

NAME _____ DATE _____ PERIOD _____

Chemistry Foundations #6: Calculating Average Atomic Mass

The variation in the number of neutrons among isotopes is responsible for the average atomic masses of elements being far from whole numbers. A majority of the elements exists as mixtures of two or more isotopes.

Average atomic mass is the weighted average of the atomic masses of the naturally occurring isotopes of an element. Calculating the mass of an element depends on both the mass and the relative abundance of each element's isotopes. The average atomic mass of an element can be found by multiplying the atomic mass of each isotope by its relative abundance (expressed in decimal form) and adding the results. This is how the atomic mass value listed in your textbook and on the periodic table were calculated.

Directions: Calculate the average atomic mass of various elements using the percent of the naturally occurring isotopes listed below. **Show all work** and compare to published values

Element	Percent of naturally occurring isotopes	Show Work	Calculated average atomic mass (amu)	Periodic Table value for atomic mass (amu)
Copper	69.17% Cu-63 30.83% Cu-65	$(0.6917 \times 63) + (0.3083 \times 65 \text{ amu}) = 63.6166$ round to 4 sig figs = 63.54	63.54	63.5
Silver	55% Ag - 107 45% Ag - 109	$(.55 \times 107) + (.45 \times 109)$	108	108
Indium	40% In - 113 60% In - 115			
Rhenium	30% Re -185 70% Re - 187	$(185 \times .30) + (187 \times .70)$	186.4	186
Lead	52.4% Pb -208 22.1% Pb-207 24.1% Pb -206 1.4% Pb-204			
Chlorine	75.5% Cl - 35 24.5% Cl - 37	$(35 \times .755) + (37 \times .245)$	35.5	35.5
Lithium	7.4% Li - 6 92.6% Li - 7			
Boron	19.6% B - 10 80.4% B - 11	$(10 \times .196) + (11 \times .804)$	10.8	10.8
Oxygen	99.76% O - 16 .046% O - 17 .20% O - 18			