

### CURRICULUM INTENT

**We aim to develop a sense of awe and wonder at the world around us and explore the way everything interconnects.**

The science curriculum at Avanti Fields provides students with the foundations for understanding the biological and physical aspects of the world, and the processes through which they develop this knowledge and understanding. Students will be taught scientific literacy, concepts and processes, working scientifically skills, methodologies of scientific enquiry, and application of science.

The curriculum also aims to foster positive and ambitious attitudes toward science, develop inquiring minds and encourage students to examine and appreciate how science and technology affect their lives, environment and the natural world.

### THE AVANTI WAY

#### EDUCATIONAL EXCELLENCE



Teachers and students are inspired, motivated and joyful. A challenging science curriculum with high academic standards and a culture of intellectual curiosity cultivates independently thoughtful and reflective students, working towards mastery in key concepts, processes and working scientifically skills.

#### CHARACTER FORMATION



A challenging and supportive learning environment in science allows students to embody the Avanti's virtues of respect, self-discipline, courage, integrity, empathy and gratitude, and develop the key Avanti Fields learner skills and qualities. Students are encouraged to make conscientious choices and display a reverence for all life, nature and the earth's resources.

#### SPIRITUAL INSIGHT



Science will build on students' natural sense of wonder, curiosity, their intuition and inspiration to offer an experience of knowledge and wisdom through experiments, enquiry and evidence.

### PROGRAMME OF STUDY

The GCSE science courses encourage the development of knowledge and understanding in science through opportunities for working scientifically. Working scientifically is the sum of all the activities that scientists do, and it features in every topic. Students are assessed on these skills along with mathematical skills in their final written exams.

Students will develop their investigative skills, scientific literacy, numerical and graphical skills, and analytical and evaluative skills.

#### GCSE SCIENCE: YEAR 10 & YEAR 11

Students start their GCSE work after Easter in year 9. There are two routes through GCSE Science: Triple award separate sciences (AQA GCSE Biology 8461, Chemistry 8462 and Physics 8463) or double award combined science (AQA GCSE Combined Science Trilogy 8464).

Separate science students are taught six science lessons per week: two lessons per discipline, usually by three subject specialist teachers. For most topics in the separate science course, there is extra content compared to the combined science double award. The final GCSE exams (6 in total) are longer (1 hour 45 minutes exams) than the combined science papers to reflect the additional content and students are awarded **three separate GCSEs** (GCSE Biology, Chemistry and Physics) with three separate and unconnected grades.

Combined science students are taught five lessons per week. Students are taught short topics that cover all three disciplines of science: Biology, Chemistry and Physics. The final GCSE exams (6 in total) are shorter (1 hour 15 minutes exams) than the separate science papers and students are awarded **two GCSEs**.

**TOPICS AND REQUIRED PRACTICALS**

| BIOLOGY                                 | CHEMISTRY  | PHYSICS                           | REQUIRED PRACTICALS FOR SCIENCE<br>[All additional RPs in bold are for separate science ONLY] |   |   |
|---|--|-----------------------------------|---|---|---|
|   |  |                                   | BIOLOGY RP  | CHEMISTRY RP  | PHYSICS RP  |
| B1 Cell biology                         | C1 Atomic structure and the periodic table         | P1 Energy                         | B1: Microscopy<br>B1: Osmosis   |   | P1: Specific heat capacity<br><b>P1: Thermal insulation</b>   |
| B2 Organisation                         | C2 Bonding, structure and the properties of matter | P2 Electricity                    | B2: Food tests<br>B2: Enzymes   |   | P2: Resistance<br>P2: I-V characteristics                     |
| B3 Infection and response               | C3 Quantitative chemistry                          | P3 Particle model of matter       | <b>B3: Microbiology</b>   |   | P3: Density   |
| B4 Bioenergetics                        | C4 Chemical changes                                | P4 Atomic structure               | B4: Photosynthesis  | C4: Making salts<br>C4: Electrolysis<br><b>C4: Neutralisation</b> |   |
| B5 Homeostasis and response             | C5 Energy Changes<br>C6 Rate of reaction           | P5 Forces                         | B5: Reaction time<br><b>B5: Germination</b>   | C5: Temperature change<br>C6: Rates of reaction                   | P5: Forces and extension<br>P5: Acceleration                  |
| B6 Inheritance, variation and evolution | C7 Organic chemistry                               | P6 Waves                          |   |   | P6: Waves<br>P6: Radiation and absorption<br><b>P6: Light</b> |
| B7 Ecology                              | C8 Chemical analysis                               | P7 Magnetism and electromagnetism | B7: Field investigations<br><b>B7: Decay</b>  | C8: Chromatography<br><b>C8: Identifying ions</b>                 |   |
|   | C9 Chemistry of the atmosphere                     | <b>P8 Space physics</b>           |   |   |   |
|   | C10 Using resources                                |                                   |   | C10: Water purification   |   |

**ASSESSMENT AND FEEDBACK**

Students are assessed regularly in science through a combination of formative and summative assessments. Students receive timely written and verbal feedback after each assessment, following the whole school 'Strengths, Improvements, and Actions' (SIA) policy. Dedicated Improvement and Reflection Time (DIRT) is built into lessons, post assessments to allow students to reflect and act upon the feedback and complete an improvement and/or challenge tasks to improve and make further progress in their knowledge, skills and understanding.

**FORMATIVE ASSESSMENT:** For each topic at KS4, one **key concept** and one **working scientifically skill** or **required practical skills** are assessed through short structured written exam style assessments. Working scientifically and numeracy are extremely important skill areas that will be assessed in the final exams, and

therefore it is important that students attend all lessons and participate fully in practical experiments. We expect all students to make every effort to catch up with missed work in their own time and take advantage of the lunchtime study support system on offer.

**SUMMATIVE ASSEMENT:** There are two summative assessments (mocks) per year at KS4. These are cumulative in nature and the purpose is to confirm the track point of the student and to promote longer term recall by testing earlier topics and to meet the demands of a linear course.

### EXAM BOARD AND AQA USEFUL WEBSITES

**EXAM BOARD:** AQA

**SPECIFICATION:** SEPARATE SCIENCES 8461 (Biology) 8462 (Chemistry) 8463 (Physics)

**SPECIFICATION:** COMBINED SCIENCE 8464 (Trilogy)

The AQA website has past papers, mark schemes and the specification all free to download.

**Separate science triple award:**

<https://www.aqa.org.uk/subjects/science/gcse/biology-8461>

<https://www.aqa.org.uk/subjects/science/gcse/chemistry-8462>

<https://www.aqa.org.uk/subjects/science/gcse/physics-8463>

**Combined science double award:**

<https://www.aqa.org.uk/subjects/science/gcse/combined-science-trilogy-8464>

### SUPPORT AND GUIDANCE

1. Use the science revision guide and workbook: **OXFORD REVISE: AQA GCSE** to learn the key facts on the knowledge organisers: READ – COVER – WRITE method → MASTER THE MINIMUM.

2. **Apply** your understanding to **exam questions:** Use the **OXFORD REVISE: AQA GCSE WORKBOOKS** to practise questions. Re-do assessment questions and questions completed in class to improve your responses.

3. **Test yourself** regularly on the key facts, equations, and units: use **FLASHCARDS**. An effective use of flashcards to prompt and recall learning using spaced practice is the **Leitner system**.

4. Use **Doddle:** Log onto [www.doddlelearn.co.uk](http://www.doddlelearn.co.uk).

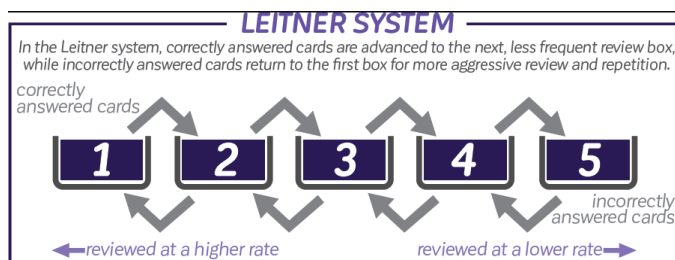
Use the 'browse' tab to view powerpoints, homework, revision lessons and interactive resources for every aspect of KS4 Science.

- INSTITUTION: Avanti Fields School
- USERNAME: FirstnameSurname18 (e.g. JoeBloggs18) (Y7:21; Y8: 20; Y9: 19; Y10: 18)
- PASSWORD: avanti

5. Log onto **Google Classroom** regularly to access homework, additional resources to support you with your learning.



6. Log onto **Collins Connect:** <https://connect.collins.co.uk/school/defaultlogin.aspx> to access the full Biology, Chemistry and Physics textbooks and complete questions.



7. Use **OAK NATIONAL ACADEMY** lessons:

<https://classroom.thenational.academy/subjects-by-key-stage/key-stage-4> to watch videos of lessons, complete the quizzes and the in-built questions and self-assess your answers using the answers provided.



8. Use **BBC BITESIZE**: <https://www.bbc.co.uk/bitesize/subjects/zrkw2hv> to learn the key concepts, try quizzes and watch video clips.

9. Watch **free science lessons** videos to support revision: <https://www.freesciencelessons.co.uk/>

10. Attend **science study club** during lunchtimes (Monday – Friday) for support with classwork and homework.

Regular review of classwork and revision in small chunks is much more effective than leaving it to the last minute before assessments and final exams.

### EXTRA-CURRICULAR / SUPER-CURRICULAR OPPORTUNITIES

**Science study club:** Monday – Friday lunchtimes open to all students to gain further support with their homework, classwork or revision. Students will have access to the subject specific textbooks and laptops.

Throughout the year, students will have the opportunity to engage in various science and STEM events, trips and competitions through the 'Take it Further' provision. Students and parents will be informed of all opportunities as and when they are organised.

