We are Made of Star Stuff: The Cosmic Origins on the Elements on Earth

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The story of how the elements on Earth came to be is perhaps the most fascinating story told anywhere in the universe. In this unit written for high school Chemistry, students explore the cosmic origins of elements and the basic nuclear particles and processes of the early universe that eventually gave rise to everything we know. Students investigate how quarks, leptons, and bosons in the young universe gave rise to protons, neutrons, and electrons. Students also unravel the processes that transformed protons and neutrons into heavier and heavier nuclei inside solar furnaces and then spread them throughout the universe in supernovae events. Students uncover the differences between fission, fusion, and radioactive decay, using model chemical equations and their knowledge of subatomic particles. Finally, students use light spectra to analyze the chemical composition of stellar bodies. This unit engages students in the three-dimensional Next Generation Science Standards through the use of Science and Engineering Practices and Cross Cutting Concepts as vehicles for student mastery of Disciplinary Core Ideas.