Radioactive Half Lives

- A radioactive element's half-life is an important factor in how dangerous the radiation can be to humans, plants, and animals

- A half life is the time required for half the original sample of matter to decay

- For example, calcium-47 has a half life of 4 ½ days. ***This means that if we had a 10 gram sample of calcium-47, we would only have 5 grams left after 4 ½ days.*** The other 5 grams would have decayed into some other element.

- Uranium-238 (the material used in atomic bombs) has a half life of 4.5 billion years. This is as long as scientists believe the earth has existed!

- Uranium-238 is much more harmful to humans than calcium-47. ***A longer half-life means much more of the material remains radioactive for so much longer.***

- Iodine-131 is used in CAT scans of your thyroid and abdomen. It is safe to use in these tests because its half-life is only 8 days.

- If you are injected with 5 mL of Iodine-131, how much is left in 8 days?
- ***2.5 mL***

- In 16 days?
- ***1.25 mL***

- In 24 days?
- ***0.625 mL***

- How much of a 100.0 g sample of gold-198 is left after 8.10 days if its half life is 2.70 days?

- 12.5 g

- A 50.0 g sample of nitrogen-16 decays to 12.5 g in 14.4 seconds. What is its half life?

- 7.2 seconds

- The half life of potassium-42 is 12.4 hours. How much of a 750. g sample is left after 62.0 hours?

- 23.4 g

- There are 5.0 g of iodine-131 left after 40.35 days. How many grams were in the original sample if its half life is 8.07 days?

- 160 g