



# NOTTINGHAM BRITISH SCHOOL – CURRICULUM DEVELOPMENT 2019



## Year 11

	October Assessment	December Assessment	March Assessment	Mock Assessment	Age-Related Expectations
<b>CHEMISTRY IGCSE</b>  <b>O620</b>  <b>(Core and Supplement)</b>  <b>(All objectives/assessment outlined are subject to amendment, in line with the needs of the learners.)</b>	<b>9. The Periodic Table</b>  <b>9.1 The Periodic Table</b>  Describe the Periodic Table as a method of classifying elements and its use to predict properties of elements  <b>9.2 Periodic trends</b>  Describe the change from metallic to non-metallic character across a period  Describe and explain the relationship between Group number, number of	<b>11. Air and Water</b>  <b>11.1 Water</b>  Describe chemical tests for water using cobalt(II) chloride and copper(II) sulfate  Describe, in outline, the treatment of the water supply in terms of filtration and chlorination  Name some of the uses of water in industry and in the home  Discuss the implications of an inadequate supply of water, limited to safe water for drinking and water for irrigating crops	<b>14. Organic Chemistry</b>  <b>14.1 Names of compounds</b>  Name and draw the structures of methane, ethane, ethene, ethanol, ethanoic acid and the products of the reactions stated in sub-topics 14.4–14.6  State the type of compound present, given a chemical name ending in -ane, -ene, -ol, or -oic acid or a molecular structure  Name and draw the structures of the unbranched alkanes, alkenes (not cis-trans), alcohols and acids containing up to four	<b>Consolidate and revise Topics 1 - 14</b>	<b>AO1 Knowledge and Understanding</b>  Candidates should be able to demonstrate knowledge and understanding of:  1. scientific phenomena, facts, laws, definitions, concepts and theories  2. scientific vocabulary, terminology and conventions (including symbols, quantities and units)  3. scientific instruments and apparatus, including techniques of operation and aspects of safety  4. scientific and technological applications with their social, economic and environmental implications.



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	<p>outer shell electrons and metallic/non-metallic character</p> <p><b>9.3 Group properties</b></p> <p>Describe lithium, sodium and potassium in Group I as a collection of relatively soft metals showing a trend in melting point, density and reaction with water</p> <p>Predict the properties of other elements in Group I, given data, where appropriate</p> <p>Describe the halogens, chlorine, bromine and iodine in Group VII, as a collection of diatomic non-metals showing a trend in colour and density and state their reaction with</p>	<p><b>11.2 Air</b></p> <p>State the composition of clean, dry air as being approximately 78% nitrogen, 21% oxygen and the remainder as being a mixture of noble gases and carbon dioxide</p> <p>Name the common pollutants in the air as being carbon monoxide, sulfur dioxide, oxides of nitrogen and lead compounds</p> <p>Describe the separation of oxygen and nitrogen from liquid air by fractional distillation</p> <p>State the source of each of these pollutants:</p> <ul style="list-style-type: none"><li>• carbon monoxide from the incomplete combustion of carbon-containing substances</li><li>• sulfur dioxide from the combustion of</li></ul>	<p>carbon atoms per molecule</p> <p>Name and draw the structural formulae of the esters which can be made from unbranched alcohols and carboxylic acids, each containing up to four carbon atoms</p> <p><b>14.2 Fuels</b></p> <p>Name the fuels: coal, natural gas and petroleum</p> <p>Name methane as the main constituent of natural gas</p> <p>Describe petroleum as a mixture of hydrocarbons and its separation into useful fractions by fractional distillation</p> <p>Describe the properties of molecules within a fraction</p> <p>Name the uses of the fractions as:</p>		<p><b>AO2 Handling Information and Problem Solving.</b></p> <p>Candidates should be able, in words or using other written forms of presentation (i.e. symbolic, graphical and numerical), to:</p> <ol style="list-style-type: none"><li>1. locate, select, organise and present information from a variety of sources</li><li>2. translate information from one form to another</li><li>3. manipulate numerical and other data</li><li>4. use information to identify patterns, report trends and draw inferences</li><li>5. present reasoned explanations for phenomena, patterns and relationships</li><li>6. make predictions and hypotheses</li></ol>
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	<p>other halide ions Predict the properties of other elements in Group VII, given data where appropriate</p> <p>Identify trends in Groups, given information about the elements concerned</p> <p><b>9.4 Transition elements</b></p> <p>Describe the transition elements as a collection of metals having high densities, high melting points and forming coloured compounds, and which, as elements and compounds, often act as catalysts</p> <p>Know that transition elements have</p>	<p>fossil fuels which contain sulfur compounds (leading to 'acid rain')</p> <ul style="list-style-type: none"> <li>• oxides of nitrogen from car engines</li> <li>• lead compounds from leaded petrol</li> </ul> <p>State the adverse effect of these common pollutants on buildings and on health and discuss why these pollutants are of global concern</p> <p>State the conditions required for the rusting of iron</p> <p>Describe and explain methods of rust prevention, specifically paint and other coatings to exclude oxygen</p> <p>Describe and explain the presence of oxides of nitrogen in car engines and their catalytic removal</p>	<ul style="list-style-type: none"> <li>• refinery gas for bottled gas for heating and cooking</li> <li>• gasoline fraction for fuel (petrol) in cars</li> <li>• naphtha fraction for making chemicals</li> <li>• kerosene/paraffin fraction for jet fuel</li> <li>• diesel oil/gas oil for fuel in diesel engines</li> <li>• fuel oil fraction for fuel for ships and home heating systems</li> <li>• lubricating fraction for lubricants, waxes and polishes</li> <li>• bitumen for making roads</li> </ul> <p><b>14.3 Homologous series</b></p> <p>Describe the concept of homologous series as a 'family' of similar compounds with similar chemical properties due to the presence of the same functional group</p>		<p>7. solve problems, including some of a quantitative nature.</p> <p><b>A03 Experimental Skills and Investigation</b></p> <p>Candidates should be able to:</p> <ol style="list-style-type: none"> <li>1. demonstrate knowledge of how to safely use techniques, apparatus and materials (including following a sequence of instructions where appropriate)</li> <li>2. plan experiments and investigations</li> <li>3. make and record observations, measurements and estimates</li> <li>4. interpret and evaluate experimental observations and data</li> <li>5. evaluate methods and suggest possible improvements.</li> </ol>
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	<p>variable oxidation states</p> <p><b>9.5 Noble gases</b></p> <p>Describe the noble gases, in Group VIII or 0, as being unreactive, monoatomic gases and explain this in terms of electronic structure State the uses of the noble gases in providing an inert atmosphere, i.e. argon in lamps, helium for filling balloons</p> <p><b>10. Metals</b></p> <p><b>10.1 Properties of metals</b></p> <p>List the general physical properties of metals</p> <p>Describe the general chemical properties of metals e.g.</p>	<p>Describe and explain sacrificial protection in terms of the reactivity series of metals and galvanising as a method of rust prevention</p> <p><b>11.3 Nitrogen and fertilisers</b></p> <p>Describe the need for nitrogen-, phosphorus- and potassium-containing fertilisers</p> <p>Describe the displacement of ammonia from its salts</p> <p>Describe and explain the essential conditions for the manufacture of ammonia by the Haber process including the sources of the hydrogen and nitrogen, i.e. hydrocarbons or steam and air</p>	<p>Describe the general characteristics of an homologous series</p> <p>Recall that the compounds in a homologous series have the same general formula</p> <p>Describe and identify structural isomerism</p> <p><b>14.4 Alkanes</b></p> <p>Describe the properties of alkanes (exemplified by methane) as being generally unreactive, except in terms of burning</p> <p>Describe the bonding in alkanes</p> <p>Describe substitution reactions of alkanes with chlorine</p> <p><b>14.5 Alkenes</b></p>		
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	<p>reaction with dilute acids and reaction with oxygen</p> <p>Explain in terms of their properties why alloys are used instead of pure metals</p> <p>Identify representations of alloys from diagrams of structure</p> <p><b>10.2 Reactivity series</b></p> <p>Place in order of reactivity: potassium, sodium, calcium, magnesium, zinc, iron, (hydrogen) and copper, by reference to the reactions, if any, of the metals with:</p> <ul style="list-style-type: none"><li>• water or steam</li><li>• dilute hydrochloric acid</li></ul>	<p><b>11.4 Carbon dioxide and methane</b></p> <p>State that carbon dioxide and methane are greenhouse gases and explain how they may contribute to climate change</p> <p>State the formation of carbon dioxide:</p> <ul style="list-style-type: none"><li>• as a product of complete combustion of carbon- containing substances</li><li>• as a product of respiration</li><li>• as a product of the reaction between an acid and a carbonate</li><li>• from the thermal decomposition of a carbonate</li></ul> <p>State the sources of methane, including decomposition of vegetation and waste gases from digestion in animals</p>	<p>Describe the manufacture of alkenes and of hydrogen by cracking</p> <p>Distinguish between saturated and unsaturated hydrocarbons:</p> <ul style="list-style-type: none"><li>• from molecular structures</li><li>• by reaction with aqueous bromine</li></ul> <p>Describe the formation of poly(ethene) as an example of addition polymerisation of monomer units</p> <p>Describe the properties of alkenes in terms of addition reactions with bromine, hydrogen and steam</p> <p><b>14.6 Alcohols</b></p> <p>Describe the manufacture of ethanol by fermentation and by the catalytic addition of steam to ethene</p>		
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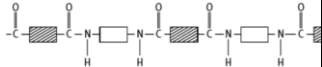
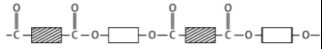
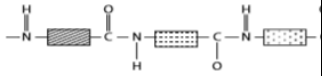
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	<ul style="list-style-type: none"><li>• and the reduction of their oxides with carbon</li></ul> <p>Deduce an order of reactivity from a given set of experimental results</p> <p>Describe the reactivity series as related to the tendency of a metal to form its positive ion, illustrated by its reaction, if any, with:</p> <ul style="list-style-type: none"><li>• the aqueous ions</li><li>• the oxides of the other listed metals</li></ul> <p>Describe and explain the action of heat on the hydroxides, carbonates and nitrates of the listed metals</p> <p>Account for the apparent unreactivity of aluminium in terms of the oxide layer</p>	<p>Describe the carbon cycle, in simple terms, to include the processes of combustion, respiration and photosynthesis</p> <p><b>12. Sulfur</b></p> <p>Name some sources of sulfur</p> <p>Name the use of sulfur in the manufacture of sulfuric acid</p> <p>State the uses of sulfur dioxide as a bleach in the manufacture of wood pulp for paper and as a food preservative (by killing bacteria)</p> <p>Describe the manufacture of sulfuric acid by the Contact process, including essential conditions and reactions</p>	<p>Describe the properties of ethanol in terms of burning</p> <p>Name the uses of ethanol as a solvent and as a fuel</p> <p>Outline the advantages and disadvantages of these two methods of manufacturing ethanol</p> <p><b>14.7 Carboxylic acids</b></p> <p>Describe the properties of aqueous ethanoic acid</p> <p>Describe the formation of ethanoic acid by the oxidation of ethanol by fermentation and with acidified potassium manganate(VII)</p> <p>Describe ethanoic acid as a typical weak acid</p> <p>Describe the reaction of a carboxylic acid with an alcohol in the presence of a catalyst to give an ester</p>		
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	<p>which adheres to the metal</p> <p><b>10.3 Extraction of metals</b></p> <p>Describe the ease in obtaining metals from their ores by relating the elements to the reactivity series</p> <p>Describe and state the essential reactions in the extraction of iron from hematite</p> <p>Describe the conversion of iron into steel using basic oxides and oxygen</p> <p>Know that aluminium is extracted from the ore bauxite by electrolysis</p> <p>Discuss the advantages and</p>	<p>Describe the properties and uses of dilute and concentrated sulfuric acid</p> <p><b>13. Carbonates</b></p> <p>Describe the manufacture of lime (calcium oxide) from calcium carbonate (limestone) in terms of thermal decomposition</p> <p>Name some uses of lime and slaked lime such as in treating acidic soil and neutralising acidic industrial waste products, e.g. flue gas desulfurisation</p> <p>Name the uses of calcium carbonate in the manufacture of iron and cement</p>	<p><b>14.8.1 Polymers</b></p> <p>Define polymers as large molecules built up from small units (monomers)</p> <p>Understand that different polymers have different units and/or different linkages</p> <p><b>14.8.2 Synthetic polymers</b></p> <p>Name some typical uses of plastics and of man-made fibres such as nylon and Terylene</p> <p>Describe the pollution problems caused by non-biodegradable plastics</p> <p>Explain the differences between condensation and addition polymerisation</p> <p>Deduce the structure of the polymer product from a given alkene and vice versa</p>		
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	<p>disadvantages of recycling metals (iron/steel and aluminium)</p> <p><b>10.3 Extraction of metals</b></p> <p>Describe in outline, the extraction of zinc from zinc blende</p> <p>Describe in outline, the extraction of aluminium from bauxite including the role of cryolite and the reactions at the electrodes</p> <p><b>10.4 Uses of metals</b></p> <p>Name the uses of aluminium:</p> <ul style="list-style-type: none"> <li>• in the manufacture of aircraft because of its strength and low density</li> </ul>		<p>Describe the formation of nylon (a polyamide) and Terylene (a polyester) by condensation polymerisation, the structure of nylon being represented as:</p>  <p>and the structure of Terylene as:</p>  <p><b>14.8.3 Natural polymers</b></p> <p>Name proteins and carbohydrates as constituents of food</p> <p>Describe proteins as possessing the same (amide) linkages as nylon but with different units</p> <p>Describe the structure of proteins as:</p>  <p>Describe the hydrolysis of proteins to amino</p>		
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	<ul style="list-style-type: none"><li>• in food containers because of its resistance to corrosion</li></ul> <p>Name the uses of copper related to its properties (electrical wiring and in cooking utensils)</p> <p>Name the uses of mild steel (car bodies and machinery) and stainless steel (chemical plant and cutlery)</p> <p>Explain the uses of zinc for galvanising and for making brass</p> <p>Describe the idea of changing the properties of iron by the controlled use of additives to form steel alloys</p>		<p>acids (you do not need to know structures and names)</p> <p>Describe complex carbohydrates in terms of a large number of sugar units, considered as</p> <p>HO——OH</p> <p>joined together by condensation polymerisation, e.g</p> <p></p> <p>Describe the hydrolysis of complex carbohydrates (e.g. starch), by acids or enzymes to give simple sugars</p> <p>Describe the fermentation of simple sugars to produce ethanol (and carbon dioxide) (You will not be expected to give the molecular formulae of sugars.)</p>		
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			Describe, in outline, the usefulness of chromatography in separating and identifying the products of hydrolysis of carbohydrates and proteins		
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### Assessment for Learning

Formative assessment to take place in daily lessons via class discussion and differentiated questioning to highlight and address specific needs.

### Assessment of Learning

- Past Paper Questions
- Weekly Quiz (20 Mins)
- End of Topic Review (Every 6-8 lessons)
- Peer Assessment
- Self-Assessment
- End of half term examination.