Stage 9

E Scientific enquiry

Ep Ideas and evidence

- **9Ep1** Discuss and explain the importance of questions, evidence and explanations, using historical and contemporary examples
- **9Ep2** Test explanations by using them to make predictions and then evaluate these against evidence
- **9Ep3** Discuss the way that scientists work today and how they worked in the past, including reference to experimentation, evidence and creative thought

Ep Plan investigative work

- **9Ep4** Select ideas and produce plans for testing based on previous knowledge, understanding and research
- **9Ep5** Suggest and use preliminary work to decide how to carry out an investigation
- **9Ep6** Decide whether to use evidence from first hand experience or secondary sources
- **9Ep7** Decide which measurements and observations are necessary and what equipment to use
- **9Ep8** Decide which apparatus to use and assess any hazards in the laboratory, field or workplace
- **9Ep9** Use appropriate sampling techniques where required

Eo Obtain and present evidence

- **9Eo1** Make sufficient observations and measurements to reduce error and make results more reliable
- **9Eo2** Use a range of materials and equipment and control risks
- **9Eo3** Make observations and measurements
- **9Eo4** Choose the best way to present results

Ec Consider evidence and approach

- **9Ec1** Describe patterns (correlations) seen in results
- **9Ec2** Interpret results using scientific knowledge and understanding
- **9Ec3** Look critically at sources of secondary data
- **9Ec4** Draw conclusions
- **9Ec5** Evaluate the methods used and refine for further investigations
- **9Ec6** Compare results and methods used by others
- **9Ec7** Present conclusions and evaluation of working methods in different ways
- **9Ec8** Explain results using scientific knowledge and understanding. Communicate this clearly to others

B Biology

Bp Plants

- **9Bp1** Define and describe photosynthesis, and use the word equation
- **9Bp2** Understand the importance of water and mineral salts to plant growth
- **9Bp3** Understand sexual reproduction in flowering plants, including pollination, fertilisation, seed formation and dispersal

Be Living things in their environment

- **9Be1** Explain the ways in which living things are adapted to their habitats. Secondary sources can be used
- **9Be2** Research the work of scientists studying the natural world Secondary sources can be used
- **9Be3** Explain and model food chains, food webs and energy flow
- **9Be4** Explain the role of decomposers
- **9Be5** Describe factors affecting the size of populations
- **9Be6** Describe and investigate some effects of human influences on the environment

Bv Variation and classification

- **9Bv1** Use and construct keys to identify plants and animals
- **9Bv2** Understand that organisms inherit characteristics from their parents through genetic material that is carried in cell nuclei
- **9Bv3** Describe how selective breeding can lead to new varieties
- **9Bv4** Discuss the work of Darwin in developing the scientific theory of natural selection

C Chemistry

Cp Material properties

- **9Cp1** Describe the structure of an atom and learn about the methods and discoveries of Rutherford
- **9Cp2** Compare the structures of the first twenty elements of the Periodic Table
- **9Cp3** Describe trends in groups and periods
- **9Cp4** Talk about the contribution of scientists. Secondary sources can be used

Cc Material changes

- **9Cc1** Explore and explain the idea of endothermic processes, e.g. melting of ice, and exothermic reactions, e.g. burning, oxidation
- **9Cc2** Describe the reactivity of metals with oxygen, water and dilute acids
- **9Cc3** Explore and understand the reactivity series
- **9Cc4** Give examples of displacement reactions
- **9Cc5** Explain how to prepare some common salts by the reactions of metals and metal carbonates and be able to write word equations for these reactions
- **9Cc6** Give an explanation of the effects of concentration, particle size, temperature and catalysts on the rate of a reaction

P Physics

Pf Forces and motion

- **9Pf1** Explain that pressure is caused by the action of a force on an area
- **9Pf2** Determine densities of solids, liquids and gases
- **9Pf3** Explain pressures in gases and liquids (qualitative only)
- **9Pf4** Know that forces can cause objects to turn on a pivot and understand the principle of moments

Pm Electricity

- **9Pm1** Describe electrostatics and the concept of charge, including digital sensors
- **9Pm2** Interpret and draw simple parallel circuits
- **9Pm3** Model and explain how common types of components, including cells (batteries), affect current
- **9Pm4** Explain how current divides in parallel circuits
- **9Pm5** Measure current using ammeters and voltage using voltmeters, including digital meters

Pe Energy

- **9Pe1** Use knowledge of energy sources including fossil fuels and renewable energy resources to consider the world's energy needs, including research from secondary sources
- **9Pe2** Identify and explain the thermal (heat) energy transfer processes of conduction, convection and radiation
- **9Pe3** Explain cooling by evaporation

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