



(9204)

Outline Schemes of Work – review version

For teaching from September 2016 onward
For International GCSE exams in June 2018 onwards

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This scheme of work suggests possible teaching and learning activities for each section of the specification. There are far more activities suggested than it would be possible to teach. It is intended that teachers should select activities appropriate to their students and the curriculum time available. The first two columns summarise the specification references, whilst the Learning Outcomes indicate what most students should be able to achieve after the work is completed. The Resources column indicates resources commonly available to schools, and other references that may be helpful. The timings are only suggested, as are the Possible Teaching and Learning Activities, which include references to experimental work. Resources are only given in brief and risk assessments should be carried out.

| **Spec Reference** | **Summary of the Specification Content** | **Learning Outcomes** ***What most students should be able to do*** | **Suggested timing (lessons)** | **Possible teaching and Learning Activities** ***Homework*** | **Resource** | **Examination ‘hints and tips’*****Students should:*** |
| --- | --- | --- | --- | --- | --- | --- |
| **3.1 Organisation**All organisms are constituted of one or more cells. Multicellular organisms have cells that are differentiated according to their function. All the basic functions of life are the result of what happens inside the cells which make up an organism. Growth is the result of multiple cell divisions. |
| **3.1.1 Cell structure** |
| 3.1.1a | Most animal cells (eukaryotic cells) have the following parts:* a nucleus, which controls the activities of the cell
* cytoplasm, in which most of the chemical reactions take place
* cell membrane, which controls the passage of substances into and out of the cell
* mitochondria, which is where most energy is released in respiration
* ribosomes, which is where protein synthesis occurs.
 | Label diagrams of animal and plant cells.Use a microscope.Prepare slides of plant and animal cells. | 2 | **Activity:** Revise plant and animal cell structure from KS3 using diagrams, then extend to include mitochondria and ribosomes.Label diagrams of plant and animal cells. | **Cells:** Microscopes, slides, coverslips, tiles, forceps, mounted needles, iodine solution, methylene blue, onion, rhubarb, spirogyra and moss. | Be able to label a sperm cell with cell membrane, cytoplasm and nucleus. |
| 3.1.1b | In addition to the above, plant cells (eukaryotic cells) often have:* chloroplasts, which absorb light energy to make food
* a permanent vacuole filled with cell sap.

Plant and algal cells also have a cell wall made of cellulose, which strengthens the cell. | Match cell organelles to their functions. |  | **Practical:** Prepare slides of onion epidermis, rhubarb epidermis, cheek cells, spirogyra, moss etc. and observe under a microscope.**Video:** Watch video clip on plant and animal structures. **Discuss:** Discuss which structures could be seen and compare with EM images – find some images using your preferred search engine.**Task:** Match organelles with their functions.**Homework:** Competition to make a plant or animal cell model and create a display. | Puzzles, quizzes and images can be found at [www.cellsalive.com](http://www.cellsalive.com) A video clip on plant and animal structures can be found on the BBC website at [www.bbc.co.uk/learningzone/clips](http://www.bbc.co.uk/learningzone/clips) by searching for clip ‘4188’.Useful information on cell structure can be found at [www.biology4kids.com](http://www.biology4kids.com) | Be able to state two parts of a leaf cell which would not be found in a sperm cell. |
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| 3.1.1c | A bacterial cell (prokaryotic cells) consists of cytoplasm and a membrane surrounded by a cell wall; the genes are not in a distinct nucleus; some of the genes are located in circular structures called plasmids. | Label diagrams of bacterial and yeast cells.Identify diagrams of cells as being from an animal, plant, bacterium or yeast.Identify plasmids in diagrams of cells. | 1 | **Practical:** How are bacterial and yeast cells different from plant and animal cells? Observe under microscope. Culture of yeast cells to show budding.**Task:** Label diagrams of bacterial and yeast cells.**Activities:** Select activities about plasmids from the National Stemcentre e-library. | Diagrams of bacteria and yeast cells.**Cells:** microscopes, slides, coverslips, yeast culture, bacterial cultures and EM images.Further information about cell structure and plasmids can be found at <http://www.nationalstemcentre.org.uk/elibrary/science/search?term=plasmids&filter=R&order=score>  | Be able to add labels to a yeast cell for cell membrane, cell wall, nucleus and vacuole.Be able to give two ways in which a root hair cell is different from an animal cell. |
| 3.1.1d | Cells may be specialised to carry out a particular function.. | Observe different types of cells under a microscope.Relate their structure to their function.Explain how specialised cells are adapted for their function.  | 1 | **Activity:** Compare diagrams of plant and animal cells – similarities and differences.Display images of cells to classify as plant, animal, bacterial or yeast and compare sizes of cells and organelles.**Practical:** Observe specialised cells under the microscope and EM images; link structure to function.**Video:** Watch video clip of egg and sperm cells.**How Science Works:** Use bioviewers to observe specialised cells.**Task:** Produce a poster of labelled specialised cells to explain how they are adapted for their function.**Video:** Watch a video on cell structure and function. | Further information on cells can be found at [www.cellsalive.com](http://www.cellsalive.com) A useful video clip on cell structure can be found on the BBC website at [www.bbc.co.uk/learningzone/clips](http://www.bbc.co.uk/learningzone/clips/) by searching for clip ‘107’.Cells: Prepared slides of different plant and animal cells, microscopes, cavity slides, coverslips, germinating cress seeds or sprouting mung beans (root hair cells).A useful video clip on cells and their functions can be found on the BBC website at [www.bbc.co.uk/learningzone/clips](http://www.bbc.co.uk/learningzone/clips/) by searching for ‘1832’. | Be able, when provided with appropriate information, to relate the structure of different types of cell to their function in a tissue, an organ, or the whole organism. |

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| --- | --- | --- | --- | --- | --- | --- |
| **3.1.2 Principles of organisation** |
| 3.1.2a | Large multicellular organisms develop systems for exchanging materials. During the development of a multicellular organism, cells differentiate so that they can perform different functions. | Explain why large organisms need different systems to survive.Explain what cell differentiation is.Describe organisation in large organisms. | 2 | **Activity:** Revise KS3 – show diagrams of the main organ systems to identify and describe their functions.**Activity:** Look at the different types of cells in the stomach and discuss how they were produced – link with lesson on specialised cells. | Torso, posters of organ systems. | Develop an understanding of size and scale in relation to cells, tissues, organs and systems. |
| 3.1.2b | A tissue is a group of cells with similar structure and function. | Define the term tissue.Name the tissues in the stomach and explain what they do. |  | **Activity:** Look at a model of the stomach showing different tissues.**Task:** Label a diagram of the stomach with the names of the tissues and their functions. |  |  |