

Subject	Science
Term	Cycle 3
Duration (approx.)	8 lessons
Module	Chemistry — Atomic Structure

Link to prior learning:

- Atomic model (Dalton)
- Differences between atoms, elements and compounds
- Chemical symbols and formulae
- Changes of state

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

- Describe the basic structure of an atom.
- Describe atoms using the atomic model and explain why atoms have no overall charge.
- Describe isotopes using the atomic model.
- Use chemical symbols of atoms to produce the chemical formulae of a range of elements and compounds.
- Explain why mass is conserved in a chemical reaction.
- Balance given symbol equations.
- Explain the difference between a compound and a mixture.
- Describe and explain different separation techniques e.g. filtration, crystallisation, simple distillation, fractional distillation and chromatography
- Describe the differences between the plum-pudding model and the nuclear model of the atom.
- Explain how evidence from scattering experiments changed the model of the atom.
- Write and draw the electronic configuration for the first 20 elements.

Skills and concepts to be developed

- Extract and interpret information about elements and atoms from the periodic table.
- Practical skills — separation techniques

Summative Assessment:

End of unit test

Literacy and Numeracy:

How will high standards be promoted in this module?

Literacy -

Vocabulary and definitions. Ability to use these in contexts for longer written answers.

Atom
Element
Compound
Mixture
Filtration
Crystallisation
Distillation
Chromatography
Proton
Neutron
Electron
Isotopes

Numeracy –

Calculations using the atomic number and relative atomic mass.
Addition—Balancing equations

Subject	Science
Term	Cycle 3
Duration (approx.)	9 lessons
Module	Biology— Digestion and Enzymes

Literacy and Numeracy:

How will high standards be promoted in this module?

Literacy -

Vocabulary and definitions. Ability to use these in contexts for longer written answers.

Cells

Tissues

Organs

Organ systems

Carbohydrate

Lipid

Protein

Enzyme

Catalyst

Amylase

Lipase

Protease

Acid

Bile

Numeracy –

Calculating rate of reaction

Plotting and interpreting of graphs

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

- Relate levels of organisation to familiar organ systems in order to give examples of cells, tissues, and organs
- Describe the functions of the organs of the digestive system.
- Explain in detail how the small intestine is adapted to its function.
- Describe the structure of simple sugars, starch, lipids, and proteins.
- Carry out multiple food tests in an organised manner.
- Describe how enzymes are used in digestion and use the lock and key theory to explain why the shape of an enzyme is vital for it to function.
- Explain why high temperatures and changes in pH prevent enzymes from catalysing reactions.
- Investigate the effect of a factor on the rate of an enzyme-controlled reaction.
- Explain how acid in the stomach increases the efficiency of pepsin.
- Explain how bile increases the efficiency of fat digestion.

Skills and concepts to be developed

Practical skills—timing, measuring, following of a method, evaluation and application.

Plotting and interpreting of graphs

Summative Assessment:

End of Topic Assessment

Link to prior learning:

Yr 8 Diet and digestion

Subject	Science
Term	Cycle 3
Duration (approx.)	5 lessons
Module	Chemistry—The Periodic Table

Link to prior learning:

- The varying physical and chemical properties of different elements
- The principles underpinning the Mendeleev Periodic Table
- The Periodic Table: periods and groups; metals and non-metals
- How patterns in reactions can be predicted with reference to the Periodic Table
- The properties of metals and non-metals

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

- Describe how the elements are arranged in groups and periods in the periodic table.
- Explain how and why the ordering of the elements has changed over time.
- Describe how the electronic structure of metals and non-metals are different.
- Explain in terms of electronic structure how the elements are arranged in the periodic table.
- Explain why the noble gases are unreactive and the trend in their boiling points.
- Recognise trends in supplied data.
- Explain why the elements in Group 1 react similarly and why the first three elements float on water.
- Describe how you can show that hydrogen and metal hydroxides are made when Group 1 metals react with water.
- Explain why the elements in Group 7 react similarly.
- Explain how to complete a halogen displacement reaction and explain what happens in the reaction.
- Use electronic structure to explain the trends in physical and chemical properties of Group 1 and Group 7 elements.

Literacy and Numeracy:

How will high standards be promoted in this module?

Literacy -

Vocabulary and definitions. Ability to use these in contexts for longer written answers.

Mendeleev
Group
Period
Electronic Structure
Electron
Alkali
Density
Halogens
Noble Gases

Numeracy –

Calculating ions using electronic structure

Balancing of equations

Skills and concepts to be developed

Analyse the changes in temperature when a material is heated, leading to the experimental determination of specific heat capacity along with corresponding calculations.

Summative Assessment:

End of Unit Test

Subject	Science
Term	Cycle 3
Duration (approx.)	5 lessons
Module	Physics — Energy Resources

Literacy and Numeracy:

How will high standards be promoted in this module?

Literacy - Vocabulary and definitions. Ability to use these in contexts for longer written answers.

Renewable

Non-renewable

Energy

Biofuel

Fossil Fuels

Climate change

Global warming

Numeracy –

Using data to support arguments

Calculations regarding energy output

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

- Outline the operation of a fossil fuel burning and nuclear power station
- Explain why biofuels are considered carbon neutral
- Compare fossil fuels and nuclear fuels in terms of energy provided, waste, and pollution
- Describe the operation of a wind farm and hydroelectric system
- Compare the operation of hydroelectric, wave, and tidal systems in terms of reliability, potential power output, and costs
- Describe the operation of a solar power tower and geothermal power plant.
- Compare and contrast the operation of solar cells (photovoltaic cells) with solar heating panels
- Describe techniques to reduce the harmful products of burning fossil fuels
- Evaluate methods of reducing damage caused by waste products of fossil fuels and nuclear fuels
- Form persuasive arguments for and against a variety of energy resources

Skills and concepts to be developed

Evaluation

Debating

Summative Assessment:

End of Topic Assessment

Link to prior learning:

Year 8 Energy Resources