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## Pearson Edexcel

### International GCSE Human Biology (2017)

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#### How to use the Scheme of Work

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This scheme of work (SoW) has been made available as a word document rather than PDF, allowing you to edit the document in a way that suits your teaching style and student needs.

International GCSEs have 120 - 140 guided learning hours.

**Guidance provided within the course planners, schemes of work and lesson plans are suggested approaches that can be adapted by centres to suit their particular context.**

**The following SoW is based on two hours of teaching time per week over 60 weeks and reflects how centres could use time for practical activities; you should edit this planner to suit your teaching approach.**

The course planner, in the *Getting Started Guide*, provides a high level view of how you could approach the topics to cover the specification content across two years.

The columns in this lesson plan indicate:

- an overview of the time allocated to lessons
- which section of the specification this lesson (or group of lessons) relates to
- the learning outcomes of those lessons
- the activities and resources that could be used to support the teaching of this lesson
- transferable skills support, see below for further information.

### **Why transferable skills?**

In recent years, higher education institutions and global employers have consistently flagged the need for students to develop a range of transferable skills to enable them to respond with confidence to the demands of undergraduate study and the world of work.

To support the design of our qualifications, we have mapped them to a transferable skills framework. The framework includes cognitive, intrapersonal skills and interpersonal skills and each skill has been interpreted for each specification to ensure they are appropriate for the subject. Further information on transferable skills is available on the website. Pearson materials, including this scheme of work, will support you in identifying and developing these skills in students.

In the final two columns of this scheme of work we have indicated which transferable skills are explicitly assessed, and also where there are opportunities for them to be developed through teaching. Our intention is that teachers can use these columns to increase opportunities for transferable skills development in learners.

### **Other course planning support**

You will find other support for planning the course in the Teacher Support Materials. There are free downloadable resources that you can access [here](#).

### **Teaching resource exemplars**

The scheme of work contains suggestions for resources that you can use to support your teaching. These are suggestions only of material you may find useful and you are encouraged to use a wide range of resources that suit the needs of your students.

### **Other teaching resources**

- Student Books – full colour textbooks matched to the specification.
- ActiveBook – a digital copy of the Student Book in the back of every copy.

Further details can be found at [www.pearsonschools.co.uk](http://www.pearsonschools.co.uk). Search for this title: Edexcel IGCSE Human Biology Student Book.

### **Pearson Subject Advisors**

Pearson has a team of specialist subject advisors available to help you with the implementation of this specification. You can contact them by:

- Email: [TeachingScience@pearson.com](mailto:TeachingScience@pearson.com)
- Telephone: UK: 020 7010 2190. International: +44 20 7010 2190
- Twitter: [@PearsonSciences](https://twitter.com/PearsonSciences)

**Health and safety**

The practicals and experiments suggested within this scheme of work are those we believe are not banned or restricted in any way and are still currently used in most schools and colleges. The International GCSE encourages experimental work with the assessment of investigative skills being made in the written examinations.

We advise teachers and technicians to discuss the merits of the suggested practicals when deciding which to carry out and how they will be carried out. For example, will it be demonstrated by the teacher or technician, or conducted by students themselves, either individually or in small groups, under the guidance and direction of the teacher?

You may have ideas for practical work that we have not suggested but would work equally well.

As in all practical work, a risk assessment is expected as part of good health and safety practice in all centres and we understand that many schools and colleges refer to the CLEAPSS service: <http://www.cleapss.org.uk/> for guidance and support in conducting science practical work.

## Edexcel International GCSE in Human Biology (2017)

Week	Content coverage	Learning outcomes	Exemplar activities	Exemplar resources	Transferable skills that are explicitly assessed through examination	Transferable skills that could also be acquired through teaching and delivery
1	<b>Section 1</b> <b>Cells and Tissues</b> <b>Cell structures and functions</b>	<p>Students will be assessed on their ability to:</p> <p>1.1 recognise cell structures as seen with a light microscope and electron microscope (TEM images only), including nucleus, chromosomes, cell membrane, mitochondria, endoplasmic reticulum and ribosomes</p> <p>1.2 describe the functions of the cell structures:</p> <ul style="list-style-type: none"> <li>• nucleus</li> <li>• chromosomes</li> <li>• cell membrane</li> <li>• mitochondria</li> <li>• endoplasmic reticulum</li> <li>• ribosomes.</li> </ul>	<p><b>Activities:</b></p> <p>Look at TEM images and try to identify structures.</p> <p>Produce a poster labelling structures and annotated with functions of each structure.</p> <p>Students can research a particular organelle and prepare a PowerPoint presentation to the class.</p> <p>Look at pre-prepared slides of various cells under a light microscope.</p> <p>Produce a slide of your own cheek cell or onion cell – compare plant and animal cell structures. <i>Please consider local Health and safety issues and regulations.</i></p> <p>Squeeze some pond weed between two microscope slides - look at them under a microscope to see how many chloroplasts</p>	<p>Edexcel International GCSE student book pages – tbc</p> <p><b>BBC Bitesize – What's In A Cell?</b>  <a href="http://www.bbc.co.uk/schools/gcsebitesize/science/add_edexcel/cells/cells2.shtml">http://www.bbc.co.uk/schools/gcsebitesize/science/add_edexcel/cells/cells2.shtml</a> (for animal cell components)</p> <p><b>Video – Electron microscope</b>  <a href="https://www.youtube.com/watch?v=fToTFjwUc5M">https://www.youtube.com/watch?v=fToTFjwUc5M</a></p> <p><b>BBC – Levels of Organisation</b>  <a href="http://www.bbc.co.uk/education/guides/zgcxsbk/revision/2">http://www.bbc.co.uk/education/guides/zgcxsbk/revision/2</a> (for animal cell components)</p> <p><b>Video – Cell biology under the microscope</b>  <a href="http://www.dnatube.com/video/2321/Cell-Biology-Under-Microscope">http://www.dnatube.com/video/2321/Cell-Biology-Under-Microscope</a></p>	<p>Critical thinking  Problem solving  Reasoning  Interpretation  Adaptive learning  Adaptability</p>	<p>Critical thinking  Problem solving  Analysis  Reasoning  Interpretation  Decision making  Adaptive learning  Learning  Intellectual Interest and curiosity  Initiative  Self-direction  Responsibility  Perseverance  Communication  Collaboration  Teamwork  Cooperation  Interpersonal skills  Leadership</p>

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			<p>there are. <i>Plant cells are outside the specification but this can develop practical skills/illustrate plant cell differences.</i></p> <p>Use an internet programme to make a word search or crossword – perhaps for homework and students can swap in pairs and try to do them in the next lesson.</p>			
2	<b>Section 1</b> <b>Cells and Tissues</b> Structure of DNA and DNA replication	<p>Students will be assessed on their ability to:</p> <p>1.3 describe the structure of a DNA molecule as:</p> <ul style="list-style-type: none"> <li>• two strands coiled to form a double helix</li> <li>• containing nucleotides</li> <li>• strands linked by complementary bases, complementary bases linked by hydrogen bonds.</li> </ul> <p>1.4 describe DNA replication as the separation of DNA strands and the formation of a new strand by complementary base pairing of nucleotides, including the role of DNA polymerase.</p>	<p><b>Activities:</b></p> <p>Make models of DNA ladder structure using card or even use different coloured jelly babies as the bases.</p> <p>Make plasticine/play-doh models to show replication.</p> <p>Download app stop motion animation – use iPhones or iPads to make an animation of DNA replication using plasticine/card etc.</p> <p>Extension for G&amp;T Make molymod models of a nucleotide.</p>	<p>Edexcel International GCSE student book pages – tbc</p> <p><b>Animations:</b>  <b>DNA structure</b>  <a href="http://highered.mheducation.com/sites/dl/free/0072835125/126997/animation12.html">http://highered.mheducation.com/sites/dl/free/0072835125/126997/animation12.html</a></p> <p><b>DNA replication</b>  <a href="http://highered.mheducation.com/sites/dl/free/0072835125/126997/animation16.html">http://highered.mheducation.com/sites/dl/free/0072835125/126997/animation16.html</a></p>	Critical thinking Problem solving Reasoning Interpretation Adaptive learning Adaptability	Critical thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Creativity Innovation Adaptability Intellectual Interest and curiosity Initiative Self-direction Perseverance Communication Collaboration Teamwork Cooperation Interpersonal skills

Week	Content coverage	Learning outcomes	Exemplar activities	Exemplar resources	Transferable skills that are explicitly assessed through examination	Transferable skills that could also be acquired through teaching and delivery
			Use an internet programme to make a word search or crossword – perhaps for homework and students can swap in pairs and try to do them in the next lesson			Leadership
3	<b>Section 1</b> <b>Cells and Tissues</b>  Protein synthesis and mutations	Students will be assessed on their ability to:  1.5 understand that a gene is a length of DNA containing a sequence of bases that code for a specific protein. <b>Teaching should be limited to:</b> <ul style="list-style-type: none"> <li>the order of bases in DNA codes for the order of amino acids in a protein</li> <li>3 bases coding for one amino acid</li> </ul> 1.6 know that RNA is a second type of nucleic acid that has the following features: <ul style="list-style-type: none"> <li>single stranded</li> <li>contains ribose</li> <li>contains uracil and that it is used to take information from DNA in the nucleus to the ribosomes for the synthesis of proteins</li> </ul> 1.7 understand that a DNA mutation involves a change in the sequence of	<b>Activities:</b>  Make models of DNA/RNA base sequences using different coloured card or even use different coloured jelly babies as the bases and show mutations changing the base sequence.  Make plasticine/play-doh models to show transcription/translation/protein synthesis.  Download app stop motion animation – use iPhones or iPads to make an animation of transcription/translation using plasticine/card etc.  Use an internet programme to make a word search or crossword – perhaps for homework and students can swap in pairs and try to do them	Edexcel International GCSE student book pages – tbc  <b>Animations:</b> <b>Transcription and translation</b> <a href="https://www.youtube.com/watch?v=fihDFf2vDrl">https://www.youtube.com/watch?v=fihDFf2vDrl</a>  <b>ABPI interactive activity on protein synthesis</b> <a href="http://www.abpischools.org.uk/topic/cellbiology/7">http://www.abpischools.org.uk/topic/cellbiology/7</a>	Critical Thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Creativity Innovation Adaptability	Critical thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Creativity Innovation Adaptability Intellectual Interest and curiosity Initiative Self-direction Perseverance Communication Collaboration Teamwork Cooperation Interpersonal skills Leadership

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		<p>bases that could lead to a change in the amino acid sequence and phenotype of an individual</p> <p>1.8 describe protein synthesis as:</p> <ul style="list-style-type: none"> <li>transcription – the formation of mRNA in the nucleus</li> <li>the transfer of mRNA to ribosomes in the cytoplasm</li> <li>translation of the genetic code by tRNA from mRNA codons</li> <li>the formation of a polypeptide chain using amino acids.</li> </ul>	in the next lesson.			
4	<p><b>Section 1</b></p> <p><b>Cells and Tissues</b></p> <p>Genetic engineering</p>	<p>Students will be assessed on their ability to:</p> <p>1.9 outline principles of genetic engineering, including:</p> <ul style="list-style-type: none"> <li>the production of genetically modified bacteria to produce human insulin</li> <li>the production of genetically modified plants to produce vaccines (e.g. hepatitis B) and to improve health (e.g. Golden Rice to increase vitamin A in the diet).</li> </ul>	<p><b>Activities:</b></p> <p>Discuss the ethical issues surrounding genetic engineering. Students could research and/or have a class debate of the pros and cons.</p> <p>Use an internet programme to make a word search or crossword – perhaps for homework and students can swap in pairs and try to do them in the next lesson</p>	<p>Edexcel International GCSE student book pages – tbc</p> <p><b>Video:</b>  <b>DNAtube</b>  <a href="http://www.dnatube.com/video/2310/Bacteria-Genetic-Engineering">http://www.dnatube.com/video/2310/Bacteria-Genetic-Engineering</a></p>	<p>Critical thinking  Problem solving  Analysis  Reasoning  Interpretation  Decision making  Adaptive learning  Creativity  Innovation  Adaptability</p>	<p>Critical thinking  Analysis  Reasoning  Interpretation  Decision making  Adaptive learning  Executive function  Personal and social responsibility  Intellectual Interest and curiosity  Initiative  Self-direction  Ethics  Integrity  Communication  Collaboration  Teamwork</p>

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						Cooperation Interpersonal skills Leadership Responsibility Assertive Communication Self- presentation
5	<b>Section 1 Cells and Tissues</b>  Mitosis, stem cells, Ethics	Students will be assessed on their ability to:  1.10 understand that mitosis occurs during growth, repair, cloning and asexual reproduction  1.11 know the four main stages of mitosis; prophase, metaphase, anaphase and telophase, which results in the production of two genetically identical diploid daughter cells  1.12 know that there are different types of stem cells, including embryonic and adult stem cells that have the ability to develop into other body cells  1.13 describe the advantages, disadvantages and ethics in the research and use of embryonic and adult stem cells.	<b>Activities:</b>  Make plasticine/play-doh models to show chromosomes during mitosis.  Download app stop motion animation – use iPhones or iPads to make an animation of mitosis using plasticine, card etc.  Discuss the ethics of using stem cells. Students could research and/or debate the pros and cons.  Investigate cell division using: <a href="http://multimediasciencesimulations.com/biology.php">http://multimediasciencesimulations.com/biology.php</a>	Edexcel International GCSE student book pages – tbc  <b>Animation:</b> <b>Mitosis</b> <a href="http://highered.mheducation.com/sites/dl/free/0072835125/126997/animation2.html">http://highered.mheducation.com/sites/dl/free/0072835125/126997/animation2.html</a>  <b>Videos:</b> <b>DNAtube</b> <a href="http://www.dnatube.com/video/162/Stem-Cells-Part-I">http://www.dnatube.com/video/162/Stem-Cells-Part-I</a>  <b>ABPI interactive activity on cell division:</b> <a href="http://www.abpischools.org.uk/topic/celldivision">http://www.abpischools.org.uk/topic/celldivision</a>  <b>BBC – Stem Cells and Medicine</b> <a href="http://www.bbc.co.uk/education/clips/zqvxcwx">http://www.bbc.co.uk/education/clips/zqvxcwx</a>	Critical thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Creativity Innovation Adaptability	Critical thinking Analysis Reasoning Interpretation Decision making Adaptive learning Executive function Personal and social responsibility Intellectual Interest and curiosity Initiative Self-direction Ethics Integrity Communication Collaboration Teamwork Cooperation Interpersonal skills Leadership Responsibility Assertive Communication



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				<b>ABPI interactive activity on stem cells:</b> <a href="http://www.abpischools.org.uk/topic/stem-cells/">http://www.abpischools.org.uk/topic/stem-cells/</a>		Self-presentation
6	<b>Section 1 Cells and Tissues</b>  Cells tissues and organs, bone and muscle specialised cells	Students will be assessed on their ability to:  1.14 understand that cells are grouped into tissues and that tissues are organised into organs  1.15 describe the structure of bone, muscle (voluntary, involuntary and cardiac, as observed under a light microscope), blood, nervous tissue and epithelium (squamous and ciliated, with reference to cells lining the cheek and trachea)  1.16 describe the structure of cells specialized for reproduction, e.g. egg (ovum) and sperm and relate their structure to function.	<b>Activities:</b>  Use a model skeleton to show bones and muscle locations/attachment.  View pre-prepared slides of blood/nervous tissue or other cells under a light microscope.  Locate/download a picture from an online library to observe red blood cells or stained white blood cells.  Use an internet programme to make a word search or crossword – perhaps for homework and students can swap in pairs and try to do them in the next lesson.	Edexcel International GCSE student book pages – tbc  <b>DNAtube –Red blood cells</b> <a href="http://www.dnatube.com/video/20/Red-Blood-Cells-under-microscope">http://www.dnatube.com/video/20/Red-Blood-Cells-under-microscope</a>  <b>DNAtube – Fusion of sperm and egg</b> <a href="http://www.dnatube.com/video/8296/Fusion-of-the-ovum-and-sperm">http://www.dnatube.com/video/8296/Fusion-of-the-ovum-and-sperm</a>	Critical thinking Problem solving Analysis Reasoning Interpretation Decision making	Critical thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Creativity Innovation Adaptability Intellectual Interest and curiosity