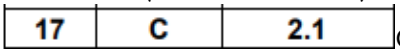
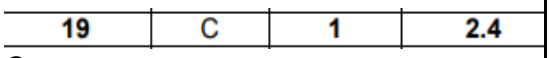
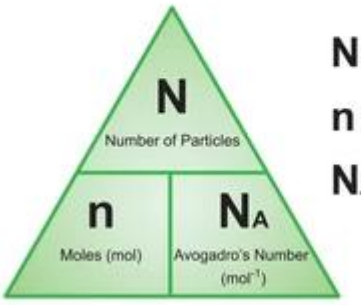
EL.Q Exam questions from past papers

Explain why each element has a characteristic emission spectrum (4)?	As each element has electrons in discrete energy levels (1) to which electrons drop levels (1) with different elements having different sized gaps (1) due to the energy released being proportional to frequency E=hv (1) and so the energy drops between levels give lines
Why do isotopes have the same chemical properties (1) ?	This is because they have the same number of electrons in their outer shells (1)
What does an emission/line spectrum show? (3)	It shows the frequency of light given out when an electron moves down energy levels in the form of coloured bands on a black background with the lines getting closer together (converging) with increasing frequency (3)
What does an absorption spectrum show? (3)	It shows the frequency of light absorbed by electrons in the form of dark bands on a colour spectrum with the lines getting closer together (converging) with increasing frequency (3)
Geiger and Marsden found that the majority of alpha particles were hardly deflected. A very few were deflected a great deal 'like firing an artillery shell at a cigarette paper and having it 'bounce back'. How does their model of the atom explain that some, but only a few, alpha particles 'bounce back'? (3)	Alpha particles are positive and so they are deflected by the positive nucleus (1) the ones that hit the nucleus bounce back (1) but not many of them do this as the nucleus is small (1)
A student says that the cloudiness is caused by insoluble calcium hydroxide being formed slowly. Comment on this statement (2)	Calcium hydroxide is partially soluble (1) so dissolves at first then appears (1)

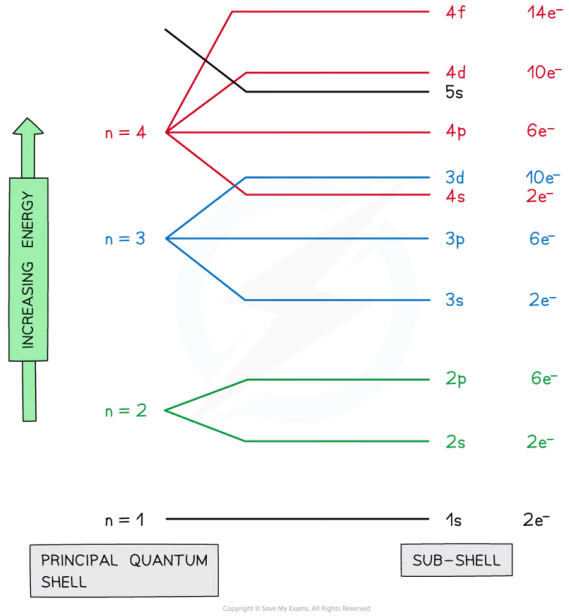
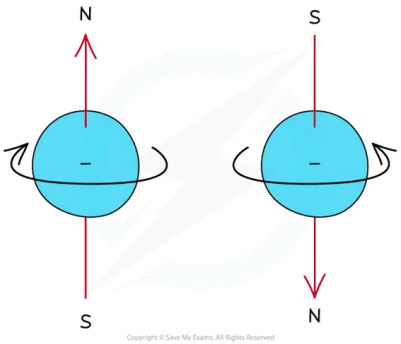
In 1911, Geiger and Marsden fired α-particles at gold foil and found that most passed through unchanged, while just a few were deflected by large amounts. This was evidence for the nuclear model of the atom. Explain the results of the Geiger and Marsden experiments using a nuclear model of the atom. (3)	Most of the atom is empty space so particles can pass undeflected (1) There are positive protons in the nucleus (1) that deflect alpha particles a lot (1)
What is the avogadro's constant the number of for a ionic (NaCl),covalent (CO_2) and metallic (Cu) structure? And therefore the answer to this question **17** What is the Avogadro constant, N_A, the number of? **A** Atoms in one mole of carbon dioxide. **B** Carbon atoms in one mole of C_2H_5OH. **C** Sodium ions in one mole of NaCl. **D** Molecules in one mole of magnesium. Your answer ☐ [1]	• The number of sodium or chloride ions in one mole of NaCl ($6.02x10^{23}$ ions) • The number of CO_2 molecules in one mole of CO_2 ($6.02x10^{23}$ molecules) • The number of copper atoms in one mole of Cu ($6.02x10^{23}$ atoms) •  C
19 Which solution contains the greatest number of ions? **A** $10.0\,cm^3$ of $0.500\,mol\,dm^{-3}$ NaCl **B** $0.300\,dm^3$ of $0.0400\,mol\,dm^{-3}$ NaCl **C** $0.0200\,dm^3$ of $0.500\,mol\,dm^{-3}$ $MgCl_2$ **D** $40.0\,cm^3$ of $0.150\,mol\,dm^{-3}$ $MgCl_2$ Your answer ☐ [1] Which solution contains the greatest number of ions?	 C • A is $0.01x0.5 = 3x10^{21} \times 2 = 9x10^{21}$ • B is $0.3x0.04 = 7.2x10^{21} \times 2 = 14x10^{21}$ • C is $0.02x0.5 = 6x10^{21} \times 3 = 18x10^{21}$ • D is $0.04x0.15 = 3.6x10^{21} \times 3 = 10x10^{21}$ • Therefore its C

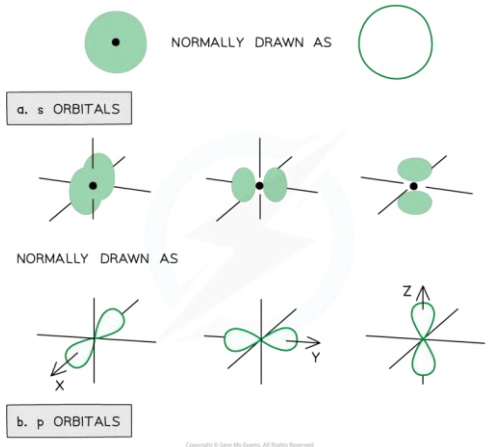
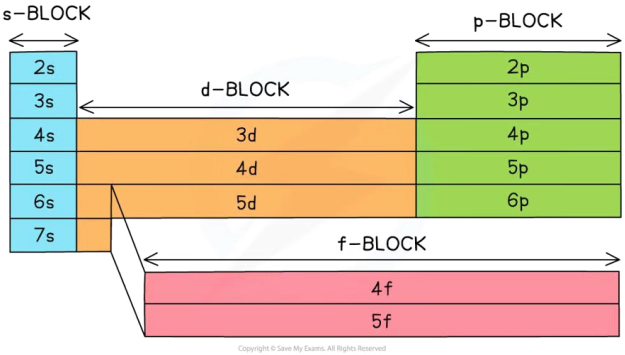
EL.a-d - Formulae, equations and amount of substance | EL1 | EL6 | EL7 | EL9 |

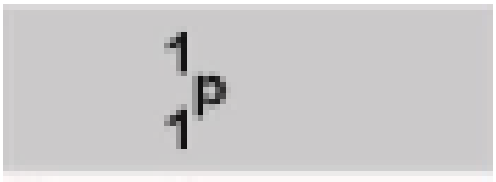
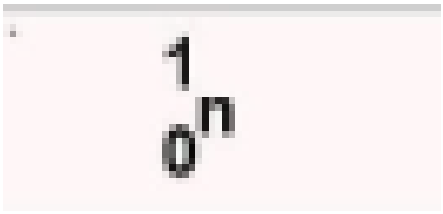
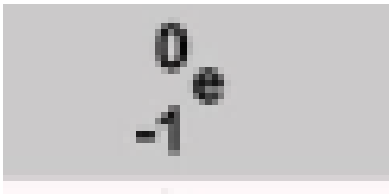
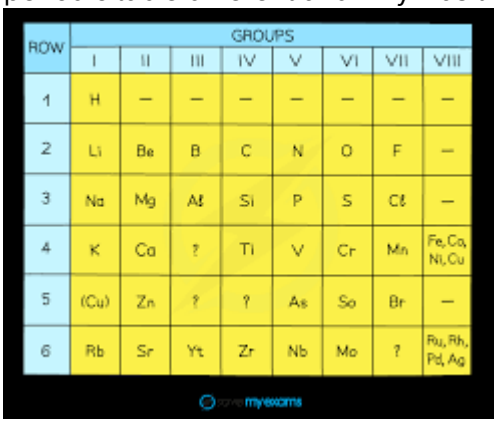
What is another name for fizzing?	Effervescence
Define empirical formula?	The **simplest** ratio of atoms of each **element** in an element/compound
Define molecular formula?	The **actual** number of atoms of each **element** in an element/compound
Define isotope?	Atoms with the same number of protons but a different number of neutrons

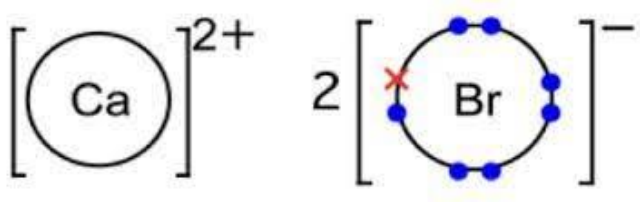
Define relative atomic mass?	The average of the masses of all isotopes taking into account their abundance relative to 1/12 of the mass of carbon-12
Define relative isotopic mass?	The mass of an atom of an isotope relative to 1/12 of the mass of carbon-12
Define Relative molecular/Formula mass?	The mean mass of a molecule relative to 1/12 of the mass of carbon-12
Why do isotopes have the same chemical properties?	They have the same number of electrons in their outer shells
What is the relative mass of an electron?	1/1840
How do isotopes of the same element vary?	In physical properties (e.g., density)
Define both cation and anion?	● Cation - positively charged ion ● Anion - negatively charged ion *Remember as cats make you positive*
What is the equation to convert g/dm^3 to mol/dm^3	g/dm^3 / RFM = mol/dm^3
How would you convert from mol/dm^3 to g/dm^3	mol/dm^3 x RFM = g/dm^3
What is a hydrated/hydrous salt?	A salt molecule loosely attached to water (called waters of crystallisation) *Thus anhydrous means the opposite*
What is the equation using Avogadro's number?	Number of particles (N) = Avogradro's number (N_A) x number of moles (n) **The Mole Formula**  $N = n \cdot N_A$ $n = N : N_A$ $N_A = N : n$

EL.e-h - Atomic structure | EL1 | EL3 | EL4

What is Nuclear fusion?	The joining of 2 or more smaller lighter nuclei to make a heavier nucleus (under conditions of high temperature and pressure)
What is the electron configuration of chromium?	$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1\ 3d^5$ or [Ar] $4s^1\ 3d^5$
What is the electron configuration of copper?	$1s^2\ 2s^2\ 2p^6\ 3s^2\ 2p^6\ 4s^1\ 3d^{10}$ or [Ar] $4s^1\ 3d^{10}$
Which shells have which subshells?	● 1 has s ● 2 has s p ● 3 has s p d ● 4 has s p d f 
Define orbitals?	Regions around the nucleus that can hold 2 electrons with opposite spins 
How many orbitals does each subshell have?	● S has 1 orbital ● P has 3 orbitals

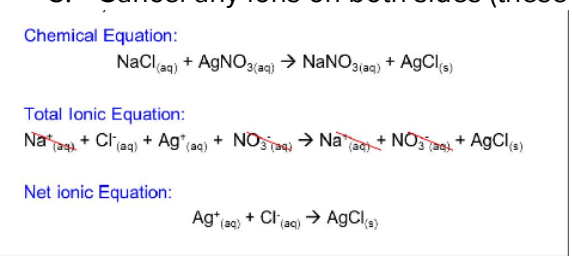
	● D has 5 orbitals ● F has 7 orbitals
What is the shape of an s-orbital/s-subshell?	Sphere *The greater the shell number, the greater the radius*
What are the shapes of the p-orbitals?	Dumbbells. 
What are the 2 rules for all orbitals of the same energy?	1. Electrons won't pair in the same subshell if they don't have to 2. Electrons in the same orbitals must have opposite spin ● This is to avoid repulsion
What are the blocks of the periodic table?	
What are outer shell electrons also known as?	Valence electrons
What is the nuclear formula for a Proton? (Draw or in the form Ar/An E)	1/1 p

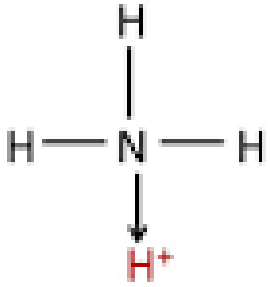
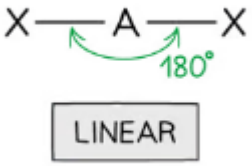
	
What is the nuclear formula for a Neutron? (Draw or in the form Ar/An E)	1/0 n 
What is the nuclear formula for a Electron? (Draw or in the form Ar/An E)	0/-1 e 
How was Mendeleev's adaptation of the periodic table different and why was this? 	• He left gaps and he ordered elements horizontally in terms of atomic weight • He also realised that elements with the same properties should be placed in the same column and so the gaps he left relates to undiscovered elements and some elements didn't fit in as isotopes had not been discovered
What was the order in which the model of the atom was developed and by who?	• Dalton model - John dalton (1803) • Plum pudding - J.J thomson (1897) • Nucleus - Geiger & mardsen (Rutherford as well) [1909-1911] • Shells - Niels bohr (1913)

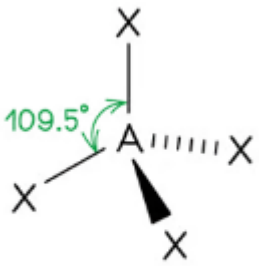
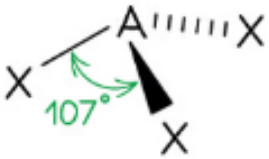
Geiger and Marsden found that the majority of alpha particles were hardly deflected. A very few were deflected a great deal 'like firing an artillery shell at a cigarette paper and having it 'bounce back'. How does their model of the atom explain that some, but only a few, alpha particles 'bounce back'? (3)	Alpha particles are positive so they are deflected by the positive nucleus (1) The ones that hit the nucleus bounce back (1) But not many do this as the nucleus is small (1)
Give 2 reasons for the percentage yield being less than 100%	● Reaction may have not had enough time to go to completion ● A side reaction has taken place ● Product was lost under purification ● Reversible reaction
What is a covalent bond?	A shared pair of electrons
Draw the dot cross diagram of $CaBr_2$?	
Which transition metals have anomalous e^- structures and why?	● Copper ([Ar] $3d^{10}$ $4s^1$) and chromium ([Ar] $3d^5$ $4s^1$) ● Having a half built/full built 3d subshells is lower in energy than a full built 4s subshell

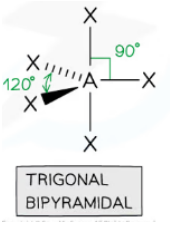
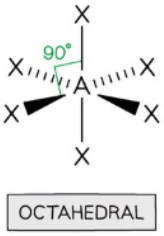
EL.i-l - **Bonding and structure | EL5 | EL7 |**

What are the 4 types of **bonding** and **structure**?	Giant Covalent, Giant metallic, Giant ionic,Molecular covalent,
Define ionic bonds.	The **electrostatic force** of attraction between **oppositely charged ions** formed by electron transfer
Describe and explain the conductivity of Giant ionic compounds under different states	● Doesn't conduct when solid (1) because the ions are fixed in a lattice (1) so cannot carry a charge ● Conducts when molten or dissolved because the ions can move and thus act as charge carriers
What are the properties of Giant Ionic structures (Mp/Bp, hardness, type of Bond, El Cond, Sol in H_2O, Sol in NPS)	● MP/BP is high ● Hard but brittle ● Strong ionic bonds between oppositely charged ions ● Conducts when molten or in solution ● Solubility is soluble in polar solvent (eg water as it forms ion-dipoles this is in Oceans topic) ● Solubility is insoluble in non polar solvents

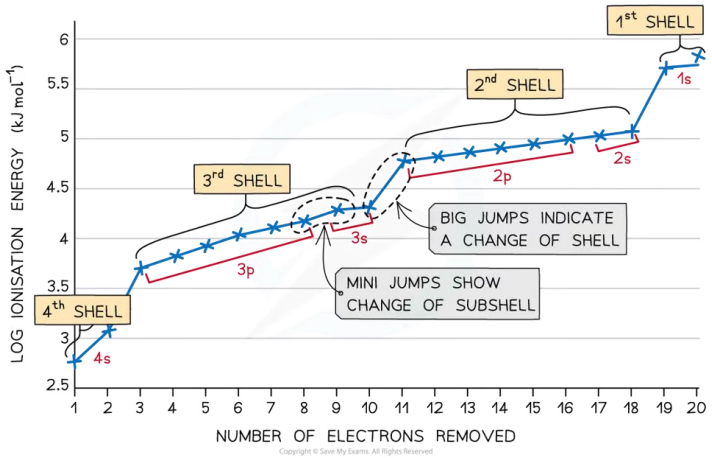
What are the properties of Simple Molecular Covalent structures (Mp/Bp, hardness, type of Bond, El Cond, Sol in H_2O, Sol in NPS)	● MP/BP is low ● Soft ● Weak intermolecular bonds between molecules and strong covalent bonds between the atoms within the molecules ● Does not conduct ● Usually insoluble in water ● Usually soluble in polar
What are the properties of Giant Covalent structures (3 Examples, Mp/Bp, hardness, type of Bond, El Cond, Solubility)	● Diamond graphite silica (silicon dioxide) ● MP/BP is Very high ● Very hard if 3D ● Strong covalent bonds ● Does not conduct except for graphite ● Solubility no never
What are the properties of Giant Metallic structures (type of particle, Mp/Bp, type of bond ,hardness, El Cond, Sol in H_2O and NPS)	● Ions in a sea of delocalised electrons ● MP/BP is High ● Strong electrostatic attractions between positive ions and delocalised electrons ● Hard but malleable ● Conducts when solid or liquid ● Insoluble in water and non polar solvents
What are the properties of Macromolecular Covalent (type of structure, type of particle, 2 examples, Mp/Bp, hardness, type of Bond, El Cond, Sol in H_2O, Sol in NPS)	● Polymers ● Long-chain molecules ● DNA, protein ● MP/BP is moderate often decomposes on heating ● Does not conduct normally ● Usually insoluble in water ● Sometimes soluble in non polar solvents
What are the steps for writing ionic equations? Remember BBC	1. **B**alance the equation. 2. **B**reak each (aq) substance into ions 3. **C**ancel any ions on both sides (these being the spectator ions) 
What are spectator ions?	Ions that aren't changing state or oxidation number
Define one mole?	The amount of substance which contains the same amount of particles as there are atoms in 12 grams of carbon-12
What is a dative (coordinate)	A shared pair of electrons where both electrons are from the same atom

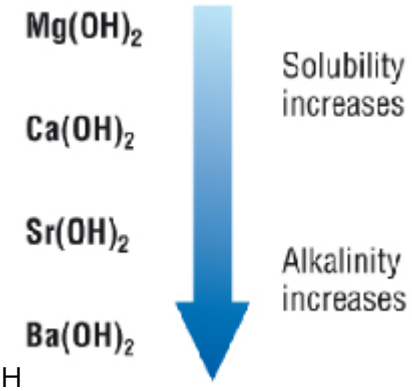
bond?	
What is used to show a dative bond?	An arrow from the atom providing the dative bond E.g. in an ammonium ion 
Give the 3 bond angles largest to smallest.	1. The bond angle between lone pairs 2. The bond angle between a lone pair and a bonding pair 3. The bond angle between bonding pairs
What do lone pairs repel by and why?	An extra 2.5 degrees as they're closer to the nucleus and thus take up more space
Describe the linear shape of a molecule with an example?	● 2 bonding pairs ● 180 degrees ● An example is CO_2 
Describe the triangular planar shape of a molecule with an example?	● Planar meaning flat on the page and all the bonds are in the same plane ● 3 bonding pairs and 0 lone pairs ● 120 degrees

Describe the tetrahedral shape of a molecule with an example?	• 4 bonding pairs • 109.5 degrees • An example is CH_4  TETRAHEDRAL
Describe the (Trigonal) pyramidal shape of a molecule?	• 3 bonding pairs and 1 lone pair • 107 degrees (because tetrahedral minus 2.5 degrees) • An example is NH_3  PYRAMIDAL
Describe the V shape or Bent shape of a molecule?	• 2 bonding pairs and 2 lone pairs • 104.5 degrees between bonding pairs (because tetrahedral minus 2 x 2.5 degrees). • An example is H_2O  NON–LINEAR (BENT) *The angle between the two lone pairs is the greatest*

Describe the Bi pyramidal shape of a molecule?	● 5 bonding pairs ● 120 degrees and 90 degrees ● An example is PCl_5 
Describe the octahedral shape of a molecule with an example?	● 6 bonding pairs ● 90 degrees ● An example is SF_6 
How should you tackle a "Explain the shape of molecule" question in 4 steps?	1. State the total no. of pair of electrons and ALSO containing this no. of **bonding and lone pairs** 'surrounding the central atom' 2. State that 'electron sets arrange themselves as far apart from each other to minimise repulsion`' (1) 3. If there are lone pairs, state lone pairs repel more than bonding pairs (1) Otherwise state electron pairs get repelled equally (1) 4. State the shape of a molecule with the bond angle *Treat double bonds as single bonds here and the total no. is both lone and bonding pairs, if they give you or you could identify the central atom say the atom of the central atom, not just ' central atom'*
What is the sentence Mrs Marsden wants you to know for Electron sets :) ?	Electron sets arrange themselves as far away from each other to minimise repulsion
How does the structure of elements change across period 3?	1. Na, Mg, Al - giant metallic lattices 2. S - giant covalent lattice 3. P_4, S_8, Cl_2, Ar- simple molecular
How does the structure of elements change across period 2?	1. Li, Be, B - giant metallic lattices 2. C - giant covalent lattice 3. N_2, O_2, F_2, Ne - simple molecular
What is the mnemonic for remembering the shapes of the shape of molecules from 2 bonding pair to 6 no lone pairs shapes included	Large Turtles Play Tennis Plus Beat To Break Oranges Linear, Trigonal Planar, Tetrahedral, Pyramidal, Bent, Trigonal Bipyramidal, Octahedral

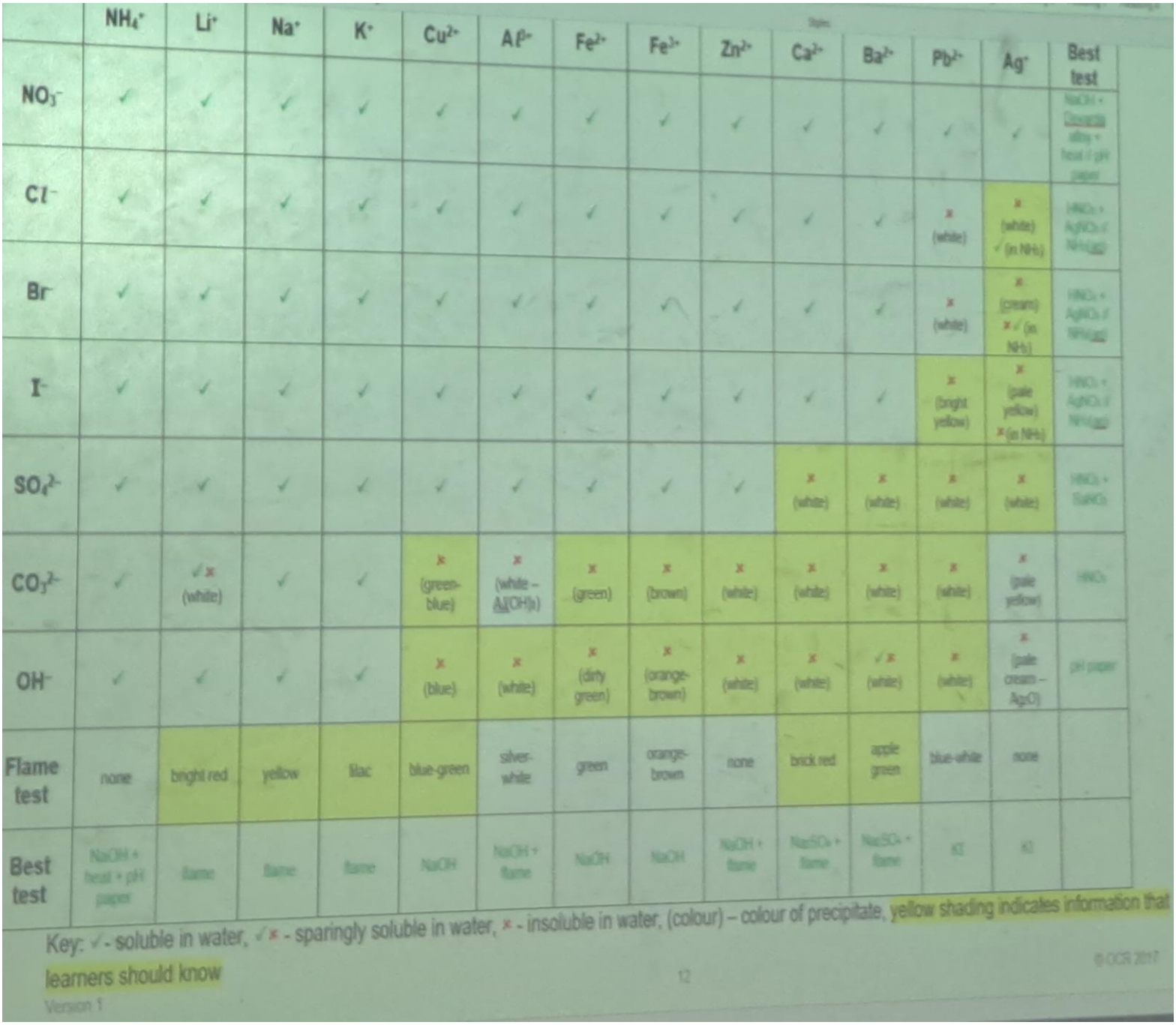
EL.m-s - Inorganic chemistry and the periodic table | EL4 | EL7 | EL8 |

Define periodicity?	A repeating pattern across different periods
Define first ionisation enthalpy/energy?	Energy required to remove an electron from each atom in one mole of gaseous atoms (2)
Why do First ionisation energies decrease down groups?	● Increased atomic radius and more shells -> more shielding -> less attraction -> easier to remove
Why are there sharp and slight increases in successive ionisation energies?	● Slight increases therefore removing an electron -> smaller atomic radius (therefore less repulsion between subshells) -> stronger attraction ● Sharp increase therefore less shielding and smaller atomic radius -> stronger attraction 
Why does First ionisation energy generally increase across periods	● Greater nuclear charge -> reduced atomic radius -> there is a greater attraction so more energy is required to remove an electron -> harder to remove outermost electron as more protons are added across the period ● During this, shielding stay the same
What is a metallic bond?	Strong electrostatic force of attraction between cations and delocalised electrons (2)
Why does the reactivity increase down group 2?	First ionisation energy decreases -> less energy required to remove the outermost electron
What is meant by the term charge density? (1)	The ratio of charge on ion to its volume (1)
What changes for group 2 carbonates down the group?	Solubility decreases and thermal stability increases and charge density decreases

How and why does Thermal stability/decomposition of Group 2 carbonates change as you go down the group**?**	● Thermal stability increases ● As the smaller metal ions at the top of the group distorts the carbonates more and has a larger charge density and so the ion would be more unstable compared to the larger ions at the bottom of the group *As the nucleus of the metal atom would attract electrons from the oxygen atoms*
How do you make testing which group 2 carbonates are more thermally stable a more valid test? (e.g BaCO3 and CaCO3)	● Use the same amount/moles of carbonate (1) ● Use the idea of same heating intensity (1) *Apparatus could be heating carbonate in a test tube and passing gas using a delivery tube through into limewater or using a gas syringe or using a upside down measuring cylinder in water*
Why is boron ($1s^2\ 2s^2\ 2p^1$)'s first ionisation energy less than beryllium ($1s^2\ 2s^2$)'s	P-orbital e- has a higher energy than the s-orbital e- -> it is easier to remove *It's all about a new factor now having an effect relative to the previous element*
Why is oxygen's ($1s^2\ 2s^2\ 2p^4$)'s first ionisation energy less than nitrogen's ($1s^2\ 2s^2\ 2p^3$)'s?	Electrons now pair in the same orbital therefore repel one another and is easier to remove
What changes for group 2 hydroxides down the group and why?	Solubility increases and alkalinity increases therefore more OH^- ions are released therefore higher pH 
What is the flame colour for Li^+	Crimson red
What is the flame colour for Na^+	Yellow
What is the flame colour for K^+	Lilac
What is the flame colour for Ca^+	Brick red

What is the flame colour for Ba^{2+}	Apple green
What is the flame colour for Cu^{2+}	Blue green
What is the test for carbonates?	1. Add HCl if you see effervescence it could contain a carbonate therefore a gas is produced 2. Bubble this gas through limewater if it turns cloudy then the gas is CO_2 and thus a carbonate is present
Give the test for sulfate ions?	1. Add HCl to dissolve any carbonates (aka a false positive which can mask desired observations) 2. Add barium chloride solution (or barium nitrate) 3. If white ppt forms you have a sulfate present This is because $Ba^{2+}_{(aq)} + SO_4^{2-}_{(aq)} \rightarrow BaSO_{4\ (s)}$
In what order **should** you carry out anion tests?	Carbonate - Sulfate - Halide (CaSH) ● Adding Ba^{2+} to CO_3^{2-} produces a white ppt of $BaCO_3$ ● Adding Ag^{+} to CO_3^{2-} produces a yellow-grey ppt of Ag_2CO_3 ● Adding Ag^{+} to SO_4^{2-} produces a white ppt of Ag_2SO_4
Precipitate colour of Silver and Sodium hydroxide and compound is produced?	Brown and Silver oxide
Precipitate colour of Copper (II) and Sodium hydroxide?	Blue
Precipitate colour of Iron (II) and Sodium hydroxide?	Green
Precipitate colour of Iron (III) and Sodium hydroxide?	Orange brown
Which ions react with sodium hydroxide and produces a white ppt and dissolves in excess	Aluminium, Zinc
Which ions react with sodium hydroxide and produce a white ppt and does not dissolve in excess?	Lead (II), Calcium
What is the equation for the reaction of a Group 2 oxide (Calcium) and acid?	$CaO + 2HCl = CaCl_2 + H_2O$
What is the equation for a group 2 (calcium) reacting with water?	$Ca + 2H_2O = Ca(OH)_2 + H_2$
What is the equation for the reaction of a	$CaO + H_2O = Ca(OH)_2$

group 2 oxide (calcium) and water?	
What is the equation for the first and second ionisation energy of group 2 (Calcium) with state symbols?	$Ca_{(g)} = Ca^{+}_{(g)} + e^{-}$ $Ca^{+}(g) = Ca^{2+}(g) + e^{-}$
What is the formula for the thermal decomposition of group 2 carbonates (calcium) with state symbols ?	$CaCO_{3(s)} = CaO_{(s)} + CO_{2(g)}$
Which nitrates are soluble?	All nitrates
Which Halides are insoluble and precipitate colour? (remember SC3L halides)	Silver Halides Copper iodide (white) Lead Chloride (white) Lead Bromide (white) Lead iodide (bright yellow)
Which Halides are soluble?	Most Halides
Which hydroxides are soluble (remember BSCALPS hydroxides)	Barium hydroxide Sodium Calcium Ammonium Lithium Potassium Strontium
Which hydroxides are insoluble?	Most Hydroxides
Which sulfates are soluble?	Most sulfates
Which sulfates are insoluble (remember BCLS sulfates)	Barium Calcium Lead Silver sulfates All 4 are white ppt
Which carbonates are soluble (remember PALS carbonates)	Potassium Ammonium Lithium Sodium Carbonates
Which carbonates are insoluble and precipitate in colour (remember CS&MC)?	Copper Carbonate (Blue/Green) Silver Carbonate (Yellow) Most Carbonates and most others are white



	NH_4^+	Li^+	Na^+	K^+	Cu^{2+}	Al^{3+}	Fe^{2+}	Fe^{3+}	Zn^{2+}	Ca^{2+}	Ba^{2+}	Pb^{2+}	Ag^+	Best test
NO_3^-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Cl^-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗ (white)	✗ (white) ✓ (in NH_3)	
Br^-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗ (white)	✗ (cream) ✗✓ (in NH_3)	
I^-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗ (bright yellow)	✗ (pale yellow) ✗ (in NH_3)	
SO_4^{2-}	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗ (white)	✗ (white)	✗ (white)	✗ (white)	
CO_3^{2-}	✓	✓✗ (white)	✓	✓	✗ (green-blue)	✗ (white – $Al(OH)_3$)	✗ (green)	✗ (brown)	✗ (white)	✗ (white)	✗ (white)	✗ (white)	✗ (pale yellow)	
OH^-	✓	✓	✓	✓	✗ (blue)	✗ (white)	✗ (dirty green)	✗ (orange-brown)	✗ (white)	✗ (white)	✓✗ (white)	✗ (white)	✗ (pale cream – Ag_2O)	
Flame test	none	bright red	yellow	lilac	blue-green	silver-white	green	orange-brown	none	brick red	apple green	blue-white	none	
Best test	NaOH + heat + pH paper	flame	flame	flame	NaOH	NaOH + flame	NaOH	NaOH	NaOH + flame	Na_2SO_4 + flame	Na_2SO_4 + flame	KI	KI	

Key: ✓ - soluble in water, ✓✗ - sparingly soluble in water, ✗ - insoluble in water, (colour) – colour of precipitate, yellow shading indicates information that learners should know

© OCR 2017

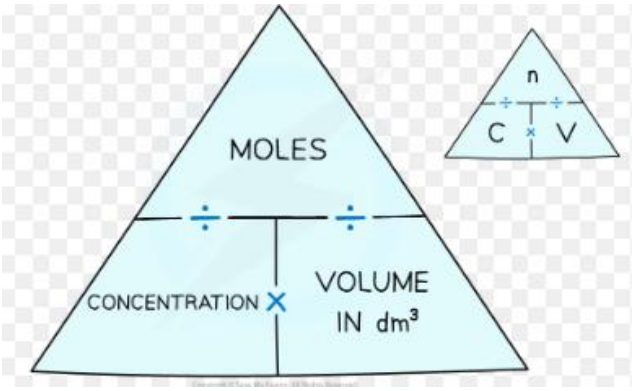
Version 1

Why won't all CO_2 be released from a reaction involving a solution?	As CO_2 is slightly soluble
Give 3 observations of a group 2 element in acid?	1. More vigorous fizzing (down the group) 2. Metal (ribbon) dissolving faster (down the group) 3. Solution heating more (down the group)

What is the trend for solubility for the group 2 carbonates	Decreases as you go down the group *I.e. $MgCO_3$ is more soluble than $BaCO_3$ this is due to the cation forming weaker ion-dipoles with water molecules but this is in the topic 8 Oceans*

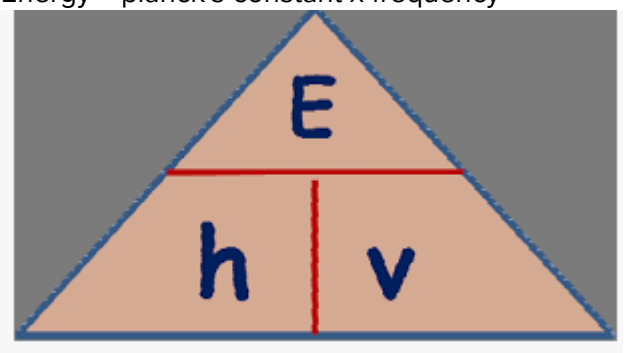
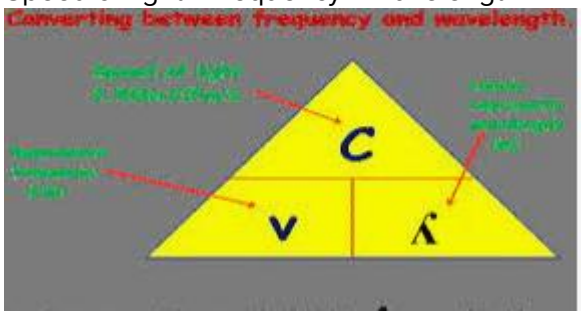
EL.t-u - Equilibria (acid–base) | EL7 | EL8 | EL9 |

What is a salt?	The product of a neutralisation reaction where the H+ ions from the acid are replaced by metals or ammonium IONS
What is an acid?	A compound that dissociates in water to produce hydrogen ions
What is an acid regarded as?	A proton donor
What is a base?	A compound that reacts with an acid to produce water
What is a base regarded as?	A proton acceptor
What is an alkali?	A base that dissolves in water to produce hydroxide ions
What is neutralisation?	A type of reaction between an acid and an alkali
What is the equation for the reaction of an Acid + Base?	Acid + Base = Salt + Water
Reaction between an acid and metal (+ type of reaction)	Acid + metal = salt + hydrogen **Redox** (not neutralisation as water isn't formed)
Reaction between an acid and metal oxide	Acid + metal oxide = salt + water
Reaction between an acid and metal carbonate	Acid + metal carbonate = salt + water + CO_2
Reaction between an acid and metal hydroxide	Acid + metal hydroxide = salt + H_2
What is the method for preparing a soluble salt using an insoluble base/solid carbonate or , metal?	● Add excess solid base to acid (gently heat to speed up reaction) ● Filter off excess solid base ● Heat filtrate solution until volume reduced by half ● Cool solution and allow remaining water to evaporate slowly and crystals to form ● Filter or pick out crystals ● Leave crystals to dry

What is the method for preparing a soluble salt using an alkali?	***Making Soluble Salts Using an Alkali*** 1) You can't use the method above with **alkalis** (soluble bases) like **sodium**, **potassium** or **ammonium hydroxides**, because you can't tell whether the reaction has **finished** — you can't just add an **excess** to the acid and filter out what's left. 2) You have to add **exactly** the right amount of alkali to just **neutralise** the acid — the most accurate way to do this is with a **titration** (see page 27). This method involves using an **indicator** (which is a substance that changes colour at a particular pH) to show you exactly how much alkali neutralises a known volume of acid. 3) Once you've found out how much alkali you need to neutralise the acid, **repeat** the titration by combining these volumes again — just don't add the indicator this time, otherwise it will contaminate the salt. 4) Then just **evaporate** off the water to **crystallise** the salt as normal.  Mildred loves sharing a good bit o' salt with the gals.
What would be in excess for preparing to make a soluble salt using an insoluble base + an acid?	The insoluble base
What is the method for a flame test?	• Use a nichrome wire • Clean the wire by dipping it into concentrated HCl and then by heating it in a bunsen flame • If the sample is not powered then grind it up • Dip the wire in the solid and put it in the bunsen flame and observe the flame colour *If a question gives you the positive charged metal ion (cation) say the specific flame colour*
What are the 2 concentration equations?	• Concentration = moles/volume • Concentration = mass/volume 
Explain the meaning of heating to a constant mass? (1)	Repeatedly heating and weighing the mass of a substance until there is no change in mass (1)

EL.v-w - Energy and matter | EL2 |

Explain why each element has a	As each element has electrons in discrete energy levels (1))

characteristic emission spectrum (4)?	to which electrons drop levels (1) with different elements have different sized gaps (1) due to the energy released being proportional to frequency E=hv (1)
What is E=hv?	Energy = planck's constant x frequency 
What is c = vλ?	Speed of light = frequency x wavelength 
Explain how elements can give off coloured light when heated and how analysis of the light from strontium proved that it was a new element (6)	● Electrons when heated get excited and jump to a higher energy level by absorbing energy. (1) ● Energy levels for each element have a unique gap and a discrete amount of energy (2) ● When an electron falls down energy levels it emits radiation in the form of visible light in which its frequencies are related to colour via the equation E=hv and so each element emits a specific frequency of light when its electrons fall to a lower energy level. (3) ● Barium emits a frequency in the green part of the visible light spectrum but strontium emits a frequency from the red part (1)
What happens to the Energy, frequency and wavelength as you go from Infrared Radiation to Ultraviolet light in the EM spectrum left to right?	● Energy increases ● Frequency increases ● Wavelength decreases

What does an emission/line spectrum show? (3)	It shows the frequency of light given out when an electron moves down energy levels in the form of coloured bands on a black background with the lines getting closer together (converging) with increasing frequency
What does an absorption spectrum show? (3)	It shows the frequency of light absorbed by electrons in the form of black lines on a coloured background with the lines getting closer together (converging) with increasing frequency
What is the equation for energy using wavelength?	Energy = planck's constant x speed of light / wavelength ($E = hc/\lambda$)
What is the frequency/frequencies of light that the visible light spectrum is present in?	10^14Hz

EL.x - Modern analytical techniques | EL1

What are the lines on a mass spectrum?	● If analysing elements they're isotopes ● If analysing compounds they're fragment ions
What does a mass spectrometer measure?	Mass to charge ratio (m/z)