

Goldwyn Plus - Science

Subject Statement and Long Term Plan



Science – Statement of Intent

“It’s all Science”

It is not just a collection of facts, rather a path to understanding.

Science is all about finding things out and learning about the world we live in. Science is on-going. It is continually refining and expanding knowledge of the universe. Science will never be finished. It is a global human endeavour that everyone is part of. It’s all Science!

In the same way we can take our pupil’s current view of the world around them and build on their understanding.

Science has taught us an awful lot about the world but it does not have the answer to everything. It does however help us to identify hazards that could potentially harm us and help us to evaluate the risks attached to them.

Science lessons at Goldwyn Plus will aim to give students the opportunity to:

- Study ‘Humans as Organisms’ from the smallest cell to all the different systems that make our bodies function.
- Understand ‘Plants’ from the smallest cell to their place in the food chain and for their importance to the atmosphere.
- Observe a microscopic view of cells and understand the implications of chromosomes and DNA for inheritance.
- To understand what the world is made of from the rock cycle and the evolution of the atmosphere to the development of the modern periodic table.
- Make observations and measurements of how materials react to heating and cooling and understand how chemicals react together to make simple and complex compounds.
- To know that energy comes in different forms and be able calculate energy transfers.
- Be exposed to different ways energy can be resourced to make electricity and the implications for the environment.
- Follow circuit diagrams to build electric circuits and know the units of measurement for current, voltage and resistance.
- Explore the relationships between forces and motion and be able to draw and interpret graphs.
- Understand how waves transfer energy from observing water waves and colours to knowing how waves from the electromagnetic spectrum are used in everyday lives.

The curriculum is sequenced to ensure:

- Students learn within a framework that builds on prior learning to increasing levels of complexity, vocabulary and understanding.
- Students have opportunity to measure and read scales using a ruler, measuring cylinder and thermometer through to taking readings from Ammeters and Voltmeters.
- Understanding their own bodies in more detail and developing understanding: e.g. from the five senses through to reflex arcs, from healthy diets to deficiency diseases, and from the sex organs to the role of hormones in the menstrual cycle.
- Observe the natural world in their immediate environment and ask questions about the impact of human activities on the world, from keeping the environment clean to climate change and extinction.
- Have an increasing awareness that Science has a 'History' and be able to sequence the development of theories for models of the atom and for natural selection and evolution.
- There is progression between key stages 3 and 4, with students being exposed to themes and content that will allow all students to access the KS4 content
- There is an increasing level of challenge and complexity to enquiries.

Examinations:

- It is anticipated that ALL pupils will have the opportunity to gain a qualification in Science best suited to their individual needs and skills. These qualifications are an AQA Award or GCSE. All pupils will benefit from a deeper understanding of the world they live in and how to keep safe.

Science Department: Long Term Plan

Term	1	2	3	4	5	6
Year 7	<p>BIOLOGY</p> <p>Title: Cells, Tissues, Organs & Systems. Aims: An introduction to life processes and the structure of plants and animals. From Scheme of work Units 7A</p> <p>Title: Reproduction in plants and animals Aims: To know how reproduction occurs in humans and plants. From Scheme of work Units 7B and 8B</p>	<p>BIOLOGY</p> <p>Title: Muscles and Bones. Aims: A study of the human body. How muscles bones and blood all contribute to movement and fitness. From Scheme of work Units 7C</p> <p>Title: Breathing and Respiration Aims: A study of gas exchange in plants and animals. To know about aerobic and anaerobic respiration. From Scheme of work Unit 8C</p> <p>Title: Ecosystems. Aims: To look at the different variations between and within species. From Scheme of work Unit 7D</p>	<p>CHEMISTRY</p> <p>Title: Mixtures and Separation Aims: To know there are different kinds of mixtures and different methods of separation. From Scheme of work Unit 7E</p> <p>Title: Acids and Alkalis Aims: To learn about indicators that can measure the strength of acids and alkalis. Introduction to the pH scale. From Scheme of work Unit 7F</p>	<p>CHEMISTRY</p> <p>Title: The particle model and atoms Aims: To understand the arrangement of particles in solids, liquids and gases. From Scheme of work Unit 7G</p> <p>Title: Elements and Molecules Aims: To know about the elements found in the earth and its atmosphere. To know that most substances exist as molecules or compounds. From Scheme of work Unit 7H</p>	<p>PHYSICS</p> <p>Title: Energy Aims: To know that we need energy as food for our bodies and fuels for our homes, schools and factories. From Scheme of work Unit 7I</p> <p>Title: Forces Aims: An introduction to the different types of forces: contact forces and non-contact forces. From Scheme of work Unit 7K</p>	<p>PHYSICS</p> <p>Title: Current Electricity. Aims: To understand the basics of an electric circuit: current, potential difference and resistance. From Scheme of work Unit 7J</p> <p>Title: Sound Introducing how sounds are made detected and used. Be able to compare different sound waves. From Scheme of work Unit 7L</p>

Year 8	<p>BIOLOGY</p> <p>Title: Food and Nutrition Aims: To understand that good health depends on having a balanced diet and getting the right amount of nutrients. From Scheme of work Unit 8A</p> <p>Title: Unicellular organisms. Aims- An introduction to microscopic life in the form of bacteria fungi and protocists. To know how these can cause different diseases. From scheme of work Unit 8D</p>	<p>BIOLOGY</p> <p>Title: Genetics and Evolution Aims: To understand how the process of Natural selection can be explained with DNA and genes. From scheme of work Unit 9A</p> <p>Title: Plant Growth. Aims: A study of how plants grow and how they are adapted to survive. From scheme of work Unit 9B</p>	<p>CHEMISTRY</p> <p>Title: Combustion Aims: To know that there are different kinds of fuels and that the products of combustion can cause air pollution. From Scheme of work Unit 8E</p> <p>Title: The Periodic Table. Aims: An introduction to Dalton’s atomic model and Mendeleev’s first table of elements. From Scheme of work Unit 8F</p> <p>Title: Reactivity. Aims: To know there are different types of chemical reaction. To know how metals are extracted from their ores. From Scheme of work Unit 9F</p>	<p>CHEMISTRY</p> <p>Title: Metals and their uses Aims: To know the properties of metals and how they react with water and acids. To know metals can be combined to make alloys. From Scheme of work Unit 8G</p> <p>Title: Rocks Aims: To know how different types of rocks are formed: Igneous, Metamorphic and Sedimentary. To know the effects of weathering and erosion. From Scheme of work Unit 8H</p>	<p>PHYSICS</p> <p>Title: Fluids Aims: A study of floating, sinking, density and pressure. From scheme of work Unit 8I</p> <p>Title: Light Aims: How to draw Ray diagrams. To know how light can reflect and refract. To know how we see colours. From Scheme of work Unit 8J</p> <p>Title: Forces and Motion Aims: How forces affect objects and the way they move. From Scheme of work Unit 9I</p>	<p>PHYSICS</p> <p>Title: Energy Transfer Aims: To know that objects have an internal energy. To know that heat energy can be transferred by conduction, radiation and convection. From Scheme of work Unit 8K</p> <p>Title: Earth and Space. Aims- To know the causes of the 4 seasons. To know the Earth has a magnetic and gravitational field. To know the Earths position in the solar system and beyond. From Scheme of work Unit 8L</p>
Year 9	<p>BIOLOGY</p> <p>Title: Key Concepts in Biology Aims: Core practical- To use</p>	<p>BIOLOGY</p> <p>Title: Genetics Aims: How genes are inherited by meiosis in</p>	<p>CHEMISTRY</p> <p>Title: States of Matter Aims: To know the different states of matter and</p>	<p>CHEMISTRY</p> <p>Title: The Periodic Table. Aims: To know about the</p>	<p>PHYSICS</p> <p>Title: Motion Aims: To understand quantities as vectors</p>	<p>PHYSICS</p> <p>Title: Waves Aims: To know the difference between longitudinal</p>

	<p>microscopes to study components of cells. To know the internal processes of cells. Core practical- Osmosis experiment. From Scheme of work Unit B1</p> <p>Title: Cells and control. Aims: To know how cells reproduce by Mitosis. To know about the nervous system. From Scheme of work Unit B2</p>	<p>sexual reproduction resulting in variation. From Scheme of work Unit B3</p> <p>Title: Natural Selection & Genetic modification Aims: To know Darwin's Theory of Evolution and how genes are used in agriculture and medicine. From Scheme of work Unit B4</p>	<p>methods of separating and purifying substances. From Scheme of work Units C1 C2</p> <p>Title: Atomic Structure Aims: To know the components of an atom and be familiar with atomic and mass numbers. From Scheme of work Units C3</p>	<p>electronic configuration of elements and how they are arranged in the periodic table. From Scheme of work Units C4</p> <p>Title: Ionic and Covalent Bonding Aims: To know the difference between ionic and covalent bonding. From Scheme of work Units C5, C6</p> <p>Title: Types of substance Aims: To look at different molecular compounds and their properties. From Scheme of work Unit C7</p>	<p>or scalars. To interpret distance time graphs. From Scheme of work Unit P1</p> <p>Title: Forces and Motion Aims: To know what a resultant force is and learn to apply Newton's Laws of Motion. From Scheme of work Unit P2</p> <p>Title: Conservation of Energy Aims: To understand about energy stores and transfers. To know about energy resources. From Scheme of work Unit P3</p>	<p>and transverse waves. From Scheme of work Unit P4</p> <p>Title: Light and EM Spectrum Aims: To know how EM waves are grouped by their wavelength and frequency. To know the uses and hazards of different EM waves. From Scheme of work Unit P5</p> <p>Title: Radioactivity Aims: To learn about different types of radiation. From Scheme of work Unit P6</p>
Year 10	<p>BIOLOGY</p> <p>Title: Health, Disease and Medicine Aims: To know about communicable and non-communicable diseases.</p>	<p>BIOLOGY</p> <p>Title: Animal Co-ordination. Control and Homeostasis Aims: To understand hormonal control of</p>	<p>CHEMISTRY</p> <p>Title: Acids and Alkalis Aims: To use an indicator to determine the pH values of different substances. Understand neutralisation</p>	<p>CHEMISTRY</p> <p>Title: Obtaining Using and Recycling Metals. Aims: To know about the different methods metals can be</p>	<p>PHYSICS</p> <p>Title: Energy and Forces Aims: To know how the energy in a system can be changed. To</p>	<p>PHYSICS</p> <p>Title: Magnetism and the motor effect Aims: To know about magnetic fields and how to make an</p>

	<p>To know how the immune system can fight disease. From Scheme of work Unit B5</p> <p>Title: Plant structures and Functions Aims: To understand the factors that affect photosynthesis. From Scheme of work Unit B6</p>	<p>metabolic rate. To know how hormones control menstruation. From Scheme of work Unit B7</p> <p>Title: Exchange and Transport in animals Aims: To know about the heart, circulatory system and gas exchange. From Scheme of work Unit B8</p>	<p>reactions. From Scheme of work Unit C8</p> <p>Title: Mass calculations Aims: To know how to work out the empirical and molecular formulae of compounds. From Scheme of work Unit C9</p> <p>Title: Electrolysis Aims: Be able to explain what is happening during electrolysis. From Scheme of work Unit C10</p>	<p>extracted from their ores. Understand the reactivity series. From Scheme of work Unit C11</p> <p>Title: Dynamic Equilibrium Aims: To understand what is meant by equilibria in Chemical Reactions. From Scheme of work Unit C12</p>	<p>know how to calculate work done and power. From Scheme of work Unit P7</p> <p>Title: Forces and their effects Aims: To know how objects interact with each other through force fields and contact forces. From Scheme of work Unit P8</p> <p>Title: Electricity and Circuits Aims: To know the components of electric circuits. From Scheme of work Unit P9</p>	<p>electro-magnet. From Scheme of work Unit P10</p> <p>Title: EM Induction. Aims: To understand how transformers work and their uses. From Scheme of work Unit P11</p> <p>Title: The Particle Model Aims: To know about density and pressure of substances. From Scheme of work Unit P12</p>
Year 11	<p>BIOLOGY</p> <p>Title: Ecosystems Aims: To look at biotic and abiotic factors of communities. To understand the terms- parasitism and mutualism. To understand biodiversity</p>	<p>BIOLOGY</p> <p>Gap Analysis B1- B8 Revision Practice exam questions.</p> <p>Mock Exam</p>	<p>CHEMISTRY</p> <p>Title: Groups in the Periodic Table Aims: To know the properties of elements in group 1 group 7 and group 0. From Scheme of work Unit C13</p>	<p>CHEMISTRY</p> <p>Title: Fuels Aims: To know about Hydrocarbons in crude oil and natural gas. To know that crude oil can be separated by fractional distillation. From Scheme of work</p>	<p>PHYSICS</p> <p>Title: Forces and Matter Aims: Bending and Stretching. Core practical- Investigating springs. From Scheme of work Unit P13</p>	<p>Exams</p>

	<p>and humans. From Scheme of work Unit B9</p> <p>Title: Material Cycles. Aims: Be able to describe the cycles for water carbon and nitrogen. From Scheme of work Unit B9</p>		<p>Title: Rates of Reaction. Aims: Core practical: To investigate the rates of reactions. From Scheme of work Unit C14</p> <p>Title: Heat Energy changes in Chemical Reactions Aims: To understand the terms endothermic and Exothermic reactions. From Scheme of work Unit C15</p>	<p>Unit C16</p> <p>Title: Earth and Atmospheric Science Aims: To understand the early, changing and current atmosphere of the Earth. To understand the effects of climate change. From Scheme of work Unit C17</p> <p>Gap Analysis C1-C12 Revision Practice exam questions.</p>	<p>Gap Analysis P1-P12 Revision Practice exam questions.</p>	
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