**Science - Chemistry Target Related Expectation (TReE) Year 7**

| | Pathway 1 (Target Grade 1-3) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5.1.1 The particle model | 5.1.2 States of matter | 5.1.3 Melting and freezing | 5.1.4 Boiling | 5.1.5 More changes in state | 5.1.6 Diffusion | 5.1.7 Gas pressure | 5.1.8 Inside particles | 5.2.1 Pure substances and mixtures | 5.2.2 Solutions | 5.2.3 Solubility | 5.2.4 Filtration | 5.2.5 Evaporation and distillation | 5.2.6 Chromatography |
| 3 Walker | • State that the properties of substances can be described in terms of particles in motion | • Make relevant observations about particle arrangement in order to decide is a substance is in its solid, liquid or gas state | • Recognise an energy transfer during a change of state | • Draw straightforward conclusions from boiling point data presented in tables and graphs | • Write a fair test enquiry question on evaporation, and plan the method and how to control the variables | • Describe examples of diffusion and state that observations about diffusion can be explained in terms of particles in motion | • Use words to explain gas pressure simply | • State definitions of atoms, elements, molecules and compounds | • With help, choose a simple technique to separate the substances in a mixture | • Use observations or data to draw a conclusion to distinguish a solution from a pure liquid | • Suggest a reason for the effect of temperature on solubility for a given solute | • With support, use the correct techniques to filter a mixture | • Label distillation apparatus and describe what happens in distillation | • Describe what happens to a mixture when it undergoes chromatography |
| 6 Newton | 6.1.1 Chemical reactions | 6.1.2 Acids and alkalis | 6.1.3 Indicators and pH | 6.1.4 Acid strength | 6.1.5 Neutralisation | 6.1.6 Making salts | 6.2.1 More about elements | 6.2.2 Chemical reactions of metals and non-metals | 6.2.3 Metals and acids | 6.2.4 Metals and oxygen | 6.2.5 Metals and water | 6.2.6 Metal displacement reactions | | |
| 6 Newton | • Describe some features of chemical reactions and know the difference between a physical and chemical change | • Name some common properties of acids and alkalis, and be able to identify hazard symbols | • State that acids have a pH below 7, neutral solutions have a pH of 7, alkalis have a pH above 7. Use an indicator to identify acid, alkali and neutral solutions | • State the pH range for acidic solutions and relate this to indicaotor colour | • State simply what happens during a neutralisation reaction | • State the type of substances made when an acid and alkali react then match the type of salt that will form from the type of acid used | • State what an element is then present some simple facts about an element | • State that many elements react with oxygen to form oxides | • Describe what happens when metals react with acids | • Name one metal that reacts vigorously with oxygen and one metal that does not react with oxygen | • State how you could find out if a metal is more or less reactive than another metal | • Use observations from experiment to state whether or not a displacement reaction has occurred | | |
| 7 Earth | 7.1.1 The structure of the Earth | 7.1.2 Sedimentary rocks | 7.1.3 Igneous and metamorphic rocks | 7.1.4 The rock cycle | 7.1.5 Ceramics | 7.2.1 The night sky | 7.2.2 The Solar System | 7.2.3 The Earth | 7.2.4 The Moon and changing ideas | | | | | |
| 7 Earth | • Design a simple model of the Earth using information about its structure | • Describe how sedimentary rocks are made | • Describe how igneous and metamorphic rocks are formed | • Give simple facts about how a rock can be changed from one type to another | • List the properties and uses of some ceramics. | • Name some objects seen in the night sky | • Explain how we see planets | • Describe differences between seasons and the motion of the Sun, stars, and Moon across the sky | • Explain simply why we see the Moon from Earth | | | | | |

| | Pathway 2 (Target Grade 4-6) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5.1.1 The particle model | 5.1.2 States of matter | 5.1.3 Melting and freezing | 5.1.4 Boiling | 5.1.5 More changes in state | 5.1.6 Diffusion | 5.1.7 Gas pressure | 5.1.8 Inside particles | 5.2.1 Pure substances and mixtures | 5.2.2 Solutions | 5.2.3 Solubility | 5.2.4 Filtration | 5.2.5 Evaporation and distillation | 5.2.6 Chromatography |
| 3 Walker | • Use models to investigate the relationship between the properties of a material and the arrangement of its particles | • Explain the properties of solids, liquids, and gases based on the arrangement and movement of their particles | • Draw annotated before and after diagrams of particles, and use words, to explain observations about melting and freezing | • Explain why different substances boil at different temperatures in terms of changes to the energy of particles | • Explain differences between evaporation, sublimation and boiling based on the arrangement and movement of particles | • Draw annotated before and after diagrams of particles, and use words, to explain diffusion | • Draw annotated particle diagrams, and use words, to explain gas pressure | • Represent atoms, molecules and elements using models | • Devise suitable techniques to separate mixtures, based on their properties | • Explain how substances dissolve using the particle model<br>• Draw annotated before and after particle diagrams to represent dissolving<br>• Use data to draw a conclusion about the mass of solute dissolved in a solution | • Use the solubility curve of a solute to describe and explain simply observations about solutions | • Choose the most suitable technique(s) to separate a mixture of substances | • Identify the physical property that must be different in order to separate a mixture by evaporation or distillation | • Use evidence from chromatography to explain how to identify unknown substances in mixtures, and to identify the pen or plant a sample is from |
| 6 Newton | 6.1.1 Chemical reactions | 6.1.2 Acids and alkalis | 6.1.3 Indicators and pH | 6.1.4 Acid strength | 6.1.5 Neutralisation | 6.1.6 Making salts | 6.2.1 More about elements | 6.2.2 Chemical reactions of metals and non-metals | 6.2.3 Metals and acids | 6.2.4 Metals and oxygen | 6.2.5 Metals and water | 6.2.6 Metal displacement reactions | | |
| 6 Newton | • Deduce whether described change is a physical change or a chemical reaction | • Compare the properties of acids and alkalis and describe differences between concentrated and dilute solutions of an acid | • Use the pH scale to measure acidity and alkalinity and describe how indicators categorise solutions as acidic, alkaline, or neutral | • Use models to explain the difference between a strong acid and a weak acid | • Explain how neutralisation reactions are used in a range of situations | • Choose the correct name of the salt formed in a neutralisation reaction from a list of possible salts | • Compare the properties of typical metals and non-metals and be able to identify an unknown element. | • Describe an oxidation reaction with a word equation and diagrams | • Predict the names of the products formed in a metal-acid reaction, and describe the reaction with a word equation. Decide which metals react more vigorously from practical observations. | • Describe an oxidation reaction with a word equation | • Compare the reactions of different metals with water | • Use the reactivity series to explain displacement reactions using word equations | | |
| 7 Earth | 7.1.1 The structure of the Earth | 7.1.2 Sedimentary rocks | 7.1.3 Igneous and metamorphic rocks | 7.1.4 The rock cycle | 7.1.5 Ceramics | 7.2.1 The night sky | 7.2.2 The Solar System | 7.2.3 The Earth | 7.2.4 The Moon and changing ideas | | | | | |
| 7 Earth | • Describe properties of the different layers of the Earth's structure | • Explain why a sedimentary rock has a particular property based on how it was formed | • Explain why igneous and metamorphic rocks have particular properties based on how they were formed | • Use the rock cycle to explain how the material in rocks is recycled | • Explain why properties of ceramics make them suitable for their uses | • Describe how space observation of stars is affected by the scale of the Universe | • Explain why we see objects in the Solar System, and describe how they appear to move | • Explain the motion of the Sun, stars, and Moon across the sky and explain why seasonal changes happen | • Describe evidence that led to a change in the model of the Solar System | | | | | |

| | Pathway 3 (Target Grade 7-9) | | | | | | | | | | | | | | |
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| 3 Walker | • Use data about particles to predict and explain differences in properties such as density | • Argue for how to classify substances which behave unusually as solids, liquids, or gases, justifying your ideas. | • Explain why there is a period of constant temperature during melting and freezing based on the arrangement and movement of particles, and energy transfers | • Suggest reasons for the different boiling points of different substances based on the arrangement, movement, and energy transfers of their particles | • Make predictions about what will happen during an unfamiliar physical process | • Draw annotated before and after diagrams of particles, and use words, to predict the relative speed of diffusion when the value of a given independent variable is changed | • Predict what will happen to gas pressure as conditions are changed in terms of particles and their energy | • Use diagrams to compare molecules of an element and a compound | • Justify the suitability of separation techniques in terms of the properties of constituent substances | • Justify whether a given particle diagram represents a solution or a pure substance | • Justify the procedure and evaluate the results in a solubility investigation | • Justify a chosen technique for separating a mixture of substances | • Justify whether evaporation or distillation would be suitable for obtaining given substances from solution | • Justify the use of chromatography in different scenarios |
| 6 Newton | 6.1.1 Chemical reactions | 6.1.2 Acids and alkalis | 6.1.3 Indicators and pH | 6.1.4 Acid strength | 6.1.5 Neutralisation | 6.1.6 Making salts | 6.2.1 More about elements | 6.2.2 Chemical reactions of metals and non-metals | 6.2.3 Metals and acids | 6.2.4 Metals and oxygen | 6.2.5 Metals and water | 6.2.6 Metal displacement reactions | | |
| 6 Newton | • Compare chemical reactions to physical changes, and deduce whether an observed or described change is a physical change or a chemical reaction | • Compare the different particles found in acids and alkalis then explain what 'concentrated' and 'dilute' mean, in terms of the numbers of particles present | • Compare the use of a variety of indicators and a pH probe to measure acidity and alkalinity and deduce the hazards of different acids and alkalis using data about their pH | • Evaluate models for strong and weak acids, and suggest improvements | • Interpret a graph of pH changes during a neutralisation reaction | • Predict the names of salts formed when acids react with metals or bases and write word equations to represent the reactions | • Deduce the relationship between the position of an element in the periodic table and its properties | • Interpret a word and symbol equation to name reactants and products | • Suggest how temperature changes may be linked with differences in reactivity between metals with acid | • Explain the reactivity of metals according to how they react with oxygen | • Deduce a rule from data about which reactions will occur or not, based on the reactivity series | • Explain predictions about displacement reactions using word and symbol equations | | |
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| 7 Earth | • Compare the different layers of the Earth in terms of their properties | • Explain in detail each stage in the formation of a sedimentary rock | • Predict observations when a substance representing lava is cooled, using knowledge about igneous rock formation to explain the answer. | • Give a detailed description and explanation of the journey of material through the rock cycle | • Justify decisions made from property data about which materials might be ceramics | • Describe the structure of the Universe in detail, in order of size and of distance away from the Earth. Be able to use and understand light years. | • Explain why we see objects in the Solar System, and why they appear to move as they do | • Interpret data to predict how the Earth's tilt affects temperature and day length | • Compare explanations about the motion and structure of the Universe from different periods in history | | | | | |