

Lesson 3

Periodic Table

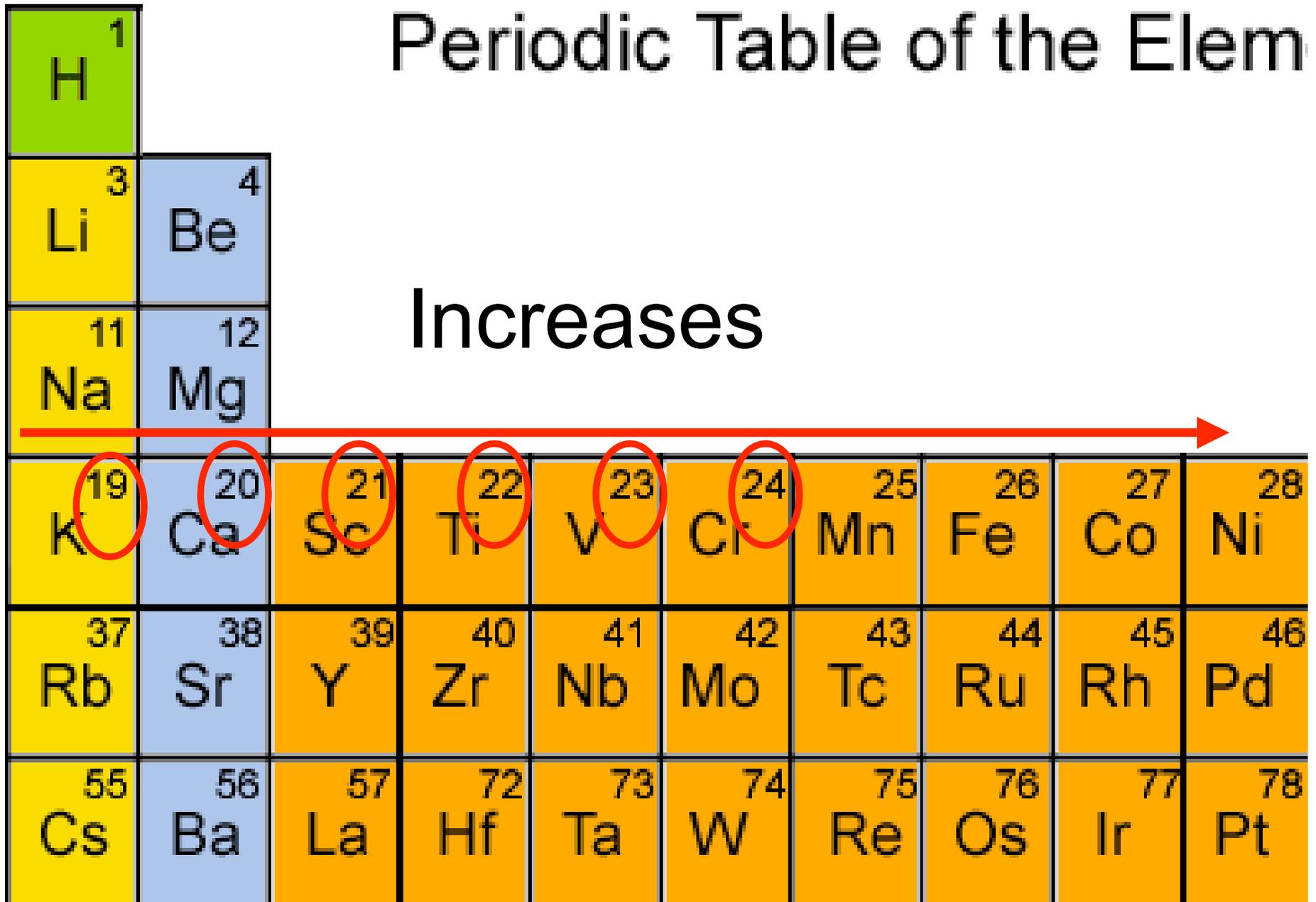
Periodic Table

Elements on the periodic table are classified and arranged in **four** basic patterns.

1. **Atomic number**: the number of protons (positively charged particle) in the nucleus of an element.

Periodic Table of the Elements

Increases



H ¹										
Li ³	Be ⁴									
Na ¹¹	Mg ¹²									
K ¹⁹	Ca ²⁰	Sc ²¹	Ti ²²	V ²³	Cr ²⁴	Mn ²⁵	Fe ²⁶	Co ²⁷	Ni ²⁸	
Rb ³⁷	Sr ³⁸	Y ³⁹	Zr ⁴⁰	Nb ⁴¹	Mo ⁴²	Tc ⁴³	Ru ⁴⁴	Rh ⁴⁵	Pd ⁴⁶	
Cs ⁵⁵	Ba ⁵⁶	La ⁵⁷	Hf ⁷²	Ta ⁷³	W ⁷⁴	Re ⁷⁵	Os ⁷⁶	Ir ⁷⁷	Pt ⁷⁸	

2. Metal vs. Non metals: separated by the staircase line.

Periodic Table of the Elements

Legend:

- hydrogen
- alkali metals
- alkali earth metals
- transition metals
- poor metals
- nonmetals
- noble gases
- rare earth metals

1 H																	2 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89 Ac	104 Unq	105 Unp	106 Unh	107 Uns	108 Uno	109 Une	110 Unn								
		58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu		
		90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr		

metals

3. **Groups (or families)**: vertical columns that have similar properties.

4. **Periods**: horizontal rows with repeated trends of reactivity.

0
2 He
10 Ne
18 Ar
36 Kr
54 Xe
86 Rn

19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn
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Reading the Element KEY

Atomic Number

Symbol

Charge
(if ion)

Atomic Mass

Example : Calcium KEY

20

2+

Ca

40.08

Periodic Table

1 2 GROUP

PERIOD 1

PERIOD 2

PERIOD 3

PERIOD 4

- hydrogen
- alkali metals
- alkali earth metals
- transition metals

metal

1 H						
3 Li	4 Be					
11 Na	12 Mg					
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc
55 Cs	56 Ba	57 La	72 Hf	73 Ta	74 W	75 Re

The periodic table can also list the physical state (phase) of the element at **room temperature**.

Black indicates a solid

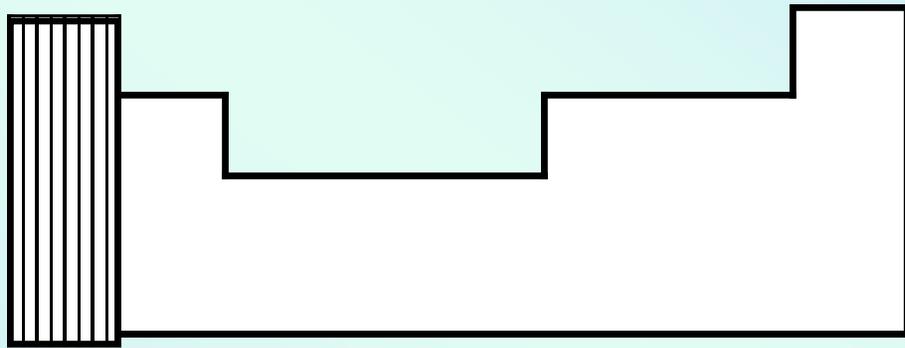
Gray area indicates a gas

Bold indicates a liquid (Hg, and Br only)

Other physical properties such as Electronegativity (attraction to electrons) and molar mass can also be determine by using your key on the periodic table.

Families of the Periodic Table

Group IA: Alkali Metals

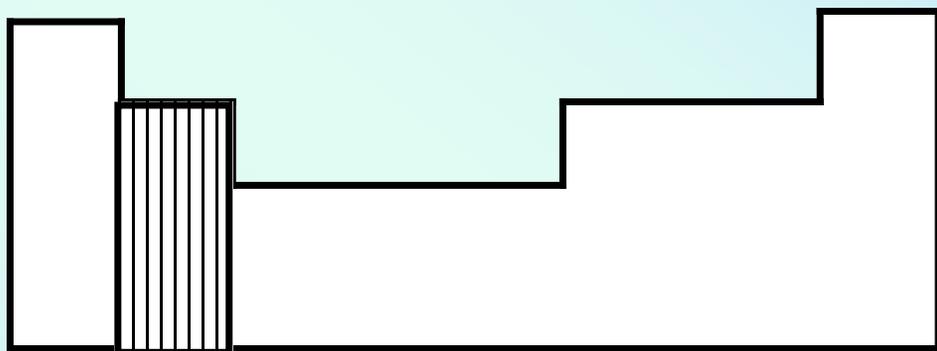


Elements are highly reactive.

Contain most reactive metal: Francium

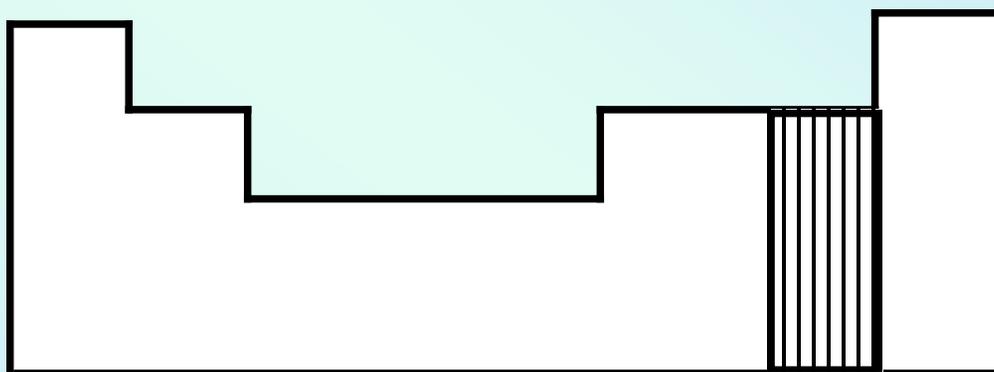
They are silver coloured, very ductile and react with air or water

Group IIA: Alkaline Earth Metals



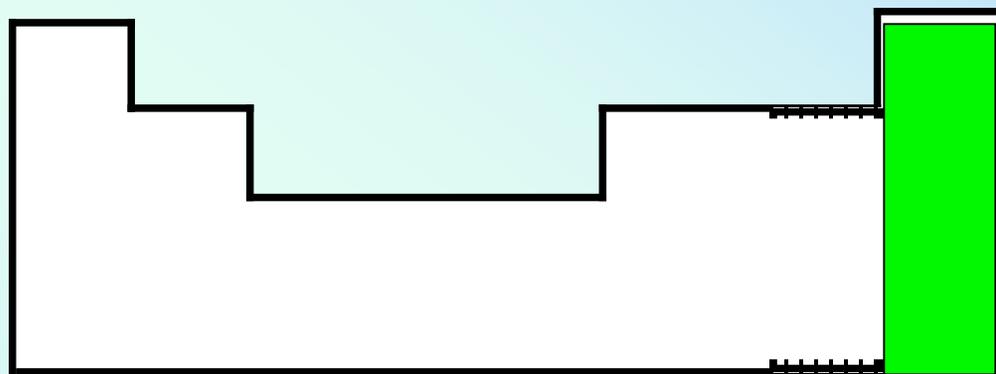
Similar to alkalis but not as reactive in air.
Oxidize with air to form a protective coating.

Group VIIA or 17: Halogens - “Salt Formers”



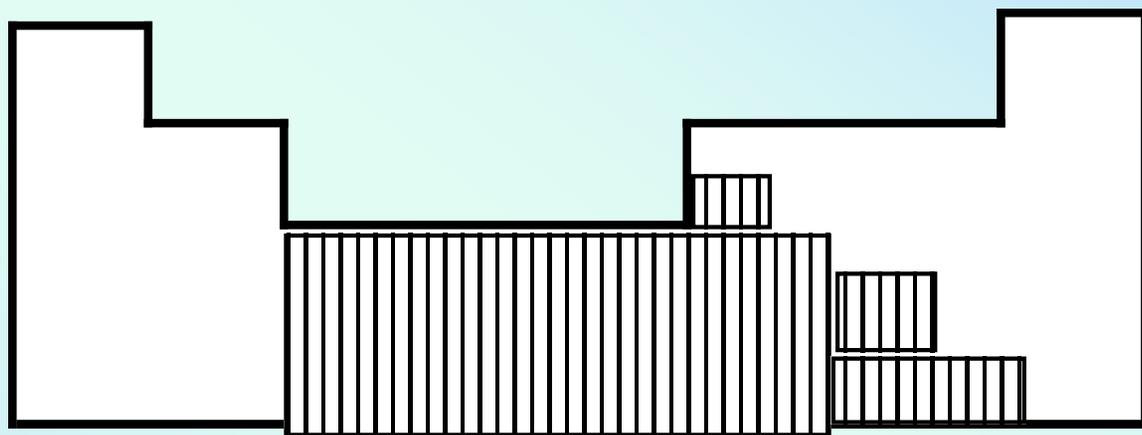
React well with metals to form compounds similar to salts. Most diverse Group. Contain all phases.
Contains the most reactive non-metal: Fluorine (it can dissolve glass)

Group VIIA or 18: Nobel Gases.



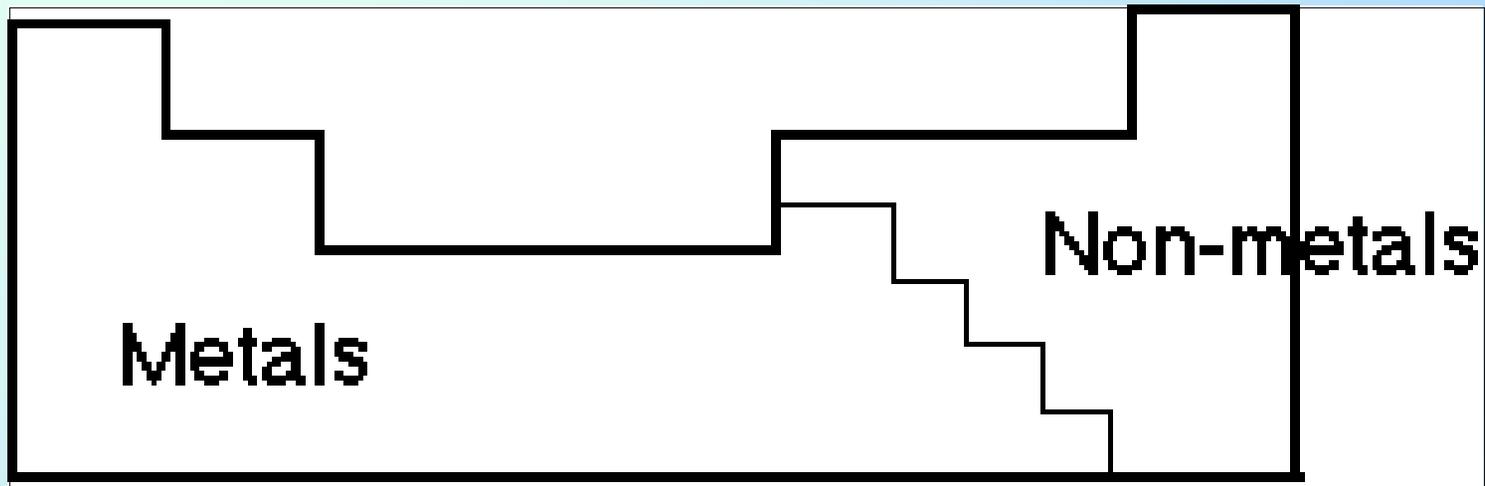
Seldom reacts to form compounds.
They are called the “Inert Gases.”

Group B elements: Transition Metals



Typical metals such as copper, iron zinc and silver.
Transition Metals have wide variety of
characteristics.

Metal and Non-Metal Staircase:



Metals and Non-Metals are separated by a staircase. Any element (except for hydrogen) on the left side is a metal and any element on the right side is a non-metal. (There are some exceptions.)

Now you try:

Can you match the following elements to the correct Family? (use your periodic table)

A. Sodium

B. Neon

C. Cl

D. Mg

E. Copper

F. O

1. Noble Gas

2. Non-metal

3. Alkali Metals

4. Transition Metal

5. Alkali Earth Metal

6. Halogen

Metal vs Non-Metal Properties

Metals

- solid (except Hg)
- silver colour (except for copper, gold)
- ductile & malleable
- conduct heat/electricity
- react with acid to form hydrogen gas

Non - Metals

- s, l, g
- all colours
- no
- no
- some

Metalloids

- nonmetals along the staircase line, have some of the properties of metals mainly they can conduct electricity (semi-conductors) ex silicon - computer chips

Last Two Groups - found at the bottom of the periodic table

Rare Earths / Lanthanide Series : atomic #'s 58 - 71

Trans Uranium / Actinide Series : Made in nuclear reactors
#'s 90 - _____

Assignment

Quiz: Date?

You will need to know first 30 elements.

- a) location
- b) symbol
- c) name (spelling)
- d) atomic number

and abcd for gold and silver.