



## Stocksbridge Junior School Science Concepts & End Points

*“The important thing is to never stop questioning.”*

**Albert Einstein**

### SJS Science Concepts

<p><b>Concept 1:</b></p>	<p><b>Scientific Enquiry</b></p> <ul style="list-style-type: none"> <li>• <b>Comparative/Fair testing</b> – Carrying out fair tests to see the effect of a changing variable.</li> <li>• <b>Research</b> – Using secondary sources of information to answer questions.</li> <li>• <b>Observation over time</b> – Observe changes that occur over a period of time (minutes to months).</li> <li>• <b>Pattern-seeking</b> – Identifying patterns and looking for relationships in enquires.</li> <li>• <b>Identifying, grouping and classifying</b> – Identifying patterns and looking for relationships in enquires.</li> <li>• <b>Problem Solving</b> – Applying scientific knowledge to find answers to problems.</li> </ul>
<p><b>Concept 2:</b></p>	<p><b>Biology</b></p> <ul style="list-style-type: none"> <li>• <b>Understand plants</b> – This concept involves becoming familiar with different types of plants, their structure and reproduction.</li> <li>• <b>Understand animals and humans</b> – This concept involves becoming familiar with different types of animals, humans and the life processes they share.</li> <li>• <b>Investigate living things</b> – This concept involves becoming familiar with a wider range of living things, including insects and understanding life processes.</li> <li>• <b>Understand evolution and inheritance</b> – This concept involves understanding that organisms come into existence, adapt, changes and evolve and become extinct.</li> </ul>
<p><b>Concept 3:</b></p>	<p><b>Chemistry</b></p> <ul style="list-style-type: none"> <li>• <b>Investigate materials</b> – This concept involves becoming familiar with a range of materials, their properties, uses and how they may be altered or changed.</li> </ul>
<p><b>Concept 4:</b></p>	<p><b>Physics</b></p> <ul style="list-style-type: none"> <li>• <b>Understand movement, forces and magnets</b> – This concept involves understanding what causes motion.</li> <li>• <b>Understand the Earth’s movement in space</b> – This concept involves understanding what causes seasonal changes, day and night.</li> <li>• <b>Investigate light and seeing</b> – This concept involves understanding how light and reflection affect sight.</li> <li>• <b>Investigate sound and hearing</b> – This concept involves understanding how sound is produced, how it travels and how is it heard.</li> <li>• <b>Understand electrical circuits</b> – This concept involves understanding circuits and their role in electrical applications.</li> </ul>

## End Points in Learning in the Science Curriculum

### Y3/4 End Points

#### **Comparative/Fair testing:**

- To set up a fair test and explain why it is fair.
- To set up a test to compare two things.

#### **Research:**

- To ask relevant scientific questions

#### **Observation over time:**

- To make careful and accurate observations, including the use of standard units.
- To use equipment, using thermometers and data loggers to make measurements.
- To use findings to report in different ways, including oral and written explanations, presentation.
- To draw conclusions and suggest improvements.

#### **Pattern Seeking:**

- To use diagrams, keys, bar charts, and tables; using scientific language.
- To use findings to report in different ways, including oral and written explanations, presentation.

#### **Identifying, grouping and classifying:**

- To gather, record, classify and present data in different ways to answer scientific questions.
- To identify differences, similarities and changes related to an enquiry.

#### **Problem Solving:**

- To ask relevant scientific questions.
- To use observations and knowledge to answer scientific questions.
- To set up a simple enquiry to explore a scientific question.
- To use findings to report in different ways, including oral and written explanations, presentation.
- To draw conclusions and suggest improvements.

## Year 3 End Points

### Understand plants:

- To be able to describe the function of different parts of flowering plants and trees.
- To be able to explore and describe the needs of different plants for survival.
- To be able to explore and describe how water is transported within plants.
- To be able to describe the plant life cycle, especially the importance of flowers

### Understand animals and humans:

- To be able to explain the importance of a nutritious, balanced diet.
- To be able to explain how nutrients, water and oxygen are transported within animals and humans.
- To be able to describe and explain the skeletal and muscular system of a human.
- To be able to describe the purpose of the skeleton in humans and animals.

### Investigate materials:

- To be able to compare and group rocks based on their appearance and physical properties, giving a reason.
- To be able to describe how fossils are formed.
- To be able to describe how soil is made.
- To be able to describe and explain the difference between sedimentary and igneous rock.

### Investigate light and seeing:

- To be able to describe what dark is (the absence of light).
- To be able to explain that light is needed in order to see.
- To be able to explain that light is reflected from a surface.
- To be able to explain and demonstrate how a shadow is formed.
- To be able to explore shadow size and explain.
- To be able to explain the danger of direct sunlight and describe how to keep protected.

### Understand movement, forces and magnets:

- To be able to explore and describe how objects move on different surfaces.
- To be able to explain how some forces require contact and some do not, giving examples.
- To be able to explore and explain how objects attract and repel in relation to objects and other magnets.
- To be able to predict whether objects will be magnetic and carry out an enquiry to test this out.
- To be able to describe how magnets work and predict whether magnets will attract or repel and give a reason.

## Year 4 End Points

### Investigate living things:

- To be able to group living things in different ways.
- To be able to use classification keys to group, identify and name living things.
- To be able to create classification keys to group, identify and name living things (for others to use).
- To be able to describe how changes to an environment could endanger living things.

### Understand animals and humans:

- To be able to identify and name the parts of the human digestive system and describe the functions of the organs in the human digestive system.
- To be able to identify and describe the different types of teeth in humans and describe the functions of different human teeth.
- To be able to use food chains to identify producers, predators and prey.
- To be able to construct food chains to identify producers, predators and prey.

### Investigate materials:

- To be able to group materials based on their state of matter (solid, liquid, gas).
- To be able to describe how some materials can change state.
- To be able to explore how materials change state.
- To be able to measure the temperature at which materials change state.
- To be able to describe the water cycle and explain the part played by evaporation and condensation in the water cycle.

### Investigate sound and hearing:

- To be able to describe how sound is made and explain how sound travels from a source to our ears.
- To be able to explain the place of vibration in hearing.
- To be able to explore the correlation between pitch and the object producing a sound.
- To be able to explore the correlation between the volume of a sound and the strength of the vibrations that produced it.
- To be able to describe what happens to a sound as it travels away from its source.

### Understand electrical circuits:

- To be able to identify and name appliances that require electricity to function.
- To be able to construct a series circuit.
- To be able to identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers).
- To be able to draw a circuit diagram.
- To be able to predict and test whether a lamp will light within a circuit.
- To be able to describe the function of a switch in a circuit.
- To be able to describe the difference between a conductor and insulators; giving examples of each.

## Y5/6 End Points

### Comparative/Fair testing:

- To plan different types of enquiries.
- To control variables in an enquiry.
- To use the outcome of test results to make predictions and set up a further comparative test.

### Research:

- To relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory.
- To read, spell and pronounce scientific vocabulary accurately.

### Observation over time:

- To plan different types of enquiries.
- To measure accurately and precisely using a range of equipment.

### Pattern Seeking:

- To explain a conclusion from an enquiry.

### Identifying, grouping and classifying:

- To plan different types of enquiries.
- To record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- To report findings from enquiries in a range of ways.

### Problem Solving:

- To explain a conclusion from an enquiry.
- To explain casual relationships in an enquiry.
- To relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory.

## Year 5 End Points

### Investigate living things:

- To be able to describe the life cycle of different living things, e.g. mammal, amphibian, insect bird.
- To be able to describe the differences between different life cycles.
- To be able to describe the process of reproduction in plants.

### Understand animals and humans:

- To be able to describe the process of reproduction in animals.
- To be able to create a timeline to indicate stages of growth in humans.

### Investigate materials:

- To be able to compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets).
- To be able to describe how a material dissolves to form a solution; explaining the process of dissolving.
- To be able to describe and show how to recover a substance from a solution.
- To be able to describe how some materials can be separated.
- To be able to demonstrate how materials can be separated (e.g. through filtering, sieving and evaporating).

## Year 6 End Points

### Investigate living things:

- To be able to classify living things into broad groups according to observable characteristics and based on similarities & differences.
- To be able to describe how living things have been classified.
- To be able to give reasons for classifying plants and animals in a specific way.

### Understand animals and humans:

- To be able to identify and name the main parts of the human circulatory system.
- To be able to describe the function of the heart, blood vessels and blood.
- To be able to discuss the impact of diet, exercise, drugs and life style on health.
- To be able to describe the ways in which nutrients and water are transported in animals, including humans.

### Understand evolution and inheritance:

- To be able to describe how the earth and living things have changed over time.
- To be able to explain how fossils can be used to find out about the past.
- To be able to explain about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents).

- I know and can demonstrate that some changes are reversible and some are not.
- To be able to explain how some changes result in the formation of a new material and that this is usually irreversible.
- To be able to discuss reversible and irreversible changes.
- To be able to give evidenced reasons why materials should be used for specific purposes.

**Understand the Earth's movement in space:**

- To be able to describe and explain the movement of the Earth and other planets relative to the Sun.
- To be able to describe and explain the movement of the Moon relative to the Earth.
- To be able to explain and demonstrate how night and day are created.
- To be able to describe the Sun, Earth and Moon (using the term spherical).
- To be able to explain what gravity is and its impact on our lives.

**Understand movement, forces and magnets:**

- To be able to identify and explain the effect of air resistance.
- To be able to identify and explain the effect of water resistance.
- To be able to identify and explain the effect of friction.
- To be able to explain how levers, pulleys and gears allow a smaller force to have a greater effect.

- To be able to explain how animals and plants are adapted to suit their environment.
- To be able to link adaptation over time to evolution.
- To be able to explain evolution.

**Investigate light and seeing:**

- To be able to explain how light travels.
- To be able to explain and demonstrate how we see objects.
- To be able to explain why shadows have the same shape as the object that casts them.
- To be able to explain how simple optical instruments work, e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.

**Understand electrical circuits:**

- To be able to explain how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer.
- To be able to compare and give reasons for why components work and do not work in a circuit.
- To be able to draw circuit diagrams using the correct symbols.

**At Stocksbridge Junior School, every child is a scientist!**