

Revision: Chemistry of Swimming

Complete the following questions. You may need to refer back to some of your notes and a Periodic Table.

1. In which group in the Periodic Table are the halogens?

2. What are the first four halogens in the Periodic Table?

- 1.
- 2.
- 3.
- 4.

Fact

When halogens bond with metals - a salt is produced. The word halogen actually means salt producer.

3. Fluorine is found at room temperature as a gas, F_2 . How are the two fluorine atoms bonded? Circle a or b.

- a) covalent bond or b) ionic bond

Key Point

The first energy level can hold two electrons; once this level is full electrons start to fill the second energy level.

The second energy level can hold 8 electrons; the second energy level is filled after the first energy level but before the third energy level.

The third energy level can hold 18 electrons; when the third energy level contains 8 electrons there is some degree of stability and the next 2 electrons go into the fourth energy level, following which any further electrons then go back into the third energy level until this contains the maximum 18 electrons.

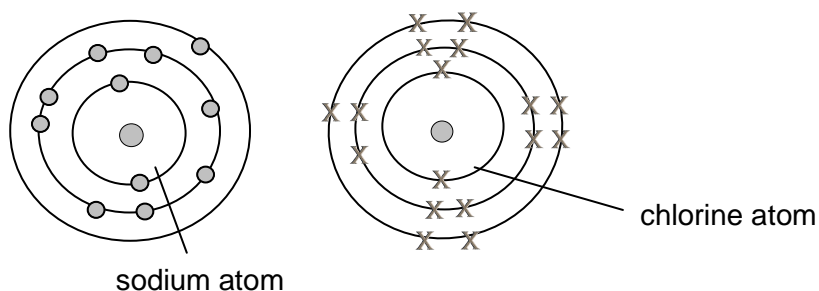
4. Fill in the chemical symbol or element name, the atomic number and number of protons, neutrons and electrons, where appropriate, in the table below for the first 20 elements of the Periodic Table. Leave the gaps in the final column (called electron arrangement) empty at the moment.

Element	Symbol	Atomic number	Mass number	Number of:			Electron Arrangement
				Protons	Neutrons	Electrons	
Hydrogen	H	1	1	1	0	1	1
	He	2	4	2	2		2
Lithium		3		3	4		2,1
Beryllium			9	4		4	
	B	5	11	5	6		2,3
Carbon			12		6	6	
Nitrogen	N	7	14	7	7		
	O	8		8		8	2,6
Fluorine	F	9	19	9	10	9	2,7
	Ne			10	10	10	2,8
Sodium		11		11		11	2,8,1
Magnesium		12		12	12		
	Al	13	27	13	14	13	2,8,3
Silicon	Si				14	14	
	P	15	31		16	15	
Sulfur			32	16			2,8,6
Chlorine	Cl	17	35	17	18	17	2,8,7
	Ar		40		22	18	2,8,8
Potassium		19			20	19	
	Ca	20	40	20			2,8,8,2

Every atom consists of protons, neutrons and electrons - except hydrogen which is a special case as it does not have any neutrons. The nucleus of the atom is made up of the protons and neutrons but the electrons reside in what are known as energy levels (these energy levels are sometimes known as shells). The electrons move around the nucleus extremely rapidly in these energy levels. Each energy level can only hold a specific number of electrons.

- Fill in the gaps in the column labelled electron arrangement of the table you started filling in for question 4 using the information on the left. Look for the pattern emerging as you run down the elements.
- Which elements from the table have full outer energy levels?

7. When a sodium atom and a chlorine atom bond to form sodium chloride an ionic bond is formed. Show this on the diagram below.



8. What is the maximum number of electrons which can be held in the third energy level?

9. Why is chlorine used in swimming pools? Circle a, b or c.

- a) To colour the water
- b) To make your eyes sting
- c) To kill harmful germs and bacteria

10. Dichloroamines are actually what give swimming pools that 'chlorine' smell. To remove dichloroamines, shock treatment is required which breaks down these dichloroamines leaving a slight excess of chlorine. Does shock treatment require more or less chlorine to be added to swimming pools to remove the 'chlorine' smell?

Key Point

When a group 7 element, such as chlorine, reacts with a group 1 metal a salt is formed. Salts are ionic compounds. When two elements bond to form an ionic compound like this, one element will lose an electron and one element will gain an electron.