St Dunstan's School
GLASTONBURY

Science Curriculum Booklet
2023-24

Subject Lead: Mrs Thomason

Subject Curriculum Intent:

" We will always have STEM with us. Some things will drop out of the public eye and will go away, but there will always be science, engineering and technology. And there will always be mathematics."

Katherine Johnson

At St Dunstan's we aim to ignite a lifelong passion for science in our students and equip them with the knowledge and confidence to question and pursue the scientific world. We believe that all students should have the right to a broad scientific education which develops critical thinking and evaluation of ideas that in turn allows our students to understand and explain the world around them as well as become responsible citizens.

St Dunstan's is a comprehensive school that admits students with a wide range of prior ability and our curriculum is designed to bridge this gap whilst reflecting the needs of our students and allowing all to achieve their full potential. Our aim is to support and stretch every student and our curriculum has been designed with the different educational needs in mind.

Our Key Stage 3 curriculum exceeds that of the National Curriculum and builds on the knowledge gained during their Key Stage 2 education therefore filling gaps in knowledge and scientific literacy and fully preparing our students for the Key Stage 4 course. At Key Stage 4 we offer the AQA double Science award (trilogy) which fully prepares our students for various science subjects in further education including A Levels, T Levels and BTech courses.

As with many communities, our students arrive at St Dunstan's with different experiences of exploring the wider and local environment around us and we have a strong focus of providing opportunities for our students to close gaps in the cultural capital and therefore remove barriers for our disadvantaged students' future learning.

The St Dunstan's science curriculum intends to instil the St Dunstan's core values of Truth; Resilience; Ambition; Community and Kindness (TRACK) as follows:

- **Truth**: the curriculum intent is to provide students with the scientific facts and theories needed to make informed observations and decisions on their future and the future of the environment as a whole as well as have the confidence to question misunderstandings.
- **Resilience**: The curriculum is designed to provide students with the ability to apply scientific reasoning to problem solving and have the confidence to adapt to the ever changing information available.
- **Ambition**: The curriculum is designed to give all learners the ability to study challenging content that allows all to flourish and provide opportunities for students to achieve expected outcomes and develop a love and understanding for science that can be taken further in education.
- **Community**: The curriculum intent is to give all students the opportunity to develop an understanding and appreciation of science that will allow them to see the relationship between community and scientific development. We strive to give our students opportunities to experience 'science in the real world' that supports in class learning with real time examples.
- **Kindness**: The curriculum is used to supply difficult and complicated information that affect people's day to day lives and our students are rewarded for their ability to learn and enquire with kindness to their fellow pupils as well as their surroundings allowing for a cohesive and safe learning environment.

Science Curriculum Implementation:

Key Stage 3

As students come to St Dunstan's from many different feeder schools, we use SATS and teacher assessment data to place students in sets immediately so there is no loss in learning on transition to secondary education.

This is the beginning of their 5-year journey to 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 of different scientific theories.

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 scientific knowledge.

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 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.

Assessment at Key Stage 4 is a mixture of knowledge quizzes and summative assessments which allow our students time to reflect and make improvements, that in turn ensure gaps in knowledge are closed. As with key stage 3, 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 Group	Y7	Y8	Y9	Y10	Y11
Fortnightly lesson allocation in hours	6	6	6	9	9

Curriculum Plan: Year 7

Term	Curriculum Foci Areas	Assessment Criteria
1	**Introduction to Science** ● Introduction to How Science Works **Cells** ● Cells, tissues and organs **Particles** ● The different properties of matter in solid, liquid or gas form ● Particle model and changes of state ● Diffusion	**Assessment 1:** MNSP Baseline Assessment
2	**Elements, atoms and compounds** ● Introducing the chemical building blocks of all matter ● Elements and compounds **Forces** ● Measuring forces ● Drag forces and friction, balanced vs unbalanced forces	**Assessment 2:** Summative assessment for topics studies this term
3	**Energy** ● Understanding energy changes and transfers ● Thermal energy and temperature **Body structure and systems** ● Overview of various organ systems ● Respiratory system and nervous system	**Assessment 3:** Summative assessment for topics studies this term Literacy Task: Healthy Body Systems
4	**Plant and animal reproduction** ● Reproductive systems ● The menstrual cycle fertilisation and development of a foetus ● Flowers and pollination; fertilisation, germination and seed dispersal **Separating mixtures** ● Mixtures and solutions ● Evaporation, distillation and chromatography	**Assessment 4:** Summative assessment for topics studies this term
5	**Introduction to reactions** ● Different types of reactions ● Conservation of mass **Sound and Waves** ● Sound and waves ● Types of wave ● Sound; loudness and pitch	**Assessment 5:** End of year exam on content from Y7
6	**The Earth and Space** ● The solar system and phases of the moon ● Structure of the earth ● Rocks **Interdependence** ● Food chains. webs and ecosystems	**Assessment 6:** Summative assessment for content in Term 6 Literacy Task: Space

Curriculum Plan: Year 8

Term	Curriculum Foci Areas	Assessment Criteria
1	**The Periodic Table** ● Groups and Periods, metals and non-metals ● Group 1 the alkali metals vs Group 7 the halogens ● Group 0 the noble gases **Photosynthesis and respiration** ● Photosynthesis and leaf structure ● Aerobic and anaerobic respiration	**Assessment 1:** MNSP Baseline Assessment
2	**Motion and pressure** ● Motion graphs ● Speed and velocity ● Pressure and turning forces **Acids and alkalis** ● Features of acids and alkalis ● Litmus, universal indicator an making other indicators **Health and digestion** ● Energy in food and food tests ● Balanced diet and digestion ● Drugs, alcohol and smoking	**Assessment 2:** Summative assessment for topics studies this term
3	**Light** ● Reflection and refraction ● The eye and the camera **Metals and acids** ● Metals and acids. metals and oxygen, metals and water ● Displacement reactions	**Assessment 3:** Summative assessment for topics studies this term.
4	**Energy resources** ● The use of energy resources ● Energy in food **Chemical Energy** ● Endothermic and exothermic reactions ● Experimental Designs **Adaptations Variation and evolution** ● Competition and variation ● Natural selection and extinction ● Adaptations, variation and inheritance	**Assessment 4:** Summative assessment for topics studies this term
5	**Magnets and Electromagnets** ● Magnetic fields and magnetic interactions ● Making magnets and electromagnets ● Electric motors **Microbes and Disease** ● Types and causes of disease ● Treating diseases	**Assessment 5:** End of year exam on topics from Y7 and Y8
6	**Atmosphere** ● Composition of the Earth's atmosphere ● Resources from the ground **Electricity** ● Conductors and insulators ● Series and parallel circuits ● Resistance in circuits	**Assessment 6:** Summative assessment for topics studies this term

Curriculum Plan: Year 9

Term	Curriculum Foci Areas	Assessment Criteria
1	**Using resources** ● 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 **Cell Biology** ● Use microscopes to explore the structure of cells ● Identify the organelles and their functions ● Investigating the processes of diffusion and osmosis	**Assessment 1:** Summative assessment for topics studies this term
2	**Atmosphere and the Earth's Resources** ● The Earth's early and present atmosphere ● The Carbon Cycle ● Potable water	**Assessment 2 :** Summative assessment for topics studies this term
3	**Particle model of matter** ● Particle behaviour of states and the changes of state ● Density of materials **Atomic Structure** ● Exploring the nucleus of the Atom ● Nuclear Radiation ● Medical applications of Radiation	**Assessment 3:** Summative assessment for topics studies this term
4	**Organisation** ● Digestive system and investigating enzyme action, ● The circulatory system and Healthy Lifestyles ● Plant organisation and photosynthesis **Chemical Analysis** ● Separation techniques ● Purity and Formulations	**Assessment 4:** Summative assessment for topics studies this term
5	**Organic Chemistry** ● Hydrocarbons ● Fractional distillation ● Cracking **Knowledge Retrieval** ● Revision and preparation for end of year exam ● Each teacher will focus on key areas	**Assessment 5:** End of year exams.
6	**Knowledge Retrieval** ● Revision and preparation for end of year exam ● Each teacher will focus on key areas **Photosynthesis and respiration** ● Investigating photosynthesis ● Respiration and the effects of exercise.	**Assessment 6:** Summative Assessment

Curriculum Plan: Year 10 Science
Exam Board: AQA

Term	Curriculum Foci Areas Assessment Criteria	Assessment Criteria
1	**Infection and Disease** ● Working with Microorganisms ● Disease transmission ● Plant diseases **Energy transfers and Energy resources** ● Calculating energy changes ● Energy Efficiency ● Renewable and non-renewable resources	**Assessment 1:** Summative assessment for topics studies this term
2	**Electricity** ● Electrical components and investigating the rules of circuits. ● Electricity in the Home **Rates of Reaction** ● Collision Theory ● Measuring the rate of reaction	**Assessment 2:** Summative assessment for topics studies this term
3	**Bonding and Structure and the Particles of Matter** ● Ionic, covalent and metallic bonding ● Giant covalent structures ● Intermolecular forces **Energy Changes** ● Energy in reactions ● Exothermic and endothermic reactions	**Assessment 3:** Summative assessment for topics studies this term
4	**Atomic Structure** ● Structure and history of the atom ● The Periodic Table ● Atoms, elements, compounds and isotopes. **Forces** ● Investigating forces ● Resultant forces ● Analysing graphical data	**Assessment 4:** Summative assessment for topics studies this term
5	**Forces and Motion** ● Investigating Acceleration and terminal velocity ● Forces and Braking **Magnetism** ● Types of magnets and magnetic fields ● The motor effect **Knowledge Retrieval** ● Revision and preparation for end of year exam	**Assessment 5:** Summative assessment for topics studies this term
6	**Knowledge Retrieval** ● Revision and preparation for end of year exam **Homeostasis and Response** ● The central Nervous System and reaction times. ● The Endocrine System ● Blood Sugar Levels ● The Menstrual Cycle, contraception and fertility.	**Assessment 6:** End of year exams: Paper 1 for Bio, Paper 2 for Chem, Phy

Curriculum Plan: Year 11 Science
Exam Board: AQA

Term	Curriculum Foci Areas Assessment Criteria	Assessment Criteria
1	**Ecology** ● Habitats and biodiversity ● Food, chains webs and sampling techniques ● Effect of Humans on the Environment **Chemical Changes** ● Reactivity Series ● Quantitative Chemistry ● Electrolysis and Energy Changes **Waves** ● Properties and types of waves ● Reflection and refraction ● Electromagnetic spectrum	**Assessment 1:** Summative assessmen t for topics studies this term
2	**Inheritance, Variation and evolution** ● Genetics and Inheritance ● Inheritance and The theory of evolution ● Investigate how genetic engineering and cloning work	**Assessment 2:** Mock exams paper 1 Biology, paper 2 Chemistry, Physics
3	**Quantitative Chemistry** ● Balancing equations ● Calculating moles ● Relative formula mass ● Conserving mass	**Assessment 3:** Summative assessmen t for topics studies this term
4	**Revision** ● Revision and preparation for exam ● Knowledge recall exercises	**Assessment 4:** Mock exams Paper 2 Biology, paper 1 Chemistry, Physics
5	**Revision and Exams**	**Targeted assessment and feedback for key cohorts**

Science Final Assessment Structure:

Subject	Weighting	Content	Proposed Date of Examination
Biology	33.3%	***Paper 1*** 1 hour 15 minutes ***Paper 2*** 1 hour 15 minutes	May/June of Year 11
Chemistry	33.3%	***Paper 1*** 1 hour 15 minutes ***Paper 2*** 1 hour 15 minutes	May/June of Year 11
Physics	33.3%	***Paper 1*** 1 hour 15 minutes ***Paper 2*** 1 hour 15 minutes	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