F4 C4
Periodic table
Antoine Lavoisier = divided the substances into four groups(Classification is not quite correct ,heat and light were grouped as gases.)
J.W.Dobereiner = triads
Lothar Meyer = plotted graph | elements relatively similar points of the curve are grouped in the same chemical family
John Newlands = arranged in ascending order of atomic mass(Law of octave)
Dmitri Mendeleev = atomic mass
Henry Moseley = proton number

Group number determined by the number of electrons in the outermost shells
Period number indicates the number of electron-filled shells

Group 1(alkali metals)very reactive=stored under paraffin oil
-Soft metal
-comparatively相对 boiling point and melting point(compare to other metals)
-shiny ,silvery solid(room temperature)
-low density(less than water)
-good conductors of heat and electricity

-Going down the group ,atomic radius increase
~the melting point and boiling points decrease : size of atom increases->attraction force between the atoms become weaker->less heat energy is needed to overcome these weak forces
~density increase : increase in atomic mass is bigger than increases in volume
~reactivity increase / electropositivity increase : atomic size increase->valence electron is further away from the nucleus->attraction force between nucleus and atom is weaker->easier to lose electron to form positive ions

Reaction:
With water=hydroxides + H2 (Na+H20–>NaOH+H2)
With air(burning)=solid metal oxide (4Na+O2–>2Na2O)
With non-metals(halogens)=halides salts (2Na+Cl2–>2NaCl)

Group 2(Alkali earth metals)

Group 3-12(Transition metals)
-form coloured compound
Copper(II) ion,Cu2+=blue
Iron(II) ion,Fe2+=Pale green
Iron(III) ion,Fe3+=Brown
Chromium(III) ion,Cr3+=Green
Cobalt(II) ion,Co2+=pink

-variable oxidation states(have more than one oxidation number)
-active catalyst
Iron = Haber process(making ammonia)
Vanadium(5) oxide=Contact process(making of sulphuric acid)
Platinum=Ostwald process(making nitric acid)
Nicker=Hydrogenation(making of margarine)

-form complex ion(complex ion is a poly atomic cation/anion consisting of a central metal ion with other groups bounded to it,sap:(CoCl4)2-
-high melting point and boiling point
-high densities
-good conductor of electricity and heat
-strong ,hard ,ductile拉伸 and malleable塑造

Group 17(halogens | diatomic)
-low melting and boiling point
~halogen consists of small molecules->attraction force between molecules are weak->less heat energy is needed to overcome these weak attraction force
-low density
-poor conductors of heat and cannot conduct electricity
-soluble in organic solvents (Tetrachloromethane)
-coloured intensity increase down the group
Fluorine=pale yellow gas
Chlorine=Greenish yellow gas
Bromine=Reddish-brown liquid
Iodine=Shiny purplish-black solid

Going down the group
~Melting point and boiling point increase : molecules get larger->attraction force between molecules become stronger->More heat energy is needed to overcome these stronger attractive force
~reactivity decrease : atoms become bigger->distance between nucleus and valence electron become further->attraction force between valence electron and the nucleus become weaker->more difficult to attract an electron to form negative ions.

Reaction:
With metals=ionic compound ($2Fe+3Cl_2 \rightarrow 2FeCl_3$)
With non-metal=covalent compound ($H_2+Cl_2 \rightarrow 2HCl$)
With water=acid
With sodium hydroxide=water+salt

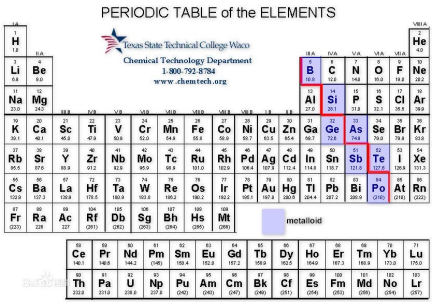
Group 18(noble gases | monoatomic)
Noble gases=chemically inert : electron arrangement are very stable/have a stable octet/ duple(Helium) electron arrangement | atom will not lose ,gain and share electron with other atoms
-low melting and boiling point
~increase when going down the group : Size of atoms increase—>attractive force between the neighbouring atoms increase—>more heat energy is required to overcome these stronger forces of attraction between atoms while melting or boiling
-low density
~density increase when going down the Group 18 : increase in atomic mass is bigger compared to the increase in volume
-poor conductors of heat and electricity
-insoluble in water
Example:
Neon = advertising lights
Argon = to fill electric bulbs

Elements in period 3
When going across period 3:
-the number of protons in nucleus increases
-the attractive forces between the nucleus and electrons become stronger
-decrease in atomic size(electron are pulled closer toward the nucleus of the atom)
-increase in electronegativity
~atomic size become bigger->number of protons in the nucleus increases->attraction force between nucleus and electrons become stronger->the atoms have higher tendency to attract electrons to from an negative ions.
-melting point increases (sodium(group 1) to aluminium(group 13))
-melting point decrease (silicon(group14) to argon(group18))
-melting point of silicon is the highest(Strong three dimensional covalent bonds)

Chemical properties
Na_2O MgO | Al_2O_3 | SiO_2 P_4O_{10} SO_3 Cl_2O_7

Basic. |Amphoteric | Acidic
Basic oxide+water—>alkaline solutions(PH>7)
~react with acid
Acidic oxide+water—>acid(PH<7)
~react with alkali/base
Amphoteric oxide(PH=7) have properties of a basic oxide and an acidic oxide(reacts both with acid and bases)

Metalloid(semi-metals)



have properties of metals and non-metals
Use:
-Chips for electronic devices
-solar cell(Silicon)
-Lasers ,for compact disc player(Silicon)
-light metals ,for camera(Silicon)