

# Year 8 Chemistry Assessment Objectives

## C5: Atoms and elements

|                   | Substantive knowledge (subject content)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Disciplinary knowledge (skills)                                                                                                                                                                                                                                                                                                                                                              |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strong</b>     | <ul style="list-style-type: none"> <li>Suggest examples to explain the terms element, compound, molecule and giant lattice.</li> <li>Draw and label a named element (<math>Z=1-20</math>), independently.</li> <li>Calculate the number of protons, neutrons and electrons of an element, independently.</li> <li>Suggest how the bulk properties of an element will differ to an individual atom of the same element.</li> <li>Suggest reasons for the different states of matter of different simple molecules, at room temperature.</li> <li>Write names for compounds with little or no guidance.</li> <li>Write chemical formulae, with little or no guidance.</li> <li>Suggest how and why the properties of large molecules (polymers) and small molecules differ.</li> <li>Using examples of ceramic and composite materials explain how their properties affect their use.</li> </ul> | <ul style="list-style-type: none"> <li>Justify how the control measures in a risk assessment lead to carrying out a safe experiment.</li> <li>Design tables for more complex data collection i.e. with repeated measurements and a mean average.</li> <li>Identify a suitable graph to draw for the data provided or collected, making reference to continuous or categoric data.</li> </ul> |
| <b>Confident</b>  | <ul style="list-style-type: none"> <li>Explain the differences between elements, compounds, molecules and giant lattices.</li> <li>Draw and label a named element (<math>Z=1-18</math>), with little or no guidance.</li> <li>Calculate the number of protons, neutrons and electrons of an element, independently.</li> <li>Explain why the bulk properties of an element are different to an individual atom of the same element.</li> <li>Explain the properties of simple molecules.</li> <li>Write names for compounds from a set of given rules.</li> <li>Write chemical formulae, having been given ions.</li> <li>Explain the difference between the properties of large molecules (polymers) and small molecules.</li> <li>Explain how the properties of ceramic and composite materials affect their use.</li> </ul>                                                                 | <ul style="list-style-type: none"> <li>Give reasons for the control measures in a risk assessment.</li> <li>Design tables for more complex data collection i.e. with repeated measurements and a mean average.</li> <li>Identify a suitable graph to draw for the data provided or collected, with limited guidance.</li> </ul>                                                              |
| <b>Developing</b> | <ul style="list-style-type: none"> <li>Describe the differences between elements, compounds, molecules and giant lattices.</li> <li>Draw an atom of a simple element (<math>Z=1-10</math>), with guidance.</li> <li>Describe the properties of simple molecules.</li> <li>Describe chemical formulae in terms of number and type of elements present.</li> <li>Describe the properties of large molecules (polymers) and compare them with small molecules.</li> <li>Describe the properties of ceramic and composite materials.</li> </ul>                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Write a risk assessment without a proforma and only given information about the hazards of particular chemicals.</li> <li>State headings and units for tables for data collection.</li> <li>Draw a bar chart accurately, having been given guidance.</li> </ul>                                                                                       |
| <b>Emerging</b>   | <ul style="list-style-type: none"> <li>Identify elements, compound, molecules and giant lattices from particle diagrams.</li> <li>Draw an atom of a simple element (<math>Z=1-5</math>), with modelling, i.e. "I do, we do, you do..." approach.</li> <li>Identify the state of matter, at room temperature, of given, simple molecules.</li> <li>Identify elements in a binary compound, when given its formula.</li> <li>Describe the properties of large molecules (polymers) by looking at a familiar example, e.g. cling film.</li> <li>Describe the properties of ceramic and composite materials by looking at a familiar example, e.g. porcelain and fibre glass.</li> </ul>                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Write a risk assessment without a proforma and given information about the hazards of particular chemicals and procedures and apparatus.</li> <li>State headings and units for tables, for data collection, having discussed the variables.</li> <li>Draw a bar chart with guidance through modelling and /or prompting.</li> </ul>                   |

## C6: The Periodic Table

|                   | <b>Substantive knowledge</b> (subject content)                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Disciplinary knowledge</b> (skills)                                                                                                                                                                                                                                                                                                                                                   |
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| <b>Strong</b>     | <ul style="list-style-type: none"> <li>Suggest how atomic structure determines how the periodic table.</li> <li>Predict properties of unfamiliar examples of Group 1 elements.</li> <li>Predict properties of unfamiliar examples of Group 7 elements.</li> <li>Relate the physical and chemical properties of Group 0 to their uses.</li> <li>Predict properties of unfamiliar examples of Transition elements and compare them with Group 1 elements.</li> </ul>    | <ul style="list-style-type: none"> <li>Design tables for more complex data collection i.e. with repeated measurements and a mean average.</li> <li>Identify a suitable graph to draw for the data provided or collected, making reference to continuous or categoric data.</li> </ul>                                                                                                    |
| <b>Confident</b>  | <ul style="list-style-type: none"> <li>Explain how the periodic table is organised.</li> <li>Explain the physical and chemical properties of Group 1 elements.</li> <li>Explain the physical and chemical properties of Group 7 elements.</li> <li>Make comparisons between the physical and chemical properties of Group 0 elements.</li> <li>Explain the physical and chemical properties of Transition elements and compare them with Group 1 elements.</li> </ul> | <ul style="list-style-type: none"> <li>Give reasons for the control measures in a risk assessment.</li> <li>Design tables for more complex data collection i.e. with repeated measurements and a mean average.</li> <li>Identify a suitable graph to draw for the data provided or collected, with limited guidance.</li> </ul>                                                          |
| <b>Developing</b> | <ul style="list-style-type: none"> <li>Describe how the periodic table is organised.</li> <li>Describe the physical and chemical properties of Group 1 elements.</li> <li>Describe the physical and chemical properties of Group 7 elements</li> <li>Describe the physical and chemical properties of Group 0 elements.</li> <li>Describe the physical and chemical properties of Transition elements.</li> </ul>                                                     | <ul style="list-style-type: none"> <li>Write a risk assessment without a proforma and only given information about the hazards of particular chemicals.</li> <li>State headings and units for tables for data collection.</li> <li>Draw a bar chart or line graph accurately, having been given guidance.</li> </ul>                                                                     |
| <b>Emerging</b>   | <ul style="list-style-type: none"> <li>Identify metals, non-metals, groups and periods on the periodic table.</li> <li>List observations about Group 1 elements.</li> <li>List observations about Group 7 elements.</li> <li>List observations about Group 0 elements.</li> <li>List observations about Transition elements.</li> </ul>                                                                                                                               | <ul style="list-style-type: none"> <li>Write a risk assessment without a proforma and given information about the hazards of particular chemicals and procedures and apparatus.</li> <li>State headings and units for tables, for data collection, having discussed the variables.</li> <li>Draw a bar chart or line graph with guidance through modelling and /or prompting.</li> </ul> |

## C7: Reactions and energy

|                   | Substantive knowledge (subject content)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Disciplinary knowledge (skills)                                                                                                                                                                                                                                                                                                                                                              |
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| <b>Strong</b>     | <ul style="list-style-type: none"> <li>Suggest symbol equations to summarise the reactions of elements with oxygen.</li> <li>Predict what will happen to the overall mass in a reaction.</li> <li>Write balanced chemical equations.</li> <li>Explain what exothermic and endothermic reactions are.</li> <li>Suggest what the products of combustion are</li> <li>Evaluate the use of fossil fuels and hydrogen as a fuel.</li> <li>Suggest the energy change involved in a thermal decomposition reaction.</li> <li>Calculate energy changes and bond energies, given average bond energy data.</li> </ul>                                                                                                                       | <ul style="list-style-type: none"> <li>Justify how the control measures in a risk assessment lead to carrying out a safe experiment.</li> <li>Design tables for more complex data collection i.e. with repeated measurements and a mean average.</li> <li>Identify a suitable graph to draw for the data provided or collected, making reference to continuous or categoric data.</li> </ul> |
| <b>Confident</b>  | <ul style="list-style-type: none"> <li>Explain symbol equations of the reactions of elements with oxygen, in words.</li> <li>Explain, using a specific example what conservation of mass is.</li> <li>Explain why mass may appear to change in a reaction.</li> <li>Balance given symbol equations.</li> <li>Write definitions of exothermic and endothermic reactions, referring to specific examples.</li> <li>Explain what the products of combustion are, referring to experimental data.</li> <li>Explain the advantages and disadvantages of fossil fuels and hydrogen.</li> <li>Explain why thermal decomposition is an endothermic reaction.</li> <li>Calculate energy changes, given average bond energy data.</li> </ul> | <ul style="list-style-type: none"> <li>Give reasons for the control measures in a risk assessment.</li> <li>Design tables for more complex data collection i.e. with repeated measurements and a mean average.</li> <li>Identify a suitable graph to draw for the data provided or collected, with limited guidance.</li> </ul>                                                              |
| <b>Developing</b> | <ul style="list-style-type: none"> <li>Describe the reactions of elements with oxygen by writing word equations.</li> <li>Describe what would happen to the mass in a given reaction example.</li> <li>Describe a balanced symbol question.</li> <li>Describe how to identify an exothermic and an endothermic reaction.</li> <li>Describe what the products of combustion are, referring to experimental data.</li> <li>Describe the advantages and disadvantages of fossil fuels and hydrogen.</li> <li>Describe why thermal decomposition is an endothermic reaction.</li> <li>Calculate energy changes, given average bond energy data, through worked examples.</li> </ul>                                                    | <ul style="list-style-type: none"> <li>Write a risk assessment without a proforma and only given information about the hazards of particular chemicals.</li> <li>State headings and units for tables for data collection.</li> <li>Draw a bar chart or line graph accurately, having been given guidance.</li> </ul>                                                                         |
| <b>Emerging</b>   | <ul style="list-style-type: none"> <li>Identify the reactants and products in a given word equation.</li> <li>Identify some elements and compounds from their symbols.</li> <li>Identify an exothermic and an endothermic reaction from a temperature change.</li> <li>State a reason for using fossil fuels and hydrogen and a reason not to use them.</li> <li>Identify how to bring about a thermal decomposition reaction.</li> <li>Calculate energy changes, using a "I do, you do" approach, given average bond energy data.</li> </ul>                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Write a risk assessment without a proforma and given information about the hazards of particular chemicals and procedures and apparatus.</li> <li>State headings and units for tables, for data collection, having discussed the variables.</li> <li>Draw a bar chart or line graph with guidance through modelling and /or prompting.</li> </ul>     |

## C8: Earth and resources

|                   | Substantive knowledge (subject content)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Disciplinary knowledge (skills)                                                                                                                                                                                                                                                         |
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| <b>Strong</b>     | <ul style="list-style-type: none"> <li>Suggest reasons why the different layers of the Earth have different properties.</li> <li>Suggest the identity of rocks based on properties.</li> <li>Suggest why some metals can be extracted from their ores, using carbon but others are extracted by alternative methods.</li> <li>Evaluate the extraction of metals and recycling.</li> <li>Suggest how processes in the environment recycle carbon in the environment.</li> <li>Suggest the impact of increasing levels of carbon dioxide in the environment.</li> </ul>                                                             | <ul style="list-style-type: none"> <li>Design tables for more complex data collection i.e. with repeated measurements and a mean average.</li> <li>Identify a suitable graph to draw for the data provided or collected, making reference to continuous or categorical data.</li> </ul> |
| <b>Confident</b>  | <ul style="list-style-type: none"> <li>Explain the structure of the Earth.</li> <li>Explain the features of rocks.</li> <li>Explain how the rock cycle forms the different types of rocks.</li> <li>Explain the extraction of metals from their ores by reduction with carbon.</li> <li>Explain the advantages and disadvantages of extraction of metals and recycling.</li> <li>Explain how the carbon cycle moves carbon in the environment.</li> <li>Explain what causes the enhanced greenhouse effect.</li> <li>Explain what Global warming is and its effects.</li> <li>Explain what climate change is.</li> </ul>          | <ul style="list-style-type: none"> <li>Design tables for more complex data collection i.e. with repeated measurements and a mean average.</li> <li>Identify a suitable graph to draw for the data provided or collected, with limited guidance.</li> </ul>                              |
| <b>Developing</b> | <ul style="list-style-type: none"> <li>Describe the structure of the Earth.</li> <li>Describe the features of rocks.</li> <li>Describe how the rock cycle forms the different types of rocks.</li> <li>Describe the extraction of metals from their ores by reduction with carbon.</li> <li>Describe the advantages and disadvantages of extraction of metals and recycling.</li> <li>Describe how the carbon cycle moves carbon in the environment.</li> <li>Describe what causes the enhanced greenhouse effect.</li> <li>Describe what Global warming is and its effects.</li> <li>Describe what climate change is.</li> </ul> | <ul style="list-style-type: none"> <li>State headings and units for tables for data collection.</li> <li>Draw a bar chart or line graph accurately, having been given guidance.</li> </ul>                                                                                              |
| <b>Emerging</b>   | <ul style="list-style-type: none"> <li>Identify the layers of the Earth.</li> <li>Identify different types of rocks from their features.</li> <li>Identify how different types of rocks are formed.</li> <li>Identify the products of reduction of metal ores, using carbon.</li> <li>Identify some processes that add and remove carbon from the atmosphere.</li> <li>Identify some greenhouse gases.</li> <li>Identify some causes of increasing carbon dioxide and methane levels in the atmosphere.</li> <li>Identify some effects of climate change.</li> </ul>                                                              | <ul style="list-style-type: none"> <li>State headings and units for tables, for data collection, having discussed the variables.</li> <li>Draw a bar chart or line graph with guidance through modelling and /or prompting.</li> </ul>                                                  |