

<b>Subject</b>	Science
<b>Term</b>	Cycle 1
<b>Duration (approx.)</b>	9 lessons
<b>Module</b>	Biology—Cells

**Factual knowledge to be taught and assessed (including subject specific vocabulary).**

Cells and organisation

Cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope.

The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts

The similarities and differences between plant and animal cells.

The role of diffusion in the movement of materials in and between cells.

The structural adaptations of some unicellular organisms.

**Skills and concepts to be developed**

Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them

**Formative Assessment one:**

Spellings and definitions of subject specific concepts

**Formative Assessment two:**

Describe in detail the method you would use to observe the cells of a plant and carry out the practical.

Strengthen vocabulary associated with the topic

**Summative Assessment:**

End of cycle 1 test.

This test will cover questions from this topic and previous topics to check understanding.

**Link to prior learning:**

KS1 and 2 Animals, including humans. Cells have not been covered by this stage so will be a new concept.

**Literacy and Numeracy: How will high standards be promoted in this module?**

**Literacy -**

Formative test 1 – spellings and descriptions

Formative test 2 – Descriptive and comparative extended answers.

**Numeracy -**

Idea of magnification.

**Link Forward: Where next for learning?**

KS4 GCSE Biology

B2 – Additional science

Cells, tissues and organs, cell division and growth, diffusion.

B3 – Triple science

Osmosis

<b>Subject</b>	Science
<b>Term</b>	Cycle I
<b>Duration (approx.)</b>	9 lessons
<b>Module</b>	Chemistry— Elements, Atoms and Compounds

**Factual knowledge to be taught and assessed (including subject specific vocabulary).**

Atoms, elements and compounds

A simple (Dalton) atomic model.

Differences between atoms, elements and compounds.

Chemical symbols and formulae for elements and compounds.

Conservation of mass changes of state and chemical reactions.

**Skills and concepts to be developed:**

Present observations and data using appropriate methods, including tables and graphs.

Identify patterns and using observations, measurements and data to draw conclusions.

**Formative Assessment one:**

Spellings and definitions of subject specific concepts.

**Formative Assessment two:**

To examine reactants and products and analyse data from 2 experiments that involve acid and alkali.

To discuss the trends in graphs from the two sources of data.

**Summative Assessment:**

End of cycle I test

This test will cover questions from this topic and previous topics to check understanding.

**Link to prior learning:**

Use knowledge of solids liquids and gases to decide how mixtures might be separated.

Atoms have not been covered by this stage so will be a new concept.

**Literacy and Numeracy:**

**How will high standards be promoted in this module?**

**Literacy:** Use of key words when answering longer written answers.

**Numeracy:** Use data to plot a graph and comment on the information shown in the graph.

**Link Forward: Where next for learning?**

KS4 GCSE Chemistry

C1 - Core science  
Fundamental Ideas

C2 – Additional science  
How Much, Rates and Energy, Salts and Electrolysis.

C3 – Triple science  
Analysis and Synthesis

<b>Subject</b>	Science
<b>Term</b>	Cycle 1
<b>Duration (approx.)</b>	11 lessons
<b>Module</b>	Biology—Structure

**Factual knowledge to be taught and assessed (including subject specific vocabulary)**

The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.

The tissues and organs of the human digestive system, the structure and functions of the gas exchange system in humans. Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems.

**Skills and concepts to be developed**

Identifying scientific evidence that has been used to support or refute ideas or arguments. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing

They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time.

**Formative Assessment one:**

Spellings and definitions of subject specific concepts.

**Formative Assessment two:**

To be able to locate the major organs and explain their function in the body and recognise organ systems.

To be able to analyse data based on opinions regarding organ transplants and donor organs.

**Summative Assessment:**

End of cycle 1 Test

This test will cover questions from this topic and previous topics to check understanding.

**Link to prior learning:**

Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system).

**Literacy and Numeracy:**

**How will high standards be promoted in this module?**

**Literacy:** extended answers in final task that requires pupils to use their knowledge to justify points of view regarding organ transplants.

**Numeracy:** use data gathered to draw graph.

**Link Forward: Where next for learning?**

KS4 GCSE Biology

B1 – Core science  
Coordination and Control

B2 – Additional science  
Cells Tissues and Organs, Enzymes

B3 – Triple science  
Exchange Of Materials, Transporting Materials, Keeping Internal Conditions Constant.

<b>Subject</b>	Science
<b>Term</b>	Cycle 2
<b>Duration (approx.)</b>	13 lessons
<b>Module</b>	Biology— Reproduction

**Factual knowledge to be taught and assessed (including subject specific vocabulary)**

Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta.

**Skills and concepts to be developed**

Pupils should be encouraged to recognise the power of rational explanation and to understand how science can be used to explain what is occurring, predict how things will behave.

**Formative Assessment one:**

Spellings and definitions of subject specific concepts.

**Formative Assessment two:**

Use data on birds to create graphs and describe patterns between chosen variables.

**Summative Assessment:**

End of cycle test

This test will cover questions from this topic and previous topics to check understanding.

**Link to prior learning:**

Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows. Describe the life process of reproduction in some plants and animals.

**Literacy and Numeracy:  
How will high standards be promoted in this module?**

Literacy -  
Formative test 1 – spellings and descriptions  
Formative test 2 – extended answers using knowledge of breeding birds.

Numeracy -  
Using tables of data to rank in order then create graphical representations.  
Comparison of two variables and the relationships between the two variables.

**Link Forward: Where next for learning?**

KS4 GCSE Biology  
B1 – Core science  
Variation, Reproduction and New Technology and Evolution - Natural Selection.  
B2 - Additional science  
Simple Inheritance in Animals and Plants and Old And New Species.

<b>Subject</b>	Science
<b>Term</b>	Cycle 2
<b>Duration (approx.)</b>	11 lessons
<b>Module</b>	Chemistry - Particles and their

**Factual knowledge to be taught and assessed (including subject specific vocabulary)**

The properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure. Changes of state in terms of the particle model.

conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving similarities and differences, including density differences, between solids, liquids and gases Brownian motion in gases

diffusion in liquids and gases driven by differences in concentration

The difference between chemical and physical changes.

The differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density, the anomaly of ice-water transition.

Atoms and molecules as particles.

changes with temperature in motion and spacing of particles

**Skills and concepts to be developed:**

Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.

**Formative assessment one:**

Spellings and definitions of subject specific concepts.

**Formative assessment two:**

Carry out the method, collect data and evaluate the effectiveness of the method.

**Summative Assessment:**

End of cycle test.

This test will cover questions from this topic and previous topics to check understanding.

**Link to prior learning**

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

**Literacy and Numeracy:**

**How will high standards be promoted in this module?**

**Literacy -**

Formative test 1 – spellings and descriptions

Formative test 2 – Comprehension of method, as well as structure, planning and evaluation.

**Numeracy –**

Formative test 2 – Reading the timer and thermometer, skills developed reading instruments and understanding scale

**Link Forward: Where next for learning?**

KS4 GCSE Chemistry

PI – Core science

States of matter, condensation, evaporation, energy transfer

<b>Subject</b>	Science
<b>Term</b>	Cycle 2
<b>Duration (approx.)</b>	15 lessons
<b>Module</b>	Physics—Forces

### **Factual knowledge to be taught and assessed (including subject specific vocabulary)**

- Forces as pushes or pulls, arising from the interaction between two objects.
- Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces.
- Forces: associated with deforming objects; stretching and squashing—springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water.
- Forces measured in newtons, measurements of stretch or compression as force is changed.
- Force-extension linear relation; Hooke's Law as a special case.
- Non-contact forces: gravity forces acting as a distance on Earth.
- Opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface.
- Forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only).
- Change depending on direction of force and its size.

### **Skills and concepts to be developed**

Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.

Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience.

### **Formative Assessment one:**

Spellings and definitions of subject specific concepts.

### **Formative Assessment two:**

Select the relevant data from the bar chart. Enter it into a table. Describe any patterns seen in the data.

### **Summative Assessment:**

End of cycle test

This test will cover questions from this topic and previous topics to check understanding.

### **Link to prior learning:**

Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.

Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

### **Literacy and Numeracy:**

#### **How will high standards be promoted in this module?**

Literacy -

Formative test 1 – spellings and descriptions.

Formative test 2 – long response to explain findings.

Numeracy -

Formative test 2—selecting data appropriately.

### **Link Forward: Where next for learning?**

KS4 GCSE Physics

P2—Additional science

Forces

<b>Subject</b>	Science
<b>Term</b>	Cycle 3
<b>Duration (approx.)</b>	9 lessons
<b>Module</b>	Physics—Sound

**Factual knowledge to be taught and assessed (including subject specific vocabulary)**

- Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition.
- Frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound
- Sound needs a medium to travel, the speed of sound in air, in water, in solids
- Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal
- Auditory range of humans and animals.

**Skills and concepts to be developed:**

Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.

**Formative assessment one:**

Spellings and descriptions test.

**Formative assessment two:**

Read the research. Use this research to generate a testable hypothesis and decide what data you will collect.  
Design an appropriate results table.

**Summative Assessment:**

End of unit test.

This test will cover questions from this topic and previous topics to check understanding.

**Link to prior learning:**

None – this will be a new topic for year 7

**Literacy and Numeracy:**

**How will high standards be promoted in this module?**

**Literacy -**

Formative test 1 – spellings and descriptions  
Formative test 2 – Comprehension of research

**Numeracy –**

Formative test 2 – Reading graph in research

**Link Forward: Where next for learning?**

KS4 GCSE Physics

PI – Core science  
Sound waves and music

<b>Subject</b>	Science
<b>Term</b>	Cycle 3
<b>Duration (approx.)</b>	12 lessons
<b>Module</b>	Chemistry— Reactions

**Factual knowledge to be taught and assessed (including subject specific vocabulary)**

Vocabulary in reactions resources  
 Reversible reactions.  
 Energy changes on changes of state (qualitative)  
 Exothermic and endothermic chemical reactions (qualitative)  
 Representing chemical reactions using formulae and using equations  
 Combustion, thermal decomposition  
 Catalysts  
 Conversion of mass

**Skills and concepts to be developed**

Pupils should build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials. They should explore reversible changes. Pupils should explore changes that are difficult to reverse, for example, burning.

**Formative Assessment one:**

Spellings and definitions of subject specific concepts

**Formative Assessment two:**

Finding out about reactions practical.  
 The pupils will make a prediction, conclude and evaluate an experiment.

**Summative Assessment:**

End of cycle test.

This test will cover questions from the topic and previous topics to check understanding.

**Link to prior learning:**

Properties and changes of materials KS2  
 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.

**Literacy and Numeracy:  
 How will high standards be promoted in this module?**

Literacy -  
 Formative test 1 – spellings and descriptions  
 Formative test 2 – Descriptive and comparative extended answers.  
 Numeracy -Conservation of mass.

**Link Forward: Where next for learning?**

KS4 GCSE Chemistry  
 Representing chemical reactions using formulae and using equations  
 Combustion, thermal decomposition.  
 Energy changes on changes of state (qualitative)



<b>Subject</b>	Science
<b>Term</b>	Cycle 3
<b>Duration (approx.)</b>	11 lessons
<b>Module</b>	Physics—Light

**Factual knowledge to be taught and assessed (including subject specific vocabulary)**

- The similarities and differences between light waves and waves in matter.
- Light waves travelling through a vacuum; speed of light.
- The transition of light through materials: absorption, diffuse scattering and specular reflection at a surface.
- Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye.
- Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras.
- Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.

**Skills and concepts to be developed:**

Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.

Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience.

**Formative assessment one:**

Spellings and definitions of subject specific concepts.

**Formative assessment two:**

Write an experimental method to determine what happens when a light ray is directed at different blocks. Make clear the controlled variables that must be in place.

**Summative Assessment:**

End of cycle test.

This test will cover questions from this topic and previous topics to check understanding.

**Link to prior learning:**

Recognise that light appears to travel in straight lines.

Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.

Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.

Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

**Literacy and Numeracy:**

**How will high standards be promoted in this module?**

**Literacy -**

Formative test 1 – spellings and descriptions

Formative test 2 – use of key words throughout method

**Numeracy –**

Formative test 2 – measuring angles

**Link Forward: Where next for learning?**

KS4 GCSE Physics

PI – Core science

The Electromagnetic Spectrum