**Valence Electrons**

* Valence electrons are electrons found on the \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_of an atom.
* Electrons available to be lost, gained, or shared in the formation of chemical compounds.
* Found in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy level.
* Elements in the \_\_\_\_\_\_\_\_\_ group (family) have the same number of valence electrons.

**Electron Configuration**

* Energy shells are divided into sub-shells as shown in the research of Erwin Schrödinger and Werner Heisenberg
* The sub-shells are labeled as the \_\_\_, \_\_\_, \_\_\_, and \_\_\_.
	+ The sub-shells each hold a certain number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ Each orbital can hold \_\_\_ electrons.
* Electron configuration: A shorthand way to keep track of all the \_\_\_\_\_\_\_\_\_ in an atom of an element for all the sub-shells that have electrons. The number of electrons in each sub-shell is shown as a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* *Electron Shells (n= 1, 2, 3, 4…)*
	+ The letter n represents the \_\_\_\_\_\_\_ shell or energy level.
* The electron shells in the shell \_\_\_\_\_\_\_\_ of an atom (except for n =1) are divided into sub-shells.

*Electron Sub-Shells (s, p, d, and f)*

* Each sub-shell is indicated by its \_\_\_\_\_\_ shell number and a letter, either\_, \_\_, \_\_, or \_\_.
	+ The maximum numbers of \_\_\_\_\_\_\_\_\_\_\_\_\_ that can occupy s, p, d, and f sub-shells are \_\_\_, \_\_\_, \_\_\_, and \_\_\_, respectively.
* Sub-shells can be seen by the separation on the periodic table.
	+ Helium is part of the **s** sub-shell.
* In an electron configuration,
	+ the number indicates the shell number;
	+ the letter indicates the sub-shell within the shell;
	+ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ indicates the number of electrons in the sub-shell.
* The superscript numbers sum to the \_\_\_\_\_\_\_\_\_\_ number of electrons for an atom of the element.
	+ Example: \_\_\_\_\_\_\_\_\_ has \_\_ electrons and its electron configuration is 1s22s22p2
	+ \_\_ + \_\_ + \_\_ =6 total electron

*Electron Configuration and the periodic table*

* The periodic table can be used to find the electron configuration for an element.
	+ - First find the \_\_\_\_\_\_\_\_\_\_\_\_ on the periodic table.
		- Then \_\_\_\_\_\_\_\_\_ through each element \_\_\_\_\_\_\_\_\_\_ in order by stating the \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_, the \_\_\_\_\_\_\_\_\_\_ type, and the \_\_\_\_\_\_\_\_\_\_ of electrons per \_\_\_\_\_\_\_\_\_\_ type until you arrive at the \_\_\_\_\_\_\_\_\_\_.

*Guided Practice*

Find the electron configuration for selenium, Se.

* Selenium is in the \_\_\_\_ energy shell, in the \_\_ sub-shell, and in the \_\_\_\_\_\_\_\_\_\_ column of the \_\_ sub-shell so its electron configuration should end in \_\_\_\_\_\_\_.
* Just follow the fill order to write the electron configuration.
	+ - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- Add up all the superscripts to check if the number equals selenium’s atomic number
			* \_\_ + \_\_ + \_\_ + \_\_ + \_\_ + \_\_ + \_\_ + \_\_ = \_\_\_\_\_ Se atomic # = 34

*Practice*

Write the following elements electron configurations.

* Li, Lithium \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* K, Potassium \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Kr, Krypton \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Pb, Lead \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Noble Gas configuration*

* To write a noble gas (\_\_\_\_\_\_\_\_\_\_\_\_\_) configuration for any element, count backwards from that element until you reach a noble gas.
	+ Write that noble gas symbol in \_\_\_\_\_\_\_\_\_\_\_.
	+ Then, continue forward with next sub-shell(s) - see the attached version of the periodic chart that shows the subshell order with respect to the elements.
* For example, if we wanted to do the shorthand configuration for sodium (Na), you would count back one element to \_\_\_\_\_\_\_\_\_\_ (Ne) and put \_\_\_\_ in brackets.
	+ [ \_\_\_ ]
* Then, noting that the next correct sub-shell is \_\_\_\_\_, include the rest of the electrons as we did with the smaller elements.
	+ [ \_\_\_ ] \_\_\_\_\_\_\_

*Practice*

* Write the following noble gas configuration for the following elements.
	+ Be, Beryllium\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ F, Fluorine\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Pt, Platinum\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_