You have mastered this topic when you can:

1) calculate the **AVERAGE RELATIVE ATOMIC MASS** of an element.
2) draw atomic models of **THOMSON**, **NAGAOKA**, **RUTHERFORD** and **BOHR**.
3) compare and contrast the atomic models of **THOMSON**, **NAGAOKA**, **RUTHERFORD** and **BOHR**.

AVERAGE RELATIVE ATOMIC MASS

I) **CALCULATING *AVERAGED RELATIVE ATOMIC MASSES***

A) You may have noticed that the ***relative atomic mass***, the mass of most of the elements recorded on your periodic table is not a whole number: **i.e.** Li: A_r = 6.939 u ; Mg: A_r = 24.31 u ; Al: A_r = 26.98 u. How is this possible given that the mass of both 1 p^+ and 1 ***n*** is 1 u? Why is it that the ***relative atomic masses*** for most elements are not whole numbers when their masses are determined by their numbers of protons and neutrons, each having a mass of 1 u? The ***relative atomic mass*** for each element recorded on your periodic table is actually a calculated **AVERAGE RELATIVEATOMIC MASS**. **The *AVERAGE RELATIVE ATOMIC MASS of an element is defined as the <u>weighted average mass</u> of all known isotopes for the element relative to the isotope carbon-12*.**

1) The **AArM = AVERAGE RELATIVE ATOMIC MASS** is calculated using this formula, **MEMORIZE IT!!**

AArM = (mass of isotope #1 • its %) + (mass of isotope #2 • its %) + (mass of isotope #3 • its %) + *etc.*

2) To calculate the ***average atomic mass*** of an element you ***<u>must be given the mass and percent abundance</u>*** of each ***isotope*** found in the sample of the element.
3) **SAMPLE PROBLEM:** A sample of naturally occurring carbon consists of 98.89% C-12 and 1.11% C-13. Calculate the average atomic mass of carbon. Round your answer to two decimal places.

Solution:

4) **Required Practice 1:** Complete these questions. **Show all your work!!** **{Answers are on page 2.}** ***ROUND YOUR ANSWERS TO THE NEAREST HUNDREDTH!***

1. A sample of potassium consists of 93.10% K-39 and 6.90% K-41. Determine it's averaged atomic mass.

2. A 1.005 g sample of Ar was analyzed and found to be composed of 99.60% Ar-40, 0.34% Ar-36 and 0.06% Ar-38. Determine the averaged atomic mass of Argon

3. A student analyzed a sample of Silicon and recorded their data in the following table. Use the information to calculate the average atomic mass of Si.

Isotope	Percent abundance
Si-28	92.21%
Si-29	4.70%
Si-30	3.09%

REVIEW OF ATOMIC THEORY

I) **Required Practice 2:** Complete these questions from your text. **Show all your work!!** **{Answers: See your teacher.}**

A) For each of the elements listed in questions 1 thorough 5, name the element then draw a diagram of its atoms as modeled by:

a) Thomson b) Nagaoka c) Rutherford d) Bohr

Be sure to label the diagram with the appropriate scientist.

1. Z = 1 2. Z = 5 3. Z = 15 4. Z = 19 5. Z = 28

6. Create a table to outline the similarities between the atomic structure given in the atomic models of Thomson, Nagaoka, Rutherford and Bohr.

7. Create a table to outline the differences between the atomic structure given in the atomic models of Thomson, Nagaoka, Rutherford and Bohr.

ANSWERS TO THE REQUIRED PRACTICE

Required Practice 1 from page 1

1. 39.14 u **2.** 39.99 u **2.** 27.11 u
