# *PLANNING SUPPORT BOOKLET*

**J257, J260**

**For first teaching in 2016**

This support material booklet is designed to accompany the OCR GCSE (9–1) in Biology B and Combined Science B (Twenty First Century).

***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](mailto:resources.feedback@ocr.org.uk)

# Introduction

This support material is designed to accompany the OCR GCSE (9–1) specification for first teaching from September 2016 for:

* [Biology B (Twenty First Century Science – J257)](http://www.ocr.org.uk/Images/234595-specification-accredited-gcse-twenty-first-century-science-suite-biology-b-j257.pdf)
* [Combined Science B (Twenty First Century Science – J260)](http://www.ocr.org.uk/Images/234597-specification-accredited-gcse-twenty-first-century-science-suite-combined-science-b-j260.pdf)

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 suits them.

## Delivery guides

Delivery guides are individual teacher guides available from the GCSE Biology B and Combined Science B qualification pages.

* <http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/>
* http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-combined-science-b-j260-from-2016/

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.

## Ideas about Science (B7) and Practical Work (B8)

Specification Chapter B7 (Ideas about Science) and Chapter B8 (Practical skills) are not included explicitly in the Planning Guidance table. The expectation is that these ideas and practical skills are developed throughout the course and in support of conceptual understanding.

Links to B7 learning outcomes and suggestions where the PAG techniques can be included are found throughout the table. This is by no means an exhaustive list of potential practical activities.

|  |  |  |
| --- | --- | --- |
| Chapter | Estimated teaching hours | Comments and PAG opportunities |
| **Chapter 1: You and Your Genes** | | |
| 1.1 What is the genome and what does it do? | 7 / 4 | PAG1 Describe how to use a light microscope to observe a variety of plant and animal cells |
| 1.2 How is genetic information inherited? | 4 / 3 |  |
| 1.3 How can and should genetic information be used? | 5 / 5 |  |
|  | **Total 16 / 12** |  |
| **Chapter 2: Keeping Healthy** | | |
| 2.1 What are the causes of disease? | 5 / 5 |  |
| 2.2 How do organisms protect themselves against pathogens? | 6 / 5 |  |
| 2.3 How can we prevent the spread of infections? | 3 / 3 |  |
| 2.4 How can we identify the cause of an infection? | 5 / 0 | PAG1 Describe how to use a light microscope to observe microorganisms  PAG7 Describe and explain the aseptic techniques used in culturing microorganisms |
| 2.5 How can lifestyle, genes and the environment affect health? | 4 / 3 | PAG6 Describe how to practically investigate the effect of exercise on pulse rate and recovery rate |
| 2.6 How can we treat disease? | 3 / 2 | PAG7 Calculate cross-sectional areas of bacterial cultures and of clear zones around antibiotic discs on agar jelly using πr2 |
|  | **Total 26 / 18** |  |
| **Chapter 3 Living Together – Food and Ecosystems** | | |
| 3.1 What happens during photosynthesis? | 10 / 9 | PAG5 Describe practical investigations into the requirements and products of photosynthesis  PAG4 Describe practical investigations into the effect of substrate concentration, temperature and pH on the rate of enzyme controlled reactions |
| 3.2 How do producers get the substances they need? | 8 / 7 | PAG8 Describe practical investigations into the processes of diffusion and osmosis  PAG1 Describe how to use a light microscope to observe the structure of the xylem and phloem  PAG6 Describe how to use a simple potometer |
| 3.3 How are organisms in an ecosystem interdependent? | 7 / 4 | PAG2 Describe the use of qualitative tests for biological molecules |
| 3.4 How are populations affected by conditions in an ecosystem? | 3 / 3 | PAG3 Describe how to carry out a field investigation into the distribution and abundance of organisms in an ecosystem |
|  | **Total 28 / 23** |  |
| **Chapter 4 Using Food and Controlling Growth** | | |
| 4.1 What happens during cellular respiration? | 3 / 3 | PAG5 Describe practical investigations into the effect of different substrates on the rate of respiration in yeast |
| 4.2 How do we know about mitochondria and other cell structures? | 1 / 1 |  |
| 4.3 How do organisms grow and develop? | 5 / 5 | PAG1 Describe how to use a light microscope to observe stages of mitosis |
| 4.4 How is plant growth controlled? | 3 / 0 | PAG6 Describe practical investigations into the role of auxin in phototropism |
| 4.5 Should stem cells be used to treat damage and disease? | 1 / 1 |  |
|  | **Total 13 / 10** |  |
| **Chapter 5 The Human Body – Staying Alive** | | |
| 5.1 How do substances get into, out of and around our bodies? | 7 / 6 |  |
| 5.2 How does the nervous system help us respond to changes? | 5 / 2 | PAG6 Describe practical investigations into reflex actions |
| 5.3 How do hormones control responses in the human body? | 2 / 2 |  |
| 5.4 Why do we need to maintain a constant internal environment? | 5 / 1 | PAG6 Describe practical investigations into temperature control in the body |
| 5.5 What role do hormones play in human reproduction? | 5 / 5 |  |
| 5.6 What can happen when organs and control systems stop working? | 7 / 2 | PAG6 Describe practical investigations into the response of the pupil in different light conditions |
|  | **Total 31 / 18** |  |
| **Chapter 6 Life on Earth – Past and Present** | | |
| 6.1 How was the theory of evolution developed? | 8 / 5 |  |
| 6.2 How do sexual and asexual reproduction affect evolution? | 1 / 0 |  |
| 6.3 How does our understanding of biology help us classify the diversity of organisms on Earth? | 1 / 1 |  |
| 6.4 How is biodiversity threatened and how can we protect it? | 8 / 3 |  |
|  | **Total 18 / 9** |  |

**Total teaching hours = 132 / 90 hours**

# Outline Scheme of Work: B5 The human body – staying alive

## Suggested teaching time for chapter: 31/8 hours

|  |  |
| --- | --- |
| **Additional remote learning opportunities**  ***As a response to the Covid-19 outbreak, additional online learning opportunities were identified for each topic in June 2020.*** | |
| **Statement** | **Teaching activities** |
| B5.1.1 & B5.1.7 | This [virtual experiment](https://ocr.org.uk/rpgbiol4) demonstrates a model lung, and how gas exchange happens in the lung. There is a full video, interactive experiment and a quiz to check learning. This BBC Bitesize clip can be used to reinforce learning about [photosynthesis](https://www.bbc.co.uk/teach/class-clips-video/biology-ks3-gcse-photosynthesis-rap/zm638xs). |
| B5.1.3 – B5.1.6 | This [video](https://www.youtube.com/watch?v=CRh_dAzXuoU) can be used for remote learning about what is in blood. This [next video](https://ocr.org.uk/Images/587763-topic-b2-cup-elevate-video-gas-exchange-at-the-alveoli.mp4) describes how the circulatory system works with the respiratory system, focusing on gas exchange at the alveoli. This BBC Bitesize [clip](https://www.bbc.co.uk/teach/class-clips-video/science-biology-ks3-ks4-human-circulation/zfbd6v4) can be used to consolidate learning about the circulation journey.  This [remote lesson](https://www.bbc.co.uk/bitesize/articles/zhjdqp3) on heart structure and function contains two videos and two practice activities to reinforce learning. This interactive [online heart structure](http://www.klbict.co.uk/interactive/science/heart.htm) labelling exercise can be used to reinforce learning. This [virtual experiment](https://ocr.org.uk/rpgbiol5) demonstrates a heart dissection. There is a full video, interactive experiment and a quiz to check learning about heart structure. |
| B5.2.1 & B5.2.2 | This is an [interactive resource](https://www.abpischools.org.uk/topic/nervoussystem/) about the nervous system, and contains information, glossaries, quick questions and animations. |
| B5.2.3 | This is an [online reaction time test](https://humanbenchmark.com/tests/reactiontime/) that students can carry out. They could be encouraged to collect data from others in their household and compare their results. It also links to PAG B6. |
| B5.3.1 | This is an [interactive resource](https://www.abpischools.org.uk/topic/hormones/) about the endocrine system, with information, glossaries, questions and animations that pupils can work through.  This Oak National academy [remote lesson](https://classroom.thenational.academy/lessons/homeostasis-and-the-human-endocrine-system) can be used here or at B5.4.1. It covers homeostasis and the human endocrine system, and contains a recap quiz, videos, and activities for students to work through. It could be used to introduce the topic, or could be used as consolidation at the end of the topic. |
| B5.4.1 & B5.4.2 | This [resource](https://www.stem.org.uk/resources/elibrary/resource/29268/homeostasis-suitable-home-teaching) has a variety of audio clips, worksheets and a basic experiment idea to help students gain a better understanding of homeostasis and thermoregulation (linking to **B5.4.3 & B5.4.7**) |
| B5.4.5 & **B5.4.6** | This is a guided [self-study animation](http://www.kscience.co.uk/animations/kidney.htm) of the kidney and the nephron. There is also this [interactive resource](https://www.abpischools.org.uk/topic/homeostasis-kidneys) about the kidneys and water balance, with information, glossaries, questions and animations that pupils can work through.  This [article](https://www.stem.org.uk/resources/elibrary/resource/27621/kidneys-suitable-home-teaching) focuses on the kidney and how it works, as well as what happens when the kidney goes wrong. It could be used as a reinforcement activity. |
| B5.5.1 & **B5.5.2** | This BBC Bitesize lesson on [hormones in reproduction](https://www.bbc.co.uk/bitesize/articles/zvm2xyc) contains two videos and two practice activities for students to work through. Students could also work through part or all of this [PowerPoint](https://www.tes.com/teaching-resource/gcse-igcse-menstrual-cycle-and-hormones-biology-12283275) about the menstrual cycle for independent learning or as a flipped learning task. |
| B5.5.3 & **B5.5.4** | This Oak National academy [remote lesson](https://classroom.thenational.academy/lessons/contraception-and-infertility) is about contraception and infertility. It contains a recap quiz, videos and activities for students to work through. This [video](https://www.youtube.com/watch?v=kMY-v0F6bX0) covering hormonal and non-hormonal types of contraceptives can also be used for independent learning. |
| B5.6.1 & **B5.6.2** | This Oak National academy [remote lesson](https://classroom.thenational.academy/lessons/blood-glucose) is about gluco-regulation. It contains a recap quiz, videos and activities for students to work through. |
| B5.6.3 | Students could use this [diabetes website](https://www.diabetes.org.uk/diabetes-the-basics) to learn about diabetes using the information and video provided. Alternatively, students can work through this [interactive website](https://www.abpischools.org.uk/topic/diabetes), which contains glossaries, questions and animations they can engage with. |
|  | These [sample exam questions](https://www.bbc.co.uk/bitesize/guides/zgqcmsg/revision/1) have multiple choice and longer answer questions about B5 that students can work through individually. |

### B5.1 How do substances get into, out of and around our bodies?

| Lesson | Statements | Teaching activities | Notes |
| --- | --- | --- | --- |
| 1 | B5.1.1 describe some of the substances transported into and out of the human body in terms of the requirements of cells, including oxygen, carbon dioxide, water, dissolved food molecules and urea | This content could be delivered using a brainstorming type of exercise thinking about the requirements of cells and the waste products of cellular processes e.g. respiration and linking this to transport mechanisms.  Alternatively, learners could be set a research task where they are required to report back to the class in some form their findings about cellular transport. | From the Key Stage 3 Programme of Study:   * The role of diffusion in the movement of materials in and between cells. |
| 2 | B5.1.2 explain how the partially-permeable cell membranes of animal cells are related to diffusion, osmosis and active transport | The content from the previous lesson links directly to considering the need for membranes and to content in Chapter B3 about diffusion, osmosis and active transport.  **Membrane transport**  A clear overview of membrane transport [here](https://www.abpischools.org.uk/topic/homeostasis-kidneys/3) along with a multiple step animation will allow learners to develop a basic understanding of the transport processes. This could be an ideal homework activity.  **Membrane structure**  This game by Bioman Games allows learners to develop an understanding of membrane structure. For the more able learners a thorough and detailed animation is available that learners can use to produce their own revision resource.  [View full activity in B5.1 How do substances get into, out of and around our bodies? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/delivery-guide/topic-gbb005-b5-the-human-body-staying-alive/delivery-guide-gbbdg019-b51-how-do-substances-get-into-out-of-and-around-our-bodies?activity=293538#293538) |  |
| 3 & 4 | B5.1.3 describe the human circulatory system, including its relationships with the gaseous exchange system, the digestive system and the excretory system  B5.1.4 explain how the structure of the heart is adapted to its function, including cardiac muscle, chambers and valves | Pages 1, 2, 4, 5 and 6 of the BBC Bitesize site [here](http://www.bbc.co.uk/education/guides/zhnk7ty/revision/1) provide some appropriate introductory information about circulation and the heart. The activity and test can be used once the structure of the blood vessels has been considered. There is also interesting information about heart disease that can be used synoptically from Chapter B2.  Learners need to know the basics of how materials are exchanged at an alveolus for gas exchange and the movement of materials across a villus in the digestive system. They also need to be familiar with carbon dioxide and urea as excretory products and how they exit the body.  You can find a video clip at the right level [here](https://www.youtube.com/watch?v=o6Ct2LK0jVQ) about the heart which is a good introduction to this content.  **Investigating the anatomy of the heart**  The Texas Heart Institute provides an excellent [resource](https://www.texasheart.org/heart-health/project-heart/) that allows learners to investigate a virtual heart. Learners can use the resource to independently produce their own information poster as they investigate the internal and external structures of the heart.  [This](https://www.tes.com/teaching-resource/the-heart-and-blood-worksheet-3011757) is a good worksheet that can be used to label parts of the heart. It also has a part that can be used in the next lesson to identify the red blood cells in the blood. [This](https://www.tes.com/teaching-resource/human-heart-6297475) is an alternative that can be used for labelling purposes. | From the Key Stage 3 Programme of Study:   * The structure and functions of the gas exchange system in humans, including adaptations to function. * The tissues and organs of the human digestive system, including adaptations to function. |
| 5 | B5.1.5 explain how the structures of arteries, veins and capillaries are adapted to their functions, including differences in the vessel walls and the presence of valves  B5.1.6 explain how red blood cells and plasma are adapted to their functions in the blood | The video clip found [here](https://www.youtube.com/watch?v=Kf_IxTS2S8E) is quite broad and covers the circulation including the content of this lesson. The recap of the content of the previous 4 lessons is a useful element to link all the parts of the circulation together.  Page three of the BBC Bitesize site [here](http://www.bbc.co.uk/education/guides/zhnk7ty/revision/3) considers this content and then the activity and test could be used as all of the content in the section will have been covered.  There are two worksheets [here](https://www.tes.com/teaching-resource/blood-vessels-6049707) that students can work through; one has questions about the circulatory system and blood vessels, whilst the other looks at the differences between blood vessels in more detail.  **Structure of blood vessels**  This visual representation of blood vessel structure can be used by the learners to allow them to independently study and produce their own revision resource. Learners could be divided into one of three groups that could present their findings to the rest of the class.  [View full activity in B5.1 How do substances get into, out of and around our bodies? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/delivery-guide/topic-gbb005-b5-the-human-body-staying-alive/delivery-guide-gbbdg019-b51-how-do-substances-get-into-out-of-and-around-our-bodies?activity=293542#293542)    **Adaptations of red blood cells**  Learners are able to develop an understanding of red blood cell and plasma function using this [brief explanation](https://www.bbc.co.uk/bitesize/guides/zwy297h/revision/6) by the BBC.  The slide on [this](https://www.tes.com/teaching-resource/blood-vessels-mix-and-match-activity-6175371) presentation can be used as a plenary to give learners the opportunity to demonstrate their learning of this content. It is a matching exercise – functions of each vessel to a picture of the vessel.  The activity found [here](https://www.tes.com/teaching-resource/respiration-circulation-loop-card-activity-3005684) is a really good revision exercise of the content in the 5 lessons so far in this chapter. It is a card loop activity so needs to be printed and cut up in advance. |  |
| 6 & 7 | B5.1.7 explain the need for exchange surfaces and a transport system in multicellular organisms in terms of surface area:volume ratio  B5.1.8 calculate surface area:volume ratios  M1c, M5c | **Investigating the need for an exchange surface**  Learners are able to practically investigate the need for an exchange surface as set out by [Nuffield Foundation](https://pbiol.rsb.org.uk/exchange-of-materials/diffusion/effect-of-size-on-uptake-by-diffusion).  **Calculating surface area to volume ratio**  Biology Junction provide an [activity](http://www.biologyjunction.com/cell_size.htm) that will allow learners to make their own model organism and from it calculate the surface area:volume ratio. |  |

### B5.2 How does the nervous system help us respond to changes?

| Lesson | Statements | Teaching activities | Notes |
| --- | --- | --- | --- |
| 1 | B5.2.1 explain how the components of the nervous system work together to enable it to function, including sensory receptors, sensory neurons, the CNS, motor neurons and effectors | These introductory ideas are rarely found covered as isolated content in online activities but the two starter activities found [here](https://www.tes.com/teaching-resource/nervous-system-starters-6050276) are quite good and the information on [this](http://www.bbc.co.uk/education/guides/zkdnb9q/revision/2) page of the BBC Bitesize site covers the content quite well.  Essentially, learners need to be familiar with the idea of stimulus 🡪 receptor 🡪 CNS 🡪 effector 🡪 response.  [This](https://www.tes.com/teaching-resource/reflex-arc-story-6410332) activity focuses on these ideas and links them to reflex arcs, as does [this](https://www.tes.com/teaching-resource/reflex-ordering-activity-6178471) card sort activity. |  |
| 2 | B5.2.2 explain how the structures of nerve cells and synapses relate to their functions | The activity found [here](https://www.tes.com/teaching-resource/neurone-diagrams-to-label-6193841) allows learners to label diagrams of nerve cells and describe the structure and function of the parts of the cells.  [This](https://www.tes.com/teaching-resource/gcse-revision-nervous-system-neurones-worksheet-11246577) is a placemat style worksheet enabling learners to label nerve cells and then use ‘fill the gaps’ to describe their functions.  **Structure of neurons**  Learners can develop an understanding by testing themselves on the structure of a motor neuron. They can then progress to develop an understanding of how a synapse works by watching a short video clip and working through a step by step explanation of the process.  [View full activity in B5.2 How does the nervous system help us respond to changes? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/delivery-guide/topic-gbb005-b5-the-human-body-staying-alive/delivery-guide-gbbdg020-b52-how-does-the-nervous-system-help-us-respond-to-changes?activity=293571#293571)    [Here](https://www.tes.com/teaching-resource/synapses-gcse-6426342) is a presentation and worksheet that cover the content about synapses at the right level.  [This](http://www.kscience.co.uk/animations/synapse.htm) is an animation that shows simply how a synapse works. It can also be manipulated to show the effect of a drug. |  |
| 3 | B5.2.3 a) explain how the structure of a reflex arc, including the relay neuron, is related to its function  b) describe practical investigations into reflex actions  *PAG6* | The video clip [here](https://www.youtube.com/watch?v=nKPEW-ao2Wg) is a short visual introduction to the idea of a reflex action with some examples.  [This](http://www.bbc.co.uk/education/guides/zkdnb9q/revision/3) page of the BBC Bitesize site introduces ideas about the reflex arc. The activity [here](http://www.bbc.co.uk/education/guides/zkdnb9q/activity) can also be used at this point. There is test but the final questions are about the eye so it might be best to wait until this content has been covered before looking at this.  **Reflex arcs**  Learners can watch the [short video clip](https://www.youtube.com/watch?v=MTH40XZbnjs) by the BBC to develop an understanding of the functioning of the reflex arc. The video moves on to the function of the eye which could be used as an introduction to B5.6.4a.  **Investigating reflex arcs**  Backyard Brains provide a detailed description of reflex arcs and provides a method for investigating visual, auditory and tactile reflexes.  [View full activity in B5.2 How does the nervous system help us respond to changes? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/delivery-guide/topic-gbb005-b5-the-human-body-staying-alive/delivery-guide-gbbdg020-b52-how-does-the-nervous-system-help-us-respond-to-changes?activity=293580#293580) | Carrying out a practical activity into reflex actions will cover the skills and techniques required for PAG6. |
| 4 & 5 | B5.2.4 describe the structure and function of the brain and roles of the cerebral cortex (intelligence, memory, language and consciousness), cerebellum (conscious movement) and brain stem (regulation of heart and breathing rate)  *(separate science only)*  **B5.2.5 explain some of the difficulties of investigating brain function**  *(separate science only)* | Learners could explore the function of the brain themselves using the website [PBS Secret Life of the Brain](http://www.pbs.org/wnet/brain/). Although the site has a lot of information, learners can be directed to find specific areas of the brain that control specific functions. Summarise that learners need to know about the cerebral cortex, cerebellum and brain stem.  **Brain function**  Learners can test themselves using this self marking assessment to develop an understanding of the parts of the brain and the function of the regions of the brain.  [View full activity in B5.2 How does the nervous system help us respond to changes? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/delivery-guide/topic-gbb005-b5-the-human-body-staying-alive/delivery-guide-gbbdg020-b52-how-does-the-nervous-system-help-us-respond-to-changes?activity=293575#293575) |  |

### B5.3 How do hormones control responses in the human body?

| Lesson | Statements | Teaching activities | Notes |
| --- | --- | --- | --- |
| 1 | B5.3.1 describe the principles of hormonal coordination and control by the human endocrine system | **Human endocrine system**  Learners can develop an understanding of the endocrine system by using this [resource](https://www.bbc.co.uk/bitesize/guides/z3gxb82/revision/1) by the BBC and producing their own revision activity. They can then progress to assess their understanding of how the endocrine system works by using the self-assessment quiz at the end of this [second resource](https://www.abpischools.org.uk/topic/hormones/).  [This](https://www.tes.com/teaching-resource/hormones-powerpoint-and-loop-game-endocrine-3009301) is a link to a presentation that introduces ideas about the endocrine system and hormones at the right level.  The activity [here](https://www.tes.com/teaching-resource/glands-and-hormones-in-the-endocrine-system-6192582) describes the main hormones in the human body and their functions and provides a useful link to the next lesson content. |  |
| 2 | **B5.3.2 explain the roles of thyroxine and adrenaline in the body, including thyroxine as an example of a negative feedback system** | Define the term negative feedback and use the example of an incubator for premature babies and how it works to keep the baby at a constant temperature (receptor, processors and effectors) and to reverse any changes in the temperature.  **Negative feedback**  This simple animation by Pearson allows learners to read about the role of thyroxine as an example of negative feedback and then observe the effects on the secretion of thyroxine and thyroid stimulating hormone on cellular activity.  [View full activity in B5.3 How do hormones control responses in the human body? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/delivery-guide/topic-gbb005-b5-the-human-body-staying-alive/delivery-guide-gbbdg021-b53-how-do-hormones-control-responses-in-the-human-body?activity=293604#293604) |  |

### B5.4 Why do we need to maintain a constant internal environment?

| Lesson | Statements | Teaching activities | Notes |
| --- | --- | --- | --- |
| 1 & 2 | B5.4.1 explain the importance of maintaining a constant internal environment in response to internal and external change  B5.4.2 a) describe the function of the skin in the control of body temperature, including changes to sweating, hair erection and blood flow  b) describe practical investigations into temperature control of the body  *PAG6*  *(separate science only)* | The presentation found [here](https://www.tes.com/teaching-resource/homeostasis-6039629) introduces ideas about homeostasis and what might happen if the mechanisms go wrong by asking learners to discuss some scenarios before describing the biological principles.  [This](https://www.tes.com/teaching-resource/homeostasis-higher-ht-6037833) presentation describes the control of body temperature and concludes with a link to a useful activity, the first part of which goes through ideas about body temperature.  [This](https://www.tes.com/teaching-resource/skin-loop-game-6050989) is a link to a loop game all focused on the role of the skin in maintaining body temperature which could be used a revision activity.  **Importance of homeostasis**  The BBC provides a concise [overview](https://www.bbc.co.uk/bitesize/guides/zgqcmsg/revision/1) of the importance of maintaining a constant internal environment that learners can use as part of an introductory lesson or as a preparation homework.  **Homeostatic processes**  This 18 minute video by Teachers TV gives an overview of a number of homeostatic processes.  [View full activity in B5.4 Why do we need to maintain a constant internal environment? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/delivery-guide/topic-gbb005-b5-the-human-body-staying-alive/delivery-guide-gbbdg022-b54-why-do-we-need-to-maintain-a-constant-internal-environment?activity=293672#293672)    **Investigating temperature control**  Nuffield Foundation provide data from an investigation into the effects of sweating and temperature. It can be used by the learners to analyse and interpret data about sweating and skin temperature before exploring ideas about how our bodies maintain a steady internal temperature.  [View full activity in B5.4 Why do we need to maintain a constant internal environment? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/delivery-guide/topic-gbb005-b5-the-human-body-staying-alive/delivery-guide-gbbdg022-b54-why-do-we-need-to-maintain-a-constant-internal-environment?activity=293674#293674) | Carrying out a practical activity into temperature control of the body will cover the skills and techniques required for PAG6. |
| 3 | **B5.4.3 explain the response of the body to different temperature challenges, including receptors, processing, responses and negative feedback**  *(separate science only)* | **Homeostatic processes**  This 18 minute video by Teachers TV gives an overview of a number of homeostatic processes.  [View full activity in B5.4 Why do we need to maintain a constant internal environment? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/delivery-guide/topic-gbb005-b5-the-human-body-staying-alive/delivery-guide-gbbdg022-b54-why-do-we-need-to-maintain-a-constant-internal-environment?activity=293672#293672)  **Temperature control**  This resource will suit the more able learner. Learners are able to listen to and watch a narrated or stepped through animation of temperature control including negative feedback before taking a quiz to assess their own learning.  [View full activity in B5.4 Why do we need to maintain a constant internal environment? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/delivery-guide/topic-gbb005-b5-the-human-body-staying-alive/delivery-guide-gbbdg022-b54-why-do-we-need-to-maintain-a-constant-internal-environment?activity=293676#293676) |  |
| 4 | B5.4.4 explain the effect on cells of osmotic changes in body fluids  B5.4.5 describe the function of the kidneys in maintaining the water balance of the body, including filtering water and urea from the blood into kidney tubules then reabsorbing as much water as required  *(separate science only)*  **B5.4.6 describe the effect of ADH on the permeability of the kidney tubules**  *(separate science only)* | **Osmosis in the body**  Learners are able to recap osmosis before applying their knowledge to the osmotic effect of different solution on both animal and plant cells.  [View full activity in B5.4 Why do we need to maintain a constant internal environment? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/delivery-guide/topic-gbb005-b5-the-human-body-staying-alive/delivery-guide-gbbdg022-b54-why-do-we-need-to-maintain-a-constant-internal-environment?activity=293638#293638)    The video clip found [here](https://www.youtube.com/watch?v=vB7tSHqR1eY) is a really good summary of kidney function that links homeostasis to the kidney’s role in balancing the amount of water in the body.  [This](https://www.youtube.com/watch?v=62e8IV-WT8c) video clip describes homeostasis quite generally with some focus on water balance and some good tips for how to word explanations in exam answers. The language and animation make it quite accessible for all abilities of learner.  Page 2 onwards of the BBC Bitesize site found [here](http://www.bbc.co.uk/education/guides/zj7v4wx/revision/2) discusses excretion, including the role of the kidney. Page 4 includes a video clip of the dissection of a pig kidney. Page 6 discusses the role of ADH.  [This](https://www.tes.com/teaching-resource/kidney-6139215) presentation is a summary of kidney function which leads learners through the importance of kidneys and has some interactive activities. It also has an annotated exam question at the end with some useful suggestions as to why answers do not receive credit.  **Kidney nephron**  Another resource for a higher ability learner. The structure and function of the kidney nephron is explained in detail by a narrated animation. The impact of ADH on the collecting duct can be seen in the second animation.  [View full activity in B5.4 Why do we need to maintain a constant internal environment? – Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/delivery-guide/topic-gbb005-b5-the-human-body-staying-alive/delivery-guide-gbbdg022-b54-why-do-we-need-to-maintain-a-constant-internal-environment?activity=293676#293640)    **Homeostatic processes**  [This](https://www.tes.com/teaching-resource/the-kidneys-6433210) is a “fill in the gaps” activity to allow learners to record information about the kidneys and ADH.  [Here](https://www.tes.com/teaching-resource/adh-cut-and-stick-6317408) is a cut and paste activity all based around the activity of ADH and negative feedback. |  |
| 5 | **B5.4.7 explain the response of the body to different osmotic challenges, including receptors, processing, response, and negative feedback**  *(separate science only)*  B5.4.8 in the context of maintaining a constant internal environment:  a) extract and interpret data from graphs, charts and tables  M2c  b) translate information between numerical and graphical forms  M4a | **Investigating temperature control**  Nuffield Foundation provide [data](https://pbiol.rsb.org.uk/control-and-communication/homeostasis/interpreting-information-about-sweating-and-temperature) from an investigation into the effects of sweating and temperature. It can be used by the learners to analyse and interpret data about sweating and skin temperature before exploring ideas about how our bodies maintain a steady internal temperature. |  |

### B5.5 What role do hormones play in human reproduction?

| Lesson | Statements | Teaching activities | Notes |
| --- | --- | --- | --- |
| 1 & 2 | B5.5.1 describe the role of hormones in human reproduction, including the control of the menstrual cycle  **B5.5.2 explain the interactions of FSH, LH, oestrogen and progesterone in the control of the menstrual cycle** | Page 3 of the BBC Bitesize site found [here](https://www.bbc.co.uk/bitesize/guides/z89vw6f/revision/3) discusses the role of the hormones in the menstrual cycle. The activity and test contain broader content so could be used synoptically.  **Control of the menstrual cycle**  Learners can gain an understanding of the menstrual cycle using this short 4 minute video clip of the process. Learning can then be reinforced using the second resource, allowing learners to compare the graphical representation of the cycle with the biological processes that are occurring.  [View full activity in B5.5 What role do hormones play in human reproduction? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/delivery-guide/topic-gbb005-b5-the-human-body-staying-alive/delivery-guide-gbbdg023-b55-what-role-do-hormones-play-in-human-reproduction?activity=293696#293696)    The lesson element found [here](https://www.ocr.org.uk/Images/300834-menstrual-cycle-lesson-element.docx) is designed to be used to deliver this content about the menstrual cycle. It is made up of 3 tasks, including one based on mathematical skills and an extension task.  [This](https://www.tes.com/teaching-resource/the-menstrual-cycle-6193778) presentation goes through the menstrual cycle and its control by the hormones in a clear and step-by-step way.  The process is summarised in the loop game found [here](https://www.tes.com/teaching-resource/menstrual-cycle-loop-dominoes-game-6141065) which can be used as a plenary or revision activity. | From the Key Stage 3 Programme of Study:  Reproduction in humans (as an example of a mammal), including the structure and function of male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of the maternal lifestyle on the foetus through the placenta. |
| 3 & 4 | B5.5.3 explain the use of hormones in contraception and evaluate hormonal and non-hormonal methods of contraception | **Contraception**  Learners can develop their knowledge of contraception using the comprehensive information available from the [NHS website](https://www.nhs.uk/conditions/contraception/). This could be used to produce an ‘NHS style’ information leaflet that could be distributed to their peers.  The video found [here](https://www.youtube.com/watch?v=vXSu68PmbKQ) is a history of birth control told in a humorous way. It contains information about barrier and hormonal methods of contraception which is a fun way of introducing the content of these lessons. However, it is worth watching in advance to check it is the sort of thing you would be happy to show to your class.  The activities found [here](https://www.tes.com/teaching-resource/hormonal-contraception-worksheets-6258313) are made up of a factsheet about the contraceptive pill and some questions about it and then a really useful task with some different scenarios asking about the best type of contraception depending on the situation. |  |
| 5 | **B5.5.4 explain the use of hormones in modern reproductive technologies to treat infertility** | **Aiding fertility**  The [resource](https://www.hfea.gov.uk/treatments/explore-all-treatments/in-vitro-fertilisation-ivf/) by the Human Fertilisation and Embryology Authority allows learners to develop their own understanding of fertility treatments including IVF and the hormonal treatments associated with the procedure. Learners can progress to the [second resource](https://patient.info/womens-health/infertility-leaflet/treatments) that allows them to develop a more detailed understanding of the drugs involved in fertility treatment and how they act on the body. |  |

### B5.6 What can happen when organs and control systems stop working?

| Lesson | Statements | Teaching activities | Notes |
| --- | --- | --- | --- |
| 1 & 2 | B5.6.1 explain how insulin controls the blood sugar level in the body  **B5.6.2 explain how glucagon and insulin work together to control the blood sugar level in the body**  B5.6.3 compare type 1 and type 2 diabetes and explain how they can be treated | **Control of blood sugar levels**  Learners are able to develop their understanding of blood glucose control using the animation by WH Freeman. The process is broken down to show the hormonal control of hypoglycaemia using glucagon and hyperglycemia using insulin.  [View full activity in B5.6 What can happen when organs and control systems stop working? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/delivery-guide/topic-gbb005-b5-the-human-body-staying-alive/delivery-guide-gbbdg024-b56-what-can-happen-when-organs-and-control-systems-stop-working?activity=293733#293733)  **Controlling diabetes**  The video found [here](https://www.youtube.com/watch?v=e-3N7w2sWps) is an interesting look at the homeostasis of blood sugar described in a clear way.  [This](https://www.tes.com/teaching-resource/control-of-blood-sugar-group-activity-11022430) activity gives learners the opportunity to work in groups to produce a flow-chart about the control of blood sugar using the cards and information that are provided as part of the activity.  The activity [here](https://www.tes.com/teaching-resource/how-blood-glucose-levels-change-during-the-day-6050166) can be used to develop mathematical skills. Learners are asked to plot data of how blood glucose levels change over the course of a day and then answer questions relating to the graph.  The activity found [here](https://www.tes.com/teaching-resource/blood-sugar-quiz-quiz-trade-cards-additional-sci-6060552) is a series of questions and answers all based around the control of blood sugar levels. The idea is that learners move around the classroom, asking one another their questions. It could be used as a starter or plenary.  The task [here](https://www.tes.com/teaching-resource/diabetes-leaflet-instructions-6174084) is a learner focused exercise which asks them to research the main ideas about the content about type 1 and type 2 diabetes.  It is possible to engage in some practical activities as part of the delivery of this content. Fake urine samples can be made using weak tea that is then “doctored” with sugar and tested using Benedict’s reagent to model one of the main symptoms of diabetes. This can be worked into a story about diagnosing a possible patient and comparing with a control from a “normal” person who does not have sugar present in their urine. If it is possible to access meters to test blood glucose levels, then horse blood could have sugar added which can then be worked into a story and tested. It might also be possible for a teacher to, for example, drink a 500ml bottle of Coke and then test their own blood repeatedly over the course of a lesson and tabulate results for learners to plot in a graph and explain. |  |
| 3 & 4 | B5.6.4 a) explain how the main structures of the eye are related to their functions, including the cornea, iris, lens, ciliary muscle and retina and to include the use of ray diagrams  b) describe practical investigations into the response of the pupil in different light conditions  *PAG6*  *(separate science only)* | The video clip found [here](https://www.youtube.com/watch?v=kFzGvlFAp_w) provides an interesting introduction to the structure and function of the eye using an eye from a horse to illustrate the main parts.  The activities found [here](https://www.tes.com/teaching-resource/the-eye-6334485) include a clear diagram of the eye to label and information about the structure and function of parts of the eye. There is also a question sheet which includes synoptic elements from earlier on in this chapter about neurones and the nervous system. The presentation is a fun plenary showing eyes from a range of different animals.  The BBC Bitesize site [here](http://www.bbc.co.uk/education/guides/zkdnb9q/revision/5) has lots of useful information about the structure and function of the eye including a short video clip showing how the lens changes shape to focus on near and distant objects.  **Eye structure**  Learners are able to use trial and error to complete the activity of labelling the eye. Feedback is given throughout the activity to allow learners to develop an understanding whilst they play. As the game is timed they can also try to beat the times of other class mates.  [View full activity in B5.6 What can happen when organs and control systems stop working? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-biology-b-j257-from-2016/delivery-guide/topic-gbb005-b5-the-human-body-staying-alive/delivery-guide-gbbdg024-b56-what-can-happen-when-organs-and-control-systems-stop-working?activity=293728#293728) | Carrying out a practical activity into the response of the pupil in different light conditions will cover the skills and techniques required for PAG6. |
| 5 & 6 | B5.6.5 describe common defects of the eye, including short-sightedness, long-sightedness and cataracts, and explain how these problems may be overcome, including using ray diagrams to illustrate the effect of lenses  *(separate science only)* | **Problems with the eye**  These BBC bitesize [pages](https://www.bbc.co.uk/bitesize/guides/zjcsd6f/revision/4) from page 4 onwards show normal vision, long sightedness and short sightedness along with ray diagrams that the learners could use to produce their own ‘eye condition leaflet’. Learners could also use the [resource](https://www.nhs.uk/conditions/cataract-surgery/) by the NHS to include cataracts in their leaflet. |  |
| 7 | **B5.6.6 explain some of the limitations in treating damage and disease in the brain and other parts of the nervous system**  *(separate science only)* | One approach to this content is to consider some of the possible damage and disease that can occur to the brain and nervous system e.g. spinal cord injuries, tumours, strokes and then flip the learning and ask learners to research some of the reasons why these conditions are so difficult to treat. This can be linked synoptically to the content in Chapter 4 about mitosis and stem cells. |  |

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