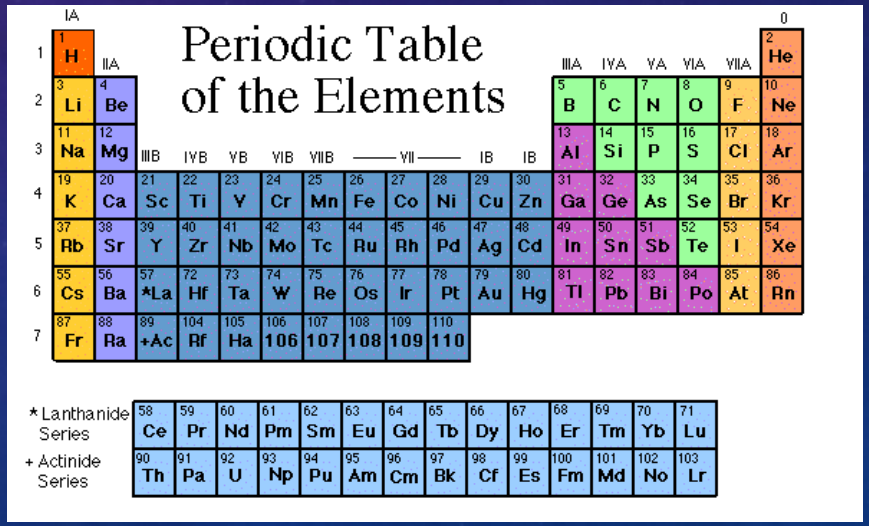
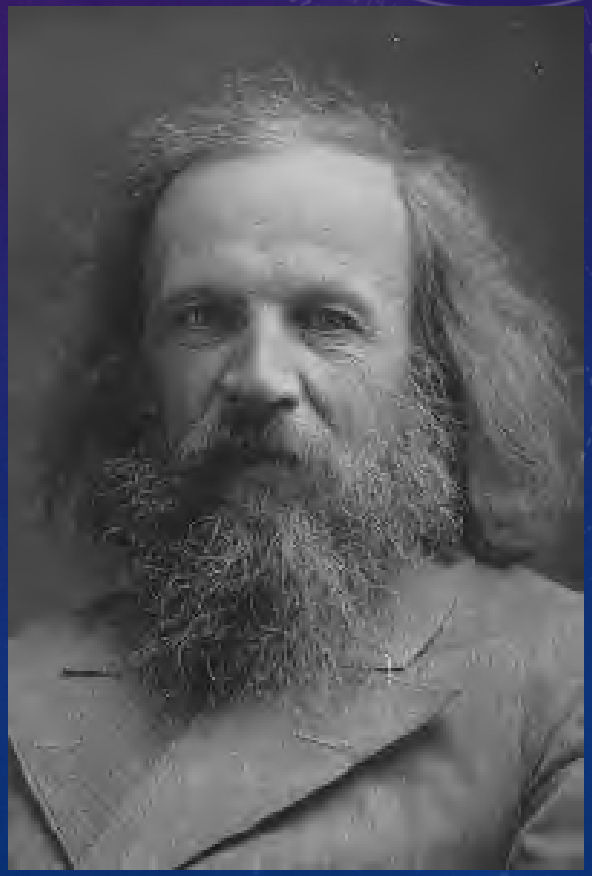
PERIODIC TABLE OF ELEMENTS



DMITRI IVANOVITCH MENDELÉEV (1869)

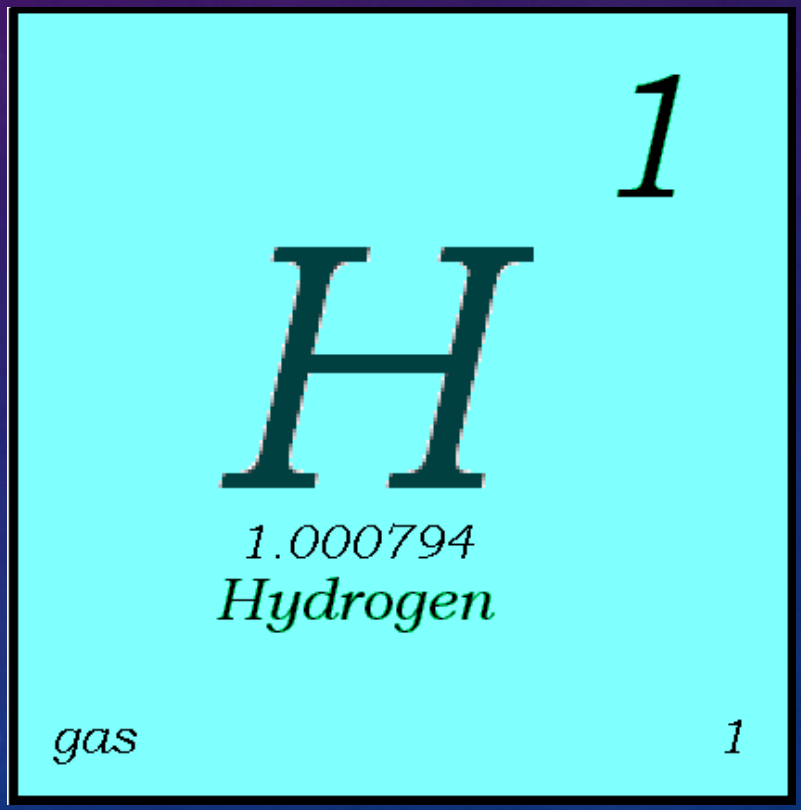
- In 1869 Mendeléev and Lothar Meyer (Germany) published nearly identical classification schemes for elements known to date. The periodic table is based on the similarity of properties and reactivities exhibited by certain elements. Later, Henri Moseley (England 1887-1915) established that each elements has a unique atomic number, which is how the current periodic table is organized.

Row	Group I — R_2O	Group II — RO	Group III — R_2O_3	Group IV RH_4 RO_2	Group V RH_3 R_2O_5	Group VI RH_2 RO_3	Group VII RH R_2O_7	Group VIII — RO_4
1	H = 1							
2	Li = 7	Be = 9.4	B = 11	C = 12	N = 14	O = 16	F = 19	
3	Na = 23	Mg = 24	Al = 27.3	Si = 28	P = 31	S = 32	Cl = 35.5	
4	K = 39	Ca = 40	— = 44	Ti = 48	V = 51	Cr = 52	Mn = 55	Fe = 56, Co = 59, Ni = 59, Cu = 63
5	(Cu = 63)	Zn = 65	— = 68	— = 72	As = 75	Se = 78	Br = 80	
6	Rb = 85	Sr = 87	?Yt = 88	Zr = 90	Nb = 94	Mo = 96	— = 100	Ru = 104, Rh = 104, Pd = 106, Ag = 108
7	(Ag = 108)	Cd = 112	In = 113	Sn = 118	Sb = 122	Te = 125	I = 127	
8	Cs = 133	Ba = 137	?Di = 138	?Ce = 140				
9								
10			?Er = 178	?La = 180	Ta = 182	W = 184		Os = 195, Ir = 197, Pt = 198, Au = 199
11	(Au = 199)	Hg = 200	Tl = 204	Pb = 207	Bi = 208			
12				Th = 231		U = 240		

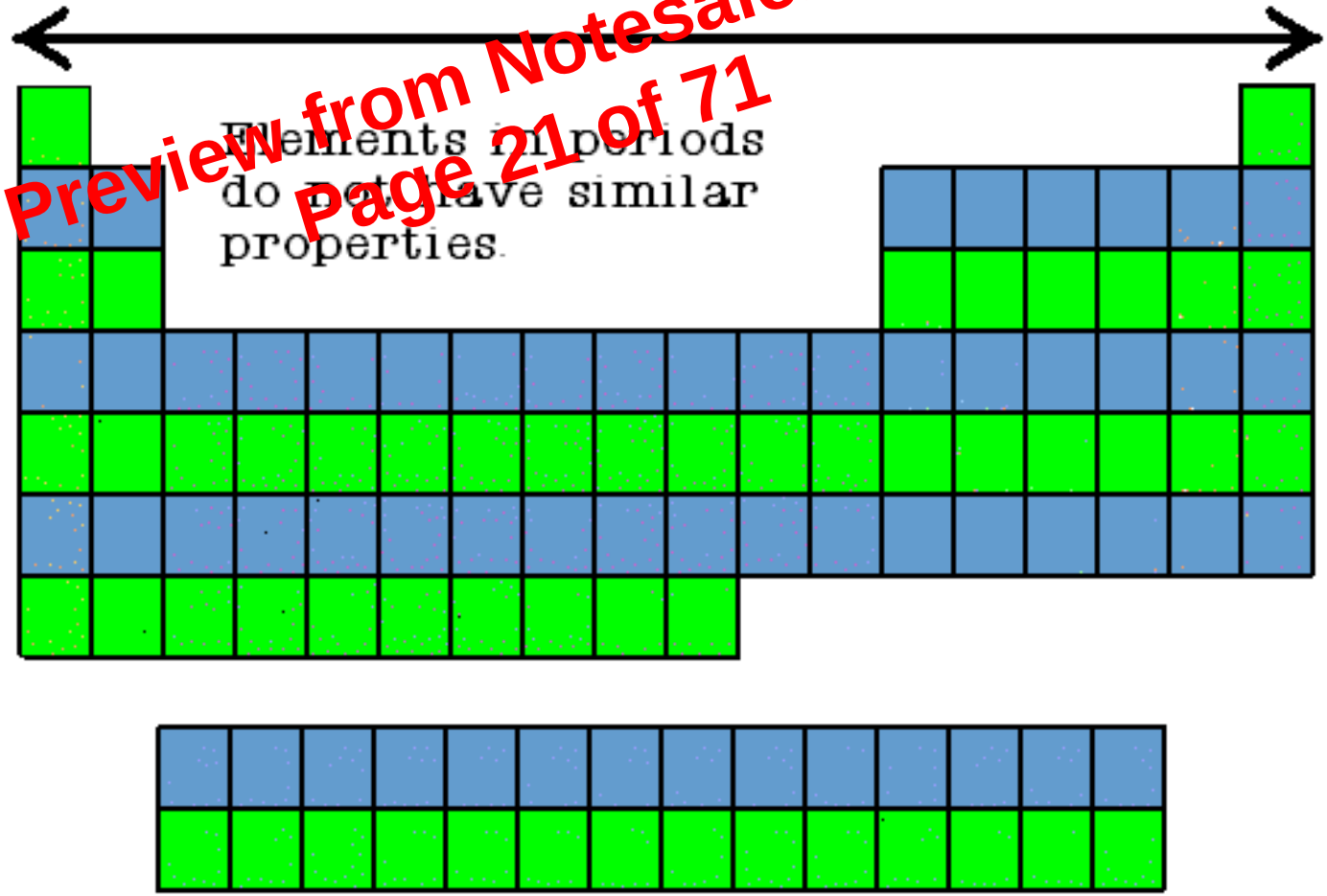


WHAT'S IN A SQUARE?

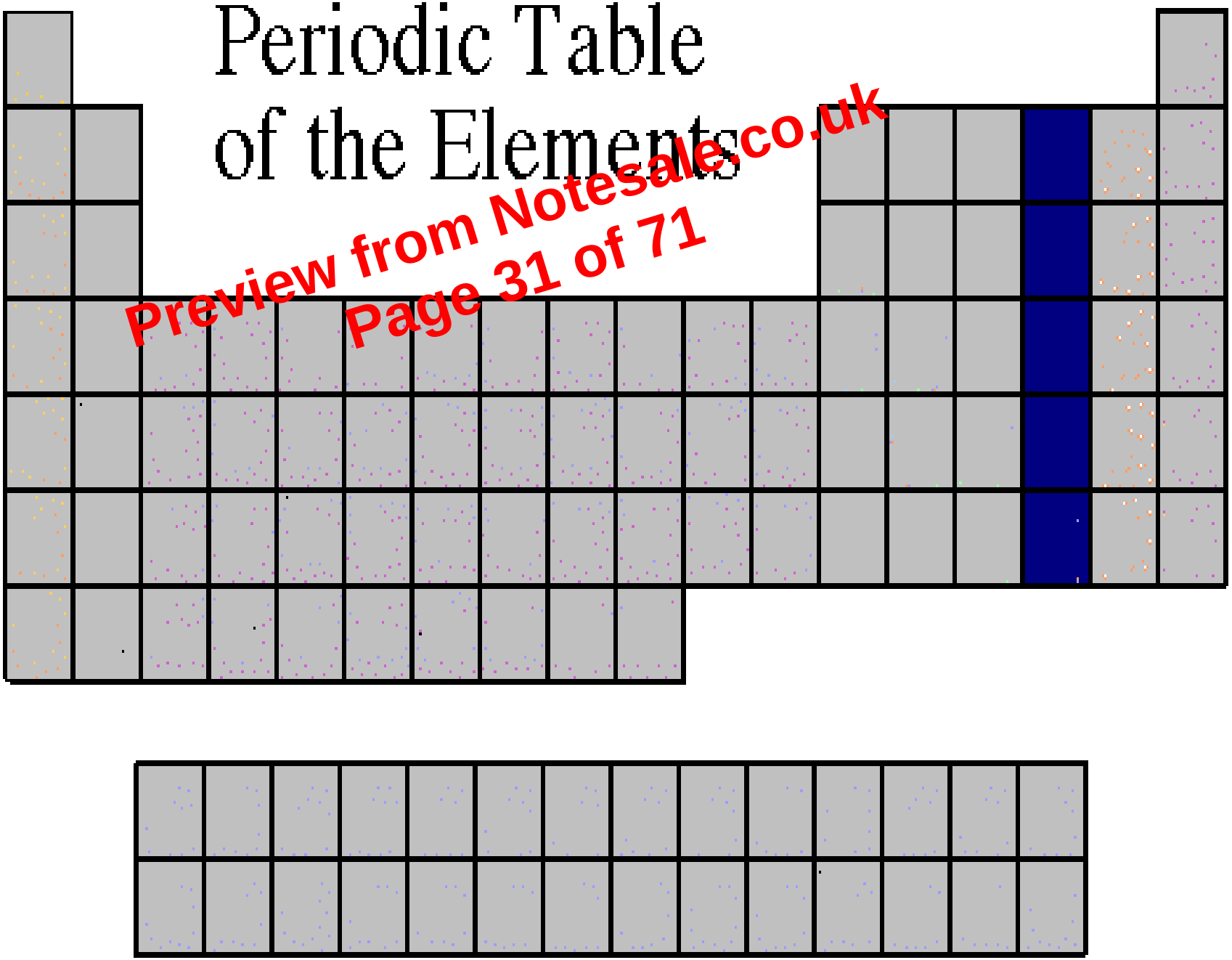
- Different periodic tables can include various bits of information, but usually:
  - atomic number
  - symbol
  - atomic mass
  - number of valence electrons
  - state of matter at room temperature.



The elements are also categorized into periods, or horizontal rows.

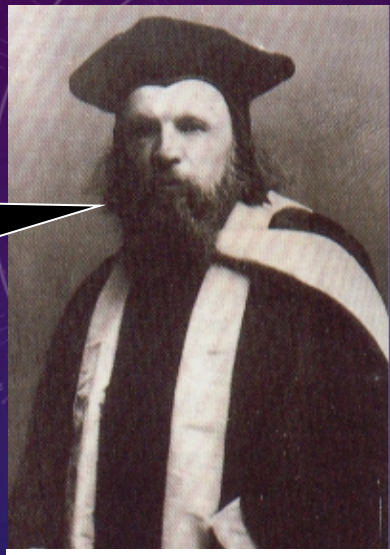


Periodic Table of the Elements



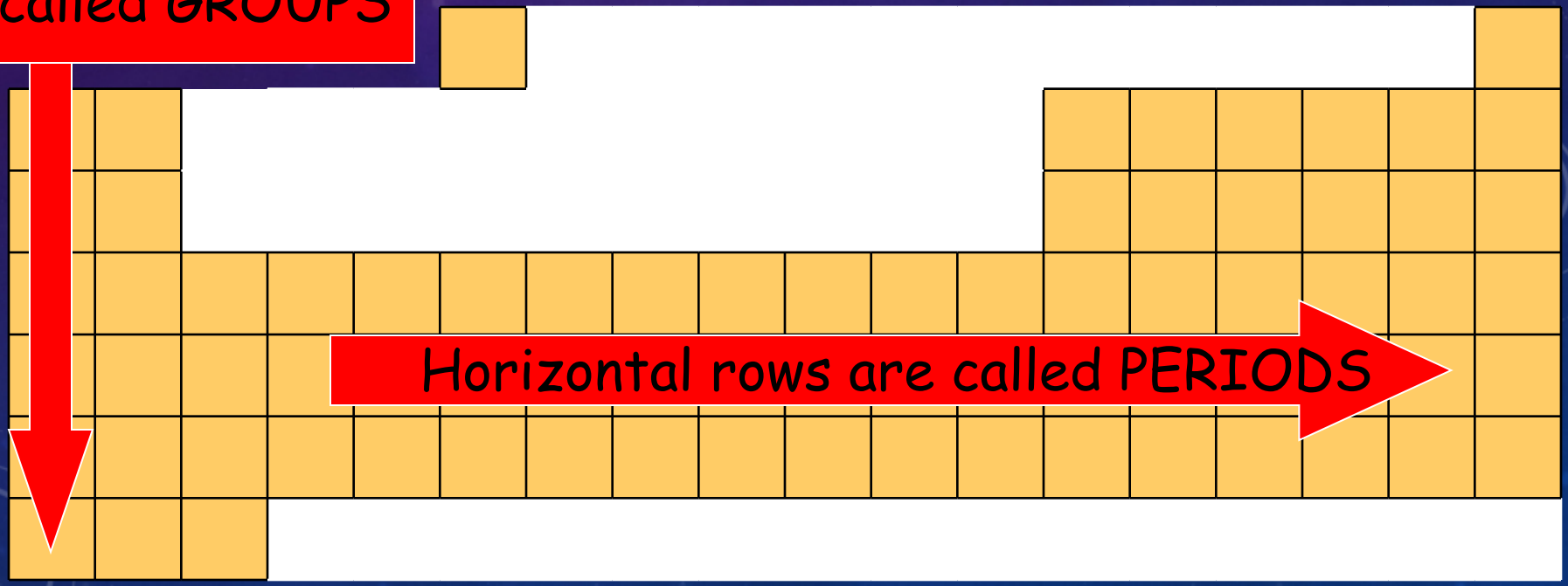
PERIODIC TABLE

The periodic table arranges all the elements in groups according to their properties.



Mendeleev

Vertical columns are called GROUPS



THE PERIODIC TABLE

Fact 1: Elements in the same group have the same number of electrons in the outer shell (this corresponds to their group number)

																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca						Fe		Ni	Cu	Zn					Br	Kr
										Ag						I	Xe
									Pt	Au	Hg						

E.g. all group 1 metals have __ electron in their outer shell

These elements have __ electrons in their outer shells

These elements have __ electrons in their outer shell

THEIR PHYSICAL PROPERTIES:

1. Like all metals, they are good conductors of heat and electricity.

2. They are softer than most other metals and they have low density (some even float on water).

3. They have low melting and boiling points, compared to most metals. There's a decrease in melting point as well as boiling point as we move down the group

THEIR CHEMICAL PROPERTIES:

1. All alkali metals react vigorously with water, releasing hydrogen gas and forming hydroxides. The hydroxides give alkaline solutions.

2. Their oxides are basic oxides and are soluble in water, giving rise to alkalis (hydroxides)

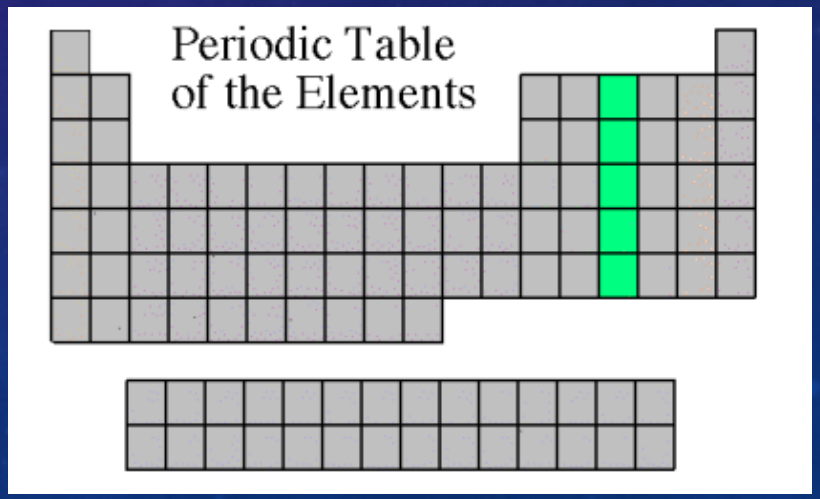
3. Their basic oxides and hydroxides can react with acids to form salts and water (neutralization reaction).

- Eg: $Li_2O + H_2O \rightarrow 2LiOH$
- $LiOH + 2HCl \rightarrow 2LiCl + H_2O$

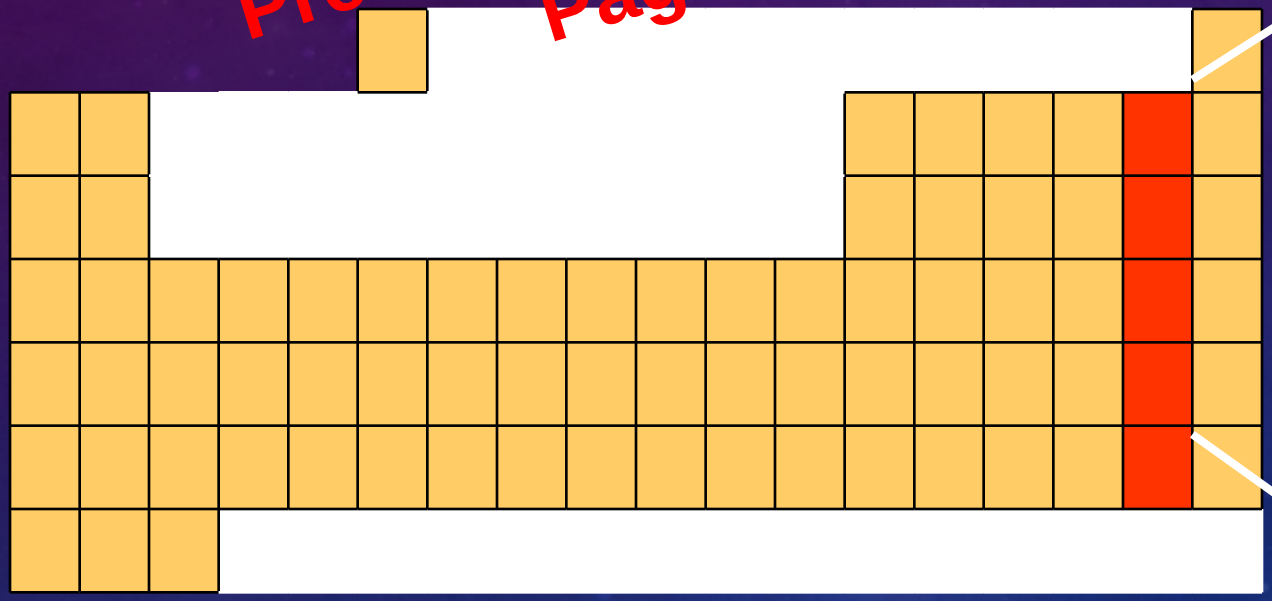
4. They react with non-metals. With chlorine they react to make chlorides and with oxygen they make oxides.

NITROGEN FAMILY

- The nitrogen family is named after the element that makes up 78% of our atmosphere.
- Nitrogen is the most important element in natural and artificial fertilizers.
- This family includes non-metals, metalloids, and metals.
- Atoms in the nitrogen family have 5 valence electrons. They tend to share electrons when they bond.
- Other elements in this family are phosphorus, arsenic, antimony, and bismuth.



GROUP 7 – THE HALOGENS



F
Cl
Br
I
At