

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”
- Discuss the band of stability (hand out worksheet)

Body:

- Define α , β^- , and β^+ radiation (and γ) 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 α , one that does β^- , and one that does β^+ decay from Table N on their reference table and write out the equations in their notebooks.