

# ISOTOPES AND AVERAGE ATOMIC MASS

Name \_\_\_\_\_

Elements come in a variety of isotopes, meaning they are made up of atoms with the same atomic number but different atomic masses. These atoms differ in the number of neutrons.

The average atomic mass is the weighted average of all the isotopes of an element.

**Example:** A sample of cesium is 75%  $^{133}\text{Cs}$ , 20%  $^{132}\text{Cs}$  and 5%  $^{134}\text{Cs}$ . What is its average atomic mass?

Answer:  $.75 \times 133 = 99.75$

$.20 \times 132 = 26.4$

$.05 \times 134 = \underline{6.7}$

Total = 132.85 amu = average atomic mass

Determine the average atomic mass of the following mixtures of isotopes.

1. 80%  $^{127}\text{I}$ , 17%  $^{126}\text{I}$ , 3%  $^{128}\text{I}$

2. 50%  $^{197}\text{Au}$ , 50%  $^{198}\text{Au}$

3. 15%  $^{55}\text{Fe}$ , 85%  $^{56}\text{Fe}$

4. 99%  $^1\text{H}$ , 0.8%  $^2\text{H}$ , 0.2%  $^3\text{H}$

5. 95%  $^{14}\text{N}$ , 3%  $^{15}\text{N}$ , 2%  $^{16}\text{N}$

6. 98%  $^{12}\text{C}$ , 2%  $^{14}\text{C}$

## Isotope Practice Worksheet

Name: \_\_\_\_\_

1. Here are three isotopes of an element:  ${}_6^{12}\text{C}$        ${}_6^{13}\text{C}$        ${}_6^{14}\text{C}$
- The element is: \_\_\_\_\_
  - The number 6 refers to the \_\_\_\_\_
  - The numbers 12, 13, and 14 refer to the \_\_\_\_\_
  - How many protons and neutrons are in the first isotope? \_\_\_\_\_
  - How many protons and neutrons are in the second isotope? \_\_\_\_\_
  - How many protons and neutrons are in the third isotope? \_\_\_\_\_

2. Complete the following chart:

Isotope name	atomic #	mass #	# of protons	# of neutrons	# of electrons
92 uranium-235					
92 uranium-238					
5 boron-10					
5 boron-11					

3. Naturally occurring europium (Eu) consists of two isotopes with a mass of 151 and 153. Europium-151 has an abundance of 48.03% and Europium-153 has an abundance of 51.97%. What is the atomic mass of europium?
4. Strontium consists of four isotopes with masses of 84 (abundance 0.50%), 86 (abundance of 9.9%), 87 (abundance of 7.0%), and 88 (abundance of 82.6%). Calculate the atomic mass of strontium.