



Buckler's Mead Academy

Curriculum Booklet: Science

Subject Lead: Miss Parsons



Science Curriculum Intent

Science education is one of the keys to social mobility. Science qualifications open the doors to many rewarding and interesting careers, and scientific literacy is critically important to being an informed citizen. Science is the most powerful method humans have for understanding the world.

Sir John Holman

We aim to ensure that our students not only develop a love for learning Science, but acquire the knowledge they need to become active and healthy citizens in modern society, and to enable them to reach their full potential, regardless of their background, able to continue to study Science beyond GCSE should they choose to do so.

At Buckler's Mead, we aim to support all learners, regardless of background, to achieve their full potential. As a relatively high proportion of our learners arrive with lower than national average attainment at Key Stage 2, and a relatively high proportion of students come from households that rely on the school to fully meet the learning needs of their child, our curriculum is designed to engender high aspirations and to support our students to reach their full potential; we do this by providing them with the resources, support and challenge they need both in lessons and away from the classroom.

We want our students to recognise that Science seeks to explain the world, to learn about the differences between each Science and to learn about the different ways scientists work. We break down the knowledge into key concepts which are taught in the separate disciplines of Biology, Chemistry and Physics from year 7 onward and carefully sequence them so that knowledge is introduced in a logical order over a 5 year journey. We want our students to retain this knowledge long term and be able to apply it to explain the world around them.

We aim to encourage the natural curiosity of our students and as such we ensure that they have the knowledge and skills required to learn through carrying out practical experiments and eventually to be able to design investigations which answer their own questions.

We want our students to become scientifically literate. To be able to read and understand scientific articles in the news or in literature, to communicate their understanding effectively and with confidence and to understand and engage with scientific issues so that they can form valid opinions and make informed decisions. Reading in our school is part of the culture. We want children to love reading and as such our Science curriculum is designed to encourage reading.

Our curriculum is also designed to ensure that our students develop a knowledge of how science relates to social, moral, spiritual and cultural issues as well as the scope and limitations of science in this regard.

The science curriculum is therefore more than a description of the journey towards expertise. It is also the means by which to get there.



Science Curriculum Implementation

All lessons follow the school's Learning Cycle (Connect, Describe, Challenge and Demonstrate). A range of differentiated activities are provided to students, including challenge tasks for students and support and scaffolding of tasks for those who require more support.

Students have regular low stakes tests to inform the next steps of learning and regular formative assessments so that students who are not making the required levels of progress are identified and further supported. Students are given time to evaluate their assessments and use these as a further learning tool to correct misconceptions.

Key Stage 3

As students come to Buckler's Mead from many different feeder schools across Yeovil and beyond, we use a Baseline Assessment to accurately pinpoint gaps in prior learning. We teach in set classes, which start in Y7 broadly based on English setting, but become based on student progress in Science in Y8 and 9, when they have completed a full range of topics. All students have access to the same curriculum but those students with lower KS2 prior attainment are given support to reach the same objectives through scaffolding of tasks.

Over their 5-year journey, learners grow and develop into scientifically literate young adults. Our science team carefully sequences students' learning to ensure knowledge is introduced in a logical order, allowing them to retain and build on their knowledge. Key skills in Science are developed throughout the academic year, for example students will learn how scientists prepare and carry out experiments. Topics are sequenced carefully to build on prior learning, with topics being revisited, to ensure knowledge acquisition is in a logical order and to prevent any misconceptions becoming embedded. Literacy is a key focus, with the use of scientific terminology that enables students to confidently explain their understanding.

Throughout Year 9, students start the transition to the GCSE course with topics that bridge the end of Key stage 3 and the beginning of key Stage 4. Key knowledge and concepts from KS3 are carried forward into KS4 and this time is also used to make links to new knowledge.

Key Stage 4

Students follow the AQA Combined Science: Trilogy specification, following a scheme of learning and assessment plan that is aligned across the Trust. Once again, knowledge is carefully sequenced to ensure continuity of learning, ensuring knowledge is built over time, whilst allowing opportunities to revisit and embed long term knowledge.

Our students are given time to evaluate assessments and correct misconceptions before moving onto new topics. This means our students are equipped to help themselves make progress and become self-aware, literate scientists ready for the demands of examinations and able to access future academic or vocational A level and Certificate courses.

Allocated Curriculum Time:

	Year 7	Year 8	Year 9	Year 10	Year 11
Lessons per fortnight	9	9	9	11	11



Term	Curriculum Foci	Formal Assessment
1	<p>Introduction to Science</p> <ul style="list-style-type: none"> Introduction to How Science Works <p>Cells</p> <ul style="list-style-type: none"> Cells, tissues and organs <p>Particles</p> <ul style="list-style-type: none"> The different properties of matter in solid, liquid or gas form Particle model and changes of state Diffusion 	<p>Assessment 1: MNSP Baseline Assessment Time: 40 mins</p>
2	<p>Elements, atoms and compounds</p> <ul style="list-style-type: none"> Introducing the chemical building blocks of all matter Elements and compounds <p>Forces</p> <ul style="list-style-type: none"> Measuring forces Drag forces and friction, balanced vs unbalanced forces 	<p>Assessment 2: Summative assessment for topics studied this term Time: 40 mins</p>
3	<p>Energy</p> <ul style="list-style-type: none"> Understanding energy changes and transfers Thermal energy and temperature <p>Body structure and systems</p> <ul style="list-style-type: none"> Overview of various organ systems Respiratory system and nervous system 	<p>Assessment 3: Summative assessment for topics studied this term Time: 40 mins</p>
4	<p>Plant and animal reproduction</p> <ul style="list-style-type: none"> Reproductive systems The menstrual cycle fertilisation and development of a foetus Flowers and pollination; fertilisation, germination and seed dispersal <p>Separating mixtures</p> <ul style="list-style-type: none"> Mixtures and solutions Evaporation, distillation and chromatography 	<p>Assessment 4: Summative assessment for topics studied this term Time: 40 mins</p>
5	<p>Introduction to reactions</p> <ul style="list-style-type: none"> Different types of reactions Conservation of mass <p>Sound and Waves</p> <ul style="list-style-type: none"> Sound and waves Types of wave Sound; loudness and pitch 	<p>Assessment 5: End of Year Exam Time: 1 hour</p>
6	<p>The Earth and Space</p> <ul style="list-style-type: none"> The solar system and phases of the moon Structure of the earth Rocks <p>Interdependence</p> <ul style="list-style-type: none"> Food chains. webs and ecosystems 	<p>Assessment 6: Summative assessment for content in Term 6 Time: 40 mins</p>



Year 8 Programme of Study

Term	Curriculum Foci	Formal Assessment
1	<p>The Periodic Table</p> <ul style="list-style-type: none"> Groups and Periods, metals and non-metals Group 1 metals vs Group 7 and the noble gases <p>Photosynthesis and respiration</p> <ul style="list-style-type: none"> Photosynthesis and leaf structure Aerobic and anaerobic respiration 	<p>Assessment 1: MNSP Baseline Assessment Time: 40 mins</p>
2	<p>Motion and pressure</p> <ul style="list-style-type: none"> Motion graphs, speed and velocity Pressure and turning forces <p>Acids and alkalis</p> <ul style="list-style-type: none"> Features of acids and alkalis Litmus, universal indicator and making other indicators <p>Health and digestion</p> <ul style="list-style-type: none"> Energy in food and food tests Balanced diet and digestion, drugs, alcohol and smoking 	<p>Assessment 2: Summative assessment for topics studied this term Time: 40 mins</p>
3	<p>Light</p> <ul style="list-style-type: none"> Reflection and refraction The eye and the camera <p>Metals and acids</p> <ul style="list-style-type: none"> Metals and acids. metals and oxygen, metals and water Displacement reactions 	<p>Assessment 3: Summative assessment for topics studied this term. Time: 40 mins</p>
4	<p>Energy resources</p> <ul style="list-style-type: none"> The use of energy resources Energy in food <p>Chemical Energy</p> <ul style="list-style-type: none"> Endothermic and exothermic reactions Experimental Designs <p>Adaptations Variation and evolution</p> <ul style="list-style-type: none"> Competition and variation Natural selection, extinction, Adaptations, variation, inheritance 	<p>Assessment 4: Summative assessment for topics studied this term Time: 40 mins</p>
5	<p>Magnets and Electromagnets</p> <ul style="list-style-type: none"> Magnetic fields and magnetic interactions Making magnets and electromagnets, electric motors <p>Microbes and Disease</p> <ul style="list-style-type: none"> Types and causes of disease Treating diseases 	<p>Assessment 5: End of year exam on topics from Y7 and Y8 Time: 1 hour</p>
6	<p>Atmosphere</p> <ul style="list-style-type: none"> Composition of the Earth's atmosphere Resources from the ground <p>Electricity</p> <ul style="list-style-type: none"> Conductors and insulators Series and parallel circuits Resistance in circuits 	<p>Assessment 6: Summative assessment for topics studied this term Time: 40 mins</p>



Term	Curriculum Foci	Formal Assessment
1	<p>Particle model of matter</p> <ul style="list-style-type: none"> • Particle behaviour of states and the changes of state • Density of materials <p>Cell Biology</p> <ul style="list-style-type: none"> • Use microscopes to explore the structure of cells • Identify the organelles and their functions • Investigating the processes of diffusion and osmosis 	<p>Assessment 1: Summative assessment for topics studied this term Time: 40 mins</p>
2	<p>Organic Chemistry</p> <ul style="list-style-type: none"> • Hydrocarbons • Fractional distillation • Cracking <p>Atmosphere and the Earth's Resources</p> <ul style="list-style-type: none"> • The Earth's early and present atmosphere • The Carbon Cycle • Potable water 	<p>Assessment 2 : Summative assessment for topics studied this term Time: 40 mins</p>
3	<p>Organisation</p> <ul style="list-style-type: none"> • Digestive system and investigating enzyme action, • The circulatory system and Healthy Lifestyles • Plant organisation and photosynthesis <p>Chemical Analysis</p> <ul style="list-style-type: none"> • Separation techniques • Purity and Formulations 	<p>Assessment 3: Summative assessment for topics studied this term Time: 40 mins</p>
4	<p>Organisation (continued)</p> <ul style="list-style-type: none"> • Digestive system and investigating enzyme action, • The circulatory system and Healthy Lifestyles • Plant organisation and photosynthesis <p>Atomic Structure</p> <ul style="list-style-type: none"> • Exploring the nucleus of the Atom • Nuclear Radiation • Medical applications of Radiation 	<p>Assessment 4: Summative assessment for topics studied this term</p>
5	<p>Knowledge Retrieval</p> <ul style="list-style-type: none"> • Revision and preparation for end of year exam • Each teacher will focus on key areas 	<p>Assessment 5: End of KS3 Exams. Time: 1 hour</p>
6	<p>Using resources</p> <ul style="list-style-type: none"> • Life cycle analyses • Carry out practical to identify gases • Distinguish between formulations and pure substances • Identify ions experimentally • Explore how thermal energy is transferred through the universe <p>Rates of Reaction</p> <ul style="list-style-type: none"> • Collision Theory • Measuring the rate of reaction 	<p>Assessment 6: Summative Assessment Time: 40 mins</p>



Year 10 GCSE Science (Trilogy) Programme of Study
 Exam Board: AQA
 Exam Specification: 8464

Term	Curriculum Foci	Formal Assessment
1	<p>Atomic Structure</p> <ul style="list-style-type: none"> Structure and history of the atom The Periodic Table Atoms, elements, compounds and isotopes <p>Electricity</p> <ul style="list-style-type: none"> Electrical components and investigating the rules of circuits Electricity in the Home <p>Energy transfers and Energy resources</p> <ul style="list-style-type: none"> Calculating energy changes Energy Efficiency Renewable and non-renewable resources 	<p>Assessment 1: Summative assessment for topics studied this term Time: 40 mins</p>
2	<p>Bonding and Structure and the Particles of Matter</p> <ul style="list-style-type: none"> Ionic, covalent and metallic bonding Giant covalent structures Intermolecular forces <p>Electricity (continued)</p>	<p>Assessment 2: Summative assessment for topics studied this term Time: 40 mins</p>
3	<p>Chemical Changes</p> <ul style="list-style-type: none"> Reactivity Series Quantitative Chemistry Electrolysis and Energy Changes <p>Energy Changes</p> <ul style="list-style-type: none"> Energy in reactions Exothermic and endothermic reactions 	<p>Assessment 3: Summative assessment for topics studied this term Time: 40 mins</p>
4	<p>Infection and Disease</p> <ul style="list-style-type: none"> Working with Microorganisms Disease transmission Plant diseases <p>Quantitative Chemistry</p> <ul style="list-style-type: none"> Balancing equations Calculating moles Relative formula mass Conserving mass 	<p>Assessment 4: Summative assessment for topics studied this term Time: 40 mins</p>
5	<p>Photosynthesis and respiration</p> <ul style="list-style-type: none"> Investigating photosynthesis Respiration and the effects of exercise <p>Knowledge Retrieval</p> <ul style="list-style-type: none"> Revision and preparation for end of year exam 	<p>Assessment 5: Summative assessment for topics studied this term Time: 40 mins</p>
6	<p>Knowledge Retrieval</p> <ul style="list-style-type: none"> Revision and preparation for end of year 	<p>Assessment 6: End of Y10 GCSE Exams:</p>



	<p>exam</p> <p>Homeostasis and Response</p> <ul style="list-style-type: none">• The central Nervous System and reaction times• The Endocrine System• Blood Sugar Levels• The Menstrual Cycle, contraception and fertility	<p>Paper 1 for Bio</p> <p>Paper 2 for Chem</p> <p>Paper 1 for Phy</p>
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Year 11 GCSE Science (Trilogy) Programme of Study

Exam Board: AQA

Exam Specification: 8464

Term	Curriculum Foci	Formal Assessment
1	Ecology <ul style="list-style-type: none">• Habitats and biodiversity• Food, chains webs and sampling techniques• Effect of Humans on the Environment Forces <ul style="list-style-type: none">• Investigating forces• Resultant forces, analysing graphical data Forces and Motion <ul style="list-style-type: none">• Investigating Acceleration and terminal velocity• Forces and Braking	Assessment 1: Summative assessment for topics studied this term Time: 40 mins
2	Inheritance, Variation and evolution <ul style="list-style-type: none">• Genetics and Inheritance• Inheritance and The theory of evolution• Investigate how genetic engineering and cloning work	Assessment 2: Mock GCSE Exams: Paper 1 Biology Paper 2 Chemistry Paper 1 Physics
3	Waves <ul style="list-style-type: none">• Properties and types of waves• Reflection and refraction• Electromagnetic spectrum Magnetism <ul style="list-style-type: none">• Types of magnets and magnetic fields• The motor effect	Assessment 3: Summative assessment for topics studied this term Time: 40 mins
4	Revision <ul style="list-style-type: none">• Revision and preparation for exam• Knowledge recall exercises	Assessment 4: Mock GCSE Exams: Paper 2 Biology Paper 1 Chemistry, Paper 2 Physics
5	Revision <ul style="list-style-type: none">• Revision and preparation for exam• Knowledge recall exercises	Targeted assessment and feedback for key cohorts



Revision and Support

There are many ways in which you can support your child in the study of Science such as:

- Create revision resources: mind maps, storyboards, cue cards
- Purchase CGP Science revision guide (this can be done through parent pay at a discounted price)
- Use DRIP sheets and practice papers to consolidate knowledge and practice exam technique (these are distributed to students by class teachers but electronic copies can be found via [science curriculum online](#))
- Encourage attendance to additional modular revision sessions (these run after school between January and April)
- Use online revision resources
 - BBC Bitesize: <https://www.bbc.co.uk/bitesize/examspecs/z8r997h>
 - Seneca: <https://senecalarning.com/en-GB/>



Final GCSE Assessment Structure

Subject	Weighting	Content	Proposed Date of Examination
Biology	33.3%	Paper 1 - 1 hour and 15 mins <ol style="list-style-type: none">1. Cell biology2. Organisation3. Infection and response4. Bioenergetics Paper 2 - 1 hour and 15 mins <ol style="list-style-type: none">1. Homeostasis and response2. Inheritance, variation and evolution3. Ecology	May/June of Year 11
Chemistry	33.3%	Paper 1 - 1 hour and 15 mins <ol style="list-style-type: none">1. Atomic structure and the periodic table2. Bonding, structure, and the properties of matter3. Quantitative chemistry4. Chemical changes5. Energy changes Paper 2 - 1 hour and 15 mins <ol style="list-style-type: none">1. The rate and extent of chemical change2. Organic chemistry3. Chemical analysis4. Chemistry of the atmosphere5. Using resources	May/June of Year 11
Physics	33.3%	Paper 1 - 1 hour and 15 mins <ol style="list-style-type: none">1. Energy2. Electricity3. Particle model of matter4. Atomic structure Paper 2 - 1 hour and 15 mins <ol style="list-style-type: none">1. Forces2. Waves3. Magnetism and electromagnetism	May/June of Year 11

Please see exam board websites for up to date information:

<https://www.aqa.org.uk/subjects/science/gcse/combined-science-trilogy-8464>