

*Wimbledon College Curriculum Intent*

*Our curriculum, rooted in our vision statement and the key principles of Jesuit education, provides aspirational pathways for all pupils to enable them to strive for excellence in all that they do so that they can achieve their potential and progress on their career pathway.*

*All pupils engage with a broad, balanced and sequenced curriculum and are supported to develop their knowledge and understanding of concepts, skills and talents. They also have access to an extensive range of extra-curricular activities which provides both a balance to their academic studies and enriching cultural capital opportunities.*

*We are committed to care for the individual pupil and their development as a whole person and help them to grow the personal characteristics and virtues within the Jesuit Pupil Profile. Being 'men and women for others' means that each pupil has the desire and capacity to make a positive difference in the lives of those they meet now as pupils and in their future lives.*

In the Science department it is our intention to produce outstanding future scientists. This includes preparing students for future study at GCSE, BTEC, A level and beyond, but it also involves instilling students with the vital skills and knowledge to help them contribute to society – whatever their career choices. Teaching in Science aims to give students a strong understanding of the world around them and the opportunity to develop the skills and knowledge in order to think scientifically. These skills include: problem solving; making careful observations; analysing data and evaluating practical methods. Science is also a highly creative subject: - over the course of their study of science, students will learn about scientists who were required to think creatively when presented with new information.

By the end of their studies in science, we expect pupils to know and understand the concepts covered in the National Curriculum for Science KS3 and the relevant GCSE or A level specifications. These are nationally recognized standards and expectations and they will ensure that our pupils can access the next level of learning (whether at our school or another institution). These standards give the best framework to ensure that our lessons and provision are excellent. They allow for a suitable breadth of science learning at KS3 and KS4, and appropriate specialisation at A Level. The skills they develop during practical work in Science will help them to understand the scientific method and apply this to real-world situations. Students continuing to study or work in science will use these skills in their workplaces, but all young people, regardless of their career path, should have an understanding of how science works. This will help them to critically evaluate scientific claims in the media for example. The scientific method of observing, hypothesizing, experimentation and reflection has applications in all areas of life.

The Science curriculum links into Wimbledon College's Curriculum Intent because it contributes towards aspirational pathways for our pupils – helping to provide them with the skills and knowledge for their next steps in education. Many of these highly transferable skills (for example thinking critically and problem solving) will be an important part of becoming men and women for others. The Jesuit Pupil Profile virtues that most align with Science are “curious and attentive”.

**Implementation**

In KS3 Science, all teaching is allocated to subject specialists (where possible) and there is a rota of topics. This is partly to allow easy access to practical equipment, but also ensures that across each period of teaching (e.g. term) every pupil has a balance of subjects and topics. This keeps the curriculum broad and varied. The SOW is designed to build both knowledge and skills across a broad range of topics culminating in studying at greater depth of some key core areas of Science including particle theory and atomic structure and chemical bonding in Chemistry, Cells, cell division and enzymes in Biology and in Physics Motion, Energy and Forces. The curriculum is designed so that some central concepts (for example cells in Biology, particles in Chemistry and Forces in Physics) are revisited and revised each year. Practical work is embedded into the schemes of work so that pupils are exposed to a range of practical equipment and techniques from the very start of year 7.

In Science we try to ensure that all pupils make good progress by planning enjoyable and engaging lessons. The Schemes of Work are well resourced with a variety of ideas for different approaches and abilities. Alongside this, pupils are provided with regular assessment opportunities – these help to identify gaps in knowledge and understanding. Marking and feedback on tests and assessments is rigorous, and pupils are given time to complete their “green pen” corrections. A termly focus on different aspects of literacy and numeracy is being developed – including, for example, graph skills. This will help to develop stronger co-curricular links. Throughout KS3, lessons are sequenced in order to introduce the foundational concepts first before moving onto more complex topics. For example, students in year 7 learn about the principles of ‘particles’ before extending this idea into atoms and molecules in year 8. Pupils at KS3 are taught in ability-groups. This allows the teacher and support staff to tailor their activities to the ability of the group.

#### **KS4 Biology**

In KS4 Biology, all teaching is allocated to subject specialists (where possible). At KS4 every student has two periods of Biology every week (Combined Science and triple science). The Biology SOW (written by S Brech using some resources from Pearson Edexcel 9-1) is carefully designed to build both knowledge and skills. The curriculum builds on some central concepts from KS3. Practical work also builds on the skills that pupils have starting learning at KS3. At GCSE the intention is for practical work to be more ‘investigative’ rather than just following practical instructions.

In Biology we try to ensure that all pupils make good progress by planning enjoyable and engaging lessons. The Biology Scheme of Work is well resourced with a variety of ideas for different approaches and abilities. Alongside this, pupils are provided with regular written assessment opportunities (tests or homeworks)– these help to identify gaps in knowledge and understanding. Marking and feedback on tests and assessments is rigorous, and pupils are given time to complete their “green pen” corrections. Pupils at KS4 are taught in ability-groups. This allows the teacher and support staff to tailor their activities to the ability of the group.

#### **KS5 Biology**

In KS5 Biology, all teaching is allocated to subject specialists. Students have 5 taught periods and a sixth allocated “independent learning” period. The Biology SOW (written by S Brech using some resources from Edexcel) is carefully designed to provide a wide range of activities. Much of the A level curriculum builds on some concepts that have been studied at KS4. This is particularly true in Year 12. Newer topics (such as Microbial Techniques) are introduced in Year 13.

Practical work also builds on the skills that pupils have learnt in KS3 and KS4. At A level pupils are expected to demonstrate practical “competency” in a range of nationally agreed scientific techniques – these include practical techniques and investigative skills such as research. Core Biology Practicals are built into the scheme of work, and staff are expected to assess pupils against 2 or 3 practical criteria in each practical.

In Biology we try to ensure that all pupils make good progress by planning enjoyable and engaging lessons. The A Level Biology Scheme of Work is well resourced with a variety of ideas for different approaches and abilities. Alongside this, pupils are provided with regular written assessment opportunities (tests or homeworks)– these help to identify gaps in knowledge and understanding. Marking and feedback on tests and assessments is rigorous, and pupils are given time to complete their “green pen” corrections. Pupils at KS5 are taught in mixed ability-groups. .

### **KS4 Chemistry**

Our KS4 curriculum is designed around the Edexcel 9-1 Science and Chemistry Schemes of Work.

The teaching done by subject specialists (where possible) and there is a clear sequence of topics. The Active Teach online textbook helps to support literacy by publishing a list of key words for each topic. The schedule of lessons is designed to introduce the foundational concepts first before moving onto more complex topics.

Where non-specialists are teaching they receive practical support in terms of subject knowledge, the carrying out of practical work and the suitability of resources for use.

The published SOW (Active Learn Combined Science and Chemistry) is carefully designed to build both knowledge and skills.

The curriculum is designed so that some central concepts (for example atomic structure, chemical bonding) are revisited and revised throughout the course. Practical work is embedded into the schemes of work.

Regular assessment helps to identify gaps in knowledge and understanding. The majority of assessments are bespoke and have been shaped by past assessments, use of the Pearson ActiveTeach and Educake supports learning by self-marking and giving teachers a clear sense of knowledge strengths and weaknesses, Foundation papers are accessible and diagnostic. Marking and feedback on tests and assessments is rigorous, and pupils are given time to complete their "green pen" corrections. Where it is clear that several pupils have misunderstood a concept, a lesson might be spent re-visiting it. Teachers are encouraged to use starter activities as a way to recall previous work (and then build on it). Revision weeks allow staff to intentionally revisit previous topics. Chemistry often relies on models to explain what cannot be seen or experienced directly. Students are given the opportunity for to experience Chemistry outside the classroom through competitions and visits.

### **KS5 Chemistry**

Our KS5 curriculum is designed around the Edexcel Chemistry Schemes of Work and there is a clear sequence of topics. It is taught by specialist teachers and is generally split between two teachers. The schedule of lessons is designed to introduce the foundational concepts first before moving onto more complex topics and builds on work at KS4 recognising the need to ensure that the gaps that students who have done Combined Science are covered (moles in solutions and gases, organic chemistry).

The published SOW (Edexcel Chemistry) is carefully designed to build both knowledge and skills. Resources and assessments to support the SOW are provided.

The schedule of lessons is designed to introduce the foundational concepts first before moving onto more complex topics.

The scheme of work is designed so that some central concepts (for example moles, balancing equations, equilibria, kinetics) are revisited and revised throughout the course.

Practical work is embedded into the schemes of work via the yearly schedule.

Regular assessment helps to identify gaps in knowledge and understanding. The assessments are also designed to build necessary exam technique skills.

The Chemistry (Hodder Education) textbook helps to support learning by allowing students to do questions and then check them.

Marking and feedback on tests and assessments is rigorous, and pupils are given time to complete their "green pen" corrections. Question analysis informs both the need for intervention and reflection on the teaching that has occurred.

To offer students to visit higher level scientific events e.g. RSC or university based activities or talks. Opportunities for students to enter competitions that stretch the more able.

### **KS4 Physics**

In KS4 Physics, where possible, teaching is allocated to subject specialists. At KS4 every student has two periods of Physics every week (Combined Science and triple science). The Physics SOW is based on Pearson Edexcel 9-1 and designed to build both knowledge and skills, for example the revisiting and deepening understanding of concepts such as forces and energy, and the building of circuits to investigate the characteristics of particular components. In Physics we try to ensure that all pupils make good progress by planning enjoyable and engaging lessons. The Physics Scheme of Work is well resourced with a variety of resources for differing abilities. Alongside this, pupils are provided with regular written assessment opportunities (tests or homeworks)– these help to identify gaps in knowledge and understanding. Marking and feedback on tests and assessments is rigorous, and pupils are given time to complete their “green pen” corrections. Pupils at KS4 are taught in ability-groups. This allows the teacher and support staff to tailor their activities to the ability of the group.

### **KS5 Physics**

Physics at KS5 is taught by subject specialists over 5 periods a week with an additional “independent learning” period. The A level Physics SOW covers the EDEXCEL Syllabus and uses resources produced in-house alongside standard textbooks. The A level curriculum builds on, deepens and extends many of the concepts studied at KS4, such as mechanics, electricity and waves, for example extending these towards particle duality and quantum ideas. Students are encouraged and guided to explore these ideas and their applications beyond the syllabus in order for them to appreciate their relevance and importance to modern technology and develop an interest in STEM subjects and careers. Experimental work also aims to further build on key practical skills developed at KS3 and KS4 of using equipment to record reliable results by additionally considering the minimisation of errors and estimation of uncertainties. Emphasis is placed on developing transferrable skills such as team work, discussion, logical analysis and problem solving alongside applying mathematical techniques and developing the literacy necessary to clearly explain complex scientific ideas. Pupils are provided with regular written assessment opportunities (tests or homeworks)– these help to identify gaps in knowledge and understanding. Marking and feedback on tests and assessments is rigorous, and pupils are given time to complete their “green pen” corrections.

## **Impact**

### **KS3 Science**

The most important measure of progress at KS3 is regular half termly assessments. These have been written in order to assess wide range of knowledge and skills across each academic year. The progress of individuals and groups is tracked by the KS3 coordinators and boys consistently not meeting their targets are referred to Supported Study or to occasional after school subject specific support sessions.

Within lessons, good teachers will also use a range of AFL techniques to monitor progress and will adjust their lesson plans accordingly. The schemes of work at KS3 include a range of different techniques to assess progress.

Impact can also be measured by participation and uptake in clubs and extra-curricular activities.

### **KS4 Biology**

The most important measure of progress in KS4 Biology is their final GCSE levels. However, throughout the course leading up to their final GCSE exams, pupils are given regular half termly assessments. These have been written in order to assess wide range of knowledge and skills across each academic year. All half-termly assessments in

Biology use past paper questions or questions written by Pearson. This ensures standardisation across all teaching groups and – to some extent – across a wider cohort (other schools who use Pearson resources). The progress of individuals and groups is tracked by the Head of Biology and boys consistently not meeting their targets are referred to Supported Study. Where necessary, individual support may be given to individual boys.

Within lessons, good teachers will also use a range of AFL techniques to monitor progress and will adjust their lesson plans accordingly. The schemes of work at KS4 include a range of different techniques to assess progress.

Impact can also be measured by participation and uptake in clubs and extra-curricular activities.

Another important measure is the number of boys choosing to study Biology at A level.

### **KS5 Biology**

The most important measure of progress in KS5 Biology is their final A level grades. However, throughout the course leading up to their final exams, students are given regular half termly assessments. These have been written in order to assess wide range of knowledge and skills across each academic year. All half-termly assessments in Biology use past paper questions. This ensures standardisation across all teaching groups and – to some extent – across a wider cohort (as examiners' reports can give staff some insight into how other students approached each question.) The progress of individuals is tracked by the Head of Biology and boys consistently not meeting their targets are given individual support. Concerns are always communicated to the pastoral team for the relevant year group.

Within lessons, good teachers will also use a range of AFL techniques to monitor progress and will adjust their lesson plans accordingly. The schemes of work at KS5 include a range of different techniques to assess progress.

Impact can also be measured by participation and uptake extra-curricular activities and trips.

Another important measure is the number of boys choosing to study Biology (or related courses) at University, or choosing to work in a Biology-related field.

In 2022, GCSE Biology results were very similar to 2019. There were fewer level 9s, but more level 8s.

2022 Results: Biology %5-9 = 100%; %7-9 = 60%; %8-9 = 40%.

In 2022 nationally the %7-9 is 50%

Our performance in comparison to other schools nationally is particularly impressive given that students entered for Biology (as opposed to combined science) tend to be the brighter students from all sectors (comprehensive, grammar and fee-paying schools)

Commenting on 2022 results:- on a number of measures our results are an improvement on 2019 results, notably the percentage of A grades and the percentage A\*-C.

Our headline results are: %A\*-D – **100%** (an improvement on 2019 where we got some E grades); %A\*-C – **75%** (an improvement on 2019 (72%)); %A\*/A – **33%** (a significant improvement on 2019 (14%)); %A\*-B – **42%** (an improvement on 2019 (38%)).

Our percentage A/A\* is just below the national average (34.9%). Our percentage A\*-D is well above national average (90.2%). Our A\*-C is just below the national average (76.0%).

### **KS4 Chemistry**

In lessons assessed via AfL in lessons by use of a range of techniques which might include thumbs up or down, whiteboards, questioning and short quizzes. Homework and classwork, half-termly assessments also highlight areas of strength and weakness with students, groups of student, classes and cohort analysis. Through this analysis

cohort themes can be addressed by re-visiting the topic/misconception. Concerns are always communicated to the pastoral team for the relevant year group. Analysis of GCSE examinations at cohort, subject level, class level and question level to assess the efficacy of the teaching in terms of attainment.

Monitor numbers progressing to A-level and BTEC Science.

0.92 VA average across both groups in 2022 and residuals positive. Faster pace and COVID negatively affected the B group, and vulnerable groups similar to Biology.

Ethnicity no affect. See below for details:-

	2022	2019	2018	2017
9 to 7	73.3	84.7	68.3	71.4
9 to 5	96.7	100	100	100
9 to 4	100	100	100	100

Name	9 %	9 - 7 %	9 - 5 %	9 - 4 %	Total Grades	Average Grade	Average Points	Residual
11/ChA	38.4	86.7	96.7	100	30	8-	7.73	0.34
11/ChB	3.3	60	96.7	100	30	7-	6.77	-0.24
Summary	20	73.3	96.7	100	60	7+	7.25	0.05

Class	Residual	APS	FFT 50 APS	VA
All	0.05	7.28	6.36	0.92
A	0.34	7.73	6.56	1.17
B	-0.24	6.77	6.21	0.58

### KS5 Chemistry

The progress of individuals and groups is tracked by the Head of Chemistry and boys consistently not meeting their targets are referred to Supported Study or to subject specific intervention after school. Where necessary, individual support may be given to individual boys or to small groups. Concerns are always communicated to the pastoral team for the relevant year group. Analysis of A-level examinations at cohort, class level and question level to assess the efficacy of the teaching in terms of attainment.

Monitor students progressing to Science based degrees and careers.

Offer after school support to Year 12 and 13 students, stretch and support.

12 of 15 at or above target in 2022. Revision sessions a success. A\* success, 3, a testament to depth of teaching and students taking on board in two cases how to study more effectively. No significant trends in ethnicity or PP.

	2022	2019	2018
A*-A	20	9	22
A*-C	80	62	72
A*-E	100	97	94

### **KS4 Physics**

The Key measure of the impact of KS4 Physics is attainment in GCSE exams, as this determines the possibility of continuing science education at a higher level, for example, A levels or BTEC, either here or at another institution. However, throughout the course leading up to their final GCSE exams, pupils are given regular assessments which have been written in order to cover a wide range of knowledge and skills across each academic year. Half-termly assessments in Physics are based on key syllabus statements published by the exam board to allow progress to be monitored and assessed effectively. The progress of individuals and groups is tracked by the Head of Physics and boys consistently not meeting their targets are referred to Supported Study. Where necessary, individual support may be given to underperforming students. Within lessons, teachers also use a range of AFL techniques to monitor progress and will adjust their pace and opportunities for revision and consolidation accordingly. Another important measure of impact is the number of pupils choosing to study Physics at A level, and the degree to which skills and theory covered at GCSE are well imbedded and provide a firm base for continued deeper study.

GCSE Physics 2022 results are excellent and significantly better than national average: 82% at 7+ (51% nationally), 100% at 4+ (93.8% nationally). The results were on average 0.4 grades above our predictions, which generally tend to be conservative. These results are slightly down from 2019 when 90% of the boys achieved at least a level 7, both years still 100% 4+. This may in part due to a statistical fluctuation or to factors related to COVID.

Using internal data the provisional estimated added value for Physics GCSE is positive 1.06. Overall, the grades were 0.8 above target, and the residual was positive 0.38, so all these measures were positive. Comparing Physics A and Physics B classes, the metrics were respectively: residual +0.44 and +0.32; target +0.6 and +0.9; value added 1.15 and 0.96 which were broadly similar.

The residual for the majority of disadvantaged boys was positive, but brought negative overall to -0.14 by two boys.

The provisional value added amongst groups according to ethnic background and SEN status: Asian +1.9; Black +0.75; White +1.1 and SEN +1.46, showed those with Asian background or with special needs doing particularly well. The Physics department benefits from experienced teachers who worked hard to teach to the best of their ability and make the most of the limited contact time. This has been a major contribution towards the excellent Physics results.