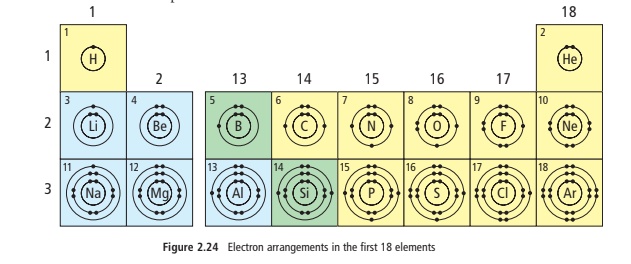
Science 9 Notes Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Blk: \_\_\_\_

**CHEMISTRY UNIT – IONS**

**Valence Electron Patterns**



Most elements in the same family have the same number of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

*Example: halogens have* ***\_\_\_\_\_\_*** *valence electrons*

Elements in the same period (row) have **valence electrons** in the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

The period number indicated that number of shells that have **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Noble Gas Stability**

**A picture containing text, bottle, newspaper, sign

Description automatically generated**The noble gases (He, Ne, ar, Kr, Xe, Rn) are normally **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**,which means the atoms do not form new substances with other atoms.

* Why? Because their atoms have **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** valence shells – the max number of electrons in their outer shells. That makes them stable.
* For two atoms to join together to make a new substance, atoms must

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** electrons. But atoms with filled valence shells will not easily trade or share electrons. They have what is called **noble gas stability**.

**Gaining/Losing Electrons**

Atoms from other families often try to achieve a kind of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** similar to the noble gases. To do this they will gain or lose electrons.

***Metals***:

* Have **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** valence electrons ; They will often **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** them all
* When metals lose their valence electrons, their remaining electrons will have the same

arrangement as the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ noble gas.**

***Non-metals:***

* They **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** 1, 2 or 3 extra electrons in order to achieve noble gas stability
* They gain exactly enough to achieve the same electron arrangement as the **noble gas in**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**What Are Ions**

Recall that an ion is an **electrically charged atom**. The ion charge is an electric charge that forms on an atom when it gains or loses electrons.

* An atom that has **gained** electrons is a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** ion because the extra electrons make it negative.
* An atom that has **lost** electrons is a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** ion because the loss of electrons removes negative charge

Some elements have a multiple ion charge, meaning they **form ions in multiple ways**.

***What pattern do you notice on the table?***

* Elements on **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** tend to form **positive** ions
* Elements on **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** tend to form **negative** ions
* Elements in same column form ions with same charge as other elements in that column

**How Atoms Become Ions**

Now that we get that an atom that has gained or lost electrons is called an ion and Ions carry an electrical charge…

* An atom of any **metal** can **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** electrons and form **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** ions
* An atom of any **non-metal** (except a noble gas) can **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** electrons
* and form **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** ions
* Ions have the same electron arrangement as the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* The charge on an ion is equal to the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of the charges on its **protons** and **electrons**

 Example: Magnesium

The ion Mg2+ has:

* + 1. **\_\_\_\_\_\_** Protons 🡪 **\_\_\_\_\_\_\_\_**
  1. **\_\_\_\_\_\_** Electrons 🡪 **\_\_\_\_\_\_\_\_**
     1. For a total charge of: **\_\_\_\_\_\_\_\_\_**