

Decay Practice Worksheet #2

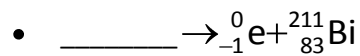
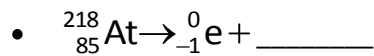
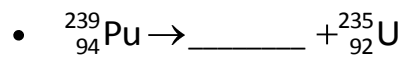
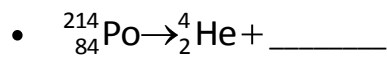
Isotopes

For each of the following isotopes, write in any missing information about the particular isotope.

Name	Oxygen-15	Nickel-58	Zirconium- ____	Argon- ____	_____ - ____	_____ - ____
# of protons					9	30
# of neutrons			50	22	10	34

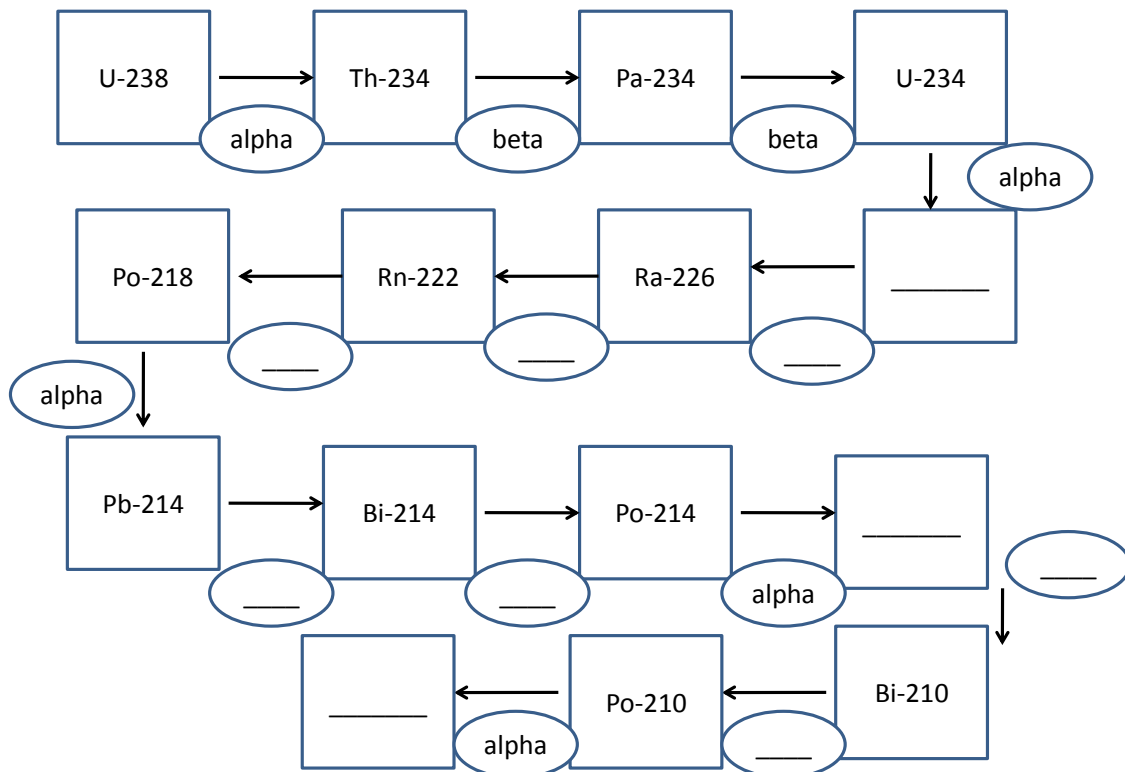
Balancing Decay Reactions

Fill in the missing parts of each of the following decay reaction formulas.



The Decay Series of Uranium

Uranium-238 is one of the radioactive elements in the earth's interior that contributes to the immense amount of heat inside the earth. Below is the decay series for a U-238 nucleus, showing all of the steps of decay that occur before it finally reaches a stable state. Fill in all blanks of either the type of decay that occurs to get from one step to another, or with the name of the isotope produced at a certain step.



Isotope Review

What are isotopes?

What does the atomic mass of each element on the periodic table mean?

Isotope Activity

In 1982 the United States government changed the way it minted pennies. Before 1982, pennies were made of 95% copper and 5% tin. Now they are made of zinc coated with copper. Because these different types of pennies have different masses, we can call them different 'isotopes' of pennies for the sake of this activity. (In 1982, some of each kind were minted, so you should not use any 1982 pennies in this activity.)

Part A: Mass of Old and New Pennies

- 1) Obtain two samples of pennies, one containing 10 pennies that are older than 1982 and one that contains 10 pennies that are newer than 1982.
- 2) Measure the mass of the 10 old pennies, and record the **average** mass of one old penny: _____g
- 3) Measure the mass of the 10 new pennies and record the **average** mass of one new penny: _____g

Part B: Four Old and Six New

- 4) Obtain a sample of pennies that contains 4 old and 6 new pennies. Record the total mass: _____g
- 5) Divide your answer for step #4 by 10 to find the average mass of a penny in your sample: _____g
- 6) Is your weighted average mass from step #5 closer to the mass of an old penny or a new penny? Why?

- 7) Look at your answer to step #5. How many individual pennies in your sample had a mass equal to this exact number? Why?

Part C: Unknown Sample of Ten

- 8) Obtain a sample of any 20 pennies, being sure to remove any pennies that are actually from 1982.
- 9) Now from your non-1982 sample, mix them up and randomly select 10 of them. **Do NOT look at the years.**
- 10) Record the total mass of the ten mixed pennies: _____g
- 11) Divide your answer for step #10 by 10 to find the average mass of a penny in your sample: _____g
- 12) Do you think you have more of the new kind of penny, or more of the old kind of penny? Why?

- 13) Make an estimate of how many of each type you think are in your sample: New _____ Old _____
- 14) Now check the dates of your pennies. Was your estimate correct?

Part D: Extension Question

- 15) Potassium (K) has three naturally-occurring isotopes, Potassium-39, Potassium-40, and Potassium-41. Using a periodic table, which isotope do you think is the most abundant in nature? Why do you think this?