**2.3 The Periodic Table** **and Atomic Theory**

(Refer to pp. 64 – 71 of BC Science 9) Name:

Date:

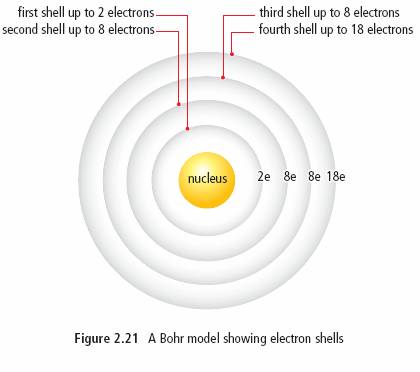
Block:

**How Atoms Become Ions**

* + - * + Atoms try to get to the level of stability of noble gases by **LOSING** or **GAINING** electrons.
* Atoms of metals lose e- to form **POSITIVE** ions.
* Atoms of non-metals gain e- to form **NEGATIVE** ions.
* Ion charge shown on the symbol by a superscript number followed by a **+** or **-** sign.

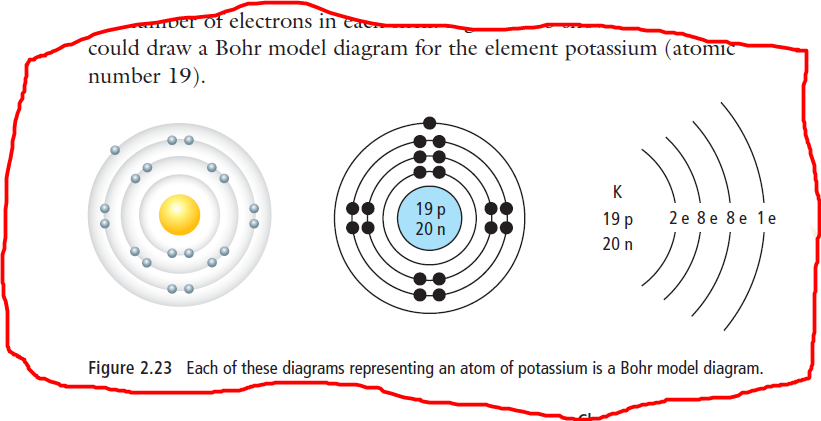
Equal to the **SUM** of charges of its protons and electrons.

**BOHR MODEL DIAGRAMS**

* a diagram that shows how many E**LECTRONS** are in each region (aka **ELECTRON SHELLS**) surrounding the nucleus.
* Each shell can only hold a **CERTAIN NUMBER** of electrons.
* 

|  |  |
| --- | --- |
| **Shell #** | **# of electrons** |
| **1st Shell** | 2 |
| **2nd Shell** | 8 |
| **3rd Shell** | 8 |
| **4th Shell** | 18 |

Three ways that the Bohr model for a potassium atom can be drawn:



**Bohr model diagrams usually include:**

1. The element **SYMBOL**.
2. The number of **PROTONS** in the nucleus.
3. The number of **NEUTRONS** in the nucleus.
4. The number of **ELECTRONS** and where they are located (on which **SHELLS** they are located) around the nucleus.

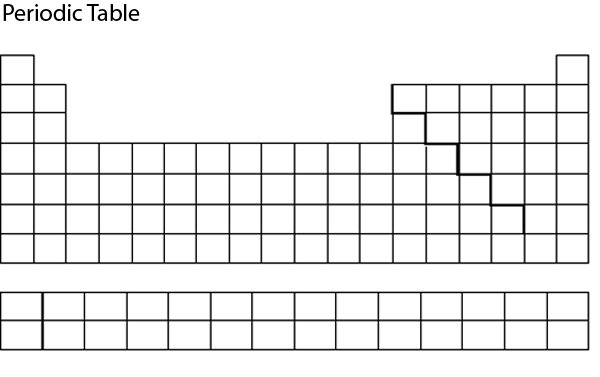
**YOUR TURN!**

**Draw the following Bohr Model Diagrams**

|  |  |
| --- | --- |
| **Sodium** | **Fluorine** |
|  |  |

**PATTERNS IN THE PERIODIC TABLE**

1. Atomic numbers increase by **ONE**  .
2. Atomic **MASS** tends to increase along with the atomic number, with some **EXCEPTIONS**.



4. Elements on the right side generally form?

**NEGATIVE**

Except for?

**NOBLE GASES**

3. Elements on the left side generally form?

**POSTIVE**

5. Elements in the same family have the same?

**ION CHARGE**

Except for? **TRANSITION METALS**

\*\*Patterns occur as a result of regular changes in the **STRUCTURE** of the atoms of elements.\*\*

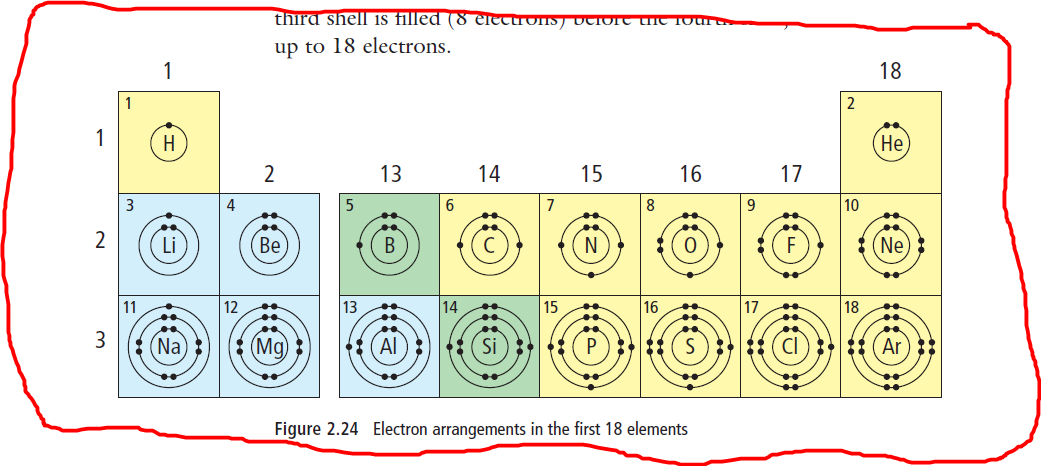
* Elements with similar properties line up in columns due to **similarities in the arrangement of their electrons.**

**Valence Electrons Patterns**

* The first shell is filled with **TWO** e- before the second shell is filled.
* The second shell is filled with **EIGHT** e- before the third is filled, and so on….
* The electrons in the **OUTER SHELL** have the strongest influence on the properties of an atom.

called **VALENCE ELECTRONS**.

1. Most elements in the **SAME FAMILY** have the **SAME NUMBER** of **VALENCE ELECTRONS**, with some exceptions for the transition metals.



Halogens

7 valence electron

Noble Gas

8 valence electron

Alkaline Earth Metals

2 valence electron

Alkali Metals

1 valence electron

Why are Noble Gases considered unreactive?

**STABLE, FULL VALENCE SHELL**

1. Elements in the S**AME PERIOD** have valence electrons in the S**AME SHELL**.
   * Ex. Carbon and oxygen are both in period 2, so they both have valence electrons in the S**ECOND** shell.
2. The **PERIOD NUMBER** indicates the **NUMBER OF SHELLS** that have electrons.
   * Ex. Elements in period 2 have **TWO** electron shells.