

Key

Calculating Average Atomic Mass Worksheet

Name \_\_\_\_\_

1. The term "average atomic mass" is a weighted average, and so is calculated differently from a "normal" average.

2. The element copper has naturally occurring isotopes with mass numbers of 63 and 65. The relative abundance and atomic masses are 69.2% for a mass of 62.93amu and 30.8% for a mass of 64.93amu. Calculate the average atomic mass of copper.

$$\begin{aligned} &.692 \times 62.93 = 43.54 \\ &.308 \times 64.93 = 20.00 \\ &\quad \quad \quad \boxed{63.54 \text{ amu}} \end{aligned}$$

3. Calculate the average atomic mass of sulfur if 95.00% of all sulfur atoms have a mass of 31.972 amu, 0.76% has a mass of 32.971amu and 4.22% have a mass of 33.967amu,

$$\begin{aligned} &.95 \times 31.972 = 30.373 \\ &.0076 \times 32.971 = .251 \\ &.0422 \times 33.967 = 1.433 \\ &\quad \quad \quad \boxed{32.054} \end{aligned}$$

4. The four isotopes of lead are shown below, each with its percent by mass abundance and the composition of its nucleus. Using the following data, first calculate the approximate atomic mass of each isotope. Then calculate the average atomic mass of lead.

82p 122n 1.37%	82p 124n 26.26%	82p 125n 20.82%	82p 126n 51.55%
$204(.0137) = 2.79$	$206(.2626) = 54.10$	$207(.2082) = 43.10$	$208(.5155) = 107.22$
$\quad \quad \quad \boxed{207.2}$			

5. There are three isotopes of silicon. They have mass numbers of 28, 29 and 30. The average atomic mass of silicon is 28.086amu. What does this say about the relative abundances of the three isotopes?

Isotope 28 is the most abundant since the avg is closest to 28.

6. Calculate the average atomic mass of bromine. One isotope of bromine has an atomic mass of 78.92amu and a relative abundance of 50.69%. The other major isotope of bromine has an atomic mass of 80.92amu and a relative abundance of 49.31%.

$$\begin{aligned} &(.5069)(78.92) + (.4931)(80.92) = \\ &40.00 + 39.90 = \boxed{79.90} \end{aligned}$$

## Atomic Structure Worksheet – Solution Key

Fill in the blanks for the elements in this chart. For the purposes of this chart, round all atomic masses to the nearest whole number.

Element	Number of Protons	Number of Neutrons	Number of Electrons	Atomic Mass	Atomic Number
lithium	3	4	3	7	3
carbon	6	6	6	12	6
chlorine	17	18	17	35	17
silver	47	61	47	108	47
lead	82	125	82	207	82
calcium	20	20	20	40	20
tantalum	73	108	73	181	73
radium	88	138	88	226	88
samarium	62	88	62	150	62
uranium	92	146	92	238	92
americium	95	148	95	243	95
lawrencium	103	159	103	262	103