Separate Science GCSE
Revision Checklists

Chemistry
PAPER 2

Name: _____

Science Teacher: _____

Chemistry 2 - Paper 5

SC3 - Atomic Structure	☐
Describe how Dalton's ideas about atoms have changed.	☐
Describe how the subatomic particles are arranged in an atom.	☐
Explain how atoms of different elements are different.	☐
Recall the charges and relative masses of the three subatomic particles.	☐
Explain why all atoms have no overall charge.	☐
Describe how the size of an atom compares to the size of its nucleus.	☐
State where most of the mass of an atom is found.	☐
State the meaning of atomic number.	☐
State the meaning of mass number.	☐
Describe how the atoms of different elements vary.	☐
State the number of electrons in an atom from its atomic number.	☐
Calculate the numbers of protons, neutrons and electrons using atomic and mass numbers.	☐
State what is meant by an isotope.	☐
Identify isotopes from information about the structure of atoms.	☐
Calculate the numbers of protons, neutrons and electrons using atomic numbers and mass numbers.	☐
Explain why the relative atomic mass of many elements is not a whole number.	☐
H Calculate the relative atomic mass of an element from the relative masses and abundances of its isotopes.	☐
SC4 - The Periodic Table	☐
Recall the chemical symbols of some common elements.	☐
Describe how Mendeleev arranged elements into a periodic table.	☐
Describe how Mendeleev predicted the existence and properties of some elements yet to be discovered.	☐
Explain how Mendeleev's early ideas were supported by later evidence.	☐
Explain some problems Mendeleev had when ordering the elements.	☐
Explain the meaning of the term 'atomic number'.	☐
Describe how the elements are arranged in the modern periodic table.	☐
Recall the positions of metals and non-metals in the periodic table.	☐
State what the term 'electronic configuration' means.	☐
Show electronic configurations in the form 2.8.1 and as diagrams.	☐
Predict the electronic configurations of the elements hydrogen to calcium.	☐

Explain the links between an element's position in the periodic table and its electronic configuration.	☐

SC5 - Ionic Bonding	☐
Recall the formulae of simple ions.	☐
Explain how cations and anions are formed.	☐
Use dot and cross diagrams to explain how ionic bonds are formed.	☐
Explain the difference between an atom and an ion.	☐
Calculate the numbers of protons, neutrons and electrons in simple ions.	☐
Explain the formation of ions in groups 1, 2, 6 and 7 of the periodic table.	☐
Recall the formulae of common polyatomic ions, and the charges on them.	☐
Interpret the use of –ide and –ate endings in the names of compounds.	☐
Name ionic compounds using –ide and –ate endings.	☐
Work out the formula of an ionic compound from the formulae of its ions.	☐
Describe the structure of ionic compounds.	☐
Explain how ionic compounds are held together.	☐
Describe the properties of ionic compounds.	☐
Explain why ionic compounds have high melting points and high boiling points.	☐
Explain why ionic compounds conduct electricity when they are molten and in aqueous solution.	☐
Explain why ionic compounds do not conduct electricity as solids.	☐
Identify ionic compounds from data about their properties.	☐
SC6 - Covalent Bonding	☐
Explain how covalent bonds are formed.	☐
Recall the names of some common molecular elements.	☐
Recall the names of some common molecular compounds.	☐
State the bonding that is found in molecules.	☐
State the approximate size (order or magnitude) of atoms and small molecules.	☐
Explain the formation of covalent bonds using dot and cross diagrams.	☐
SC7 - Types of Substance	☐
Recall examples of common covalent, simple molecular compounds.	☐
Describe the general properties of covalent, simple molecular compounds.	☐
Explain why covalent, simple molecular compounds have low melting and boiling points.	☐
Explain why covalent, simple molecular compounds are poor conductors of electricity.	☐
Describe the structure of a polymer.	☐
Recall some allotropes of carbon.	☐
Describe the basic differences between covalent, simple molecules and giant covalent structures.	☐
Describe the structures of diamond, graphite, fullerenes and graphene.	☐

Describe the properties of diamond, graphite, fullerenes and graphene.	☐
Explain the properties and uses of diamond and graphite in terms of their structure and bonding.	☐
Explain the properties of fullerenes and graphene in terms of their structure and bonding.	☐
Describe the particles and how they are arranged in metals.	☐
Explain why metals are malleable.	☐
Explain why metals conduct electricity.	☐
Describe the typical properties of metals.	☐
Describe the typical properties of non-metals.	☐
Give examples of ionic; covalent, simple molecular; covalent, giant molecular; and metallic substances.	☐
Describe how the different types of bonds and structures are formed.	☐
Explain how the structure and bonding of a substance is linked to its physical properties. (Relative melting point and boiling point, relative solubility in water and ability to conduct electricity, as solids and in solution.)	☐
Explain why we use models to represent structure and bonding.	☐
Represent structures and bonding using a variety of different models (dot and cross, ball and stick, 2D, 3D).	☐
Describe the limitations of the different models used to represent structure and bonding (dot and cross, ball and stick, 2D, 3D).	☐
SC9 - Chemistry Calculations	☐
Calculate the relative formula mass of a substance from relative atomic masses.	☐
Calculate the empirical formula of a compound from the masses of the elements it contains.	☐
Explain the difference between an empirical formula and a molecular formula.	☐
Deduce the empirical formula from a molecular formula.	☐
Deduce the molecular formula for a compound from its empirical formula and its relative formula mass.	☐
Describe an experiment to determine the empirical formula for a compound.	☐
Explain the law of conservation of mass in a closed system.	☐
Explain the law of conservation of mass in a non-enclosed system.	☐
Calculate the mass of product formed from a given mass of reactant, using a balanced equation.	☐
Calculate the mass of a reactant needed to produce a given amount of product, using a balanced equation.	☐
Calculate the concentration of a solution in g dm–3.	☐
H Describe what is meant by a mole of particles.	☐
H Calculate the number of moles of particles in a given mass of a certain substance and vice versa.	☐
H Calculate the number of particles in a given number of moles or mass of a substance and vice versa.	☐
H Explain that the mass of a product formed in a reaction is controlled by the mass of reactant that is not in excess.	☐
H Deduce the balanced equation for a reaction from the masses of reactants and/or products.	☐

SC17 - Groups in the Periodic Table	I Know it!
Explain the classification of alkali metals, halogens and noble gases, into groups in the periodic table.	☐
Describe the main physical properties of alkali metals.	☐
Describe the reactions of lithium, sodium and potassium with water.	☐
Write word, balanced and H ionic equations (including state symbols) for the reactions of alkali metals.	☐
Describe the pattern of reactivity of the alkali metals.	☐
Explain how the electronic configurations of the atoms of alkali metals affect their reactivity.	☐
Recall the appearance of chlorine, bromine and iodine at room temperature.	☐
Describe the trends in colour, melting point and boiling point of chlorine, bromine and iodine down the group, and use these to predict physical properties of other halogens.	☐
Describe the chemical test for chlorine gas.	☐
Describe the trends in the reactions of halogens with metals, and use this to predict reactions of other halogens	☐
Write word and balanced chemical equations, including state symbols, for the reactions of halogens with metals.	☐
Describe hydrogen halides and their chemical properties.	☐
Describe the relative reactivity of halogens.	☐
Explain how the reactivity of halogens can be worked out from displacement reactions.	☐
Write balanced chemical equations, including state symbols, for the displacement reactions of halogens.	☐
H Explain how displacement reactions are examples of redox reactions.	☐
H Write ionic equations, including state symbols, for displacement reactions of halogens.	☐
Explain the order of reactivity of halogens (using electronic configurations).	☐
Explain why noble gases are chemically inert by referring to their electronic configuration.	☐
Describe uses of noble gases linked with their properties.	☐
Describe the trends in the physical properties of the noble gases.	☐
Use trends in physical properties to predict the physical properties of other noble gases.	☐
SC18 - Rates of Reaction	
Describe different changes that can occur as a reaction proceeds.	☐
Suggest different experimental methods to investigate rates of reaction (e.g. measurements of mass of reactants against time, volume of gas released against time, concentration of reactant or product against time).	☐
Use graphs of changes (in mass, volume or concentration of reactant or product) against time, to interpret what is happening during reactions.	☐
Explain what has to happen for reactions to take place.	☐
Explain why changes in the energy of particles affect rates of reaction.	☐
Explain why changes in the frequency of collisions between particles affect the rate of reaction.	☐

Explain why changes in temperature, concentration, surface area and pressure affect the rate of reaction (surface area for solids, pressure for gases only).	☐
Describe ways of speeding up or slowing down chemical reactions.	☐
Describe what a catalyst does.	☐
Explain how catalysts are useful.	☐
Explain what the activation energy of a reaction is.	☐
Explain how catalysts speed up chemical reactions.	☐
Describe what enzymes are.	☐
Name one or more examples of enzymes.	☐
SC19 - Heat Energy Changes in Chemical Reactions	
Recall some examples of exothermic and endothermic changes.	☐
Describe how heat changes in solution may be determined.	☐
Describe the differences between exothermic and endothermic changes.	☐
Describe exothermic and endothermic reactions in terms of energy changes when bonds are broken and formed.	☐
H Use bond energies to calculate energy changes in reactions.	☐
Explain the meaning of activation energy.	☐
Draw and label reaction profiles.	☐
SC20 - Fuels	
Recall the meaning of the term hydrocarbon.	☐
Describe the compounds found in crude oil.	☐
Describe the importance of crude oil for the petrochemical industry.	☐
Explain why crude oil is a finite resource.	☐
Recall the names of some common fossil fuels.	☐
Describe how crude oil is separated by fractional distillation.	☐
Explain how fractional distillation of crude oil works.	☐
Recall the names and uses of fractions from crude oil.	☐
Describe how fractions differ from each other.	☐
Explain why the properties of different fractions differ.	☐
Describe that oil fractions mostly contain alkanes.	☐
Describe the main features of an homologous series.	☐
Explain why alkanes form an homologous series.	☐
Describe the complete combustion of hydrocarbon fuels.	☐
Explain the production of harmful products during the incomplete combustion of hydrocarbon fuels.	☐
Explain why carbon monoxide is toxic.	☐
Describe the problems caused by incomplete combustion.	☐

Explain how some hydrocarbon fuels produce sulfur dioxide in use.	☐
Recall the names of the pollutants responsible for acid rain.	☐
Describe some effects of acid rain.	☐
Explain why oxides of nitrogen are produced when fuels are burned in engines.	☐
Evaluate hydrogen as an alternative fuel to petrol for cars.	☐
Describe what happens during cracking.	☐
Explain why alkanes are saturated and alkenes are unsaturated.	☐
Explain why cracking is necessary.	☐
SC21 - Earth and Atmosphere Science	
Describe how the Earth's early atmosphere was formed.	☐
State the names and relative amounts of the gases found in the Earth's early atmosphere.	☐
Draw conclusions from evidence about the Earth's early atmosphere.	☐
Explain how the oceans are thought to have formed.	☐
Describe how the formation of the oceans influenced the composition of the atmosphere.	☐
Explain how photosynthetic organisms (including plants) changed the composition of the atmosphere.	☐
State the chemical test for oxygen.	☐
Recall the names of significant greenhouse gases.	☐
Describe the processes involved in the greenhouse effect.	☐
Describe how human activity increases the concentration of greenhouse gases.	☐
Evaluate the correlation between atmospheric carbon dioxide concentrations and fossil fuel use.	☐
Evaluate the evidence for increased atmospheric greenhouse gas concentrations being part of the cause of global warming and climate change.	☐
Suggest possible effects on the climate of increased levels of carbon dioxide and methane.	☐
Describe how human activity leads to increased carbon dioxide levels.	☐
Describe how human activity leads to increased methane levels.	☐
Describe the projected effects of climate change.	☐
Describe how the potential harmful effects of climate change can be addressed and limited.	☐
SC22 - Hydrocarbons	
State the names, formulae and structures of the first four members of the alkane homologous series.	☐
Distinguish between saturated hydrocarbons and unsaturated hydrocarbons.	☐
State the names, formulae and structures of the first four members of the alkene homologous series.	☐
Define the term 'functional group' and describe the functional group in alkenes.	☐
Describe the similarities and differences between butane, but-1-ene and but-2-ene.	☐
Describe what an 'addition reaction' is.	☐
Describe the reaction of bromine with ethene and other alkenes.	☐
Recall how bromine water is used to distinguish between alkanes and alkenes.	☐

Explain how the bromine water test distinguishes between alkanes and alkenes.	☐
Recall the products of complete combustion of alkanes and alkenes.	☐
Explain why the products of the complete combustion of a hydrocarbon are carbon dioxide and water.	☐
SC23 – Alcohols and Carboxylic acids	
State the name and formula of the alcohol in alcoholic drinks.	☐
Describe how alcoholic drinks are made from carbohydrates.	☐
Describe how alcoholic drinks are made from carbohydrates.	☐
Write word equations for the formation of ethanol from carbohydrates.	☐
Write balanced equations for the formation of ethanol from carbohydrates.	☐
Explain how fractional distillation can be used to produce more concentrated alcohol solutions.	☐
State the names, formulae and structures of the first four members of the alcohol homologous series.	☐
State the functional group present in all alcohols.	☐
Describe some chemical reactions of alcohols.	☐
Explain why alcohols have similar chemical properties.	☐
Use the chemical properties of the first four alcohols to predict the properties of other alcohols.	☐
State the names, formulae and structures of the first four members of the carboxylic acid series.	☐
Recall the functional group present in all carboxylic acids.	☐
Recall that carboxylic acids can be formed by the oxidation of alcohols.	☐
Describe some chemical properties of carboxylic acids.	☐
Explain why carboxylic acids take part in similar chemical reactions.	☐
Use the properties of the first four carboxylic acids to predict the properties of other carboxylic acids.	☐
SC24 - Polymers	
Recall the meaning of the term polymer.	☐
Describe how ethene molecules join together to form poly(ethene).	☐
Describe how alkenes undergo addition polymerisation.	☐
Recall that DNA is a polymer made from four different monomers called nucleotides.	☐
Recall that starch is a polymer made from sugars.	☐
Recall that proteins are polymers made from amino acids.	☐
Describe how other addition polymers are formed from their monomers: poly(propene), poly(chloroethene) (PVC) and poly(tetrafluoroethene) (PTFE).	☐
Deduce the structure of a polymer from the structure of a monomer.	☐
Deduce the structure of a monomer from the structure of a polymer.	☐
Explain how the uses of a polymer are related to its properties and vice versa.	☐
H Explain what is meant by a condensation reaction.	☐
H Draw the structure of a molecule with two carboxylic acid groups.	☐

H Draw the structure of a molecule with two alcohol groups.	☐
H Draw the structure of a polyester.	☐
H Explain how a molecule of water is formed each time an ester link is formed.	☐
State the starting material for most synthetic polymers.	☐
Describe the problems associated with the production and disposal of synthetic polymers.	☐
Describe some advantages of recycling polymers.	☐
Describe some disadvantages of recycling polymers.	☐
Evaluate the advantages and disadvantages of recycling polymers.	☐
SC25 – Qualitative analysis: Tests for ions	
Recall flame test colours for some metal ions.	☐
Describe how to carry out flame tests.	☐
Describe the advantages of instrumental methods of analysis.	☐
Use flame photometer data to determine the concentration of metal ions in solution.	☐
Use flame photometer data to identify metal ion	☐
Explain why the test for a given ion must be unique to that ion.	☐
Recall some metal hydroxide precipitate colours.	☐
Describe how to identify metal ions using sodium hydroxide solution.	☐
Describe how to identify ammonium ions and ammonia.	☐
Describe how to identify carbonate ions.	☐
Describe how to identify carbon dioxide.	☐
Describe how to identify sulfate ions in solution.	☐
Recall the colours of silver halide precipitates.	☐
Describe how to identify halide ions in solution.	☐
SC26 – Bulk and surface properties of matter including nanoparticles	
Recall what glass ceramics and clay ceramics are.	☐
Use data to compare the physical properties of ceramics, polymers and metals.	☐
Explain why the properties of a material make it suitable for a given use.	☐
Select suitable materials for a particular purpose using given data.	☐
Recall what composite materials are.	☐
Give some examples of composite materials.	☐
Explain why the properties of a composite material make it suitable for a given use.	☐
Select suitable materials, including composite materials, for a particular purpose using given data.	☐
Recall what nanoparticles are.	☐
Compare the relative sizes of nanoparticles, atoms and molecules.	☐
Calculate the surface area to volume ratio of a nanoparticle.	☐

Relate the uses of nanoparticulate materials to their properties.	☐
Explain some possible risks associated with nanoparticles.	☐