

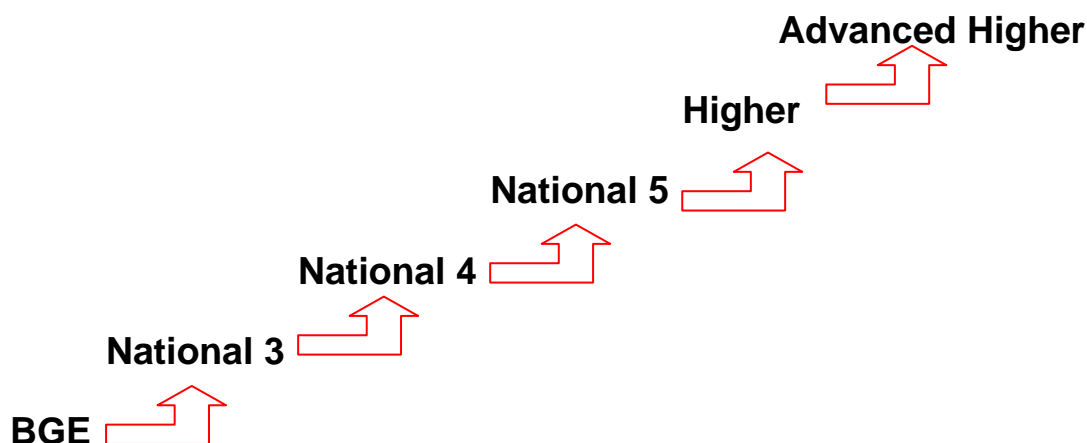
# Learning in Science

Pupils are fascinated by new discoveries and technologies and become increasingly aware of, and passionate about, the impact of science on their own health and wellbeing, the health of society and of the environment.

Learning through the sciences enables pupils to:

- investigate their environment by observing, exploring, investigating and recording
- demonstrate a secure understanding of the big ideas and concepts of science
- make sense of evidence collected and presented in a scientific manner
- recognise the impact science makes on their lives, on the lives of others, on the environment and on culture
- express opinions and make decisions on social, moral, ethical, economic and environmental issues informed by their knowledge and understanding of science
- and, for some, establish the foundation for more advanced learning and future careers in, the sciences and technologies.

As pupils progress through their Broad General Education and into the Senior Phase, they will follow curricular pathways to meet their needs and aspirations which will recognise and accredit their attainment and achievements.



Learning and teaching approaches in science will continue to promote classroom talk, group discussion and debate. Pupils will continue to have the opportunity to become actively involved in their learning, to engage in studies beyond the classroom and to deepen their knowledge and their understanding of the big ideas of science. Through involvement in a wide range of open-ended experiences, challenges and investigations they will continue to develop critical thinking skills and appreciate the key role of the scientific process in generating new knowledge.

The main lines of development for all courses within Science will be:

- Our Living World
- Our Material World
- Our Physical world

# Environmental Science

**Courses** give opportunities for pupils to develop the ability to think analytically, creatively and independently, and to make evaluations. The Course covers a variety of contexts relevant to science's impact on the environment and society through covering the topics Fragile Earth, Human Health and Applications of Science. This will enable pupils to become scientifically literate citizens, able to review the science-based claims they will meet. It provides a skills set for lateral progression is possible to other qualifications in the sciences. This Course can also assist entry to employment, training and further education.

**The skills** that pupils gain by successfully completing Science courses will be valuable for learning, life and work. Pupils will:

- develop and apply knowledge and understanding of science
- develop an understanding of science's role in scientific issues and relevant applications of science in society and the environment
- develop scientific inquiry and investigative skills
- develop scientific analytical thinking skills in a science context
- develop the use of technology, equipment and materials safely in practical scientific activities
- develop problem solving skills in a science context
- use and understand scientific literacy in everyday contexts to communicate ideas and issues
- develop the knowledge and skills for more advanced learning in sciences

**The Learner Journey** through all levels of the course will be coherent and provide challenge and will also serve to equip all pupils with an understanding of the impact of science on everyday life, and with the knowledge and skills to be able to evaluate media reports. This will also equip pupils to make their own decisions on issues within a modern society where the body of scientific knowledge and its applications and implications are ever developing. By using the skills base and knowledge and understanding of science, pupils will become scientifically literate citizens. Science courses will ensure clear pathways and progression from BGE courses onwards through the national qualifications.

## National 3/4 Environmental Science

The course consists of 3 mandatory Units, including the Added Value Unit.

### Environmental Science: Living Environment

In this unit, pupils will investigate their environment in terms of interdependence and biodiversity.

### Environmental Science: Earth's Resources

Pupils develop an understanding of renewable and non-renewable resources and their conservation.

### Environmental Science: Sustainability

Pupils explore sustainability of key natural resources and possible implications for human activity

### Added Value Unit: Environmental Science Assignment

Pupils draw on and extend the skills they have learned from across the Units and demonstrate the breadth of knowledge and skills acquired, in unfamiliar contexts and/or integrated ways.

## Home Learning in Science

All pupils will be required to continue their learning at home. Research is an important skill in Science and pupils will be required to develop deeper learning by:

- Researching new discoveries
- Analysing Science related articles
- Creating 3D models
- Practicing problem solving skills
- Revising using books and online resources

Parents/carers can be supportive by discussing their work with them or aiding them with research, model building or checking through learning outcomes and asking questions to test knowledge. Other ways in which parents/carers can support pupils include:

- Visits to The Science Centre
- Visit to the zoo
- Discussing Science related topics in the news.

## Supporting Pupils in Science

Throughout the course pupils will benefit from individual support from teachers and a range of professional partners.

Support strategies will include:

- Feedback on class work and homework
- Discussion of overall individual strengths, areas of improvement, next steps and progress
- Supported study after school and at lunchtime
- Visits to places of Scientific interest.

# Biology

**Courses** will allow pupils to understand and investigate the living world in an engaging and enjoyable way. It develops learners' abilities to think analytically, creatively and independently, and to make reasoned evaluations. The Course provides opportunities for pupils to acquire and apply knowledge to evaluate biological issues, assess risk, and make informed decisions. This enables pupils to develop an informed and ethical view of complex issues.

**The skills** that pupils gain by successfully completing Biology courses will be valuable for learning, life and work. Pupils will:

- develop their communication and collaborative working
- demonstrating knowledge and understanding
- applying knowledge of biology to familiar situations
- planning experiments to illustrate a particular effect, applying safety measures
- carrying out straightforward experimental procedures, safely, recording general observations and collecting data
- applying information handling skills including
- making generalisations based on evidence/information
- drawing valid conclusions and giving explanations supported by evidence
- suggesting improvements to experiments/investigations
- communicating findings/information
- develop leadership skills
- apply critical thinking in new and unfamiliar contexts to solve problems.

**The Learner Journey** through all levels of the course will be coherent and provide challenge and enjoyment. This Course has a skills-based approach to learning. It takes account of the needs of all pupils and provides sufficient flexibility to enable pupils to achieve in different ways. Biology courses will ensure clear pathways and progression from BGE courses onwards through the national qualifications.

## National 4 Biology

The course consists of four mandatory units, including the Added Value Unit. This Course or its Units may provide progression to other qualifications in Biology or related areas and further study, employment and/or training

Biology: **Cell Biology**

Biology: **Multicellular Organisms**

Biology: **Life on Earth**

## National 5 Biology

The course consists of 3 mandatory units as well as the Course assessment.

Biology: **Cell Biology**

Biology: **Multicellular Organisms**

Biology: **Life on Earth**

## Home Learning in Biology

All pupils will be required to continue their learning at home. Research is an important skill in Biology and pupils encourages the development of skills and resourcefulness, which lead to becoming a confident individual. Successful learners in biology think creatively, analyse and solve problems. Biology aims to produce responsible citizens, through studying of relevant areas of biology, such as health, environment and sustainability. Home learning tasks may include:

- Researching new discoveries and Biological issues
- Analysing Science related articles
- Discussing ethical issues at home
- Creating 3D models
- Practicing problem solving skills
- Revising using books and online resources

Parents/carers can be supportive by discussing their work with them or aiding them with research, model building or checking through learning outcomes and asking questions to test knowledge. Other ways in which parents/carers can support pupils include:

- Visits to The Science Centre
- Visit to the zoo
- Discussing Science related topics in the news.

## Supporting Pupils in Biology

Throughout the course pupils will benefit from individual support from teachers and a range of professional partners.

Support strategies will include:

- Feedback on class work and homework
- Discussion of overall individual strengths, areas of improvement, next steps and progress
- Supported study after school and at lunchtime
- Visits to places of Scientific interest e.g. Edinburgh Zoo, Glasgow Science Centre

# Chemistry

**Courses** will allow pupils to understand and investigate the material world in an engaging and enjoyable way. It develops pupils' abilities to think analytically, creatively and independently, and to make reasoned evaluations. The Course provides opportunities for pupils to acquire and apply knowledge, and make informed decisions. Chemistry is the study of matter and its interactions. Chemistry explains the links between the particulate nature of matter and the macroscopic properties of the world. Chemistry research and development is essential for the introduction of new products. The chemical industry is a major contributor to the economy of the country and ethical view of complex issues.

**The skills** that pupils gain by successfully completing Chemistry courses will be valuable for learning, life and work. Pupils will:

- demonstrating knowledge and understanding
- applying knowledge of chemistry to familiar situations
- planning experiments to illustrate a particular effect, applying safety measures
- carrying out straightforward experimental procedures, safely, recording general observations and collecting data
- applying information handling skills including
- making generalisations based on evidence/information
- drawing valid conclusions and giving explanations supported by evidence
- suggesting improvements to experiments/investigations
- communicating findings/information

**The Learner Journey** through all levels of the course will be coherent and provide challenge and enjoyment. This Course has a skills-based approach to learning. It takes account of the needs of all pupils and provides sufficient flexibility to enable pupils to achieve in different ways. Chemistry courses will ensure clear pathways and progression from BGE courses onwards through the national qualifications.

## National 4 Chemistry

The course consists of four mandatory units, including the Added Value Unit.

Chemistry: **Chemical Changes and Structure**

Chemistry : **Nature's Chemistry**

Chemistry : **Chemistry in Society**

Chemistry : **Chemistry assignment (Added value unit )**

## National 5 Chemistry

The course consists of three mandatory units.

To gain the award of the Course, the pupil must pass all of the Units as well as the Course assessment.

Chemistry: **Chemical Changes and Structure**

Chemistry : **Nature's Chemistry**

Chemistry : **Chemistry in Society**

## Home Learning in Chemistry

All pupils will be required to continue their learning at home. Research is an important skill in Chemistry and encourages the development of skills and resourcefulness, which lead to becoming a confident individual. Successful learners in biology think creatively, analyse and solve problems. Chemistry aims to produce responsible citizens, through studying of relevant areas of chemistry, such as environment and sustainability. Home learning tasks may include:

- Researching new discoveries and Chemical issues
- Analysing related articles
- Discussing ethical issues at home
- Creating 3D models
- Practicing problem solving skills
- Revising using books and online resources

Parents/carers can be supportive by discussing their work with them or aiding them with research, model building or checking through learning outcomes and asking questions to test knowledge. Other ways in which parents/carers can support pupils include:

- Visits to The Science Centre
- Visit to the zoo
- Discussing Science related topics in the news.

## Supporting Pupils in Chemistry

Throughout the course pupils will benefit from individual support from teachers and a range of professional partners.

Support strategies will include:

- Feedback on class work and homework
- Discussion of overall individual strengths, areas of improvement, next steps and progress
- Supported study after school and at lunchtime
- Visits to places of Scientific interest e.g. Summerlee Heritage Museum.

# Physics

**Courses** will allow pupils to understand and investigate the world. They engage in a wide range of investigative tasks, which allows them to develop important skills to become creative, inventive and enterprising, in a world where the skills and knowledge developed by physics are needed across all sectors of society.

**The skills** that pupils gain by successfully completing Physics courses will be valuable for learning, life and work. Pupils will:

- demonstrating knowledge and understanding
- applying knowledge of physics to familiar situations
- planning experiments to illustrate a particular effect, applying safety measures
- carrying out straightforward experimental procedures, safely, recording general observations and collecting data
- applying information handling skills including
- making generalisations based on evidence/information
- drawing valid conclusions and giving explanations supported by evidence
- suggesting improvements to experiments/investigations
- communicating findings/information

**The Learner Journey** through all levels of the course will be coherent and provide challenge and enjoyment. This Course has a skills-based approach to learning. It takes account of the needs of all pupils and provides sufficient flexibility to enable pupils to achieve in different ways. Physics courses will ensure clear pathways and progression from BGE courses onwards through the national qualifications.

## National 4 Physics

The course consists of four mandatory units, including the Added Value Unit.

Physics : **Electricity and Energy**

Physics : **Waves and Radiation**

Physics : **Dynamics and Space**

Physics : **Physics assignment (Added value unit )**

## National 5 Physics

The course consists of three mandatory units.

To gain the award of the Course, the pupil must pass all of the Units as well as the Course assessment.

Physics : **Electricity and Energy**

Physics : **Waves and Radiation**

Physics : **Dynamics and Space**



## Home Learning in Physics

All pupils will be required to continue their learning at home. Research is an important skill in Physics and encourages the development of skills and resourcefulness, which lead to becoming a confident individual. Successful learners in biology think creatively, analyse and solve problems. Physics aims to produce responsible citizens, through studying of relevant areas of physics, such as environment and sustainability. Home learning tasks may include:

- Researching new discoveries and Chemical issues
- Analysing related articles
- Discussing ethical issues at home
- Creating 3D models
- Practicing problem solving skills
- Revising using books and online resources

Parents/carers can be supportive by discussing their work with them or aiding them with research, model building or checking through learning outcomes and asking questions to test knowledge. Other ways in which parents/carers can support pupils include:

- Visits to The Science Centre
- Visit to the zoo
- Discussing Science related topics in the news.

## Supporting Pupils in Physics

Throughout the course pupils will benefit from individual support from teachers and a range of professional partners.

Support strategies will include:

- Feedback on class work and homework
- Discussion of overall individual strengths, areas of improvement, next steps and progress
- Supported study after school and at lunchtime
- Visits to places of Scientific interest e.g. Whitelee Wind Farm

## Careers in Science

All Science subjects develop skills which are required in many careers, not just specific to the sciences. These skills can be applied to a multitude of careers and in many cases higher education courses encourage pupils to have a qualification in a science subject. It is

Below are some specific careers related to Science.

<b>Biology</b>	<b>Chemistry</b>	<b>Physics</b>
Physician	Agricultural Chemist	Radiographer
Nurse	Dentist	Mechanic
Midwife	Pharmacist	Electrician
Sport Scientist	Forensic Chemist	Physician
Carer	Lab Technician	Optician
Dentist	Brewer Lab Assistant	Optometrist
Health worker	Hospital administrator	Science Technician
Nutritionist	Systems Analyst	Engineer
Dietician	Toxicologist	Vet
Vet	Perfumer	Teacher/Lecturer
Pharmacist	Pharmaceutical Sales Representative	Radiation protection practitioner
Optician	Environmental Health Specialist	Geophysicist seismologist
Optometrist	Occupational Safety Specialist	Meteorologist
Beautician	Physician	Promoter
Laboratory Technician	Food Scientist Technician	Technical author
Forensic Scientist	Teacher/Lecturer	Systems developer
Cytologist	Vet	Pilot
Microbiologist	Crime Lab Analyst	Operational researcher