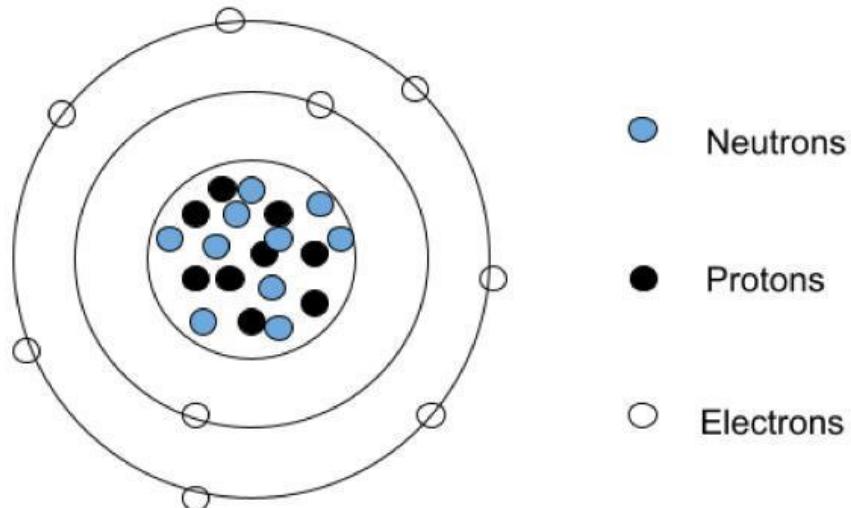


Name: _____

Hour: _____

Elements, Ions, and Isotopes Practice

Below is a picture of a Fluorine atom.



How many protons does Fluorine have? _____

How many neutrons does Fluorine have? _____

How many electrons does Fluorine have? _____

The atomic number of Fluorine is: 9

Which numbers above are all similar? Circle the answers.

Protons

Neutrons

Atomic Number

Electrons

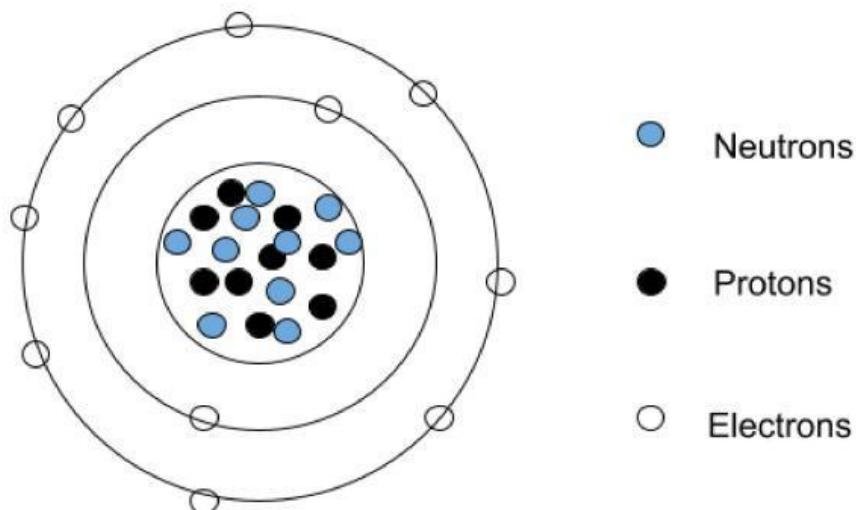
We can conclude that, in a neutral atom, the Atomic Number is equal to the number of: _____

Note: Electrons and Protons are only the same number when an atom is neutral. The number of electrons can change. The number of protons never changes. If the protons change, it is a completely different element.



Have your teacher check your work and sign off here before moving on. _____

Below is another picture of the Fluorine atom, but something has changed in it.



How many protons does this Fluorine have? _____

What charge does a proton have? _____

How many neutrons does this Fluorine have? _____

What charge does a neutron have? _____

How many electrons does this Fluorine have? _____

What charge does an electron have? _____

What changed between this atom and the one above? _____

When this changes, we call it an **ion**. Ions are atoms that now have a positive or negative charge. This is still Fluorine, because it still has the same number of protons, so it has the same atomic number, but now it is a Fluorine ion. This Fluorine ion has a charge of -1.

Based on what changed and how it changed in this Fluorine atom, why do you think it has a charge of -1?



Have your teacher check your work and sign off here before moving on. _____

Below are atoms and their most common ions. Identify how many protons, neutrons, and electrons are in each.

Atom: Zinc

Ion: Zinc $^{+2}$

Protons: 30

Protons: _____

Neutrons: 34

Neutrons: _____

Electrons: 30

Electrons: _____

Atom: Sulfur

Ion: Sulfur $^{-2}$

Protons: 16

Protons: _____

Neutrons: 16

Neutrons: _____

Electrons: 16

Electrons: _____

Atom: Silver

Ion: Silver $^{+1}$

Protons: _____

Protons: 47

Neutrons: 60

Neutrons: _____

Electrons: _____

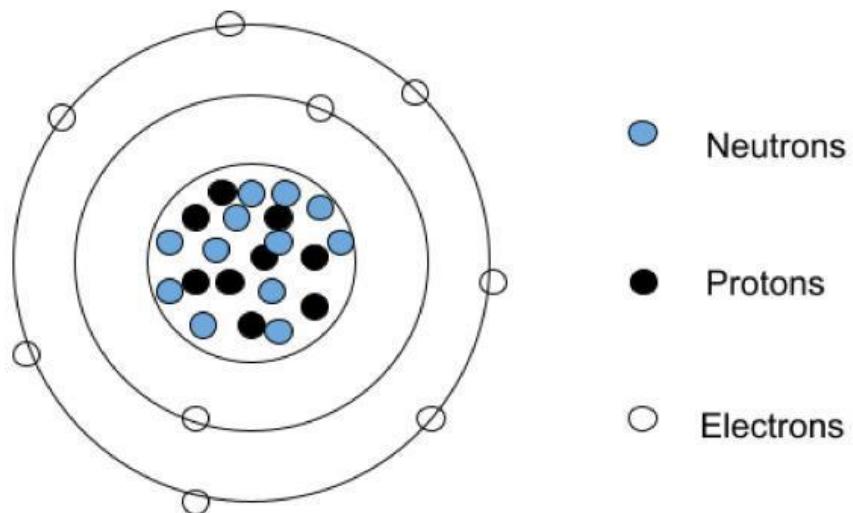
Electrons: 46

Write your own definition of an ion here: _____



Have your teacher check your work and sign off here before moving on. _____

Below is another picture of a Fluorine atom, but something else has changed this time.



How many protons does this Fluorine have? _____

How many neutrons does this Fluorine have? _____

How many electrons does this Fluorine have? _____

What changed between this Fluorine atom and the first one? _____

When this changes, we call it an **isotope**. An isotope has a different mass from its original atom. This Fluorine isotope is still Fluorine because the number of protons, the atomic number, has not changed. However, now it is an isotope and the mass is different. Also, it still has a neutral charge like a normal atom, only ions have charges.

Scientists often refer to an isotope with the new mass in its name. For example, Carbon normally has 6 protons and 6 neutrons, giving it a mass of 12. An isotope of Carbon is Carbon 14. It has 6 protons and 8 neutrons. By knowing the name of the isotope, we can determine how many neutrons there are.

Write your own definition of an isotope here: _____



Have your teacher check your work and sign off here before moving on. _____

Below are atoms and their isotopes, identify how many protons, neutrons, and electrons there are in each.

Atom: Uranium

Isotope: Uranium 235

Protons: 92

Protons: _____

Neutrons: 146

Neutrons: _____

Electrons: _____

Electrons: _____

Atom: Oxygen

Isotope: Oxygen 18

Protons: _____

Protons: _____

Neutrons: 8

Neutrons: _____

Electrons: 8

Electrons: _____

Atom: Hydrogen

Isotope: Hydrogen 3

Protons: _____

Protons: _____

Neutrons: 0

Neutrons: _____

Electrons: _____

Electrons: _____

Nitrogen normally has a mass of 14. A common isotope of Nitrogen is Nitrogen 15.

Did this isotope lose or gain neutrons? _____

How many neutrons did it lose or gain? _____



Have your teacher check your work and sign off here before moving on. _____

Use the periodic table to complete the table below.

Element/Ion/Isotope	Mass	# of Protons	# of Electrons	# of Neutrons
Krypton				
Iron ⁺²				
Lithium 5				
Aluminum 27				
Chlorine ⁻¹				
Potassium				
		20	18	
	45	22	22	
		25	25	30



Have your teacher check your work and sign off here before moving on. _____