Course: Honors Chemistry
Lesson: Introduction to Nuclear Chemistry and Types of Decay

Objectives:
● Students will be able to correctly write nuclear decay equations
● Students will be able to conceptualize how heavy elements are formed from stars

Bring:
● Per student – “Band of Stability Worksheet”, chart of nuclides, chemistry reference table
● Per group – two die, two C-12 marble nuclei, copy of rules for Nucleosynthesis game

Students will have previously:
● Read “The Birth of the Elements” article (ChemMatters, October 2000, p. 4-5)
● Learned what isotopes are and how to write their notation

Introduction:
● Define the terms “unstable” and “radiation”
● Discus the band of stability (hand out worksheet)

Body:
● Define $\alpha$, $\beta^-$, and $\beta^+$ radiation (and $\gamma$) and write an example equation for each on the board.
● Have students recall “Birth of the Elements” article.
● Explain Nucleosynthesis game and how we will play it to model what happens in stars (as explained in the article.)
● Students will play Nucleosynthesis game, writing out the equation for what happened at each turn and drawing arrows on their nuclide chart to trace the path from H to O. (Winning teams may receive a small prize.)

Closure:
● Have students select one element that does $\alpha$, one that does $\beta^-$, and one that does $\beta^+$ decay from Table N on their reference table and write out the equations in their notebooks.