Orsett Heath Academy Science Department Curriculum Journey

The purpose of the curriculum:
We believe that science education provides the foundations for understanding the world. Science changes our lives and is vital to the world's future prosperity. The overarching aim for Science at Orsett Heath Academy is to help our learners to acquire deeper scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics. In order to achieve this, students will develop an understanding of the nature, processes and methods of science through different types of scientific enquiries. Students will use their learning to help to answer scientific questions about the world around them. Through science education, students will learn to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They are encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes. By revisiting the 'big ideas' in Science through a spiral curriculum, we will equip students with the scientific knowledge and skills required to understand the uses and implications of science, today and for the future.

In year 11, you will prepare for final examinations in either combined science or triple science

A Levels – *You can study Biology, Chemistry or Physics and even other Science subjects such as Geology and Astronomy.*

Year 11

- B7: Ecology
- C6: The rate and extent of chemical change
- C10: Using resources
- P5 (Triple Science – Physics): Space physics

Skills:

- AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures.
- AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures.
- AO3: Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures.

In year 10, Science will split into either Combined Science or Triple Science (Biology, Chemistry & Physics)

Year 10

- B3: Infection & and response
  B5: Homeostasis and response
- B6: Inheritance, variation and evolution
- C3: Quantitative chemistry
  C4: Chemical changes
- C5: Energy changes
  C7: Organic chemistry
- P4: Atomic structure
  P5: Forces
- P7: Magnetism and electromagnetism

Students will either follow AQA Combined Science Trilogy or AQA Triple Science Biology, Chemistry and Physics. The units will contain theory, required practical-based lessons, revision and exam practice. Students complete all 6 Science papers in year 11 with exams accounting for 100% of their grades. Within these exams there will be questions that will draw on the knowledge and understanding students have gained from carrying out the required practical activities. These questions will count for at least 15 % of the overall marks for the qualification.

In year 9, you will consolidate knowledge learned over KS3 and prepare for the transition to KS4.

Don't forget, throughout year 7 and 8, you will also have the opportunity to enrich your science experience through STEM club each week and through the various trips and extra-curricular activities

Year 9

- Cell Biology
  Organisation
- Bioenergetics
- Atomic structure
  Structure and bonding
- Chemical Analysis
  The Atmosphere
- Energy
  Electricity
- Particle Model of matter

Working Scientifically - Analysis and evaluation

- apply mathematical concepts and calculate results
- present observations and data using appropriate methods, including tables and graphs
- interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions
- present reasoned explanations, including explaining data in relation to predictions and hypotheses
- evaluate data, showing awareness of potential sources of random and systematic error
- identify further questions arising from their results.

Working Scientifically - Experimental skills and investigations

- ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience
- make predictions using scientific knowledge and understanding
- select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate
- use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety
- make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements

In year 8, you will begin to expand on the knowledge you have gained in year 7 and further develop your science enquiry skills.

Year 8

- Unit 6: Plants
- Unit 5: Waves
- Unit 4: Reactivity
- Unit 3: Electricity and Circuits
- Unit 2: Atoms & Elements
- Unit 1: Fitness

Working Scientifically - Scientific attitudes:

- pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility
- understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and pee review
- evaluate risks.

Working Scientifically – Measurement

- understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature
- use and derive simple equations and carry out appropriate calculations
- undertake basic data analysis including simple statistical techniques.

Year 7

- Unit 1: Chemical Reactions
- Unit 2: Variation
- Unit 3: Forces
- Unit 4: Particles
- Unit 5: The Earth & Space
- Unit 6: Cells and Reproduction

*Assessments will be completed at the end of each topic to test understanding of that topic and previously completed topics.

You will complete Personalised Learning Checklists to show how your learning in Science is progressing

You will follow these 'golden threads' in KS2 Science all the way through your journey…

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Using test results to make predictions to set up further comparative and fair tests
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays

What did Key Stage 2 look like (Years 5 & 6)?
Can you spot where the skills you gained here link to Key Stage 3?

KS2 Primary School

Identifying scientific evidence that has been used to support or refute ideas or arguments.

When you reach year 7, The National Curriculum for Science aims to ensure that all pupils:

- Have a deeper understanding the world through the specific disciplines of biology, chemistry and physics.
- Appreciate how science has changed our lives and can articulate why it is vital to the world's future prosperity.
- Learn about aspects of the knowledge, methods, processes and uses of science.
- Develop the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena.
- Are encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.