

FRANKLIN-SIMPSON HIGH SCHOOL

Course Name: Pre – AP Chemistry **Unit Name:** Nuclear Chemistry

Days: 4

Quality Core Objectives:

Unit 20 Nuclear Chemistry	
I.A.1. Scientific Inquiry	c. Collect, organize, and analyze data accurately and use techniques and equipment appropriately
	d. Interpret results and draw conclusions, revising hypotheses as necessary and/or formulating additional questions or explanations
	e. Write and speak effectively to present and explain scientific results, using appropriate terminology and graphics
	f. Safely use laboratory equipment and techniques when conducting scientific investigations
	g. Routinely make predictions and estimations
I.A.2. Mathematics and Measurement in Science	g. Use graphical, mathematical, and/or statistical models to express patterns and relationships inferred from sets of scientific data
I.A.3. Science in Practice	c. Explain the criteria that explanations must meet to be considered scientific (e.g., be consistent with experimental/observational evidence about nature, be open to critique and modification, use ethical reporting methods and procedures)
	e. Use a variety of appropriate sources (e.g., Internet, scientific journals) to retrieve relevant information; cite references properly
	f. Identify and analyze the advantages and disadvantages of widespread use of and reliance on technology
II.A.2. Elements, Atomic Mass, and Nomenclature	c. Compare characteristics of isotopes of the same element
V.E. Nuclear Chemistry	a. Describe alpha, beta, and gamma decay, half-life, and fission and fusion
	b. Write appropriate equations for nuclear decay reactions, using particle balance; describe how the nucleus changes during these reactions and compare the resulting radiation with regard to penetrating ability

Purpose of the Unit:

Students will be able to describe alpha, beta, and gamma decay and construct the appropriate nuclear decay reactions for various isotopes. They will be able to identify and describe the three basic types of nuclear decay particles with regard to penetrating ability. Students will also be able to identify and appropriately cite relevant scientific sources with regard to MLA formatting. In addition, students will be able to utilize steps in the scientific inquiry process using graphical, mathematical, or statistical models as necessary.

Prerequisites: Students should be able to:

- Identify and calculate the number of subatomic particles in an isotope of a given element.
- Demonstrate knowledge of the appropriate use of laboratory equipment along with the associated safety protocols.
- Demonstrate prior exposure sources, examples and implications of radiation.

Daily Lesson Guide

Day	Lesson Content and Objectives	Focus Questions	Critical Thinking (High Yield / Literacy /LTF/etc.)	Engagement	Assessment and/or Accommodations
1	* Isotopes * Alpha, beta, gamma decay reactions * fission, fusion, half-life II.A.2.c V.E.a, b	* What makes up the radioactive particles? *Why do nuclei decay? * What happens when a nucleus decay?	* Summarizing and note taking * Nonlinguistic representation * Identifying similarities and differences * Advanced organizers * Evaluation/ Application	* Pre-test * Model notes * Work sample problems together, alone (formative) * Venn diagram * Article on uses of radiation	* Evaluate pre – test * Evaluate practice problems and Venn diagram for understanding * Evaluate comprehension of article Enrichment: Less guidance in note taking, more independence in practice, more challenging examples in formative

2	<p>* Laboratory: Demonstrating and graphically representing half-lives I.A.1.c, d, e, f, g I.A.2.g I.A.3.c, e, f II.A.2.c V.E.a, b</p>	<p>* How can I use what I know to demonstrate half-lives?</p>	<p>* Synthesis * Application/ Analysis * Identifying similarities and differences * Learning with others * Authenticity * Novelty and Variety * Generating and testing hypotheses</p>	<p>* ACT bell ringer * Conduct lab according to procedures provided (summative)</p>	<p>* Evaluate lab report Enrichment: Student development of lab procedures with less guidance</p>
3	<p>* Review I.A.1.c, d, e, f, g I.A.2.g I.A.3.c, e, f II.A.2.c V.E.a, b</p>	<p>* What can I do to be better prepared for the exam?</p>	<p>* Use clickers to test students' knowledge and clarify and misconceptions before the exam with immediate feedback.</p>	<p>* ACT bell ringer * Use clickers to review with exam like questions (summative)</p>	<p>* Students participate in review Enrichment: Less time to solve problems and limited use of aides</p>
4	<p>* Exam I.A.1.c, d, e, f, g I.A.2.g I.A.3.c, e, f II.A.2.c V.E.a, b</p>	<p>* Can I demonstrate my knowledge on the exam?</p>	<p>* Evaluation * Analysis * Application * Synthesis</p>	<p>* ACT bell ringer * Students take exam (summative)</p>	<p>* Evaluate exam Enrichment: No use of supports with exemption of periodic table, periodic table only has element symbols, not names</p>