

MAGDALEN COURT SCHOOL

CURRICULUM POLICY FOR SCIENCE

Magdalen Court School bases its Science provision on the National Curriculum. The QCDA Schemes of Work from 'Science – A Scheme of Work for Key Stage 1 and 2' is used in our Junior school.

From Year 7 onwards, lessons are taught on Biology, Chemistry and Physics in discrete topics. Significant expansion of the key ideas provided by the National Curriculum has been woven throughout the teaching and learning in order to more fully prepare our young scientists for onward progression in these subjects. At the end of Year 9, all pupils sit the Optional Tests in Science, and this is used, in addition to teacher assessments, to set targets for their Science GCSEs. In year 10 pupils begin their Key Stage 4 studies, following the OCR 21st Century Core Science programme, and then in year 11, Additional Science. This allows all pupils to leave the college with two GCSEs in Science.

Science is a core subject and at Key Stage 2 will be allocated two hours a week rising to three hours a week at Key Stage 3 and four hours at Key Stages 4 to enable the syllabus to be successfully covered.

AIMS

A broad and balanced science education is the entitlement of every pupil regardless of ethnic origin, gender, class, aptitude or disability. The aims in teaching science at Pattisons include:

- Building on pupils' natural curiosity and developing a scientific approach to problems
- Encouraging open mindedness, self criticism, perseverance and responsibility
- Preparing pupils for life in an increasingly scientific and technological world
- Encouraging pupils to question the reliability of sources they read, hear or see
- Fostering concern about and appreciation of our environment
- Building pupils' self-confidence to enable them to work independently whilst developing their social skills to work co-operatively with others
- Helping pupils acquire progressive understanding of scientific processes
- Helping pupils to acquire and develop practical scientific skills
- Providing pupils with an enjoyable experience of Science so that they will develop a lasting interest and be motivated to study science at a higher level

Teaching and Learning Style

We use a variety of teaching and learning styles in Science lessons. Our Headmaster's aim is to develop pupil's knowledge, skills, and understanding. Sometimes we do this through teacher-led activities, while at other times we engage the pupils in an enquiry-based research activity. We encourage the pupils to ask, as well as answer, scientific questions. They have the opportunity to use a variety of data, such as statistics, graphs, pictures, and photographs. They use ICT in Science lessons where it enhances their learning. They take part in role-play and discussions and they present reports to the rest of the class. They engage in a wide variety of problem-solving activities. Wherever possible, we involve the pupils in 'real' scientific activities, for example, researching a local environmental problem or carrying out a practical experiment and analysing the results.

We recognise that there are pupils of widely different scientific abilities in all classes and we ensure that we provide suitable learning opportunities for all pupils by matching the challenge of the task to the ability of the pupil. We achieve this in a variety of ways which may include:

- setting common tasks which are open-ended and can have a variety of responses;
- setting tasks of increasing difficulty (we do not expect all pupils to complete all tasks);
- grouping pupils by ability in the room and setting different tasks for each ability group;
- providing resources of different complexity, matched to the ability of the pupil;
- using classroom assistants to support the work of individual pupils or groups of pupils.

Throughout all key stages, pupils are taught in their form groups. They will be provided with opportunities to work individually, co-operatively in small groups, in mixed ability and gender groups, friendship groups and as a whole class. The structure of our provision uses the National Curriculum QCDA document for Science which ensures continuity and progression throughout each Key stage. Units of work are taught as detailed later in this document.

It is essential to consider breadth and balance throughout each year group and across each key stage. 'How Science works' is encompassed within the science teaching at Pattisons and pupils will be taught about experimental and investigative methods as an integral part of their Science studies.

Staffing And Organisation Across the Key Stages

Magdalen Court School bases its Science provision on the National Curriculum. The QCDA Schemes of Work from 'Science – A Scheme of Work for Key Stage 1 and 2' is used in our Junior school. From Year 7 onwards, lessons are taught on Biology, Chemistry and Physics in discrete topics. Significant expansion of the key ideas provided by the National Curriculum has been woven throughout the teaching and learning in order to more fully prepare our young scientists for onward progression in these subjects. At the end of Year 9, all pupils sit the Optional Tests in Science, and this is used, in addition to teacher assessments, to set targets for their Science GCSEs. In year 10 pupils begin their Key Stage 4 studies, following the OCR 21st Century Core Science programme, and then in year 11, Additional Science. This allows all pupils to leave the college with two GCSEs in Science. **(There is also scope for some pupils to be entered into a triple science award (Biology, chemistry and physics)).** Science is a core subject and at Key Stage 2 will be allocated two hours a week rising to three hours a week at Key Stage 3 and four/five hours at Key Stages 4 to enable the syllabus to be successfully covered.

There is one science teacher at Pattisons Senior School who will:

- Teach Science across KS3 and 4
- Manage the budget for Science and ensure appropriate resources are available to deliver the science curriculum
- Attend in-service courses and meetings with other colleagues internally and externally to keep up to date with the latest developments in this rapidly changing curriculum area
- Act as subject leader and liaise with the members of staff in the Junior School teaching Science in KS1 and 2

Early Years Foundation Stage (EYFS)

We use the document "Development Matters in the Early Years Foundation Stage" to inform planning in the Nursery and Reception classes. Our curriculum for the EYFS reflects the areas of learning identified in the Early Learning Goals. Our pupils' learning experiences enable them to develop competency and skill across all the learning areas. The Early Years Goals are organised into seven areas and provide the basis for planning throughout the EYFS, so layering secure foundations for future learning. We relate the scientific aspects of the pupils' work to the objectives set out in the EYFS Learning Goals (ELGs) which underpin the curriculum planning for pupils aged three to five. Science makes a significant contribution to the objective in the EYFS Learning Goals of developing a pupil's knowledge and understanding of the world, e.g. through investigating what floats and what sinks when placed in water.

The EYFS covers Science topics through the specific learning area of Understanding the World and corresponding learning goals "Children know about similarities and differences in relation to places, objects, materials, and living things" and "They make observations of animals and plants and explain why some things occur, and talk about changes." Science topics are linked with units of study such as All About Me, Toys, People Who Help Us, Under the Sea, and All Creatures Great and Small. During the All About Me unit in the Autumn Term, the science topics of "Our Body" and "5 Senses" are explored using a weekly teacher led activity on parts of the body and the five separate senses. Spontaneous learning opportunities, both indoor and outdoor, are provided that explore the topics taught in the teacher led activity. During Toys or People Who Help Us in the Spring Term, the science topic of "Materials" is explored using a weekly teacher led activity on how we can use different materials to do different jobs, such as the appropriate materials for underwater toys or a fireman's coat. Spontaneous learning opportunities, both indoor and outdoor, are provided that explore the topics taught in the teacher led activity. During Under the Sea or All Creatures Great and Small in the Summer Term, the science topics of "Animals and their Habitats" and "Changes in Nature" are explored using a weekly teacher led activity on life cycles of butterflies and frogs, habitats of the creatures studied in class, and the patterns found in nature, including symmetry and camouflage. Spontaneous learning opportunities, both indoor and outdoor, are provided that explore the topics taught in the teacher led activity.

To appreciate the approach in EYFS please observe the pupils in this area of the school and consult The EYFS Policy, the “*Statutory Framework for the Early Years Foundation Stage*” DCFS 2012, and “*Development Matters in the Early Years Foundation Stage*” British Association for Early Childhood Education 2012

Science in the Junior School

Pupils explore the exciting world of science through a practical, hands-on approach to scientific study that encourages them to develop a sense of enquiry and an ability to solve problems. Utilising the Senior School’s specialist laboratories, pupils are able to explore resources that will inspire them to plan, conduct and evaluate experiments that will enrich their scientific knowledge of the world and develop their investigative skills.

Science in the Senior School

The teaching of science is based on an imaginative, creative curriculum, which aims at promoting awareness of current developments and applications in science. The department seeks to promote enthusiasm, curiosity and understanding in all its pupils about themselves and the world about them, and to develop the skills of drawing conclusions and evaluating results from detailed observation and analysis. In Years 7-9, pupils are encouraged to adopt an investigative approach, and practical laboratory work forms an integral part of their studies. In Year 7, science is timetabled as a single subject; from Year 8 onwards, pupils study Biology, Chemistry and Physics as discrete subjects and are set according to ability.

In Biology, lower-school pupils study living organisms at a relatively elementary level. They build upon this study during their GCSE course to gain a much deeper understanding of the complexity of cells and organisms and of the interaction of organisms with each other and with the environment.

In Chemistry, lower-school pupils make detailed observations of chemical reactions. In the upper school they build upon their knowledge and are able to give more detailed explanations of why chemical reactions take place, with reference to atomic structure and bonding.

In Physics, lower-school pupils begin to study the nature of forces, energy, electricity, and waves so that as they move into the GCSE course they can appreciate the effects of these phenomena and their uses. GCSE courses available are Edexcel, IGCSE Triple Award Science and AQA GCSE Science and Additional Science. These courses provide a firm foundation for the study of Biology, Chemistry and Physics at AS and A Level.

Learning outcomes

Year 7 Science

- Measuring, recording and analysing techniques
- Particle theory to explain dissolving and separation techniques
- Energy transfers and the need for energy resources
- How to construct and use simple electrical circuits and devices
- The human life-cycle and understanding puberty
- The Periodic Table and the construction of chemical equations.

Year 8/9 Biology

- Types of food groups, leading to a discussion of issues of anorexia and heart disease
- Respiration, leading to a discussion of how asthma affects breathing
- The mechanics of the heart and how high blood pressure can cause heart disease
- The skeleton structure, joints and understanding sports injuries
- Contrasting respiration and photosynthesis
- The use of microscopes and using them to identify types of cells
- Predicting, observing and explaining the effect of enzymes
- Research into microbes and disease and how this can lead to careers in science
- Ecology, habitats and our effect on the environment.

Year 8/9 Chemistry

- Chemical and physical changes and their application to oxidation and rusting
- Chemical accounts and the law of conservation of mass
- The structure of the atom, interpreting the numbers on the Periodic Table and determining chemical formulae

- Observations of how metals react in water, acids and how they displace each other to determine the reactivity series
- How electricity can be used to split compounds
- Predicting chemical formulae and communicating using chemical equations
- Ions to explain electrolysis
- Acidity leading to salt making
- Investigations into indigestion medicines and solubility to practise planning, observing, analysis and evaluation skills.

Year 8/9 Physics

- How we see and how this can be applied to photography and colour
- How boats float, leading to a consideration of how density is calculated
- How planes fly, leading to a consideration of balanced and unbalanced forces
- The term pressure and how it relates to weather forecasting
- How we hear, leading to a consideration of sound as waves
- How glasses correct vision, leading to a consideration of the refraction of light
- What is light, leading to a consideration of wave theory
- How physics is used in hospitals, broadcasting and for predicting and analysing earthquakes
- Energy efficiency in the home and carbon emissions.

English

Science contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening. The pupils develop oral skills in Science lessons through discussions (for example of the environment) and through recounting their observations of scientific experiments. They develop their writing skills through writing reports and projects and by recording information.

Mathematics

Science contributes to the teaching of Mathematics in a number of ways. The pupils use weights and measures and learn to use and apply number. Through working on investigations they learn to estimate and predict. They develop the skills of accurate observation and recording of events. They use numbers in many of their answers and conclusions.

Information and Communication Technology (ICT)

Pupils use ICT in science lessons where appropriate. They use it to support their work in Science by learning how to find, select, and analyse information on the Internet and on laptops. Pupils use ICT (digital cameras and digital microscopes) to record, present and interpret data and to review, modify and evaluate their work and improve its presentation.

Personal, Social, Health and Economic Education (PSHEE) and Citizenship

Science makes a significant contribution to the teaching of PSHEE. This is mainly in two areas. Firstly, the subject matter lends itself to raising matters of Citizenship and social welfare. For example, pupils study the way people recycle material and how environments are changed for better or worse. Secondly, pupils benefit from the nature of the subject in that it gives them opportunities to take part in debates and discussions. Science promotes the concept of positive Citizenship.

Spiritual, Moral, Social and Cultural Development

Science teaching offers pupils many opportunities to examine some of the fundamental questions in life, for example, how the world was created. Through many of the amazing processes that affect living things, pupils develop a sense of awe and wonder regarding the nature of our world. Science raises many social and moral questions. We give them the chance to reflect on the way people care for the planet and how science can contribute to the way we manage the earth's resources. Science teaches pupils about the reasons why people are different and, by developing the pupil's knowledge and understanding of physical and environmental factors, it promotes respect for other people.

Teaching Science to Pupils with Special Educational Needs

At Magdalen Court School we teach Science to all pupils, whatever their ability. Science forms part of the school curriculum policy to provide a broad and balanced education to all pupils. Through our Science teaching we provide

learning opportunities that enable all pupils to make progress. We do this by setting suitable learning challenges and responding to each pupil's different needs.

When progress falls significantly outside the expected range, the pupil may have Special Educational Needs. Our assessment process looks at a range of factors – classroom organisation, teaching materials, teaching style, and differentiation – so that we can take some additional or different action to enable the pupil to learn more effectively. This ensures that our teaching is matched to the pupils needs. Where a pupil requires an Individual Education Plan (IEP); this IEP may include, as appropriate, specific targets relating to Science.

We enable pupils to have access to the full range of activities involved in learning Science. Where pupils are to participate in activities outside the classroom, for example, a trip to a science museum, we carry out a risk assessment prior to the activity, to ensure that the activity is safe and appropriate for all pupils.

Resources

Science resources will be stored in the Science Laboratory and ancillary Supplies room. Resources will be constantly monitored and updated to best support the curriculum. Equipment is checked on a regular basis and repaired or replaced as necessary. Small electrical items are PAT tested annually. Each pupil has a copy of the relevant textbook to support their learning, and the opportunity to purchase exam revision guides and workbooks at cost from the school.

Equal Opportunities

All activities will be planned in a way that encourages full and active participation by all pupils, irrespective of ability or gender. The QCDA programme of study describes the expected levels of achievement that pupils should reach by the end of each unit, including those for pupils who have made more or less progress, depending on their ability. There will be a range of hand picked, current and relevant books, journals and other materials available both within individual laboratories and in the Library/Learning Resources area to provide additional information for use by staff and students. Sets of GCSE course textbooks in each Science specialism will be maintained in the relevant laboratory. Students across key stages 3, 4 and 5 will be loaned copies of the relevant course textbook for home use for the duration of the course.

Science Homework

Weekly homework that has been appropriately planned to consolidate and challenge the pupils' knowledge and understanding will be set for all pupils at each key stage. Tasks that are to be undertaken at home should be clearly identified and entered in the Homework Diary by the pupils. A heading saying 'Homework' should be written at the top of every such piece of work in their exercise books, before being handed in for assessment.

Science And Ict

In the Senior ICT is woven into lessons both by showing pupils relevant science clips through a data projector in the classroom, and by pupils using the ICT suite to research and prepare reports and power point presentations and to present experimental data on spreadsheets.

Appropriate and exciting opportunities to use ICT have been considered during the planning of the Science curriculum at Pattisons. Pupils are often asked to use secondary sources to find information. CD ROMS and the internet provide an important source for data for research but pupils need to be taught the skills of retrieving the information they want efficiently and safely. Before using these sources, pupils need to know exactly what it is they want to find out and should be encouraged to choose the resource that does the job best. Multimedia sources can be used to show things that cannot be readily seen e.g. the activity of micro-organisms or the flow of current in a wire.

Science And Display

Display of pupils' work at all key stages is important for reasons of celebration, information and consolidation of learning. Materials suitable for display include key scientific vocabulary, books and artefacts, models, posters, graphs, written work, diagrams and explanatory texts. Our aim is to use quality displays at every opportunity to ensure that the learning environment for our pupils is vibrant and celebratory.

Health And Safety

The Science teacher takes into account recommendations by the ASE (Association for Science education) which gives guidelines for teachers of science and for technicians. Pattisons also subscribes to **CLEAPSS** to ensure the safe use of chemicals and other procedures in the laboratories.

Assessment, Recording And Reporting

We assess pupils work in Science by making informal judgements as we observe them during lessons. On completion of a piece of work, the teacher marks the work and comments as necessary. At the end of a unit of work the pupils complete a Rising Stars Test (Yrs 1-6) to monitor their understanding and application of what was taught in the unit. Their results are recorded on the Teacher's Drive. The Science coordinator keeps samples of pupils work in the Science policy folder and uses these to demonstrate what the expected level of achievement is in Science for each age group in the school.

Science work is undertaken in the appropriate subject A5 exercise book. Pupils are expected to keep their books safe in a plastic wallet to ensure they stay in good condition. Pupils will have the opportunity to use a variety of ways to record their work, including annotated diagrams, written descriptions and graphs.

Science investigations need not be written up in full for each investigation undertaken as the focus of each piece of practical work pupils undertake has been planned to cover the full range of scientific skills expected at each key stage, and to comply with external examination requirements.

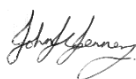
The end of unit expectation in each QCDA scheme of work provides a broad description of achievement. These can be used to help the teacher assess the progress made by individual pupils. Pupils will be formally assessed by written examination once a year but there will be regular end of unit testing at each key stage. Teacher Assessments and more formal testing and identification of levels/grades will be reported to parents in line with Magdalen Court School policies.

Monitoring and Review

The monitoring of the standards of pupils work and of the quality of teaching in Science is the responsibility of the Science coordinator. The work of the coordinator also involves supporting colleagues in the teaching of Science, being informed about current developments in the subject, and providing a strategic lead and direction for the subject in the school. The Science coordinator gives the Headmaster an annual summary report in which s/he evaluates the strengths and weaknesses in the subject and indicates areas for further improvement.

Date: August 2016

Signed:



Principle