# Planning Support Booklet

**J247, J250**

**For first teaching in 2016**

This support material booklet is designed to accompany the OCR GCSE (9-1) specification in Biology A and Combined Science A (Gateway Science).

***DISCLAIMER***

This resource was designed using the most up to date information from the specification at the time it was published. Specifications are updated over time, which means there may be contradictions between the resource and the specification, therefore please use the information on the latest specification at all times.If you do notice a discrepancy please contact us on the following email address: resources.feedback@ocr.org.uk

# Introduction

This support material is designed to accompany the OCR GCSE (9-1) specification in Biology A (Gateway) for teaching from September 2016.

The Planning Guidance table on the following pages sets out *suggested* teaching times for the topics within the specification. Note that we always recommend that individual centres plan their schemes of work according to their individual needs. Actual teaching times for topics will depend on the amount of practical work done within each topic and the emphasis placed on development of practical skills in various areas, as well as use of contexts, case studies and other work to support depth of understanding and application of knowledge and understanding. It will also depend on the level of prior knowledge and understanding that learners bring to the course.

The table follows the order of the topics in the specification. It is not implied that centres teach the specification topics in the order shown, centres are free to teach the specification in the order that suites them.

## Delivery guides

The column ‘Delivery guides’ refers to individual teacher guides available from the [GCSE (9–1) Biology A](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/) and [Combined Science A](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-combined-science-a-j250-from-2016/) qualification pages.

These Delivery guides provide further guidance and suggestions for teaching of individual topics, including links to a range of activities that may be used and guidance on resolving common misconceptions.

## Practical work

Specification topic p7 (Practical skills) is not included explicitly in the Planning Guidance table. The expectation is that the practical skills are developed throughout the course and in support of conceptual understanding.

Suggestions for where the PAG techniques can be are included throughout the table. This is by no means and exhaustive list of potential practical activities.

| Topic | Teaching hoursSeparate / Combined | Delivery guides | PAG opportunities |
| --- | --- | --- | --- |
| **Topic 1: Cell level systems** |
| B1.1 Cell structures | 3.0/3.0 | Cell level systems – delivery guide | PAG B1: Microscopy – investigation of a range of cellsPAG B6: Physiology, responses respiration - Investigation of cytoplasmic streaming in Elodea spp.PAG B7: Microbiological techniques - Preparation of cheek cell slides |
| B1.2 What happens in cells (and what do cells need)? | 6.5/4.0 | Cell level systems – delivery guide | PAG B1: Microscopy – observation of mitosis in root tip cells PAG B2: Testing for biological molecules - Investigation of DNA extraction from a living organismPAG B2: Testing for biological molecules - Investigations of enzyme activityPAG B2: Testing for biological molecules - Investigation into the effect of amylase on a baby rice pastePAG B4: Rates of enzyme controlled reactions - Investigation into the effect of amylaseon a baby rice pastePAG B4: Rates of enzyme controlled reactions including numerical analysis of dataand graphical representation of results |
| B1.3 Respiration | 5.5/5.0 | Cell level systems – delivery guide | PAG B2: Testing for biological molecules – Investigation into respirationPAG B6: Physiology, responses respiration - research into whether plants respirePAG B6: Physiology, responses respiration – investigation into aerobic and anaerobic respiration using fungi |
| B1.4 Photosynthesis | 6.0/5.0 | Cell level systems – delivery guide | PAG B2: Testing for biological molecules – Investigation into photosynthesisPAG B5: Photosynthesis - Investigation of photosynthesis in algae using alginate beadsPAG B5: Photosynthesis - Investigation of photosynthesis e.g. the Priestley experiment using Cabomba to collect oxygen or the Ingenhousz experiment to show mass gainPAG B5: Photosynthesis - Experiments to show the consequences of light exclusion on photosynthesising plantsPAG B5: Photosynthesis - Investigation of photosynthesis in algae using alginate beads to immobilize the algae |
| **Total for topic 1 = 21.0 / 17 hours** |
| **Topic B2: Scaling up** |
| B2.1 Supplying the cell | 6.0/5.0 | Scaling up – delivery guide | PAG B6: Physiology, responses respiration - Investigation of ‘creaming yeast’ to show osmosisPAG B6: Physiology, responses respiration - Investigation into changes in mass of vegetable chips when placed in sucrose/salt concentrations of varying concentrations PAG B8: Transport in and out of cells - Investigation into changes in mass of vegetable chips when placed in sucrose/salt concentrations of varying concentrations |
| B2.2 The challenges of size | 9.0/9.0 | Scaling up – delivery guide | PAG B1: Microscopy – investigation of a blood smear/blood vesselsPAG B1: Microscopy – Examination of root hair cellsPAG B1: Microscopy - Measurement of plant stomatal densityPAG B1: Microscopy - Investigation of the position of the xylem/phloem in root, stem and leaf tissuesPAG B6: Physiology, responses respiration - Measurement of plant stomatal density and openingPAG B6: Physiology, responses respiration - investigations into environmental factors that affect water uptake in plants |
| **Total for topic 2 = 15.0 / 14.0 hours** |
| **Topic B3: Organism level systems** |
| B3.1 Coordination and control – the nervous system | 7.0/3.0 | Organism level – delivery guide systems | PAG B6: Physiology, responses respiration - Research into reflexes/reaction times |
| B3.2 Coordination and control – the endocrine system | 8.0/5.0 | Organism level systems – delivery guide | PAG B6: Physiology, responses respiration - Investigation of the effects of phototropism using seedlings |
| B3.3 Maintaining internal environments | 9.0/4.0 | Organism level systems – delivery guide | PAG B8: Transport in and out of cells - Demonstration of the different water potentials on different cells |
| **Total for topic 3 = 24.0 / 12.0 hours** |
| **Topic B4: Community level systems** |
| B4.1 Ecosystems | 9.0/5.0 | Community level systems – delivery guide | PAG B1: - Examination of the roots of a leguminous plant PAG B3: Sampling techniques - Investigation of the holly leaf miner or the horse-chestnut leaf miner (*Cameraria ohridella*)PAG B3: Sampling techniques - Identification of the biotic factors in an ecosystem using sampling techniquesPAG B4: Rates of enzyme controlled reactions - Investigation of the most favourable conditions for compostingPAG B7: Microbiological techniques - Investigation of the most favourable conditions for composting |
| **Total for topic 4 = 9.0 / 5.0 hours** |
| **Topic B5: Genes, inheritance and selection** |
| B5.1 Inheritance | 12.0/9.0 | Genes, inheritance and selection – delivery guide |  |
| B5.2 Natural selection and evolution | 6.0/4.0 | Genes, inheritance and selection – delivery guide |  |
| **Total for topic 5 = 18.0 / 13.0 hours** |
| **Topic 6 Global challenges** |
| B6.1 Monitoring and maintaining the environment | 4.0/3.0 | Monitoring and maintaining the environment – topic exploration pack | PAG B3: Sampling techniques - Investigation into the effects of lichen distribution against pollutionPAG B3: Sampling techniques - Investigation into the effectiveness of germination in different strengths of acid rainPAG B3: Sampling techniques - Investigation of ecological sampling methods |
| B6.2 Feeding the human race | 7.0/4.0 | Feeding the human race – topic exploration pack |  |
| B6.3 Monitoring and maintaining health | 22.0/16.0 | Monitoring and maintaining health – topic exploration pack | PAG B7: Microbiological techniques - Investigation into growth bacterial cultures using aseptic techniques |
| **Total for topic 6 = 33.0 / 23.0 hours** |

**Total teaching hours = 120 hours/ 84 hours**

# Outline Scheme of Work: B5: Genes, inheritance and selection

## Suggested teaching time for chapter: 13.5 hours

### B5.1 Inheritance

| Lesson | Statements | Teaching activities | Notes |
| --- | --- | --- | --- |
| 1 | B5.1a explain the following terms: gamete, chromosome, gene, allele/variant, dominant, recessive, homozygous, heterozygous, genotype and phenotypeB5.1b describe the genome as the entire genetic material of an organismB5.1c describe that the genome, and its interaction with the environment, influence the development of the phenotype of an organism to include use of examples of discontinuous and continuous variation e.g. eye colour, weight and height | StarterProvide students with a glossary sheet that they can use to define the words throughout the topic. This can be an on-going task.MainStart filling in the glossary with genome. Discuss the whether everything is determined by the genome. Discuss the characteristics that are defined genetically, environmentally or have a basis in both. There are a number of characteristics that can be used with the class, examples include: * Widow’s peak
* Blood type
* Eye colour
* Ear lobes
* Tongue rolling

Separate the class into the separate categories above. This can be done by getting the learners to stand on one or other side of the classroom or get the students to find one of each type in the class and report back at the end of the task.Students work in groups to measure each other’s height, record the data in a table and use it to draw a line graph. Students observe each other’s eye colour in their group/whole class, record the data in a table and use this data to draw a bar chart.Define phenotype.Relate discontinuous and continuous variation with examples. This needs to be linked to how they can be derived (genetic, environmental or a combination of both).PlenarySummarise what you have learned today. This can be done with a Venn diagram.HomeworkIf you wanted a super power what would it be and why? | From the Key Stage 3 Programme of Study:Heredity as the process by which genetic information is transmitted from one generation to the next.The concept of species and variationbetween individuals within a species being continuous or discontinuous. |
| 2 | B5.1d Recall that all variants arise from mutations, and that most have no effect on the phenotype, some influence phenotype and a very few determine phenotype | StarterAsk the students what their chosen super power was. Separate the superpowers into biological possibility or impossibility.MainDiscuss what a mutation is and examples of neutral, beneficial and harmful mutations.Introduce mutations as:Chromosome mutations – a change in the chromosome e.g. two chromosomes becoming one. Discuss the link between ape and human chromosomes; apes have 24 pairs, humans have 23 pairs. Other examples are extra chromosomes (Kleinfelter syndrome XXY, Down syndrome) missing sections of chromosomes (e.g. cri du chat syndrome). DNA mutation. A change in the DNA sequence. The types of mutation can be insertion, deletion, substitution, inversion.Demonstrate that a deletion of one base can drastically change the effect of the code. Look up examples on lost consonants. This video discusses the effect of mutations:<https://www.youtube.com/watch?v=eDbK0cxKKsk>Note that this type of mutation can lead to no change in phenotype.PlenaryLook up the mutant word in [Graham Rawle’s ‘lost consonants’](http://www.grahamrawle.com/lost-consonants.html) HomeworkCreate an information leaflet on mutations. Include some examples of neutral, beneficial and harmful mutations. | From the Key Stage 3 Programme of Study:A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. |
| 3/4 | **B5.1e****describe how genetic variants may** **influence phenotype:** * **in coding DNA by altering the activity of a protein to include: DNA related to mutations affecting protein structure, including active sites of enzymes**
* **in non-coding DNA by altering how genes are expressed to include: DNA related to stopping transcription of mRNA (use of terms promoter, transcription factor not required)**
 | StarterUse the lighting in the class as an example. The light is analogous to a gene. The switch is analogous to the genes regulatory region. What would happen if the light bulb was broken? What would happen if the switch was broken?MainIntroduce what happens to a gene when it is ‘switched on’. DNA – mRNA to protein. If the gene is not switched on then the mRNA is not produced. Therefore the protein is not produced. Use the British Library analogy

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| Cell | British Library |
| DNA never leaves the nucleus | Books are not allowed to be taken out of the library |
| Gene is a section of all of the information | A book is a section of the entire library |
| mRNA is a copy of a gene | A photocopy is a copy of a book (e.g. Mary Berry’s recipe for Bakewell Tart) |
| Protein | Bakewell Tart |

In coding DNA introduce students to the genetic code. Although this is not included in the specification it may be easier to teach from this aspect. Introduce the triplet and for more able learners introduce the reason why it’s a triplet of bases.There are 20 amino acids. To get a code that covers 20 amino acids with a four code DNA sequence we need three letters to code for an amino acid.Students look up the code for:* Methionine
* Phenylalanine
* Glycine
* Serine

What is the effect of changing the first letter of the code, the second letter of the code and the third letter of the code?Notice that there are some drastic changes and some mutations that have no effect at all.PlenaryDefine what a mutation is in your glossary. |  |
| 5/6 | B5.1f explain some of the advantages and disadvantages of asexual and sexual reproduction in a range of organisms to include: the number of live offspring per birth, how quickly the organisms can reproduce versus the need for the introduction of variation in a population caused by environmental pressures | StarterDiscuss the differences between asexual and sexual reproduction. Show photos of different organisms and ask students whether they think they carry out asexual or sexual reproduction.MainIntroduce sexual reproduction.Define a clone. Introduce the idea of asexual reproduction using the following species as examples: spider plants, bacteria, starfish. The following video explains asexual reproduction:<https://www.youtube.com/watch?v=i9zj9V8OWRk>Students work in groups using plantlets from spider plants to grow their own spider plant or using tubers/bulbs to grow their own potatoes/daffodils/onions.Demonstrate the method of taking cuttings from a plant. Card sort and practise questions on asexual and sexual reproduction with extension task: <http://www.ocr.org.uk/Images/258215-asexual-and-sexual-reproduction-lesson-element.docx>Teacher notes:<http://www.ocr.org.uk/Images/258214-asexual-and-sexual-reproduction-teacher-instructions.pdf>PlenaryPlace ‘Asexual Reproduction’ and ‘Sexual reproduction’ signs at either end of the classroom and students walk towards the sign that applies to the following statements.Only one parent neededLarge numbers of offspring produced quickly.Two parents neededVariation within speciesChange in environment could destroy the speciesFew offspring producedHomeworkUse the internet to research the advantages and disadvantages of using asexual reproduction to produce potatoes in the UK. |  |
| 7 | B5.1g explain the terms haploid and diploidB5.1hexplain the role of meiotic cell division in halving the chromosome number to form gametes | StarterDiscuss the difference between haploid and diploid.MainExplain the meaning of the words: haploid and diploid.The following video describes meiosis and the formation of gametes:<https://www.youtube.com/watch?v=CuxaXghfyeE>Explain meiosis using diagrams of each stage.Flow chart on meiosis and extension questions:<http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/Images/123-357572-lr4-meiosis-flow-v1.doc>Student group activity and extension tasks:<https://www.ocr.org.uk/Images/374812-mitosis-and-meiosis.docx>Students work in groups to design and create their own poster on meiosis – describing what happens at each stage of the cycle.Students present posters to the rest of the class.Peer marking of presentations.PlenaryLaminated diagrams of meiosis stages. Students work in pairs to put them in the correct order. |  |
| 89/10 | B5.1i explain single gene inheritance to include: the context of homozygous and heterozygous crosses involving dominant and recessive geneB5.1j predict the results of single gene crossesB5.1l recall that most phenotypic features are the result of multiple genes rather than single gene inheritance | StarterReinforce the definition of a gene. This [video](https://www.youtube.com/watch?v=5MQdXjRPHmQ) can be used.MainIntroduce alleles using the example of an allele which codes for brown eyes and an allele which codes for blue eyes in humans. Discuss the meaning of the words: ‘dominant’ and ‘recessive’. Use example of brown eyes dominant over blue eyes to help students understand further. Define genotype.Explain use of letters to represent genotype and the meaning of the words ‘homozygous’ and heterozygous’. Example:Homozygous: BB, bb.Heterozygous: Bb.Differentiated practice questions on alleles, with answers:<http://www.ocr.org.uk/Images/404623-genes-inheritance-and-selection-lesson-element.doc>Kittens and variation activity: <http://www.ocr.org.uk/Images/264489-sexual-reproduction-kittens-and-variation-learner-activity.doc> PlenaryAdd new words to glossary and revision quiz using mini whiteboards.HomeworkGenetics terminology worksheet:<https://www.nlm.nih.gov/exhibition/harrypottersworld/pdf/teachersgeneticterms.pdf>StarterShow students an example of a genetic cross e.g. golden and black Labrador, and show the appearance of the puppies. Three Labrador puppies are black and one is golden. Discuss the appearance of the puppies.MainConstruct Punnett squares and demonstrate how to calculate the offspring’s genotype, using the parents’ genotypes.Lesson 9/10 imageComplete examples of homozygous and heterozygous Punnet squares with students. Explain how to calculate percentages, fractions, and ratios from Punnet squares.Practice questions with answers:<http://www.ocr.org.uk/Images/404623-genes-inheritance-and-selection-lesson-element.doc>PlenaryTrue/false quiz.HomeworkGenetic cross questions – calculating percentages, fractions, and ratios. | Genotype is the combination of genes.Phenotype is physical appearance.Working scientifically:WS1.2a |
| 11 | B5.1m describe the development of our understanding of genetics to include the work of Mendel | StarterShow students this video, which describes the work of Mendel and his contribution to genetics: <https://www.youtube.com/watch?v=Mehz7tCxjSE>MainDiscuss the work of Gregor Mendel.Students design a social media page for Gregor Mendel. Students should describe his work and show who his peers were at the time.PlenaryStudents peer mark each other’s work.HomeworkResearch the disorder polydactyl and find out the chances of it being passed on to the next generation. |  |
| 12 | B5.1k describe sex determination in humans using a genetic cross | StarterA couple are expecting their fourth child. Their other three children are all girls. What will the next child be, a girl or a boy?MainIntroduce the idea that the 23rd chromosome is the sex chromosome and females have two X chromosomes and males have an X and a Y chromosome.Demonstrate how Punnet squares can be used to determine the sex of offspring, using the genotypes of both parents.Students work in pairs to complete Punnet squares questions, to calculate the sex of the offspring.BBC Bitesize notes on inheritance:<http://www.bbc.co.uk/education/guides/z3g2pv4/revision/2>PlenaryRecap on learning: give students cards with XY (boy) or XX (girl), which they can use to answer summary questions.HomeworkExam-style question on inheritance. |  |

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| Additional remote learning opportunities***As a response to the Covid-19 outbreak, additional online learning opportunities were identified for each topic in June 2020.*** |
| **Lesson** | **Statement** | **Teaching activities** |
| 5 & 6 | B5.1f | This Amoeba sisters [video](https://www.youtube.com/watch?v=vl6Vlf2thvI) can be used for independent study about mutations. It can also be linked to protein synthesis and DNA from B1. |
| 7 | B5.1g & B5.1h | This Amoeba sisters [video](https://www.youtube.com/watch?v=VzDMG7ke69g) can be used for independent learning about meiosis. This [interactive website](https://www.footprints-science.co.uk/) has some free animations and quizzes students can work through. This includes a variety of quizzes about meiosis, such as a multiple choice quiz, fill in the gaps tasks and connecting ideas together. |
| 8 | B5.1i | This [interactive resource](https://www.abpischools.org.uk/topic/genes-and-inheritance) has information pages, glossaries, animations and questions that students can work through. |
| 9 & 10 | B5.1j & B5.1l | This [PowerPoint](https://www.tes.com/teaching-resource/punnett-square-7161572) has examples of punnett squares, that include answers and shows the chance of certain traits based on the punnett square. This second [resource pack](https://www.tes.com/teaching-resource/punnett-squares-and-pedigree-analysis-12174963) has a powerpoint, worksheet and exam question that students can work through. It also includes the answers for students to check their work. |
| 11 | B5.1m | This [TED talk](https://www.youtube.com/watch?v=Mehz7tCxjSE) discusses the work of Mendel and how it has led to our understanding of genetics. |

### B5.2 Inheritance

| Lesson | Statements | Teaching activities | Notes |
| --- | --- | --- | --- |
| 13 | B5.2a state that there is usually extensive genetic variation within a population of a species | StarterGet students to play ‘Beetle Drive’ game. Using a dice roll a:1. Head
2. Thorax
3. Abdomen
4. Eyes and an antenna (cannot add unless you have thrown a 1; need 2 fours)
5. Wings (cannot add unless you have thrown a 2; need two fives)
6. Legs (cannot add unless you have thrown a 2; need six sixes)

Note: you can speed this up by only needing a single roll for all legs etc.MainShow the variety of dogs that there are from Chihuahua to the Great Dane. All are the same species. Define species.Look at variation within the human population. Look at continuous and discontinuous variation. Explain the difference between the two and also the influence of genotype and environment on both.PlenaryMultiple choice quiz.HomeworkFind out what a liger is, and write an explanation on why it is known as a ‘hybrid’. |  |
| 14 | B5.2b describe the impact of developments in biology on classification systems to include: natural and artificial classification systems and use of molecular phylogenetics based on DNA Sequencing | StarterWhat species are humans most closely related to? MainDefine classification.Students create their own mnemonic to remember the seven taxonomic levels. E.g.  “King Phillip Can Only Find Green Slippers”.A game based on Play Your Cards Right can also be played. Cards with taxon names are placed face down. The teacher turns the first one over to reveal a name such as ‘family’. Students then asked to predict if the next card will be a higher or lower group than family.Comparison between artificial and natural classification and discuss how classification systems have developed over time.Research species that have been reclassified in the light of molecular evidence such as chimpanzees, giant pandas, whales or elephants.PlenaryKey word bingo/hangman.Homework“Are African elephants really two different species?”Use this article and explain why the African Elephant was originally thought to be one species and has now been discovered to be split into different species. State the differences between the African savannah elephant and the African forest elephant. <http://news.nationalgeographic.com/news/2010/12/101222-african-elephants-two-species-new-science/> | Working Scientifically:WS1.1a |
| 15 | B5.2c explain how evolution occurs through the natural selection of variants that have given rise to phenotypes best suited to their environment to include the concept of mutation | StarterA diagram of the stages of evolution and ask students what they know about the topic.MainDefine Evolution.Use example of the ‘Peppered Moth’ to describe natural selection.‘The Peppered Moth Game’: <https://www.biologycorner.com/worksheets/peppermoth_paper.html>Students work in groups to play the ‘Natural Selection Game’: <http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/Images/123-357552-lr5-evolution-game-v2.doc>PlenaryUpdate glossary and multiple choice quiz.HomeworkFind out whether the pale peppered moth or the dark peppered moth is more common in the UK today and explain your findings.OrResearch why antibiotic resistance is becoming more common today, with reference to natural selection. | From the Key Stage 3 Programme of Study:The variation between species and between individuals of the same species meaning some organisms compete more successfully, which can drive natural selection.Changes in the environment which mayleave individuals within a species, andsome entire species, less well adaptedto compete successfully and reproduce,which in turn may lead to extinction. |
| 16 | B5.2d describe evolution as a change in the inherited characteristics of a population over time, through a process of natural selection, which may result in the formation of new speciesB5.2e describe the evidence for evolution to include: fossils and antibiotic resistance in bacteria | StarterWhen were dinosaurs alive? How do we know?Show students a diagram of how horses looked millions of years ago and how they look today. Ask learners to write down as many differences between the appearance the ancient and modern horse and discuss reasons for the changes.MainDescribe what a fossil is and how it is formed.Describe how the fossil record and bacteria resistance provide evidence for evolution.Look at samples of fossils.Instructions mat to make fossils using plasticine.<https://www.tes.com/teaching-resource/making-fossils-instructions-sheet-11006858>Card sort - formation of fossils:<https://www.tes.com/teaching-resource/how-fossils-are-formed-6151304>The following video describes evidence for evolution:<https://www.youtube.com/watch?v=lIEoO5KdPvg>PlenaryRevision Quiz using mini whiteboards.HomeworkAnolis lizards have evolved greatly in the last 100 years. Find out how they have evolved to cope with environmental pressures.  |  |
| 17 | B5.2f describe the work of Darwin and Wallace in the development of the theory of evolution by natural selection and explain the impact of these ideas on modern biology to include: seedbanks being used as a store of biodiversity | StarterShow a diagram of Darwin’s finches and discuss why the birds evolved differently due to differences in their diet and environment. MainDescribe the work of Darwin and Wallace and how the theory of evolution was formed.Create a comic strip of Darwin’s lifeUse the following websites to make a presentation/performance on the life of either Darwin or Wallace:  <http://darwin-online.org.uk/><http://darwin200.christs.cam.ac.uk/node/83>PlenaryPresentations/performances on Darwin and Wallace to the rest of the class.HomeworkRevise for end of topic quiz. |  |
| 18 |  | StarterProvide learners with revision timeMainEnd of topic quizPlenaryPeer mark quiz |  |

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| **Lesson** | **Statement** | **Teaching activities** |
| 14 | B5.2b | This [video](https://www.youtube.com/watch?v=HLnaIJm5wM4) can be used by students to understand how classification works and how it has changed over time. |
| 15 & 16 | B5.2c, B5.2d, B5.2e | This Amoeba sisters [video](https://www.youtube.com/watch?v=7VM9YxmULuo&list=PLwL0Myd7Dk1FuT0I6icE7octRIgJqMBhS&index=3) about natural selection can be used by students for independent learning.This [interactive simulation](https://phet.colorado.edu/en/simulation/legacy/natural-selection) allows students to see natural selection in action, and allows them to be able to ‘control’ species, such as adding a mutation to certain species and seeing the effect. |
| 17 | B5.2f | Students could read this brief [biography](https://www.nationalgeographic.org/encyclopedia/alfred-wallace/) about the work of Wallace, and then compare this to what they may already know about him and Darwin. There is also a [biography](https://www.nationalgeographic.org/encyclopedia/charles-darwin/) about the work of Darwin. |
|  |  | These [revision pages](https://www.bbc.co.uk/bitesize/guides/zt4f8mn/revision/1) about natural selection and evolution are followed by an interactive test that students can complete. |



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