SBSP PROGRESSION OF COMPONENT KNOWLEDGE THROUGH SCIENCE UNITS

CHEMISTRY – EVERDAY MATERIALS AND PROPERTIES AND CHANGES OF MATERIALS

Early Learning Goal:

- Use all their senses in hands-on exploration of natural materials.
- Understand some important processes and changes in the natural world around them changing states of matter.
- Explore collections of materials with similar and/or different properties.
- Talk about the differences between materials and changes they notice.

Reception Component Knowledge

- I can talk about different materials and their properties.
- I can investigate if an object floats or sinks.
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Year 1 NC links:

- distinguish between an object and the material from which it is made
- identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
- describe the simple physical properties of a variety of everyday materials
- compare and group together a variety of everyday materials on the basis of their simple physical properties

Year 1 Component Knowledge

Exploring Everyday Materials

- Understand what a material is
- Identify a variety of everyday materials
- Describe everyday materials
- Understand that all objects are made from materials
- Identify what material an object is made from
- Understand that different objects can be made from the same material
- Give simple descriptions of everyday materials
- Describe the properties of everyday materials
- Explain why materials are chosen for particular objects
- Understand that some materials are natural and some are manmade
- Identify natural and manmade materials
- Understand that natural and manmade materials are used for different purposes
- Understand that some objects float and some objects sink
- Predict and identify if an object will float or sink
- Predict and identify if an object will float or sink and explain if my prediction was correct
- Understand that some materials soak up water
- Compare materials that are absorbent and not absorbent
- Understand that non-absorbent materials are used in objects that need to be waterproof

Exploring Everyday Materials - Building

- Identify and name some materials used in building a house
- Describe the simple physical properties of materials used in building a house
- Understand the suitability of materials used in building a house

- Understand what waterproof means
- Know what materials are waterproof
- Understand why the roof of a house needs to be waterproof
- Understand that glass is transparent
- Understand why glass is used to make windows
- Explain why glass is the best material to use for windows and why other materials might be unsuitable
- Understand the properties of fabric
- Understand that a variety of materials are sometimes used to make one object
- Understand why specific materials are used to make furniture
- Understand that there are different types of fabrics
- Understand that different fabrics have different properties
- Understand that different fabrics have specific uses
- Identify and name a variety of everyday materials
- Describe the simple physical properties of a variety of everyday materials
- Explain the uses of materials and why they are suitable

Working Scientifically Component Knowledge
Exploring Everyday Materials

- Identifying and classifying
- Using their observations and ideas to suggest answers to questions
- Performing simple tests
- Gathering and recording data to help in answering questions

Exploring Everyday Materials - Building

- Performing simple tests
- Using their observations and ideas to suggest answers to questions
- Identifying and classifying

Key Vocabulary
Exploring Everyday Materials

- material, wood, metal, fabric, plastic
- object, brick, glass, elastic, property
- opaque, stiff, dull, transparent
- rubber, polyester, factory, manmade, natural
- submerge, float, predict, buoyant, sink
- umbrella, waterproof, sponge, absorbent, soak

Exploring Everyday Materials - Building

- brick, solid, clay, strong, wind
- roof, non-absorbent, waterproof, absorbent, slate
- window frame, transparent, opaque, window pane, suitable
- fabric, furniture, cotton, mattress, soft
- jumper, wool, weather, suitable
- evaluate, garden, material, tile, properties

Year 2 NC links:

- identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
- find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

Year 2 Component Knowledge

- Understand what a material is
- Know the properties of a variety of everyday materials
- Explain why some materials are suitable for specific uses
- Understand that some materials are stronger than others
- Compare the strength of different materials
- Understand that materials differ in strength and can be strengthened by changing their structure
- Understand that the shapes of objects can be changed by stretching
- Compare how the shapes of objects change when they are stretched
- Compare how some objects change after stretching while other objects return to their original form
- Understand that the shapes of objects can be changed by twisting, bending, squashing or stretching
- Compare how the shapes of objects change when they are twisted, bent, squashed or stretched
- Understand why bending, twisting, stretching or squashing objects is important in everyday life
- Know that some materials are suitable or unsuitable for particular purposes
- Understand the properties of materials that make them suitable or unsuitable for particular purposes
- Link the suitability of materials for particular purposes with the uses of everyday tools
- Understand that some materials can be melted
- Know that some materials can be melted to change their shape
- Know that some materials can be melted and mixed with other materials to change their properties

Working Scientifically Component Knowledge

- Using their observations and ideas to suggest answers to questions
- Predicting, observing, investigating, measuring and recording

Key Vocabulary

- brick, material, suitable, property, object
- bridge, structure, obstacle, triangle, construction
- hinder, stretchy, elastic, floppy, limit
- force, twist, bend, stretch, squash
- waterproof, protective, fluorescent, safety, mackintosh
- bound, highway, road, merchant, John McAdam

Year 5 NC links:

- explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda
- demonstrate that dissolving, mixing and changes of state are reversible changes
- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic

Year 5 Component Knowledge

Properties of Materials

- Group materials according to their properties
- Carry out a fair and comparative test to group materials according to their properties
- Use results from a fair and comparative test to explain how the properties of materials enable them to be suitable for a specific task
- Identify materials that are thermal conductors
- Carry out a fair and comparative test to test the thermal conductive properties of materials
- Use results from a fair and comparative test to explain how the thermal conductive properties of materials enable them to be suitable for a specific task
- Investigate the hardness of materials
- Carry out a fair and comparative test to test the hardness of materials
- Use results from a fair and comparative test to explain how the hardness of materials enables them to be suitable for a specific task
- Understand what the term 'dissolve' means
- Investigate and identify which materials are soluble and insoluble in water
- Using the results of their investigation, consider which solutions could be reversed
- Ask questions that explore the solubility of a solute
- Design an investigation that tests the solubility of a solute
- Present the findings from an investigation that tests the solubility of a solute
- Identify the different separation methods
- Describe the processes of different separation methods
- Explain the most effective separation method for various materials

Changes of Materials

- Describe how evaporation can be used to get the salt back from salty water
- Use the results of an evaporation experiment to explain which mystery liquid is a solution
- Suggest a method to recover the water from a salt water solution and explain why this method works
- Identify methods for reversing a physical change
- Describe how the method used to reverse a physical change works
- Evaluate the strengths and weaknesses of the method chosen and suggest improvements
- Name some irreversible changes
- Use observations to describe how you can tell an irreversible change has taken place
- Explain why the change is irreversible and what new products have been made
- Identify rusting as an irreversible change
- Plan an experiment to investigate rusting and include how to make it a fair test
- Explain why rusting is an irreversible change, why it is a problem and how to prevent it
- Identify the 3 factors a fire needs to burn
- Describe and explain different methods for extinguishing a fire
- Apply knowledge of the fire triangle to alternative extinguishing methods

Working Scientifically Component Knowledge

Properties of Materials

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision and taking repeat readings when appropriate
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs and bar and line graph
- Reporting and presenting findings from enquiries - including conclusions, causal relationships and explanations of and a degree of trust in results - in oral and written forms such as displays and other presentations

- Using test results to make predictions to set up further comparative and fair tests

Changes of Materials

- Reporting and presenting findings from enquiries - including conclusions, causal relationships and explanations of and a degree of trust in results - in oral and written forms such as displays and other presentations
- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Identifying scientific evidence that has been used to support or refute ideas or arguments

Key Vocabulary

Properties of Materials

- magnetic, durable, transparent, versatile, conductive
- thermal, degrees Celsius (°C), conduction, insulator, molecules
- steel, stone, force, hardness, iron
- solute, insoluble, solvent, dissolve, soluble
- solution, substance, saturation
- evaporation, filtering, sieving, mixture, pure substance

Changes of Materials

- pure substance, solute, solvent, evaporate, solution
- melting, reversible, mixture, physical change
- irreversible, effervescence, compare, chemical change, product
- fair test, control variable, corrosion, rusting, variable
- combustion, oxygen, fuel, extinguish, smother

KS3 NC links:

Chemical reactions as the rearrangement of atoms. Representing chemical reactions using formulae and using equations. Combustion, thermal decomposition, oxidation and displacement reactions. Defining acids and alkalis in terms of neutralisation reactions. The pH scale for measuring acidity/alkalinity; and indicators.