Isotopes and Half-Life and Radioactivity: Oh my!

Course Name: Physical Science, Earth Science, Biology	
Unit Title: Radiation in the Human Body	**Day: 4/15**

Relevant NC Standard Course of Study Goal(s):

- PSc.2.3.1 Compare nuclear reactions including alpha decay, beta decay, and gamma decay; nuclear fusion and nuclear fission.
  - Compare alpha, beta, and gamma decay processes –alpha decay reduces the mass of an atom by 4 and the atomic number by 2; beta decay increases the atomic number by 1 (a neutron decays into a proton and electron); gamma rays are electromagnetic waves released from the nucleus along with either an alpha or beta particle
  - Compare the processes of fission (splitting of a very large atom) and fusion (joining of atoms) in terms of conditions required for occurrence, energy released, and the nature of products.

Specific Lesson Objectives

Students will understand:

- how fusion fuels the Sun
- how energy is released in fusion

Students will know:

- the difference between fusion and fission
- the similarities and differences between alpha, beta, and gamma decay

Students will be able to:

- complete basic decay calculations
- correctly match vocabulary words with their definitions

Key Vocabulary/Formulae for this Lesson

- decay
- gamma decay
- alpha decay
- beta decay
- fusion
- fission
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Materials

- white board
- marker
- laptop
- projector
- PowerPoint presentations

Technology Needs
• teacher laptop • projector • Internet or downloaded YouTube video • Decay PowerPoint • Fusion and Fission PowerPoint

LESSON ACTIVITIES

Opening (Hook, Warm-Up, Anticipatory Set, Review, etc.)

Describe activity to elicit active involvement of students or refer to previous learning:
Do Now - review questions on isotopes and half life the day before (10 min)

Procedure: Include all sections that apply to this lesson; combine as necessary.

Section	Time	What the Teacher will do:	What the Students will do:
Statement of Objective & Purpose	2 min	State the goals and agenda for the day	listen
Guided Practice	15 min	monitor vocabulary review game	find the partner with the corresponding word to their definition or vice-versa and present match to class
Input, Modeling, & Check for Understanding	20 min	present notes on decay	listen, take notes in format according to teacher preference, answer when prompted, ask questions to clarify understanding
Guided Practice	15 min	assign practice problems on decay, circulate to clarify understanding	work in partners on assigned decay problems to clarify teacher presentation
Input, Modeling, & Check for Understanding	25 min	present notes on fusion and fission, including Veritasium YouTube video (https://www.youtube.com/watch?v=Ux33-5k8cjg)	listen, take notes in format according to teacher preference, answer when prompted, ask questions to clarify understanding, note video information in notes if prompted
Closing/ Summary	3 min	assign exit ticket	complete exit ticket

Assessment of Student Learning

Students will have a vocabulary quiz on Day 5 and a Unit Test on the final day of the unit. The assessment for this day alone is evaluation of the assigned exit ticket and decay practice problems (optional). Qualitative evaluation should be consistently carried out by the teacher in the form of leading questions and class discussions.