

# Switching Guide

*International AS and A-level*

## Biology

(9610)

Switching from Pearson Edexcel or  
Cambridge International to  
OxfordAQA International Qualifications

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exam board *that  
puts fairness first***

## Switching to OxfordAQA International AS and A-level Biology (9610)

With relevant, up-to-date and motivating content, the **OxfordAQA International AS and A-level Biology** specification gives students an excellent springboard to higher level study in Biology.

### Key features:

- Our papers are carefully designed to avoid cultural or linguistic bias, allowing students to achieve their full potential.
- Practical components are flexible around local access to equipment and materials, with practical knowledge assessed through the main exam papers.
- Carefully balanced depth of content that includes broad topics that capture students' interest, such as a unique section on digestion.



## Topic by topic comparison

| OxfordAQA specification (9610) v4.1  | Pearson Edexcel International specification   | Cambridge International specification  |
|--|---|--|
| <b>Overall structure</b>   |   |  |
| <p><b>Split into four units</b> (2 AS and 2 A2):</p> <ul style="list-style-type: none"> <li>• The diversity of living organisms (AS)</li> <li>• Biological systems and disease (AS)</li> <li>• Populations and genes (A2)</li> <li>• Control (A2)</li> </ul> <p>Each unit has a number of topics: the diversity of living organisms-11, biological systems and disease-11, populations and genes-8 and control-10. The units are then set out by stating the unit title, then the unit subtitle, then the detailed statements of the knowledge/skill required. At the end of each unit there is a list of biological principles students should be expected to understand.</p> <p>List of six required practical exercises for AS and another four for A2. These are also integrated into the specification at the end of each unit.</p> <p>Practical is assessed throughout the five exams. There is no separate practical exam.</p> <p>For AS level there are two exams, one for unit 1 and one for unit 2. For A2 there are three exams, one for unit 3, one for unit 4 and a synoptic paper. All five exams make up the A-level. The papers are all the same length, have the same number of marks and are equally weighted.</p> | <p><b>Split into four units</b> (2 AS and 2 A2):</p> <ul style="list-style-type: none"> <li>• Molecules, Diet, Transport and Health (AS)</li> <li>• Cells, Development, Biodiversity and Conservation (AS)</li> <li>• Energy, Environment, Microbiology and Immunity (A2)</li> <li>• Respiration, Internal Environment, Coordination and Gene Technology (A2)</li> </ul> <p>Each theory unit has two topics within it, a summary of which is found at the start of each unit, along with assessment information. Each topic is then set out with statements of what students will be assessed on.</p> <p>There are 18 (nine for AS, nine for A2) recommended core practical exercises. They are interspersed throughout the units. It is expected that all students will have experience of these practical exercises, as knowledge and understanding of the recommended core practical exercises will be assessed via an exam paper, one for AS and one for A2. There is guidance on the structure of the exams and what will be assessed.</p> <p>For AS level there are two theory exams, one for each unit. These two plus the practical paper constitute the AS level qualification. For A2 there are two theory exams, one for each unit. These plus the practical paper constitute the A2 qualification. All six exams make up the A-level. The first two AS exams are both 90 minutes long and the first two A-level papers are 105 minutes long. The two practical papers are both 80 minutes long.</p> | <p>There are 19 smaller units (11 AS and 8 A2). Each unit provides a summary context at the start. In one column is the topic subheading and the assessable learning outcomes in another.</p> <p>Practical is assessed via exam papers, one for AS and one for A2. The AS practical paper is laboratory based whereas the A2 practical paper is written only. There is extensive guidance on the administration of the AS paper. Investigative and practical techniques are interspersed throughout the specification.</p> <p>For AS level there are two theory exam papers, one of which is multiple choice. These two plus the practical paper constitute the AS qualification. For A2 there is one theory exam plus a written practical paper. All five exams make up the A-level. The papers are not equally weighted.</p> |

| OxfordAQA specification (9610) v4.1 | Pearson Edexcel International specification   | Cambridge International specification  |
|-------------------------------------|---|--|
| Content                             | Coverage  | Coverage   |
| 3.1.1 Biological molecules          | <p>This is covered in Pearson Edexcel sections 1.2, 1.4, 1.5, 2.6 and 4.3</p> <p>Pearson Edexcel have the material spread across different topics, for OxfordAQA they are all together. The guidance provided by OxfordAQA is more extensive.</p> <p>Covered in similar detail except:</p> <ul style="list-style-type: none"> <li>• Pearson Edexcel include the importance of water.</li> <li>• OxfordAQA include qualitative food tests but Pearson Edexcel include semi-quantitative food tests.</li> </ul> | <p>This is covered in by Cambridge International in sections 2.1 to 2.4</p> <p>All food tests are in one section, whereas OxfordAQA have them with each type of biological molecule. Cambridge International include a semi-quantitative test for reducing sugars.</p> <p>Carbohydrates are studied in a similar level of detail. OxfordAQA include a diagram of <math>\alpha</math>-glucose and <math>\beta</math>-glucose.</p> <p>Lipids are covered in similar detail except OxfordAQA, includes saturated and unsaturated triglycerides.</p> <p>Proteins structure is covered in a similar level of detail, OxfordAQA include a diagram of amino acid structure. Cambridge International have specific examples of haemoglobin and collagen included.</p> <p>Cambridge International also include the structure and properties of water.</p> |
| 3.1.2 Cells and cell structure      | <p>This is covered in Pearson Edexcel section 3.1 – 3.8, 4.1 and 4.2</p> <p>Pearson Edexcel covers plant cells in more detail, with knowledge of amyloplasts, vacuole, tonoplast, plasmodesmata, pits and middle lamella required.</p> <p>OxfordAQA additionally include microscopy, magnification calculations and the principles of cell fractionation and ultracentrifugation in the separation of cell components.</p>  | <p>This is covered in Cambridge International sections 1.1 and 1.2</p> <p>Cambridge International ask for knowledge of more organelles than OxfordAQA and also include the structure of viruses.</p> <p>Cambridge International ask students to use an eyepiece graticule and stage micrometer scale to measure cells; OxfordAQA do not.</p> <p>OxfordAQA include the principles of cell fractionation and ultracentrifugation in the separation of cell components.</p>   |

| OxfordAQA specification (9610) v4.1                            | Pearson Edexcel International specification   | Cambridge International specification   |
|--|---|---|
| 3.1.3 Biochemical reactions in cells are controlled by enzymes | <p>This is covered in Pearson Edexcel sections 2.7, 2.8, 5.21. The topic is therefore split between AS and A2.</p> <p>OxfordAQA additionally require students to understand the effects of competitive and non-competitive inhibitors on the rate of enzyme-controlled reactions.</p> | <p>This is covered in Cambridge International sections 3.1 and 3.2.</p> <p>Covered in a similar level of detail by both. Cambridge International also include:</p> <ul style="list-style-type: none"> <li>• A requirement for students to understand the maximum rate of reaction (<math>V_{max}</math>) is used to derive the Michaelis-Menten constant (<math>K_m</math>) which is used to compare the affinity of different enzymes for their substrates</li> <li>• Immobilised enzymes</li> <li>• A specific requirement to use a colorimeter to measure the progress of enzyme-catalysed reactions.</li> </ul> |
| 3.1.4 Transport into and out of cells                          | <p>This is covered in Pearson Edexcel section 2.1 – 2.5</p> <p>Pearson Edexcel include Fick's Law of diffusion by name and endocytosis and exocytosis, whereas OxfordAQA do not. OxfordAQA include the role of microvilli.</p>  | <p>This is covered in Cambridge International sections 4.1 and 4.2.</p> <p>Covered in similar detail except:</p> <p>Cambridge International include cell signalling, endocytosis, exocytosis, surface area to volume ratio and the effects of osmosis on cells.</p> <p>OxfordAQA include the role of microvilli and more detail about active transport.</p>   |

| OxfordAQA specification (9610) v4.1                                       | Pearson Edexcel International specification  | Cambridge International specification  |
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| <p>3.1.5 Gas exchange and the transport of oxygen in living organisms</p> | <p>This is covered in Pearson Edexcel section 2.1 and 1.9 Pearson Edexcel offer little detail about the depth required. The general properties of gas exchange surfaces are considered, where OxfordAQA go into more detail, with body shape also considered.</p> <p>OxfordAQA include gas exchange in single-celled organisms, insects and the leaves of a dicotyledonous plant. The mechanism of breathing in humans is also included.</p> <p>OxfordAQA expect students to identify and explain the adaptations of unfamiliar examples of gas exchange surfaces and interpret data relating to the effects of lung disease on gas exchange and ventilation.</p> <p>Pearson Edexcel include the role of haemoglobin in the transport of carbon dioxide. OxfordAQA expect students to understand the general pattern of blood circulation in a mammal, Pearson Edexcel do not.</p> | <p>Covered in Cambridge International sections 2.3, 4.2, 8.1, 8.2 and 9.1</p> <p>Surface area to volume ratio is similar on both specifications.</p> <p>OxfordAQA include gas exchange in single-celled organisms, insects and the leaves of a dicotyledonous plant.</p> <p>Cambridge International have more detailed lung structure and function, and include investigations and the effects of smoking. OxfordAQA students expected to identify and explain the adaptations of unfamiliar examples of gas exchange surfaces and interpret data relating to the effects of lung disease on gas exchange and ventilation.</p> <p>Cambridge International require more detailed knowledge of the role of haemoglobin, including role of carbonic anhydrase, the formation of haemoglobinic acid and carbamino-haemoglobin. They also require knowledge of the role of the plasma in the transport of carbon dioxide.</p> |
| <p>3.1.6 Living organisms vary</p>  | <p>This is partially covered in Pearson Edexcel 3.20 and 3.21</p> <p>Pearson Edexcel covers the sources of continuous variation, whereas OxfordAQA compares interspecific and intraspecific variation.</p> <p>OxfordAQA uses this topic to introduce the ideas of random sampling, sample size mean and standard deviation For Pearson Edexcel this covered in the mathematical skills appendix.</p>   | <p>Covered in Cambridge International 17.1</p> <p>Cambridge International compares continuous and discontinuous variation, whereas OxfordAQA compares interspecific and intraspecific variation.</p> <p>OxfordAQA introduces the standard deviation here, for Cambridge International this is an A-level only concept and part of the practical exam, paper 5.</p>   |

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| 3.1.7 DNA, genes and chromosomes             | <p>This is covered in Pearson Edexcel sections 2.9 – 2.10</p> <p>Pearson Edexcel require knowledge of Meselson and Stahl's classic experiment, OxfordAQA do not.</p> <p>OxfordAQA include the structure of chromosomes, mitochondrial and chloroplast DNA and the idea of exons and non-coding introns. These are not on the Pearson Edexcel specification.</p> | <p>Covered in Cambridge International section 5.1 and 6.1</p> <p>OxfordAQA include mitochondrial and chloroplast DNA but Cambridge International contains detail about DNA polymerase adding nucleotides in a 5' to 3' direction. Cambridge International also includes detail about the function of telomeres.</p>  |
| 3.1.8 Protein synthesis                      | <p>This is covered in Pearson Edexcel sections 2.11 -2.13</p> <p>Pearson Edexcel do not include splicing, the difference between eukaryotic and prokaryotic protein synthesis and how chaperones assist in the folding of other proteins.</p>   | <p>Covered in Cambridge International section 6.2.</p> <p>Covered in similar detail but OxfordAQA include protein folding and the role of chaperone proteins.</p>  |
| 3.1.9 Genetic diversity may arise by meiosis | <p>This is covered in Pearson Edexcel section 3.10</p> <p>Covered in a similar level of detail but with OxfordAQA offering extra guidance and including random fertilisation.</p>   | <p>Covered in Cambridge International section 16.1</p> <p>For Cambridge International this is an A2 concept, AS for OxfordAQA.</p> <p>Cambridge International covers all that OxfordAQA does in this section, but additionally expects students to be able to recognise the stages of meiosis.</p>   |
| 3.1.10 Species and taxonomy                  | <p>This is covered in Pearson Edexcel section 1.14</p> <p>OxfordAQA have more detail to include the definition of a species and the full taxonomic hierarchy.</p>   | <p>Covered in Cambridge International section 18.1</p> <p>For Cambridge International this is an A2 concept, AS for OxfordAQA.</p> <p>Both specifications use the same hierarchy.</p> <p>Cambridge International requires students to know the characteristic features of the three domains and five kingdoms, and why viruses are not included in the three domain classification, OxfordAQA does not.</p> <p>OxfordAQA expect students to understand how immunology and genome sequencing can help to clarify taxonomic relationships between organisms.</p> |



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| 3.1.11 Biodiversity within a community                      | <p>This is covered in Pearson Edexcel section 4.14 – 4.21</p> <p>Pearson Edexcel state that genetic diversity can be measured by the variety of alleles. OxfordAQA give more methods in a greater level of detail. However, Pearson Edexcel includes the formula for calculating the heterozygosity index.</p> <p>Both include conservation. Pearson Edexcel include methods of conservation, scientific research, captive breeding programmes, reintroduction programmes and education. OxfordAQA include how human activities reduce biodiversity and the balance between human food production and conservation.</p> <p>Both include species richness as a measure of biodiversity and the same index of diversity.</p> | <p>Covered in Cambridge International section 18.2</p> <p>For Cambridge International this is an A2 concept, AS for OxfordAQA.</p> <p>OxfordAQA include methods of measuring genetic diversity.</p> <p>Cambridge International includes the use of the Lincoln index, ecological field techniques and the statistical tests, Spearman's rank correlation and Pearson's linear correlation.</p> <p>OxfordAQA require students to understand the balance between human food production and conservation.</p> |
| 3.2.1 The causes of disease: pathogens, lifestyle and genes | <p>Risk factors are covered in Pearson Edexcel sections 1.12, 1.15-1.17, 6.5 and 6.7</p> <p>For Pearson Edexcel details of pathogens and their entry into the body is mostly an A2 concept.</p> <p>Pearson Edexcel require students to distinguish between the structure of bacteria and viruses, whereas OxfordAQA simply state that bacteria and viruses are pathogens.</p> <p>Both include major routes pathogens take to enter the body, Pearson Edexcel also include the role of barriers in protecting the body.</p>   | <p>Covered in Cambridge International section 10.1</p> <p>Cambridge International include more detail regarding specific pathogenic diseases; cholera, malaria, tuberculosis (TB) and HIV/AIDS. OxfordAQA cover cholera in section 3.2.3 and HIV/AIDS in section 3.2.4.</p> <p>OxfordAQA has a section; Lifestyle, coronary heart disease and cancer, that Cambridge International does not.</p>   |
| 3.2.2 Digestion and absorption                              | Pearson Edexcel does not have this section on the specification.   | Cambridge International does not have this section on the specification.   |
| 3.2.3 Cholera   | Pearson Edexcel does not mention cholera on the specification.   | <p>Covered in Cambridge International section 10.1</p> <p>Covered in similar detail, except OxfordAQA has a greater stress on oral rehydration solutions.</p>  |



| OxfordAQA specification (9610) v4.1                                     | Pearson Edexcel International specification  | Cambridge International specification   |
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| 3.2.4 HIV as an example of a human disease caused by a virus            | <p>This is covered in Pearson Edexcel section 6.5 and 6.6</p> <p>For Pearson Edexcel this is an A2 concept, AS level for OxfordAQA.</p> <p>Pearson Edexcel only require students to understand the structure of HIV and how it infects human cells.</p> <p>In addition, OxfordAQA require students to understand the replication cycle and the effects of drugs used in treatment of HIV/AIDS (when provided with appropriate information for the latter).</p> | <p>Covered in Cambridge International sections 10.1</p> <p>Cambridge International does not require knowledge of the structure of HIV, OxfordAQA does. OxfordAQA also expects knowledge of the replication cycle of HIV, Cambridge International only requires methods of transmission. Cambridge International considers the biological, social and economic factors that need to be considered in the prevention and control of HIV/AIDS, and factors that influence the global patterns of distribution of HIV/AIDS.</p> |
| 3.2.5 The defensive functions of mammalian blood                        | <p>This is covered in Pearson Edexcel sections 6.8 – 6.13</p> <p>For Pearson Edexcel this is an A2 concept, AS level for OxfordAQA.</p> <p>Similar detail is covered except the two specifications emphasise different aspects. Pearson Edexcel has a greater focus on the roles of T and B cells; OxfordAQA has a greater focus on vaccination.</p> <p>Person Edexcel covers the difference between bacteriostatic and bactericidal antibiotics.</p>          | <p>Covered in Cambridge International sections 11.1 and 11.2</p> <p>Covered in similar detail, except Cambridge International includes monoclonal antibodies.</p>   |
| 3.2.6 The circulation of blood and the structure of the mammalian heart | <p>Covered in Pearson Edexcel section 1.6 – 1.8 and 7.13</p> <p>Covered in similar detail, except OxfordAQA includes the formation and return of tissue fluid.</p>   | <p>Covered in Cambridge International sections 8.1 and 8.3</p> <p>Covered in similar detail, except:</p> <ul style="list-style-type: none"> <li>• Cambridge International includes the structure of blood cells.</li> <li>• OxfordAQA include the return of tissue fluid and the calculation of cardiac output.</li> </ul>  |

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| 3.2.7 Heart disease may be associated with specific risk factors | <p>Covered in Pearson Edexcel section 1.10 – 1.13 and 1.18 – 1.20</p> <p>Pearson Edexcel go into more detail including the process of blood clotting, treatments for CVD and the effects of blood cholesterol levels.</p> <p>OxfordAQA includes myocardial infarction and its cause in terms of an interruption of blood flow to cardiac muscle.</p>   | Cambridge International does not have this section on the specification.  |
| 3.2.8 Mass transport systems in plants                           | <p>Covered in Pearson Edexcel section 4.4 and 4.5</p> <p>Pearson Edexcel concentrates on the structure, position in the stem and function of sclerenchyma fibres (support), xylem vessels (support and transport of water and mineral ions) and phloem (translocation of organic solutes).</p> <p>OxfordAQA go into more detail about the mechanisms involved in transport and include:</p> <ul style="list-style-type: none"> <li>• The pathway of water from root hairs, through the cortex and endodermis to the xylem including the apoplastic and symplastic pathways</li> <li>• The roles of root pressure and the cohesion-tension theory in moving water through the xylem.</li> <li>• Transpiration and the effects of light, temperature, humidity and air movement.</li> <li>• Phloem and the passage of organic substances through a plant explained by the mass flow hypothesis.</li> </ul> | <p>Covered in Cambridge International sections 7.1 and 7.2</p> <p>Covered in similar detail, except Cambridge International includes a greater description of what is expected and expects students to be able to draw and label cells and tissues.</p> |
| 3.2.9 The role of aphids in spreading plant viruses              | Pearson Edexcel does not have this section on the specification.   | Cambridge International does not have this section on the specification.  |

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| 3.2.10 Cells divide by binary fission and mitosis             | <p>Covered in Pearson Edexcel section 3.14</p> <p>Pearson Edexcel provide little detail, only asking that students explain the role of mitosis and the cell cycle for growth and asexual reproduction. Students need to be able to prepare and stain a root tip squash in order to observe the stages of mitosis.</p> <p>OxfordAQA provides a greater level of detail of what is required and also includes binary fission and conjugation in bacteria.</p>  | <p>Covered in Cambridge International sections 5.1 and 5.2</p> <p>Covered in similar detail, except:</p> <ul style="list-style-type: none"> <li>Cambridge International includes the importance of telomeres</li> <li>OxfordAQA includes binary fission and conjugation in bacteria.</li> </ul>                |
| 3.2.11 Mutation and cancer                                    | <p>Covered in Pearson Edexcel section 2.1.4 and 2.16</p> <p>This section is covered very basically in the Pearson Edexcel specification. Students only have to understand that mutations are errors in DNA replication and then link this to cystic fibrosis (cystic fibrosis is not on the OxfordAQA' specification).</p> <p>For OxfordAQA students also need to know:</p> <ul style="list-style-type: none"> <li>The types of mutation</li> <li>The types of mutagen</li> <li>The main characteristics of benign and malignant tumours</li> <li>The genetic control of cell division</li> <li>How mutations lead to cancer</li> </ul> <p>These are not on Pearson Edexcel's specification.</p> | <p>Covered in Cambridge International sections 6.2</p> <p>Covered in similar detail, except OxfordAQA include a section linking mutation to cancer and requires understanding of proto-oncogenes and tumour suppressor genes. Cambridge International only link smoking with the incidence of lung cancer.</p> |
| 3.3.1 The effect of biotic and abiotic factors on populations | <p>Covered in Pearson Edexcel section 5.10 – 5.15</p> <p>Topics covered are broadly similar, however, the OxfordAQA specification provides more detail about what is expected regarding succession. It also covers the management of succession.</p>   | <p>Covered in Cambridge International section 18.2</p> <p>Cambridge International only requires definitions; OxfordAQA gives more detail.</p> <p>OxfordAQA include factors affecting population size and also succession. These are not on the Cambridge International specification.</p>                      |

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| 3.3.2 Photosynthesis                     | <p>Covered in Edexcel sections 5.1 – 5</p> <p>Covered in a similar level of detail, except OxfordAQA also include limiting factors. Pearson Edexcel requires knowledge of absorption and action spectra along with the separation of pigments by chromatography.</p>  | <p>Covered in Cambridge International sections 13.1 and 13.2</p> <p>Covered in similar detail, except Cambridge International also includes:</p> <ul style="list-style-type: none"> <li>• Chromatography to separate and identify chloroplast pigments</li> <li>• The absorption and action spectra</li> <li>• The use of redox indicators in studying the rate of photosynthesis.</li> </ul> |
| 3.3.3 Respiration                        | <p>Covered in Pearson Edexcel sections 7.1 – 7.8</p> <p>Covered in a similar level of detail except the OxfordAQA specification expect students to know some of the names of intermediate compounds. OxfordAQA includes more detail about the Respiratory Quotient (RQ).</p>  | <p>Covered in Cambridge International sections 12.1 and 12.2</p> <p>Covered into similar detail, except Cambridge International also includes:</p> <ul style="list-style-type: none"> <li>• Rice growth</li> <li>• More guidance about how to measure the rate of respiration using respirometers or redox indicators.</li> </ul>   |
| 3.3.4 Energy transfer through ecosystems | <p>Covered in Pearson Edexcel sections 5.9 and 5.10</p> <p>Covered in a similar level of detail, except OxfordAQA also include:</p> <ul style="list-style-type: none"> <li>• Food chains, webs and pyramids</li> <li>• Net production of consumers</li> <li>• Ways in which farming practices increase the efficiency of energy transfer</li> </ul> | Cambridge International does not have this section on the specification.  |

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| 3.3.5 Nutrient cycles                   | <p>Covered in Pearson Edexcel section 5.18 and 5.19</p> <p>Covered in a similar level of detail, except:</p> <ul style="list-style-type: none"> <li>• Pearson Edexcel link the carbon cycle more to methods of reducing atmospheric carbon dioxide levels and require more analysis of evidence for global warming.</li> <li>• OxfordAQA include more detail about the processes involved in the carbon cycle and also include the nitrogen cycle, the use of natural and artificial fertilisers and eutrophication.</li> </ul>   | Cambridge International does not have this section on the specification.  |
| 3.3.6 Inheritance                       | <p>Covered in Pearson Edexcel sections 2.15</p> <p>For Pearson Edexcel this is an AS topic, for OxfordAQA it is an A2 topic, as such the level of difficulty is greater with the OxfordAQA specification which includes all that the Pearson Edexcel specification does plus:</p> <ul style="list-style-type: none"> <li>• Codominance</li> <li>• Dihybrid inheritance</li> <li>• Crosses involving sex-linkage, autosomal linkage, multiple alleles and epistasis</li> <li>• Use of the chi-squared (<math>\chi^2</math>) test to determine whether there is a significant difference between the expected genetic ratios and the observed ratios.</li> </ul> <p>Pearson Edexcel give a specific example of monohybrid inheritance to study, OxfordAQA do not.</p> | <p>Covered in Cambridge International section 16.2</p> <p>Covered into similar detail, except Cambridge International gives specified examples of inherited conditions (albinism, sickle cell anaemia, haemophilia and Huntington's disease) and how a gene is involved in the pathway for the production of gibberellin.</p> |
| 3.3.7 Allele frequencies in populations | <p>Covered in Pearson Edexcel section 4.20</p> <p>Pearson Edexcel only covers the Hardy-Weinberg equation but does not cover genetic bottlenecks or genetic drift.</p>  | <p>Covered in Cambridge International section 17.2.</p> <p>Covered in similar detail.</p>   |

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| 3.3.8 Evolution may lead to speciation              | Covered in Pearson Edexcel sections 4.20 and 5.23 – 5.24<br><br>For Pearson Edexcel this topic is split between AS and A2. With a basic grasp at AS level developed at A2 level. For OxfordAQA this is an A2 only topic.  | Covered in Cambridge International section 17.3<br><br>Covered in similar detail, except OxfordAQA include more description of the key principles of evolution and different types of selection.   |
| 3.4.1 Control systems involve stimulus and response | Covered in Pearson Edexcel section 8.3<br><br>Pearson Edexcel refers to white and grey matter but does not include taxes or kinesis.  | Covered in Cambridge International section 15.1<br><br>Covered in similar detail, except:<br><ul style="list-style-type: none"> <li>• OxfordAQA include the importance of simple reflexes in avoiding damage to the body.</li> <li>• OxfordAQA include an extra section on taxes and kineses.</li> </ul> |
| 3.4.2 Receptors                                     | Covered in Pearson Edexcel section 8.6 and 8.8<br><br>Pearson Edexcel does not include the Pacinian corpuscle or colour vision and the action of cone cells, whereas OxfordAQA do.<br><br>Pearson Edexcel expects a greater level of knowledge of the action of rod cells and also includes pupil dilation and contraction. | Covered in Cambridge International section 15.1<br><br>Cambridge International only covers chemoreceptors in taste buds but OxfordAQA cover the Pacinian corpuscle and the human retina.   |

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| 3.4.3 Nerve impulses and synaptic transmission | <p>Covered in Pearson Edexcel sections 8.1, 8.4, 8.5 - 8.7</p> <p>The same topics are covered except:</p> <ul style="list-style-type: none"> <li>• Pearson Edexcel expect knowledge of the structure of sensory, relay and motor neurones, OxfordAQA cover only motor neurones.</li> <li>• OxfordAQA include more factors that affect the speed of transmission of an action potential, i.e. temperature and axon diameter.</li> <li>• OxfordAQA include temporal and special summation.</li> <li>• Pearson Edexcel give specified examples of the effects of drugs on synapses (L-Dopa in the treatment of Parkinson's disease and the action of MDMA in ecstasy), whereas OxfordAQA expect students to use information provided to predict and explain the effects of specific drugs and toxins on synaptic transmission.</li> </ul> | <p>Covered in Cambridge International section 15.1</p> <p>Covered in similar detail, except:</p> <ul style="list-style-type: none"> <li>• Cambridge International includes the structure of sensory and motor neurones (OxfordAQA motor neurone only).</li> <li>• OxfordAQA includes axon diameter, temperature as factors affecting the speed of conduction</li> <li>• OxfordAQA covers temporal and special summation and also inhibitory synapses.</li> </ul>  |
| 3.4.4 Skeletal muscles as effectors            | <p>Covered in Pearson Edexcel section 7.9 -7.11</p> <p>Covered in a similar level of detail, except:</p> <ul style="list-style-type: none"> <li>• Pearson Edexcel include the roles of troponin and ATPase in muscle contraction and how tendons and ligaments are involved in movement.</li> <li>• OxfordAQA include the role of phosphocreatine in providing the energy supply during muscle contraction.</li> </ul>   | <p>Covered in Cambridge International section 15.1</p> <p>Covered in similar detail, except:</p> <ul style="list-style-type: none"> <li>• Cambridge International includes the role of troponin in muscle contraction.</li> <li>• OxfordAQA includes an extra section on muscles as effectors. This has antagonistic muscles action, the roles of ATP and phosphocreatine in providing the energy supply during muscle contraction and the structure, location and general properties of slow and fast skeletal muscle fibres.</li> </ul> |



| OxfordAQA specification (9610) v4.1                           | Pearson Edexcel International specification  | Cambridge International specification   |
|---|--|---|
| 3.4.5 Control systems in plants                               | <p>Covered in Pearson Edexcel section 8.11</p> <p>Covered in a similar level of detail, except:</p> <ul style="list-style-type: none"> <li>Pearson Edexcel include how plants detect light using phytochrome.</li> <li>OxfordAQA include more detail regarding plant tropisms, the role of ethene in fruit ripening and the role of abscisic acid in closing the stomata.</li> </ul> | <p>Covered in Cambridge International section 14.2 and 15.2</p> <p>Both specifications cover the role of auxins, although differ in the details required. Both cover the role of abscisic acid in closing the stomata.</p> <p>Cambridge International includes the response of the Venus fly trap and the role of gibberellin in the germination of wheat or barley and in stem elongation. OxfordAQA includes the role of ethene in fruit ripening.</p>  |
| 3.4.6 Homeostasis and negative feedback                       | <p>Covered in Pearson Edexcel section 7.16 and 7.17</p> <p>Both cover the principles of homeostasis, negative feedback and positive feedback. Additionally, Pearson Edexcel includes the role of the hypothalamus in temperature regulation.</p>   | <p>Covered in Cambridge International section 14.1</p> <p>Both specifications cover the principles of homeostasis and negative feedback. Additionally OxfordAQA covers positive feedback.</p>   |
| 3.4.7 Hormones and the control of blood glucose concentration | <p>Pearson Edexcel does not have this section on the specification.</p>  | <p>Covered in Cambridge International section 14.1</p> <p>Covered in similar detail, except:</p> <ul style="list-style-type: none"> <li>Cambridge International gives more detail regarding the cellular mechanisms by which insulin and glucagon work</li> <li>Cambridge International includes details of test strips and biosensors for measuring glucose concentration</li> <li>OxfordAQA include detail about Type1 and Type2 diabetes</li> <li>OxfordAQA cover the role of adrenaline.</li> </ul> |
| 3.4.8 Control of heart rate                                   | <p>Covered in Pearson Edexcel section 7.12 and 7.13</p> <p>Covered in a similar level of detail, except:</p> <p>Pearson Edexcel include how the use of electrocardiograms (ECGs) can aid the diagnosis of abnormal heart rhythms. Pearson Edexcel also include the control of breathing rate, which OxfordAQA do not.</p>  | <p>Covered in Cambridge International section 8.3</p> <p>For Cambridge International this is an AS concept, A2 level for OxfordAQA.</p> <p>Covered in similar detail, except the OxfordAQA specification includes the roles of chemoreceptors and pressure receptors, the autonomic nervous system and effectors in controlling heart rate.</p>   |

| OxfordAQA specification (9610) v4.1               | Pearson Edexcel International specification   | Cambridge International specification  |
|---|---|--|
| 3.4.9 Regulation of transcription and translation | <p>Covered in Pearson Edexcel sections 3.17 – 3.20 and 7.22</p> <p>For Pearson Edexcel this topic is covered mainly at AS. For OxfordAQA this is an A2 topic.</p> <p>OxfordAQA include multipotency, unipotency and RNA interference.</p> | <p>The nearest equivalent on the Cambridge International specification would be section 16.3 covering structural and regulatory genes and between repressible and inducible enzymes, the lac operon, transcription factors and how gibberellin activates genes by causing the breakdown of DELLA protein repressors.</p> <p>The OxfordAQA specification includes epigenetic control of gene expression, RNA interference and cell potency.</p> |
| 3.4.10 Recombinant DNA technology                 | <p>Covered in Pearson Edexcel sections 6.17 and 8.17 – 8.22</p> <p>Covered in a similar level of detail, except OxfordAQA includes the use marker genes. Pearson Edexcel includes microarrays and bioinformatics.</p>                     | <p>Covered in Cambridge International section 19.1</p> <p>Covered in similar detail, except Cambridge International includes:</p> <ul style="list-style-type: none"> <li>• How microarrays are used in the analysis of genomes and in detecting mRNA in studies of gene expression</li> <li>• The process of gel electrophoresis</li> </ul>  |

## Topics on the Pearson Edexcel specification that OxfordAQA does not cover

| Section of the Pearson Edexcel International specification | Topic  |
|--|--|
| Topic 1  | 1.1 The importance of water<br>1.3 Semi-quantitative estimation of reducing sugars and starch<br>1.11 The blood clotting process<br>1.14 Investigating the vitamin C content of food and drink<br>1.18 Blood cholesterol levels<br>1.20 Treatments for CVD   |
| Topic 2  | 2.1 Fick's Law<br>2.10 Meselson and Stahl's experiment<br>2.16 Cystic fibrosis<br>2.17 Genetic screening   |
| Topic 3  | 3.11 Mammalian gametes<br>3.12 & 13 Fertilisation in mammals and flowering plants  |
| Topic 4  | 4.5 & 6 Sclerenchyma<br>4.7 Uses of plant fibres<br>4.8 Importance of water and inorganic ions to plants<br>4.11 Antimicrobial properties of plant substances<br>4.13 Comparison of historic drug testing with contemporary drug testing protocols<br>4.17 Heterozygosity index<br>4.21 Conservation methods |
| Topic 5  | 5.6 Absorption and action spectra<br>5.16 Evidence for global warming<br>5.25 The role of the scientific community in validating new evidence  |

| Section of the Pearson Edexcel International specification | Topic   |
|--|---|
| Topic 6  | 6.1 Aseptic techniques<br>6.2 Measuring the growth of microorganisms<br>6.3 Bacterial growth curve<br>6.6 Mycobacterium tuberculosis<br>6.13 Bacteriostatic and bactericidal antibiotics<br>6.15 Causes of hospital acquired infections<br>6.18 Gel electrophoresis<br>6.19 DNA profiling<br>6.20 How to determine the time of death  |
| Topic 7  | 7.5. The fate of lactate<br>7.9 Tendons, ligaments, extensor and flexor muscles.<br>7.12 The use of ECGs<br>7.13 Control of ventilation<br>7.17 Thermoregulation<br>7.18 – 7.2 The kidney, liver and excretion  |
| Topic 8  | 8.1 The structure of sensory and relay neurones<br>8.6 Pupil dilation and contraction<br>8.9 Habituation<br>8.11 How plants detect light using photoreceptors<br>8.14 Functions of the regions of the human brain<br>8.15 Magnetic resonance imaging (MRI), functional magnetic resonance imaging (fMRI) and computed tomography (CT)<br>8.16 How imbalances in brain chemicals can contribute to ill health<br>8.20 Microarrays<br>8.21 Bioinformatics |

## Topics on the Cambridge International specification that OxfordAQA does not cover

| Section of the Cambridge International specification | Topic   |
|--|---|
| 2.4  | Water   |
| 9.2  | Smoking                                       |
| 10.2   | Antibiotics                                   |
| 14.1   | Deamination the kidney and osmoregulation     |
| 18.3   | Conservation                                  |
| 19.2   | Genetic technology applied to medicine        |
| 19.3   | Genetically modified organisms in agriculture |

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