Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ANSWER KEY\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_\_

**Summative 3.1, 3.2, 3.3 Study Guide – ANSWER KEY**

**Learning Target 3.1**

1. Complete the following table.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Element | Symbol | Atomic # | Atomic Mass | # protons | # neutrons | # electrons | Nuclear Symbol |
| Argon | Ar | 18 | 40 | 18 | 22 | 18 | $\begin{matrix}40\\18\end{matrix}$Ar |
| Cadmium | Cd | 48 | 112 | 48 | 64 | 48 | $\begin{matrix}112\\48\end{matrix}$Cd |
| Praseodymium | Pr | 59 | 140 | 59 | 81 | 59 | $\begin{matrix}140\\59\end{matrix}$Pr |
| Lead | Pb | 82 | 207 | 82 | 125 | 82 | $\begin{matrix}207\\82\end{matrix}$Pb |
| Tungsten | W | 74 | 184 | 74 | 110 | 74 | $\begin{matrix}184\\74\end{matrix}$W |

**Learning Target 3.2**

1. Label the parts of the atom to the right. What is the charge on each subatomic particle? Identify where the mass is located and where the volume is located.

Proton = +1

Electron

Neutron = 0

Electron = -1

Nucleus = Mass

 Electron cloud = Volume

Neutron

Proton

1. Draw Bohr models for Lithium, Calcium, Neon, and Phosphorous. How many valence electrons does each one have?

   

**Learning Target 3.3**

1. If an atom has **5** valence electrons…
	1. Will it gain or lose electrons? **gain** (element wants to reach full shell of 8, thus it gaining 3 electrons is easier than losing 5 electrons)
	2. How many will it gain or lose? **3**
	3. What will its charge be? **-3** (each electron is a -1 charge, if you gain 3 electrons, you change your charge by -3)
2. If an atom has **2** valence electrons…
	1. Will it gain or lose electrons? **lose** (element wants to reach full shell of 8, thus it losing 2 electrons is easier than gaining 7 electrons)
	2. How many will it gain or lose? **2**
	3. What will its charge be? **+2** (each electron is a -1 charge, if you lose two electrons, you change your charge by +2)
3. Complete the following table.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Element | Ion Symbol | Atomic # | Atomic Mass | # protons | # neutrons | # electrons | Nuclear Symbol (include charge) |
| Cobalt | Co2+ | 27 | 59 | 27 | 32 | 25 | $\begin{matrix}59\\27\end{matrix}$Co2+ |
| Aluminum | Al3+ | 13 | 27 | 13 | 14 | 10 | $\begin{matrix}27\\13\end{matrix}$Al3+ |
| Palladium | Pb2+ | 46 | 106 | 46 | 60 | 44 | $\begin{matrix}106\\46\end{matrix}$Pb2+ |
| Cesium | Cs2+ | 55 | 133 | 55 | 78 | 53 | $\begin{matrix}133\\55\end{matrix}$Cs2+ |
| Iodine (-1) | I- | 53 | 127 | 53 | 74 | 54 | $\begin{matrix}127\\53\end{matrix}$I- |

1. Why does iodine form an ion?

Iodine has 7 valence electrons. All elements want to have a full shell/orbit/energy level of electrons to be stable. In this case, iodine wants 8 valence electrons (octet rule). In order to get 8 electrons, iodine will form an ion (unequal amounts of protons and electrons) to get its full shell.