

The Science Department

Our ethos is to provide stimulating learning and challenge in a supportive and nurturing environment which facilitates the needs of all our students.

We want to give all children a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and also an understanding of the uses and implications of Science, today and for the future. Our motto is **"Science is all around"**.

At Laleham-Gap, scientific enquiry skills are embedded in each topic the children study and these topics are revisited and developed throughout their time at school. Topics, such as cells, particles & forces are taught in Yr.7/Yr.8 and studied again in further detail throughout KS.4 – Entry Level or GCSE. This model allows children to build upon their **prior knowledge** and increases their enthusiasm for the topics whilst using taught strategies to embed this procedural knowledge.

All children are encouraged to develop and use a range of skills including observations, planning and investigations, as well as being encouraged to question the world around them and become independent learners in exploring possible answers for their scientific based questions. Specialist vocabulary for topics is taught and built up, and effective questioning using appropriate **command words** to communicate ideas is encouraged. Concepts taught are reinforced by focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions.

Scientific skills and knowledge will be applied, reinforced and extended making links, where appropriate, with other curriculum areas. These curriculum links are evident on the Scheme of Work Route Maps (long term plans) and in the shared document detailing cross curricular skills. Key cross circular subjects are Mathematics, Humanities (especially Geography), ICT, Food Technology, PE, Art and Learning for Life / Personal Development.

As a department we are committed to the school ethos of **Learn Grow & Succeed:**

- **Learn** → through engagement & to question the scientific world around you.
- **Grow** → in confidence, acquire new skills and become more independent learners.
- **Succeed** → to the best of your ability.

The intent of the curriculum: What we expect our students to learn

Years 7 & 8:

In **Yr.7 & Yr.8** → students broadly follow **Pearson's Explore Science framework**. We follow a 2 year KS.3 Science curriculum. We have incorporated some **Yr.9 learning within our Y.8 topics & the rest is covered during the first year of our Entry level & Combined GCSE course which commence at the start of Yr.9. (Refer to our long term planning for content details)**

Students have 5 lessons of Science a week, rotating around the 3 disciplines of Biology, Chemistry & Physics – each taught by a specialist teacher in that field.

During the first term of Yr.7 we teach an introductory 2 week selection of activities including – use of microscopes, hazards & risks and measuring/units. After this period students are baseline tested (determine prior knowledge) and students are allocated into groups. This helps to support and facilitate the individual needs of our students. There are 12 units of work in Yr.7 & 12 units of work in Yr.8.

We have organised the sequence of teaching of the units to help support with student engagement & skill development. For example in Chemistry Acids & Alkalis is delivered in Terms 1 & 2 because there is much more opportunity for kinaesthetic learning and practical work. Particles which is much more conceptual is left for later during the year – Term 5.

See example below:

YR.7	Science <i>*Bold → Yr.9 NC</i>			
	Term 1 & 2	Term 3	Term 4	Term 5 & 6
Biol	7A. Cells + BASELINE TESTING <i>(Microscope introduction)</i> - Life processes - Organs - Tissues - Cells - Organ systems Assessment preparation	7D. Ecosystems - Variation - Adaptations - Effects of the environment - Effect on the environment - Transfer in food chains Assessment preparation	7C. Muscles/Bones - Muscles & breathing - Muscles & blood - The skeleton - Muscles & moving - Drugs & their effects Assessment preparation	7B. Animal Reproduction - Animal sexual reproduction - Reproductive organs - Pregnancy - Gestation & birth - Growing up Introduction to Biology fieldwork techniques Assessment preparation
Chem	7F. Acids/Alkalis + BASELINE TESTING <i>(Safety introduction)</i> - Hazards - Acids & alkalis - Indicators - Soil testing (application) - Neutralisation - Neutralisation in everyday life Assessment preparation	7H. Chemical reactions - Chemical versus Physical - Burning/oxidation - Metals and acids - Intro to carbonates - Oxygen - Priestly - Testing gases – H₂, O₂ & CO₂	7H. Chemical reactions - Metals & their properties - Elements/compounds - Particle diagrams Assessment preparation	7G. Particles - Air pressure Assessment preparation
Phys	7K. Forces + BASELINE TESTING <i>(Measuring introduction)</i> - Forces - Springs - Friction - Pressure - Balanced/unbalanced forces Assessment preparation	7I. Energy - Energy from food - Energy transfer & stores - Fuels - Other energy resources - Using resources Assessment preparation	7G. Particles - Solids, liquids & gases - Particles – atoms intro - Brownian motion - Diffusion	7E. Mixtures & separation - Mixtures - Solutions - Evaporation - Chromatography - Distillation Assessment preparation
			7L. Sound - Animal sound - Moving sounds - Detecting sound - Using sounds - Comparing sounds Assessment preparation	7J. Current/Electricity - Current - Circuit modelling - Series versus parallel Voltage & resistance* - Using electricity Static electricity* Electromagnets* Assessment preparation

Students complete an assessment (tiered - foundation/higher) at the end of each unit which is then marked based on the Pearson's 12 step model. Results can be compared to their prior knowledge from the baseline tests and a judgement on progress can be determined.

Years 9, 10 & 11:

Our students follow a **3 year EDEXCEL Entry Level** or **EDEXCEL Double Science GCSE** route pathway at the start of Yr.9. **(Refer to our long term planning for content details)**

Students have 6 lessons of Science a week, rotating around the 3 disciplines of Biology, Chemistry & Physics – each taught by a specialist teacher in that field.

(Further details on our EDEXCEL Science Entry level qualification & EDEXCEL GCSE Combined Science qualification, can be found in the information below.

Edexcel Entry Level Certificate in Science



The **Edexcel Entry Level Certificate** in Science enables students to acquire a body of basic scientific knowledge and an understanding of some important scientific ideas whilst developing basic experimental and investigative skills.

To ensure students have the opportunity to fulfil their potential, the topics are aligned to content in the **Edexcel GCSE in Combined Science**. This ensures that students can either start to gain GCSE foundation tier knowledge but then drop back to Entry level if the GCSE is too demanding or complete the Entry Level qualification and then build on their knowledge by attempting the **Entry Level qualification in Further Science commencing at the end of Year 10**.

There are **6 topics** that focus on the following areas of the **K.S.4** Programme of Study:

- 1. Paper 1: Biology 1A - Cells, genetics, inheritance & modification.**
- 2. Paper 2: Biology 1B - Health, disease & the development of medicines.**
- 3. Paper 3: Chemistry 1A - Atoms, compounds and states of matter.**
- 4. Paper 4: Chemistry 1B - Separating mixtures, breaking down substances, acids & metals.**
- 5. Paper 5: Physics 1A - Forces, movement & energy.**
- 6. Paper 6: Physics 1B – Waves & radiation.**

Assessment:

The **Entry Level Certificate** in Science is awarded at one of three levels: **Entry 1**, **Entry 2** and **Entry 3**, with Entry 1 being the **lowest** level of achievement and Entry 3 the **highest**. For each level, assessment is based on **six externally set assessments**:

- **Topic assessments** are worth **25 marks** in total. Each internally marked, externally set and moderated).
- **The total mark is out of 150** - (6 topics test each worth 25 marks)
- **Assessments are completed during the 2 year course.**
- The **Further Entry level assessments** can be taken during **Year 11**.
- Different types of **question** are used in the topic tests, including some of the following:
 - **Single word** response.
 - **Multiple-choice** questions.
 - **Word boxes** in various forms.
 - Simple **arithmetic**.
 - Simple **free response**.

Further information: <http://qualifications.pearson.com/content/dam/pdf/Entry>

Recommended reading: CGP GCSE Core Science (Edexcel) The Revision Guide (Foundation/The basics)



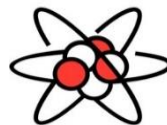
Overview of Topics – Entry Single Science

Please refer to long term planning guide for greater detail

Biology 1A paper 1	Chemistry 1A paper 3	Physics 1A paper 5
Cells, genetics, inheritance and modification	Atoms, compounds and states of matter	Forces, movement and energy
Biology 1B paper 2	Chemistry 1B paper 4	Physics 1B paper 6
Health, disease and the development of medicines	Separating mixtures, breaking down substances, acids and metals	Waves and radiation

Overview of Topics – Entry Further Science

Biology 2A paper 1	Chemistry 2A paper 3	Physics 2A paper 5
Plants and ecosystems	Chemical reactions: patterns, energy and rates	Electricity and magnets
Biology 2B paper 2	Chemistry 2B paper 4	Physics 2B paper 6
Human biology	Chemistry in our world: fuels and the Earth's atmosphere	Energy and particles



Edexcel GCSE (9-1) Combined Science

The new **EDEXCEL GCSE (9-1) in Combined Science** encourages students to be inspired, motivated and challenged by following a broad, coherent, practical, satisfying and worthwhile course of study. It provides insight into and experience of how science works, stimulating students' curiosity and encouraging them to engage with science in their everyday lives and to make informed choices about further study and career choices.

EDEXCEL GCSE Combined Science: This is equivalent to **2 GCSEs**. It is divided into **6 units: Biology 1 & 2, Chemistry 1 & 2 & Physics 1 & 2**. The **content overview** of each unit will be readily available from Science staff during parent's consolation evening.

Overview of assessment:

Each unit (B1 & B2, C1 & C2 & P1 & P2) is assessed through a **1 hour & 10 minutes**, 60 mark, **tiered** written examination, containing six questions. **There is a foundation paper: grades 1-5 or a higher paper: grades 4-9**

The **6 unit examinations** are **externally assessed** and each is **16.67%** of the **total GCSE**. Students will be entered for either the **standard** or **higher** paper depending upon their ability. This GCSE follows a **linear programme of assessment** (*In a **linear qualification**, the examinations are taken at the **end** of the course*).

The Unit examinations includes three types of question parts:

1. **Objective questions** – used only where this will provide credible evidence of knowledge and skills.
2. **Structured short answers** – for maths, How Science Works or theory.
3. **Longer answers** worth six marks – to help provide stretch and challenge.

During the **duration** of the **GCSE course**, students will undertake **18 mandatory core practicals**. These will be completed in class. Knowledge & understanding of these practical techniques and procedures will be assessed in the **6 terminal papers** in **May/June** of **exam year**. **It is essential that students complete all 18 core practicals.**

Further information: <http://www.edexcel.com/quals/gcse/GCSE-Combined Science-2016>

Recommended reading: CGP GCSE Core Science (Edexcel) The Revision Guide (Foundation/Higher)



Overview of Topics – GCSE Combined Science

Please refer to long term planning guide for greater detail

Biology 1 paper 1	Chemistry 1 paper 3	Physics 1 paper 5
Key concepts	Key concepts	Key concepts
Cells & control	States of matter	Motion & forces
Genetics	Chemical changes	Conservation/energy
Natural selection	Extraction of metals	Waves
Health & diseases		EMS
		Radioactivity
Biology 2 paper 2	Chemistry 2 paper 4	Physics 2 paper 6
Key concepts	Key concepts	Key concepts
Plant structure	Groups/Periodic Table	Energy
Animal coordination	Rates of reaction	Forces & effects
Exchange & transport	Fuels & Earth Science	Electricity
Ecosystems & cycles		Magnetism
		Particle model
		Forces & matter

Please note that the above is only a **general guide** to the **areas** that are covered.
Key concepts will feature on **both papers**.