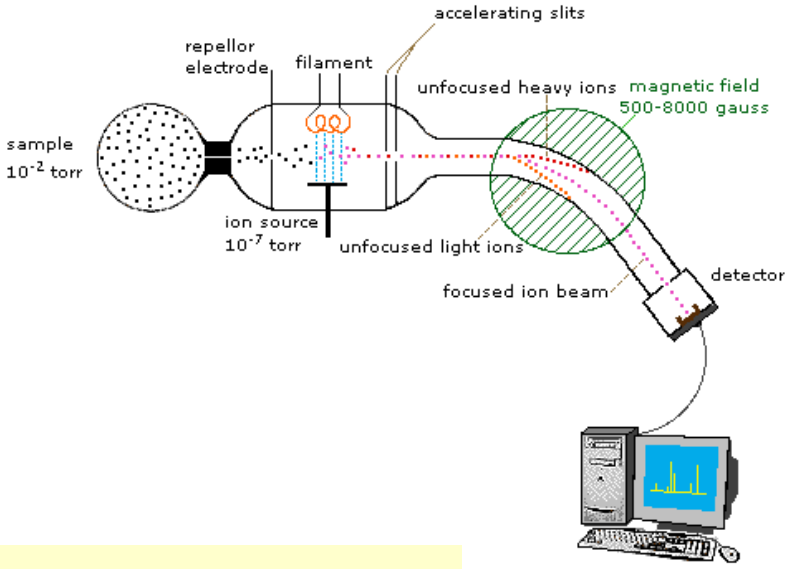
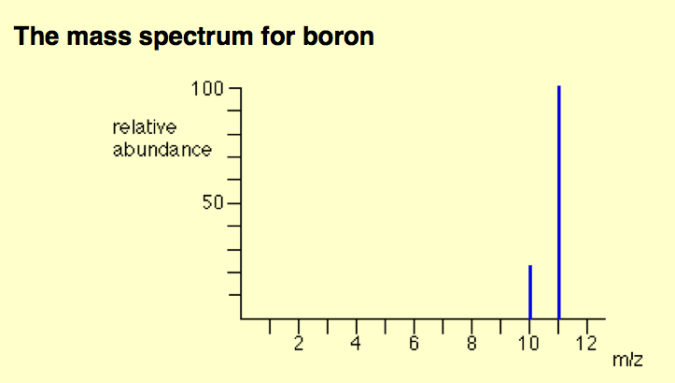
Name _____

Date _____ **Pd** ____

Mass Spectroscopy Worksheet

In a mass spectrometer, the sample to be analyzed is vaporized, then ionized, then passes through a magnetic field which exerts a sideways force on the ions. Heavier ions are deflected to a lesser extent than lighter ones. As the strength of the magnetic field is varied, ions of different masses reach the detector.





The mass spectrum at the left was produced by passing a sample of boron atoms through a mass spectrometer.

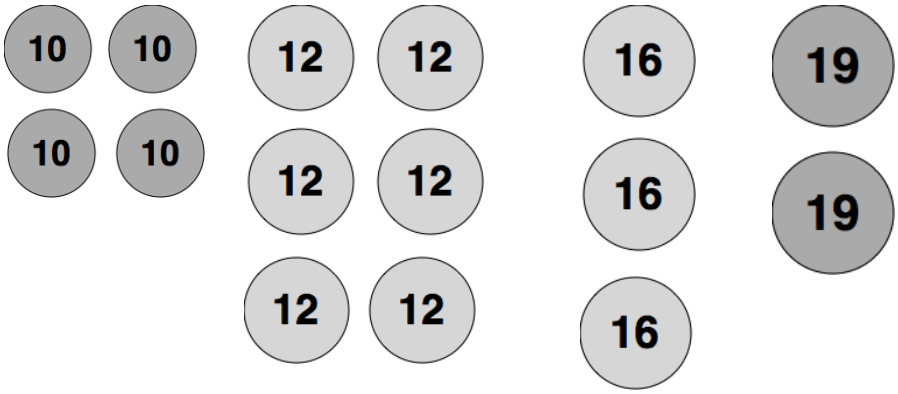
Using the model of the atom at the time of Bohr, explain how boron can have atoms of two different masses. Draw a diagram of each atom to support your explanation.

Explain why it would be incorrect to state that the average mass of boron atoms is $\frac{10+11}{2}=10.5$.

MS diagram from: *https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/spectrpy/massspec/masspec1.htm*
Spectra from: *http://www.chemguide.co.uk/analysis/masspec/howitworks.html*

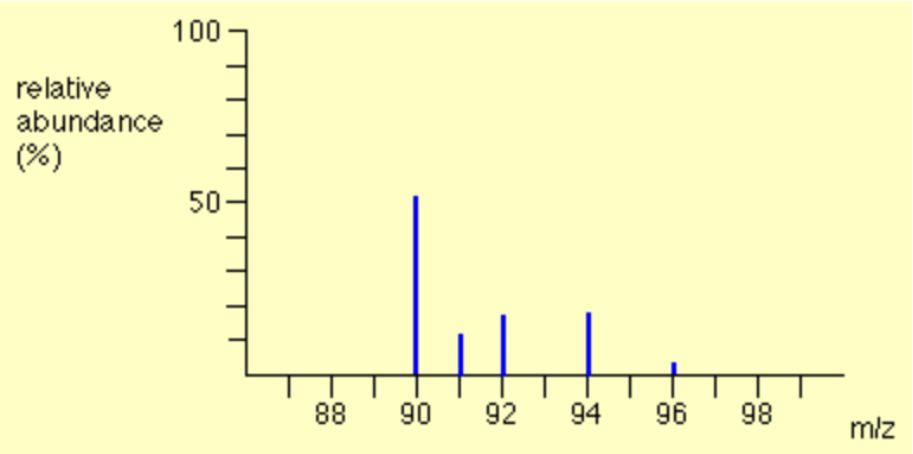
Finding Weighted Averages

What is the average mass of these 15 items?



Show could you figure out the average without adding individual masses one at a time.

From the spectrum below, determine the average molar mass of the element.

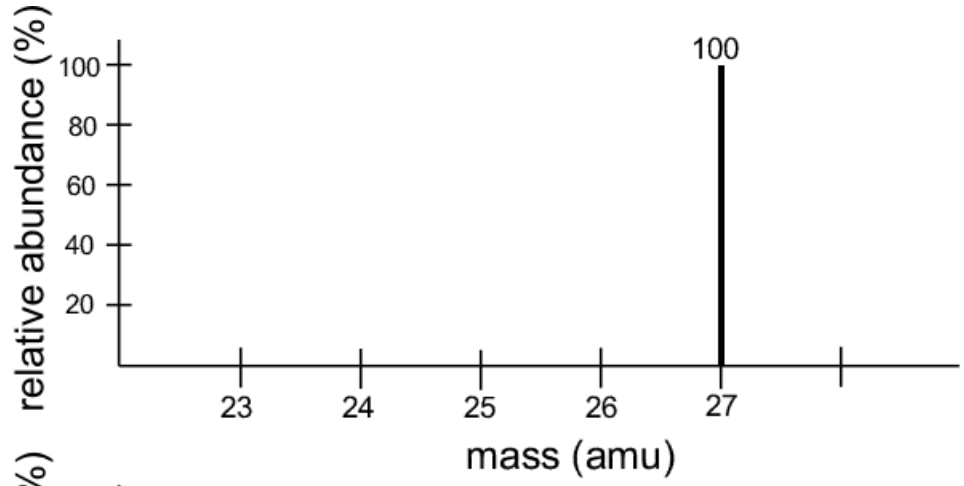


From the average mass, identify the element, then write the symbol (including atomic number and mass number) of the most abundant isotope of this element.

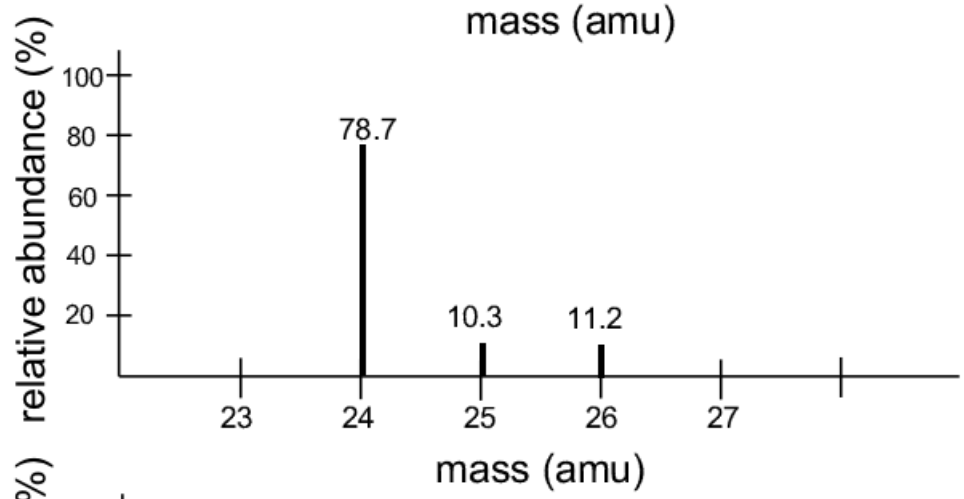
MS diagram from: *https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/spectrpy/massspec/masspec1.htm*
Spectra from: *http://www.chemguide.co.uk/analysis/masspec/howitworks.html*

For each of the following mass spectra, determine the average molar mass of the element and write the symbol for each of the isotopes.

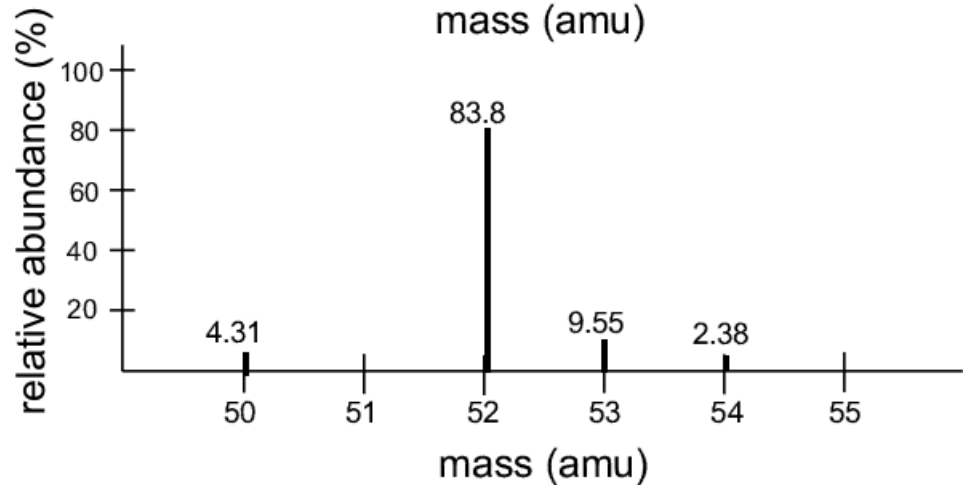
A



B



C



MS diagram from: *https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/spectrpy/massspec/masspec1.htm*
Spectra from: *http://www.chemguide.co.uk/analysis/masspec/howitworks.html*