

Astrochemistry & Nuclear Chemistry Study Guide

The big ideas for this unit are:

- Nuclear fission
 - This is when a nucleus *splits* into smaller nuclei.
- Nuclear fusion
 - This is when two nuclei are *joined* into a larger nucleus.
 - It happens in stars.
 - Fusion makes all the elements heavier than hydrogen.
- Radioactive decay
 - Some nuclei are unstable. They emit radiation as they decay to a more stable isotope.
 - Isotopes are atoms with the same number of protons, but different numbers of neutrons.
- Radiation
 - It is the emission of energy or particles.
 - Includes electromagnetic radiation such as radio waves, microwaves, light waves, x-rays, and gamma rays.
 - Can be particles from radioactive decay such as alpha particles or beta particles.
 - Alpha particles are two protons and two neutrons (a helium nucleus)
 - Beta particles are electrons
 - Substances will only absorb or emit radiation of specific wavelengths.
 - This is useful for identifying substances.
- The Big Bang Theory
 - Is scientists' best understanding of how the universe formed.
 - States that 13.8 billion years ago, the universe was a super dense point that rapidly expanded, creating all matter and space.
 - Is based on three kinds of evidence:
 - Cosmic Background Radiation
 - Redshift of Galaxies
 - Abundance of Elements