Slide 1

Unit
13
Lesson
5

AIM
- Half Life Practice

AGENDA
- U13L5 Lesson video
- Half-Life Practice

YOYO
- Watch the lesson video on YouTube (U13L5)

HOMEWORK
- CL#28 – Half-Lives– due TONIGHT by 11:59 pm
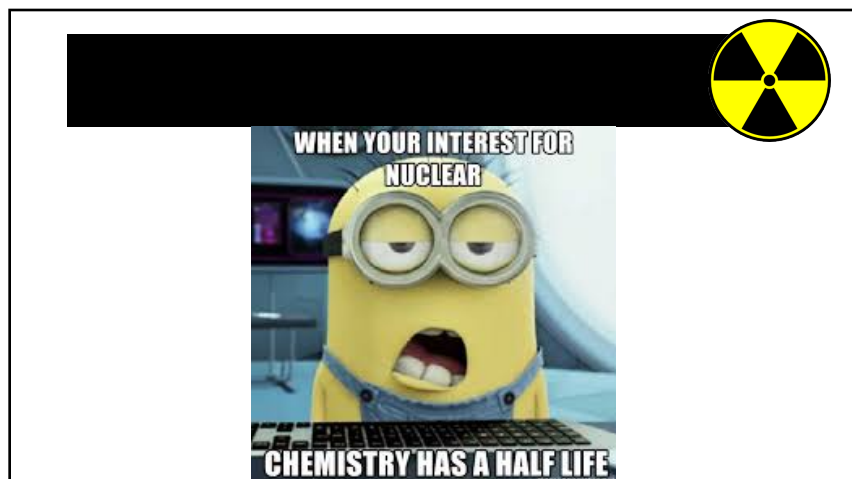- Follow calendar

1

Slide 2

Half Lives

- Radioactive isotopes are unstable, which means that they spontaneously (readily) decay (break apart) into different isotopes or elements. Radioactive isotopes give off radiation during the process of radioactive decay. Radiation can be in the form of particles (alpha, beta, or positron) and/or pure energy (gamma rays). For radioactive isotopes, the rate (speed) of radioactive decay is constant. All radioactive isotopes have a specific **half-life**, or **time that it takes for exactly half of the sample to decay into something else and half of the sample to remain unchanged.** It is because of information about half-lives that we can know how old the Earth is and how old fossils are.

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Slide 3

WHEN YOUR INTEREST FOR NUCLEAR
CHEMISTRY HAS A HALF LIFE

3

Slide 4

Time Elapsed

Question 1: How long will it take for 30. g of ^{226}Ra to decay to 7.5 g?

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Time Elapsed

Question 2: How long will it take for a 28 g sample of ^{19}Ne to decay to 3.5 g?

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Amount Remaining

Question 3: How many grams of ^{16}N will be left from a 16.0 g sample after 21.6 s?

6

Amount Remaining

Question 4: After 9.8×10^{10} years, how many grams will be left from a 256 g sample of Th-232?

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Fraction Remaining

Question 5: What fraction of a 100 g sample of K-42 will remain after 24.8 hours?

8

6/6/20

Fraction Remaining

Question 6: What fraction of radioactive I-131 sample would remain unchanged after 32.28 days.

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Number of Half Lives

Question 7: How many half-life periods will it take for 50 g of ^{99}Tc to decay to 6.25 g?

10

Number of Half Lives

Question 8: How many half-lives have elapsed if a 100 g sample of a radioactive isotope has only 12.5 g remaining?

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Original Mass

Question 9: If 2 grams of an original sample of gold-198 remained after 13.45 days, what was the mass of the original sample?

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Original Mass

Question 10: If 16.5 g of uranium-235 remain after 2.84×10^9 years, how much of the radioactive isotope was in the original sample?

13

Half Life

Question 11: An original sample of the radioisotope fluorine-21 had a mass of 80.0 milligrams. Only 20.0 milligrams of this original sample remain unchanged after 8.32 seconds. What is the half-life of fluorine-21?
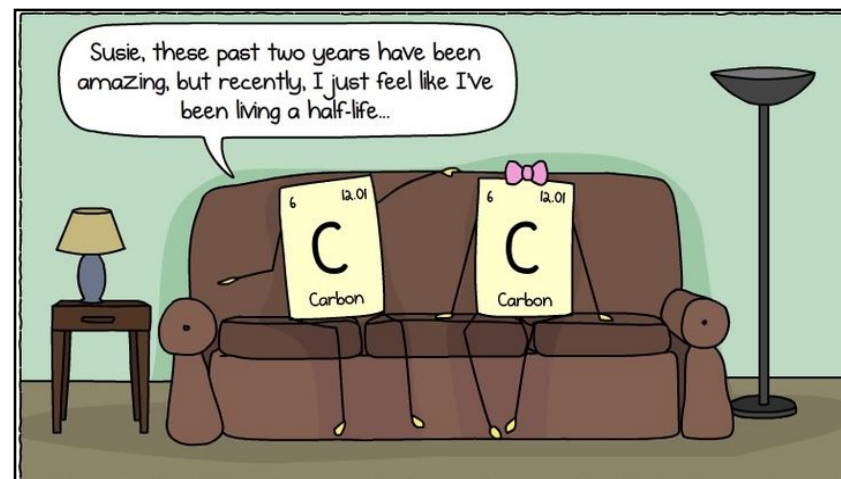
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Half Life

Question 12: What is the half-life of a 208 g sample of sodium-24 if it decays to 13.0 g of sodium-24 within 60.0 hours?

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