098.html
- Cowell, Alan. British Secretely Used Baby's Bones in Tests. October 1, 2001
- tms.physics.lsa.umich.edu/214/other/news/100101UKBones.html
- Handbook Of Chemistry And Physics; Special Student Edition. 73rd ed., CRC Press, 1992-93

Objective: Use Srontium-90, a radioactive element, which is hazardous to human health, to

1. Discuss how Sr-90 can find its way into the environment and then into the human body.
2. Relate Sr-90 via the Periodic Table to a similar element which is known to be physiologically important, namely calcium, and point out the body's inability to differentiate between Sr and Ca.
3. Discuss the path followed by the ingested Sr-90.
4. Discuss medical/physiological problems associated with exposure to and ingestion of Sr-90.
5. Discuss studies done in the past as well as current studies ("Tooth Fairy Project" and RPHP) to determine the amount of Sr-90 absorbed by the human bone and that correlate these finding with above ground nuclear testing during the cold war, nuclear accidents (Three-Mile Island, Chernobyl) and an increase in various health problems.

6. Discuss Maximum Containment Levels (MCLs) established by EPA in drinking water and on-the-job exposure through the air, as well as decontamination steps that should be taken promptly after exposure.
7. Discuss biological vs. physical half-life of Sr-90.
8. Discuss the radioactive decay of Sr-90 and write the nuclear equations describing it.