

The Periodic Table

Determining Shells and Valence Electrons

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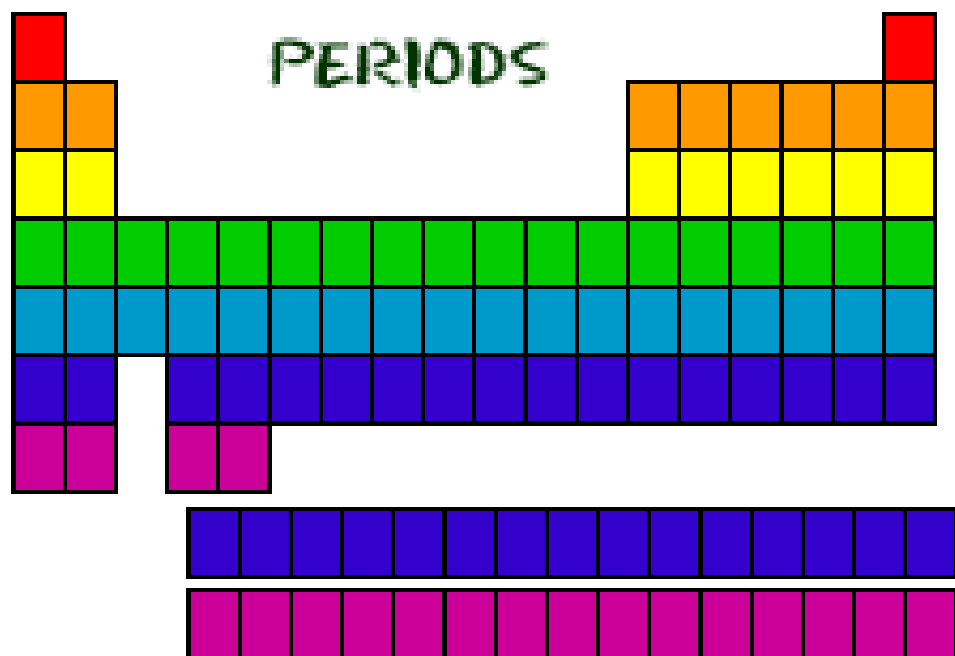
Valence Electrons

- Each electron shell can hold a certain number of electrons
- Electron shells are filled from the **inside** out
- Noble Gases have **full** outer electron shells
- All other elements have **partially filled** outer electron shells

Electron Shell	Number of Electrons
1	2
2	8
3	8
4	18
5	18
6	32
7	32

Periods

- The elements in each period have the same number of shells



1st Period = 1 Shell

2nd Period = 2 Shells

3rd Period = 3 Shells

4th Period = 4 Shells

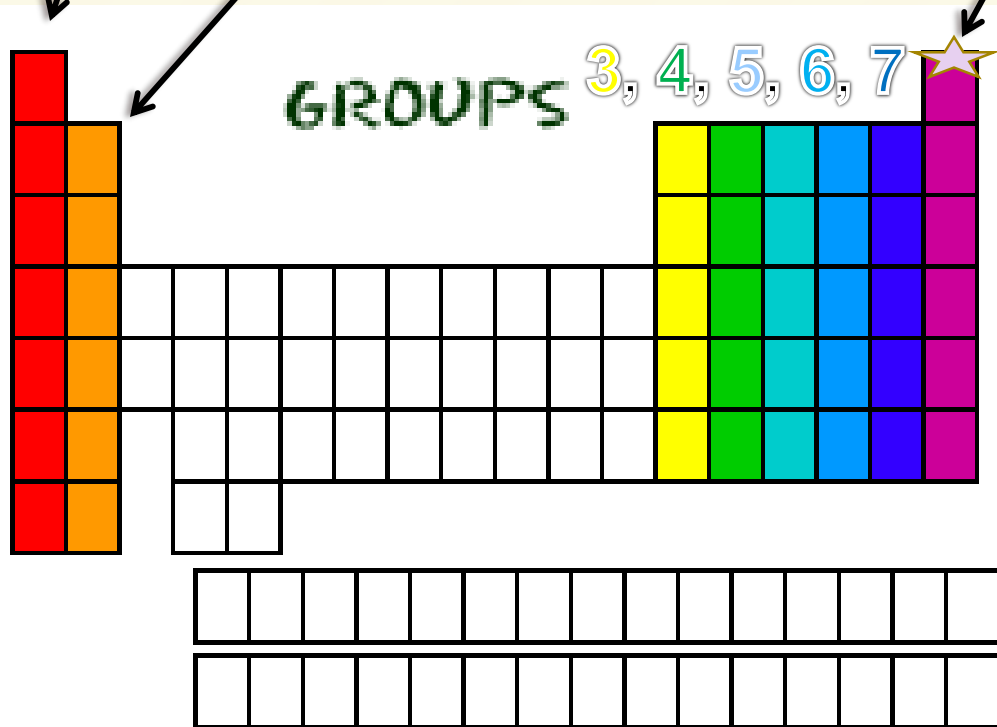
Groups

Group 1 = 1 electron

Group 2 = 2 electrons

Group 8 = 8 electrons

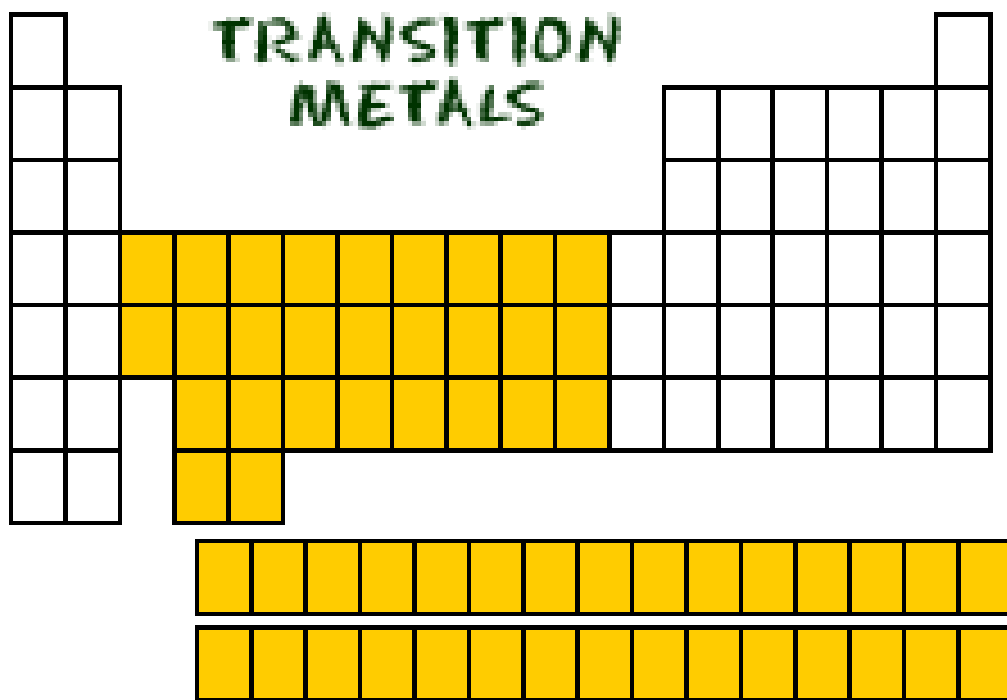
★ Except for He, it has 2 electrons



•The electrons in the outer shell are called "valence electrons"

•Each element in a group has the same number of electrons in their outer orbital, also known as "shells".

Transition Metals



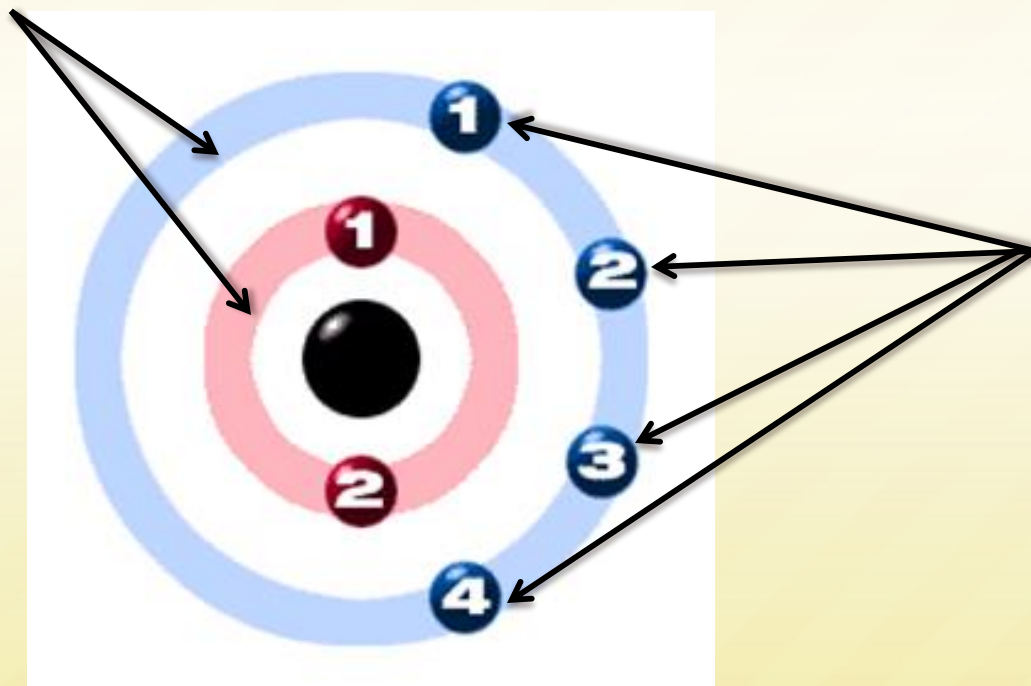
- Transition Metals have slightly different rules for shells and valence electrons.

- This is something you will learn about in High School Chemistry.

Determine the number of shells and the number of valence electrons for:

Carbon - C

2nd Period = 2 shells

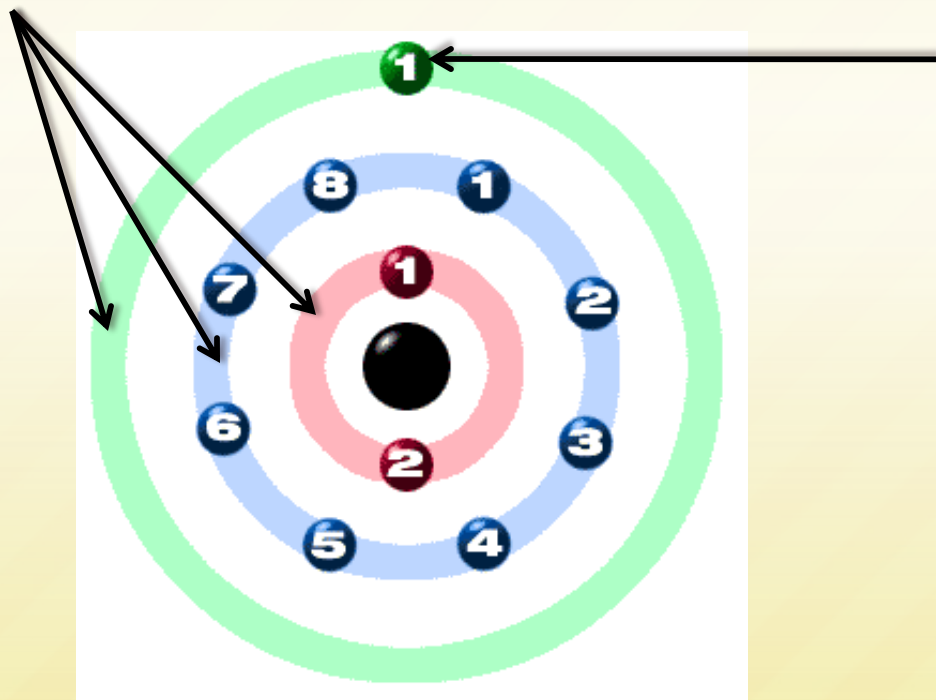


**4th Group =
4 valence
electrons**

Determine the number of shells and the number of valence electrons for:

Sodium - Na

3rd Period = 3 shells



**1st Group =
1 valence
electron**

Write your answers on your handout.

Ne

Name the element.

Number of shells ?

Valence electrons ?

Write your answers on your handout.

Ne

Name the element.

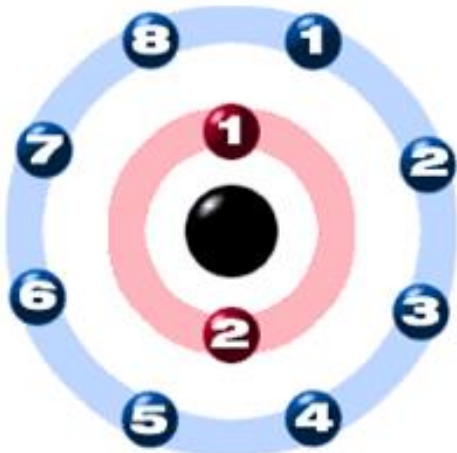
Number of shells ?

Valence electrons ?

Neon

2nd Period = 2 shells

8th Group = 8 valence electrons



Write your answers on your handout.

Be

Name the element.

Number of shells ?

Valence electrons ?

Write your answers on your handout.

Be

Name the element.

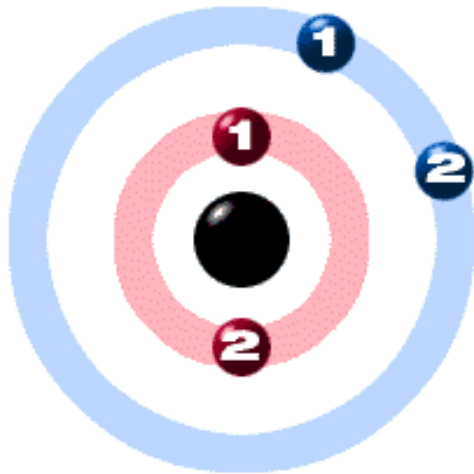
Number of shells ?

Valence electrons ?

Beryllium

2nd Period = 2 shells

2nd Group = 2 valence electrons



Write your answers on your handout.

S

Name the element.

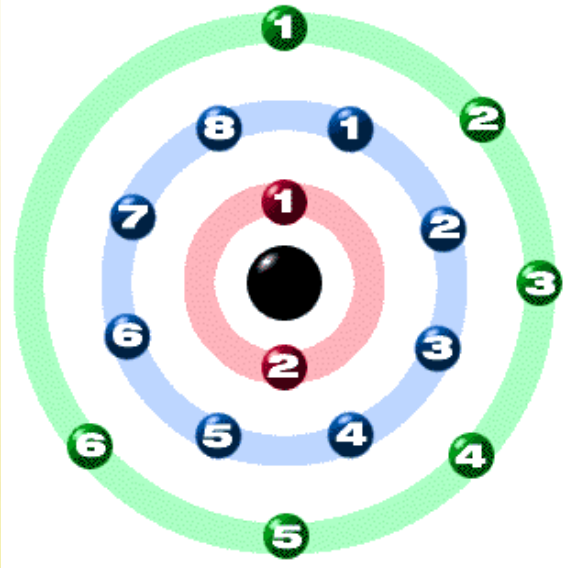
Number of shells ?

Valence electrons ?

Write your answers on your handout.

S

**Name the element.
Number of shells ?
Valence electrons ?**



Sulfur

3rd Period = 3 shells

6th Group = 6 valence electrons

Write your answers on your handout.

K

Name the element.

Number of shells ?

Valence electrons ?

Write your answers on your handout.

K

Name the element.

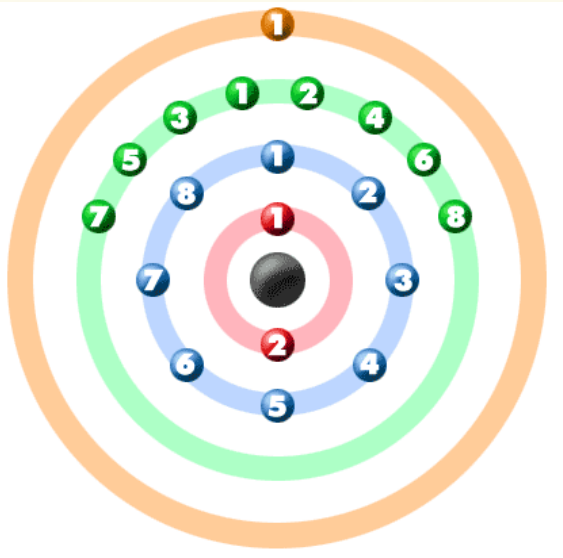
Number of shells ?

Valence electrons ?

Potassium

4th Period = 4 shells

1st Group = 1 valence electron



Valence Shells & Reactivity

- Atoms want to gain **stability**
- Atoms will try to gain or lose electrons to have a **full** valence shell
- Noble gases are usually **unreactive** because they have **full** valence shells
- Metals try to **lose** electrons. Alkali and Alkaline earth metals are the most reactive.
- Non-Metals try to **gain** electrons, with Halogens being the most reactive.

Gaining & Losing Electrons

- Electrons are **negatively** charged
- Protons are **positively** charged
- Neutral atoms do not have a charge because the number of protons is the same as the number of electrons
- When atoms gain or lose electrons they become positively or negatively **charged**
- An atom with a charge is called an **Ion**