

# KS5 Long Term Plan 2020-2021

## Subject: Biology

### Exam Board: AQA



#### Statement of Intent

##### Curriculum Statement of Intent Science

The aim of the Science department here at St Pauls' is:

***“Empowering students to take ownership of their learning enabling them to achieve outstanding results and become independent scientists realising the importance of science in their everyday lives. The Science Department are a dedicated, supportive team who value sharing good practice to make students be the best that they can be.”***

Science at St Paul's is about developing student's ideas and ways of working that enable them to make sense of the world in which they live through investigation, as well as using and applying processing skills. We ensure that all children are exposed to high-quality teaching and learning experiences, which allow children to engage with practical experiments. They are immersed in scientific vocabulary, which aids students' knowledge and understanding not only of the topic they are studying, but also of the world around them. We intend to provide all students with a broad and balanced Science curriculum and encourage them to develop a sense of excitement and curiosity about Science.

Science teaching at St. Paul's involves adapting and extending the curriculum to match all pupils' needs across all 3 Key Stages. We ensure that all students are provided with rich learning experiences that aim to:

- Prepare our children for life in an increasingly scientific and technological world today and in the future;
- Help our children acquire a growing understanding of the nature, processes and methods of scientific ideas;
- Help develop and extend our students scientific concept of their world;
- Build on our students natural curiosity and developing a scientific approach to problems;
- Encouraging open-mindedness, self-assessment, perseverance and developing the skills of 3 investigations – including: observing, measuring, predicting, hypothesising, experimenting, communicating, interpreting, explaining and evaluating;
- Develop the use of scientific language, recording and techniques;
- Make links between science and other subjects.

## Statement of Implementation

A Level Biology follows the AQA specification. The Biology curriculum is delivered across 2 years and is broken down into blocks of teaching, with each block of teaching lasting approximately half a term, split between two specialist teachers. In Year 12, students have 6 x 50 minute lessons per week, 3 lessons with each specialist teacher. Each of which deliver six blocks of teaching. In Year 13, students have 7 x 50 minute lessons per week split between the two specialist teachers. Each teacher deliver 3 blocks of teaching during the course of Year 13.

Lessons use a range of teaching approaches that allows students to master the assessment objectives assessed at the end of the course:

- **AO1:** Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures
- **AO2:** Apply knowledge and understanding of scientific ideas, processes, techniques and procedures, in both theoretical and practical context, when handling qualitative and quantitative data
- **AO3:** Analyse, interpret and evaluate scientific information, ideas and evidence, to make judgements and reach conclusions.

Throughout the course students' complete 12 Required Practicals, which develop their practical, analytical & evaluative skills, and promoting their interest in biology. The Required Practicals are completed in Lab Books, which include exam style questions to help prepare them for both internal and external assessments.

The curriculum content is assessed at the end of each block of teaching via end of topic tests, which include interleaved question from previous blocks of teaching, ensuring that the students are regularly reviewing previous learning. The end of topic tests mirror the nature of the final examinations, including covering all AOs.

Term	Topics Covered		Skills/AOs/interleaved content	Assessment
Yr. 12 Autumn 1	<b>Teacher 1</b> 3.1.1 Monomers and polymers 3.1.2 Carbohydrates 3.1.3 Lipids 3.1.4 Proteins (18L)	<b>Teacher 2</b> 3.2.1 Cell structure 3.2.2 All cells arise from other cells (16L) <b>Required practical 2: Mitoses (2L)</b>	AO1 – Demonstration of knowledge of scientific ideas Extended exam answers (5 & 6 markers) AO2 application of knowledge of scientific idea.- Data questions  <b>RP2</b> Apparatus and technique d, e, f CPAC 1, 2a, 3b & 4a	<b>By Week of 12/10/20</b> 2 End of topic tests  <b>Teacher 1</b> Biological molecules- carbohydrates, lipids & proteins  <b>Teacher 2</b> <ul style="list-style-type: none"> <li>Cell structure, microscopes, cell cycle &amp; mitosis</li> <li><b>Required practical 2</b></li> </ul>
Yr. 12 Autumn 2	<b>Teacher 1</b> 3.1.4 enzymes (6L) <b>Required practical 1: Enzymes (2L)</b> 3.1.6 ATP 3.1.7 Water 3.1.8 Inorganic ions (3L) 3.3.1 Surface area to volume ratio (2L) 3.3.2 Gas exchange plants (4L)	<b>Teacher 2</b> 3.1.5 Nucleic acids are important information-carrying molecules 3.4.1 DNA, genes and chromosomes 3.4.2 Protein synthesis 3.4.3 Genetic diversity can arise as a result of mutation or during meiosis (16L)	Interleave questions from 3.1.1, 3.1.2 and 3.1.3 Interleave questions from 3.2.1 & 3.2.2  Build on AO1 knowledge base: Interleaved “pop” quizzes and extended writing  Develop AO2 application of scientific idea, maths skills and data questions  <b>RP1</b> Apparatus and technique a, b, c, f, l CPAC 2b 2d & 4b	<b>By Week of 13/12/20</b> 2 End of topic tests  <b>Teacher 1</b> <ul style="list-style-type: none"> <li>All Biological molecules- Gas exchange</li> <li><b>Required practical 1</b></li> </ul> <b>Teacher 2</b> Structure of DNA, protein synthesis, genetic diversity and cells recap
Yr. 12 Spring 1	<b>Teacher 1</b> 3.3.2 Gas exchange (9L) 3.3.3 Start Digestion and absorption (4L)	<b>Teacher 2</b> 3.2.3 Transport across cell membranes (9L) <b>Required practical 3: dilution series (2L)</b>  <b>Required practical 4: Cell membrane permeability (2L)</b>	Interleaved questions from Autumn 1, molecules and structure of DNA  Continue to build on AO1 knowledge base, Interleaved “pop” quizzes Further develop AO2 application of scientific idea Maths skills & data questions  AO3 Analyse, interpret and evaluate scientific information  <b>RP3</b> Apparatus and technique c, h, j, l CPAC 1, 2a, 2c, 5a <b>RP4</b> Apparatus and technique a, b, c, j & l CPAC 2b, 3b, 5b	<b>By Week of 8/2/21</b> 2 End of topic tests  <b>Teacher 1</b> Gas exchange, digestion plus interleaved molecules  <b>Teacher 2</b> <ul style="list-style-type: none"> <li>Cells, DNA and transport across membranes</li> <li><b>Required practicals 3 &amp; 4</b></li> </ul>

<p>Yr. 12 Spring 2</p>	<p><b>Teacher 1</b> 3.3.4 Mass transport 3.3.4.1 Mass transport in animals 3.3.4.2 Mass transport in plants (16L)  <b>Required practical 5: Dissection (2L)</b></p>	<p><b>Teacher 2</b> 3.2.4 Cell recognition and the immune system (8L)  3.4.4 Genetic diversity and adaptation (4L)  <b>Required practical 6: Antibiotic resistance (2L)</b></p>	<p>Interleaved questions from Autumn 1 &amp; 2,  Continue to build AO1 knowledge base, Interleaved “pop” quizzes &amp; extended writing Further develop AO2 maths skills &amp; data questions application of scientific idea Develop AO3 drawing conclusions and evaluating information  <b>RP5</b> Apparatus and technique E h j CPAC 1, 2a, 3b, 4a <b>RP6</b> Apparatus and technique c i CPAC 1, 3b, 4a &amp; 5b</p>	<p><b>By Week of 22/3/21</b> 2 End of topic tests  <b>Teacher 1</b> • Mass transport and interleaved questions • <b>Required practical 5</b>  <b>Teacher 2</b> • Cells, DNA and transport across membranes • <b>Required practical 6</b></p>
<p>Yr. 12 Summer 1</p>	<p><b>Teacher 1</b> 3.6.1.1 Survival and response 6.1.2 Receptors 3.6.1.3 Control of heart rate (max 15L)</p>	<p><b>Teacher 2</b> 3.4.5 Species and taxonomy 3.4.6 Biodiversity within a community 3.7 Investigating diversity <b>PLUS</b> 3.7.2 Populations without Hardy Weinberg (max 15L)</p>	<p>Interleaved questions from Autumn 1, 2 &amp; Sp 1  Continue to build AO1 knowledge base, Interleaved “pop” quizzes &amp; extended writing Further develop AO2 maths skills &amp; data questions application of scientific idea Develop AO3 drawing conclusions and evaluating information</p>	<p><b>By Week of 24/5/21</b> 2 End of topic tests  <b>Teacher 1</b> Response  <b>Teacher 2</b> Population genetics</p>
<p>Yr. 12 Summer 2</p>	<p><b>Teacher 1</b> <b>Required practical 10: Choice chamber/ animal behaviour project (1L)</b>  Revision</p>	<p><b>Teacher 2</b> <b>Required practical 12: Ecology project (1L)</b>  Revision</p>	<p><b>Revision – AO1, AO2 &amp; AO3</b>  <b>RP10</b> Apparatus and technique h CPAC 2b, 3b, 4b <b>RP11</b> Apparatus and technique A, b, h, k, i CPAC 2c, 3a &amp; 5b</p>	<p><b>Mock exam Full paper 1 AS level End June beginning July Date to be finalised once exam boards say when A level exams TBC</b>  <b>Teacher 1</b> <b>Required practical 10</b> <b>Teacher 2</b> <b>Required practical 12</b></p>

Term	Topics Covered	Skills/AOs/interleaved content	Assessment	Term
Yr. 13 Autumn 1	<b>Teacher 1 3p</b> 3.6.2 Nervous coordination (11L)	<b>Teacher 2 4p</b> 3.5.1 Photosynthesis (6L)  3.5.2 Respiration (6L)  3.5.3 Energy and ecosystems (2L)	Revision Yr. 12 Interleaved questions from Yr. 12  Continue to build AO1 knowledge base, Interleaved “pop” quizzes & extended writing Further develop AO2 maths skills & data questions Develop AO3 drawing conclusions and evaluating information	<b>2 End of topic tests: by week 2/2/20</b>  <b>Teacher 2</b> Test on Photosynthesis & respiration  <b>PPEs in last 2 weeks of Autumn 1 12/10/20 Full paper 1 2hrs</b>  <b>Teacher 1</b> Test on Nervous coordination
Yr. 13 Autumn 2	<b>Teacher 1 3p</b> 3.6.4 Homeostasis is the maintenance of a stable internal environment (12L)  <b>Required practical 11: Colour metric glucose calibration curve urine (2L)</b>  <b>Required practical 5: Dissection (from Yr. 12) (2L) Only 1 class</b>	<b>Teacher 2 4p</b> 3.5.4 Nutrient cycles (6L)  <b>Required practical's 4, 7, 8 &amp; 9. (1L)</b>  <b>7.1 Inheritance (9L)</b>  <b>3.7.2 Populations revisited hardy Weinberg, chi squared (3L)</b>	Interleaved questions from Yr. 12 & Autumn 1  Continue to build AO1 knowledge base, Interleaved “pop” quizzes & extended writing Further develop AO2 maths skills & data questions Develop AO3 drawing conclusions and evaluating information  <b>RP4</b> Apparatus and technique a, b, c, j & l CPAC 2b, 3b, 5b <b>RP7</b> Apparatus and technique b, c, & g CPAC 1, 2a, & 4b <b>RP8</b> Apparatus and technique A, b, & c CPAC 2b, 3b, & 4b <b>RP9</b> Apparatus and technique A, b, c & i CPAC 1, 2b, 2d, 4a, 4b, 5a & 5b <b>RP11</b> Apparatus and technique b, c & f CPAC 1, 2a, 2d & 4a	<b>2 End of topic tests: by week 18/12/2020</b>  <b>Teacher 1</b> Test on Homeostasis <b>Required practical 11</b> <b>Required practical 5</b>  <b>Teacher 2</b> Tests Genetics and energy <b>Required practical 4</b> <b>Required practical 7</b> <b>Required practical 8</b> <b>Required practical 9</b>
Yr. 13 Spring 1	<b>Teacher 1 3p</b> 3 weeks before PPEs (9L in total)  3.7.3 Evolution may lead to speciation (7L)	<b>Teacher 2 4p</b> 3 weeks before PPEs (12L in total)  3.8.1 Alteration of the sequence of bases in	Interleaved questions from Yr. 12 & Autumn term  Continue to build AO1 knowledge base, Interleaved “pop” quizzes & extended writing	<b>PPEs 25/1/21 to 5/2/21 2 Full papers, paper 1 &amp; paper 2 Each 2hrs</b>  <b>Teacher 1</b> <b>Required practical 10</b> <b>Required practical 12</b>

	<p>3.7.4 Populations in ecosystems (2L)</p> <p><b>Required practical 10: Choice chamber/ animal behaviour project (2L)</b></p> <p><b>Required practical 12: Ecology if needed (2L)</b></p>	<p>DNA can alter the structure of proteins</p> <p>3.8 The control of gene expression</p> <p>3.8.2.3 Gene expression and cancer</p> <p>3.8.4 Gene technologies</p>	<p>Further develop AO2 maths skills &amp; data questions</p> <p>Develop AO3 drawing conclusions and evaluating information</p> <p><b>RP10</b> Apparatus and technique h CPAC 2b, 3b, 4b</p> <p><b>RP11</b> Apparatus and technique A, b, h, k, i CPAC 2c, 3a &amp; 5b</p>	
Yr. 13 Spring 2	<p>Slippage and holistic interleaved revision to biology focusing on:</p> <ul style="list-style-type: none"> <li>• Comprehension questions</li> <li>• Data analysis</li> <li>• Mathematical skills</li> <li>• Essays</li> </ul>		<p><b>Exam skills</b> AO1, AO2 &amp; AO3</p>	<p><b>2 End of topic tests: by week 2/2/21</b></p> <p><b>Teacher 1</b> Population ecology</p> <p><b>Teacher 2</b> Gene technologies by 23/3/2021</p> <p><b>Full paper 3 mock DTB</b></p>
Yr. 13 Summer 1	<b>Revision</b>		<p><b>Exam skills</b> AO1, AO2 &amp; AO3</p>	Practice papers/exam questions