Date:_____Name:_____

Activity – Using your Noodle

1. What is the basic atomic difference between isotopes of the same element?

Any sample of the element will contain these isotopes in the average concentrations typical of that element. The relative atomic mass is the WEIGHTED average of the masses of the isotopes in a sample.

2. If there are 200 macaroni noodles, 27 penne noodles and 173 fusilli noodles in a bag, what is the percent abundance of each noodle in the bag?

3. If your chemistry mark is broken down so that 68.0% is based on exams and tests, 14.0% is based on labs and 18.0% is based on assignments and your scores are: exams/tests 81%, 89% on labs and 83% on assignments, what is your chemistry mark for the semester? (This is your weighted average.)

In this activity you will use an imaginary element whose atoms are macroscopic. Your examination of this element will be fairly easy since its atoms are visible to the naked eye. The element Noodlium consists of three isotopes, each represented by a different variety of pasta.

Total Mass of Sample

_____

Mass of the Empty Container

_____

Mass of Sample Only

_____

Procedure

1. Obtain a sample of "Noodlium" from your teacher. It contains a mixture of different isotopes, i.e., pasta noodle varieties.
2. Measure and record the total mass of the sample. Record the data.
3. Carefully empty the contents onto a large flat surface. Measure the mass of the empty container. Record the data.
4. Subtract this empty container mass from the total mass to give the mass of the sample alone. Record the data.
5. Sort and record the number of pasta noodles by type. (Give the isotopes names.)
6. Calculate the percentage abundandance of each noodle type (isotope) in the sample, using the formula: % Abundance = # of noodles of a given type/total number of noodles

Name of Isotope	Sketch of Isotope	Number of isotope "atoms"	Percentage abundance of isotope"atoms" in Noodlium sample
TOTALS	N/A		

9. Take 10 noodles of each type and weigh them. Divide this mass by 10 to find the isotope (noodle) mass.

Name of Isotope	Mass of 10 Noodles	∴ Isotope mass

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10. Determine the weighted average atomic mass for Noodlium using the formula:

$$\text{average atomic mass} = [\text{isotope mass}_a \times \frac{(\%)_a}{100}] + [\text{isotope mass}_b \times \frac{(\%)_b}{100}] + [\text{isotope mass}_c \times \frac{(\%)_c}{100}]$$

avg. atomic mass =

∴ average atomic mass of Noodlium is _____ g

Questions

1. Is your weighted average mass consistent with the total sample mass? Explain.

2. Define the term isotope.

3. Explain the difference between Neon-19, Neon-20 and Neon-22.

4. Using the data provided, find the Average Atomic Masses of the following elements. Last question in a BONUS CHALLENGE.

Isotope	Atomic Mass	Percent Abundance
H - 1	1.008amu	99.985%
H – 2	2.014amu	0.015%
H – 3	3.016amu	Neglect

Isotope	Atomic Mass	Percent Abundance
Cl – 35	35.01amu	75.8%
Cl – 37	37.013amu	24.2%

Avg Mass of Li = 6.94amu, find missing % abundance

Isotope	Atomic Mass	Percent Abundance
Li - 6	6.015amu	x %
Li – 7	7.016amu	92.32%

Isotope	Atomic Mass	Percent Abundance
Mg -24	23.98amu	78.60%
Mg- 25	24.99amu	10.11%
Mg- 26	25.98amu	11.29%

Isotope	Atomic Mass	Percent Abundance
Pb – 206	205.98amu	x
Pb - 207	206.98amu	x
Pb - 208	207.98amu	100-2x