

Trends in the Periodic Table

Learning Goals:

- ✓ Understand that the elements are arranged according to their atomic structures on the periodic table.
- ✓ Recognize the patterns of arrangement across the rows (periods) and down the columns (groups/families)

Review pages 220-225 & 238-239 in your textbook to help you complete the following statements.

1. The periodic table is arranged into **rows** \longleftrightarrow and **columns** \updownarrow .

Rows are called _____ periods. Columns are called _____ groups or families.

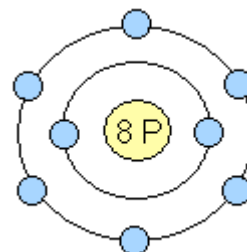
2. Elements in the same **period** have the same number of _____ electron shells.

- Sodium is in period 3 and has _____³ energy levels, while potassium is in period 4 and has _____⁴ energy levels.

3. As you move down the periodic table the number of energy levels _____ increases _____ and therefore, the size/atomic radius of the elements increases.

4. Elements in the same family have the same number of _____ electrons _____ in their outermost energy level.

- Oxygen is in family # _____¹⁶, and has _____⁶ electrons in its outermost energy level.
- Sulphur is in family # _____¹⁶ and also has _____⁶ electrons in its outermost energy level.
- Since sulphur and oxygen are in different _____ periods _____ they have a different _____ total # of electrons _____.



5. Many of the **properties** of the elements are determined by electrons in their outermost energy level. These outermost electrons are called _____ valence _____ **electrons**.

- Ex. Elements in group 1 are very reactive with water and acid.

6. The Noble Gases in group _____¹⁸ are not reactive. Why? _____ They have a full octet (8) and are very stable

7. As you move down the periodic table on the left-hand side (near Group 1) the reactivity of the elements increase.

Why? Group 1 elements want to lose 1 electron. As you get further down the group, the valence electron gets further away from the nucleus and it becomes easier to lose that electron. It is far away from the nucleus and is easier to lose than an electron that is closer to the nucleus.

8. As you move from right to left across a period (ex. Group 18 \rightarrow Group 1) the atoms get _____ bigger _____ and the reactivity of the METALS increases.

Why? The metals on the start (left) of a period have less protons than the metals on the end (right). Less protons means the nucleus is less positively charged. Less positively charged protons are weaker and cannot pull electrons as close to the nucleus as an atom with more protons (close to Group 18). Since it cannot pull the electrons closer, the atom is bigger. It is also easier to lose electrons so it is also more reactive.