|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Lesson | Aiming for 4 | | Aiming for 6 | | Aiming for 8 | |
| C12.1 Pure substances and mixtures | I can state what a pure substance is. |  | I can describe the difference between pure substances, impure substances, and formulations. |  | I can justify the classification of pure substances, impure substances, and formulations when data is supplied. |  |
| I can describe how melting point and boiling point data can be used to identify pure substances. |  | I can explain how melting point and boiling point data can be used to determine the purity of a substance. |  | I can explain in detail the use of formulations. |  |
| I can state what a formulation is. |  | I can state uses of formulations. |  | I can calculate percentage compositions of components in a range of formulations. |  |
| C12.2 Analysing chromatograms | I can describe and safely carry out a method to make a paper chromatogram. |  | I can explain how chromatography separates solutes. |  | I can explain why different substances and different conditions will have different Rf values. |  |
| I can describe how to calculate Rf values. |  | I can calculate Rf values from given data. |  | I can calculate Rf values from a chromatogram, using an appropriate number of significant figures. |  |
| I can describe a use of chromatography. |  | I can use a chromatogram to determine if a sample is pure or impure. |  | I can interpret a chromatogram to identify unknown substances. |  |
| C12.3 Testing for gases | I can safely carry out the laboratory test for hydrogen, oxygen, carbon dioxide, and chlorine. |  | I can explain why limewater turns milky when it reacts with carbon dioxide. |  | I can write balanced symbol equations, including state symbols, for the reactions of limewater with carbon dioxide and hydrogen with oxygen. |  |
| I can describe how to safely carry out the laboratory test for chlorine gas. |  | I can interpret results to identify a gas that is present. |  | I can explain why a glowing splint re-ignites in oxygen. |  |
| I can identify hydrogen, carbon dioxide, and oxygen from a laboratory test. |  | I can explain why hydrogen ‘pops’ near a naked flame. |  | I can explain why chlorine gas turns damp indicator paper colourless. |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Lesson | Aiming for 4 | | Aiming for 6 | | Aiming for 8 | |
| C11.4 Tests for positive ions | I can safely carry out a flame test. |  | I can identify a metal ion from the colour of a flame or the colour of the hydroxide precipitate. |  | I can evaluate flame tests as a method for identifying of positive metal ions. |  |
| I can safely carry out testing for metal ions using sodium hydroxide. |  | I can write balanced symbol equations, including state symbols, for the production of an insoluble metal hydroxide. |  | I can write balanced ionic equations, including state symbols for the production of insoluble metal hydroxide. |  |
| I can write a word equation for the reaction between sodium hydroxide and a specified metal salt solution. |  | I can explain why a flame test cannot be used to identify a mixture of metal solutions. |  | I can explain why iron(II) hydroxide solution often changes colour when it stands in air. |  |
| C11.5 Tests for negative ions | I can safely carry out testing for carbonates, halides, and sulfate ions. |  | I can identify the presence of carbonate, a specific halide, or sulfate ions from simple laboratory tests. |  | I can evaluate the halide ion test. |  |
| I can write a word equation for the reaction when a specific carbonate, halide, or sulfate is being tested with support. |  | I can write balanced symbol equations, including state symbols for reactions in the simple laboratory tests for carbonate, halide, or sulfate ions. |  | I can write balanced ionic equations, including state symbols, for simple laboratory tests for carbonate, halide, or sulfate ions. |  |
|  |  | I can explain why it can be difficult to identify halides using this method. |  | I can explain in detail how to identify a compound from the results of simple laboratory tests. |  |
| C11.6 Instrumental analysis | I can list some of the advantages and disadvantages of instrumental techniques. |  | I can compare and contrast instrumental techniques with simple laboratory tests. |  | I can evaluate the use of instrumental techniques. |  |
| I can state an example of an instrumental technique. |  | I can describe the main processes of flame emission spectroscopy. |  | I can explain how metal ions emit light when in a flame. |  |
| I can state a use for flame emission spectroscopy. |  | I can explain how flame emission spectroscopy is an improvement on flame tests. |  | I can interpret results from flame emission spectroscopy when data is given. |  |