

CHEMCOM UNIT 6 OBJECTIVES

Nuclear Chemistry

SECTION A - THE NATURE OF ATOMS

- Describe the structure of the atom, including the location of protons, neutrons, and electrons.
- Describe the characteristics of protons, neutrons, and electrons and explain how they interact with one another.
- Define atomic number, mass number, and atomic mass.
- Define isotope and give examples of some common isotopes.
- Solve problems involving the atomic numbers and mass numbers of some common isotopes.

SECTION B - NUCLEAR RADIATION

- Define and describe *radioactivity*.
- Distinguish between ionizing and non-ionizing radiation.
- Define and describe *background radiation*, including some of its sources.
- Describe the effect of ionizing radiation on living tissue.
- Distinguish among alpha, beta, and gamma radiation.
- Write and balance nuclear equations for decay reactions.
- List and describe methods for detecting and measuring ionizing radiation.

SECTION C - USING RADIOACTIVITY

- Define and describe *half-life*.
- Given its half-life, calculate the amount of a particular radioisotope that remains after a given period of time.
- Describe how radioisotopes are used as diagnostic tracers in medicine.
- Describe how radioisotopes are used to kill cancerous cells.
- Describe the process of nuclear transmutation.
- Write and balance nuclear equations for bombardment reactions.

SECTION D: NUCLEAR ENERGY: BENEFITS AND BURDENS

- Define and describe *nuclear fission*.
- Write a balanced nuclear equation for a fission reaction.
- Describe how electricity is generated in a nuclear power plant.
- Define and describe *nuclear fusion*.
- Evaluate methods for disposal of nuclear waste, including the burdens and benefits of each.
- Evaluate the use of nuclear energy in the world today.