



## **Biology AS Bridging Project**

For Biology at A-Level we follow the specification OCR A.

### **General Resources:**

1. OCR Website - the specification can be found here for AS and A Level Biology

<https://www.ocr.org.uk/qualifications/as-and-a-level/biology-a-h020-h420-from-2015/#as-level>

2. Currently free on amazon to download to a kindle or device that allows the kindle app:

New Head Start to A-level Biology (CGP A-Level Biology) Kindle Edition

[https://www.amazon.co.uk/gp/product/B00VE2NIOI/ref=ppx\\_yo\\_dt\\_b\\_d\\_asin\\_title\\_o02?ie=UTF8&psc=1](https://www.amazon.co.uk/gp/product/B00VE2NIOI/ref=ppx_yo_dt_b_d_asin_title_o02?ie=UTF8&psc=1)

3. Physics and Maths Tutor:

<https://www.physicsandmathstutor.com/biology-revision/a-level-ocr-a/>

4. Transition from GCSE to A Level. You will be using this for some of your tasks.

[http://fdslive.oup.com/www.oup.com/oxed/secondary/science/Science\\_A\\_Level\\_Transition\\_Pack\\_Biology.pdf](http://fdslive.oup.com/www.oup.com/oxed/secondary/science/Science_A_Level_Transition_Pack_Biology.pdf)

### **Section 1: Cell Structure**

The first part of AS Biology looks at the structure of cells in more detail than you have learnt already, it will feel like you are bombarded with new terminology so use this time to recap what you have learnt at GCSE and familiarise yourself with some new terms! Using your GCSE knowledge, as a baseline before completing further tasks.

#### **Tasks:**

1. Draw a typical animal cell and label the parts.
2. Draw a typical plant cell and label the parts.
3. Do a table to compare and contrast plant and animal cells (considering the similarities and differences).
4. What do the different parts of the cell do? Make a table for structure and function.
5. What is a specialised cell? Why are these important?
6. Select three examples of specialised cells (at least one must be a plant cell) and make a fact file for each. You should include: a diagram, location of where the cell is found, key features annotated, explanations of how each part helps this cell be specialised.





The rest of the tasks will involve research, reading and watching videos and completing tasks on what you have read/watched/researched.

7. Watch: The wacky history of cell theory - Lauren Royal-Woods  
<https://www.youtube.com/watch?v=4OpBylwH9DU>
8. Make a timeline of events in the history of cell theory. Research further information of some of the key scientists and add this to your timeline. You should include images to make your timeline interesting.
9. Watch the video on Biology: Cell Structure | Nucleus Medical Media  
<https://www.youtube.com/watch?v=URUJD5NEXC8>
10. Read these notes on Cell Organelles:
  - <https://pmt.physicsandmathstutor.com/download/Biology/A-level/Notes/OCR-A/2-Foundations-in-Biology/Summary/2.1.%20Cell%20Structure.pdf>
  - <https://www.physicsandmathstutor.com/biology-revision/a-level-ocr-a/module-2/cell-structure-flashcards/>
  - <https://www.s-cool.co.uk/a-level/biology/cells-and-organelles/revise-it/organelles>
11. Write notes on the functions of the following. You should use the notes you have read.
  - Ribosome
  - Mitochondria
  - Chloroplasts
  - Nucleus - include the different sections of the nucleus as well
  - Centrioles
  - Endoplasmic Reticulum (ER) - Rough (RER) and Smooth (SER)
  - Golgi apparatus
  - Lysosomes
  - Flagella and cilia
  - Vacuole
  - Cytoskeleton
  - Cell wall
  - Cell membrane
  - Tonoplast
12. With all the additional new words you have looked at - find a diagram of a more complex animal and plant cell, draw and label.
13. Find a definition of "prokaryotic" and "eukaryotic".
14. Draw a diagram of a generalised prokaryotic (bacterial) cell. You need to label it with the key features. Highlight any key differences.



15. Draw a table to compare prokaryotic and eukaryotic cells.
16. Complete the question in the form of an essay. You will be given credit for the quality of written communication.

Q: Plant cells are also eukaryotic. Outline the function(s) of each part of a **plant cell**.

17. Extended creative task: Make a model of a cell - plant or animal - OR large poster. Both need to include the functions of the organelles. This needs to include new terminology.

## **Section 2: Microscopy**

There are two main types of microscope: light and electron. You are going to research into these two types.

Tasks:

1. Watch the video: Microscopes and How to Use a Light Microscope.

<https://www.youtube.com/watch?v=tVcEEw6qbBQ>

2. Make a fact sheet or presentation on light microscopes.
3. Research into Electron microscope and write some notes.
4. Read the information on:

<https://alevelnotes.com/notes/biology/cells/cell-structure/magnification>

5. Make a comparison table of the microscope types you have researched.
6. Watch the video on: Microscope Drawings - Biology A Level.

[https://www.youtube.com/watch?v=ElqjDBI\\_g9M](https://www.youtube.com/watch?v=ElqjDBI_g9M)

7. Write a set of rules on how to make a scientific drawing. This could then be used as a checklist for anyone completing a scientific drawing.
8. Find an image of some cells under the microscope and have a go at doing a scientific drawing for it.
9. Read the notes:  
<https://pmt.physicsandmathstutor.com/download/Biology/A-level/Notes/OCR-A/1-Practical-Skills-in-Biology/PAG%2001%20-%20Microscopy.pdf>
10. Make a poster on performing microscopy - include using stains, measuring the sizes of objects. This is one of the required practicals that you need to understand well.





### **Section 3: Biological Molecules**

Everything is made of something. Monomers make up polymers, amino acids make up proteins and nucleotides make up polynucleotides. You will learn the joys of condensation and hydrolysis reactions to build up new wonderful substances.

Tasks:

1. Watch the video on "Biomolecules"

<https://www.youtube.com/watch?v=YO244P1e9QM>

2. Watch the video on "Biological Molecules - You are what you eat: crash course #3"

<https://www.youtube.com/watch?v=H8WJ2KENIK0>

You may want to watch twice and the second time, stop the video at various points to write some notes.

### **Carbohydrates**

3. Read the notes on Physics and Maths tutor (sections on monomers, polymers and carbohydrates) and S-Cool. Answer the series of questions below. You should use full sentences and highlight any key words.

- <https://pmt.physicsandmathstutor.com/download/Biology/A-level/Notes/OCR-A/2-Foundations-in-Biology/Summary/2.2.%20Biological%20Molecules.pdf>
- <https://www.s-cool.co.uk/a-level/biology/biological-molecules-and-enzymes/revise-it/carbohydrates>

- a) What is a monomer?
- b) What is a polymer?
- c) What is a condensation reaction?
- d) What is a hydrolysis reaction?
- e) What are carbohydrates made of?
- f) What are the different categories of carbohydrates?
- g) What are the 3 forms of carbohydrate?
- h) What is a monosaccharide?
- i) What is a polysaccharide?
- j) What are some examples of disaccharides?
- k) What are some examples of polysaccharides?
- l) Draw the alpha and beta glucose molecules. What are the differences?
- m) Draw how a condensation and hydrolysis reaction work, using an example.
- n) Draw a table to compare: starch, cellulose and glycogen.
- o) What is the biochemical test for sugars?



## Lipids

4. Read the notes on Physics and Maths tutor (section lipids ) and S-Cool. Answer the series of questions below. You should use full sentences and highlight any key words.
  - <https://pmt.physicsandmathstutor.com/download/Biology/A-level/Notes/OCR-A/2-Foundations-in-Biology/Summary/2.2.%20Biological%20Molecules.pdf>
  - <https://www.s-cool.co.uk/a-level/biology/biological-molecules-and-enzymes/revise-it/lipids>
- a) What is the difference between saturated and unsaturated?
- b) What are fats made of?
- c) What is the structure of a triglyceride?
- d) How does the number of bonds affect the properties of a fat?
- e) What is a phospholipid?
- f) What is meant by hydrophilic and hydrophobic?
5. Make a mind map on the functions of lipids.

## Water

6. Watch video on "Properties of Water":

<https://www.youtube.com/watch?v=3jwAGWky98c>

7. Read the section on water on Physics and Maths tutor notes.
  - <https://pmt.physicsandmathstutor.com/download/Biology/A-level/Notes/OCR-A/2-Foundations-in-Biology/Summary/2.2.%20Biological%20Molecules.pdf>
  - <https://www.s-cool.co.uk/a-level/biology/biological-molecules-and-enzymes/revise-it/water>
8. Using the information from the above links, make a detailed mind map on the properties and uses of water.
9. Make a series of questions and answers on water and lipids.

## Proteins

10. Watch the video on "Protein Structure and Folding"

<https://www.youtube.com/watch?v=hok2hyED9go&t=151s>

11. Read the section on proteins on Physics and Maths tutor notes.
  - <https://pmt.physicsandmathstutor.com/download/Biology/A-level/Notes/OCR-A/2-Foundations-in-Biology/Summary/2.2.%20Biological%20Molecules.pdf>
  - <https://www.s-cool.co.uk/a-level/biology/biological-molecules-and-enzymes/revise-it/proteins>
12. Describe the 4 levels of protein structure (in detail) in a table.





## Qualitative Testing

13. Watch the video "Food Tests". Write some notes as the video plays.

<https://www.youtube.com/watch?v=sLP8dcnWnJg&t=50s>

14. Research methods of how to test for carbohydrates - reducing and non-reducing sugars. Write a method of how you would do this.

15. Write a method for how you would test for proteins and fats.

16. Make a table comparing the different biological molecules: carbohydrates, proteins, fats. To include: similarities, differences and testing.

17. Compare your table to the one on the link below:

<https://pmt.physicsandmathstutor.com/download/Biology/A-level/Notes/OCR-A/1-Practical-Skills-in-Biology/PAG%2009%20-%20Qualitative%20Testing.pdf>

## Summary Tasks:

18. Make a fact file for the biological molecules:

- Starch
- Glycogen
- Cellulose
- Haemoglobin
- Collagen

19. Make a crossword on biological molecules, using definitions and clues.

20. Make a glossary of key words and definitions.

## Section 4: Cell Division and Cell Diversity

### Specialised Cells

1. Watch the video "Specialized Cells: Significance and Examples". Write some notes.

<https://www.youtube.com/watch?v=wNe6RuKOfFA&t=68s>

2. Make a detailed table for the different specialised cells. In the explanation column you need to give reasons why the key features help the cell to carry out its function.

Cell and diagram	Function	Key features (specialisations)	Explanation

You should include the following cells: red blood cell, white blood cell, sperm cell, root hair cell, palisade cell, guard cell, ciliated epithelial cell, squamous epithelial cell.







## Mitosis and Meiosis

3. Watch these videos on mitosis and meiosis.
  - Mitosis - Stages of Mitosis | Cells | Biology | FuseSchool  
<https://www.youtube.com/watch?v=RNwJbMovnVQ>
  - Mitosis: The Amazing Cell Process that Uses Division to Multiply!  
<https://www.youtube.com/watch?v=f-lDPgEfAHI>
  - Meiosis  
<https://www.youtube.com/watch?v=VzDMG7ke69g>
  - Meiosis | Genetics | Biology | FuseSchool  
<https://www.youtube.com/watch?v=5pwwIsDE6eq>
4. Read the notes on Physics and Maths Tutor:
  - <https://pmt.physicsandmathstutor.com/download/Biology/A-level/Notes/OCR-A/2-Foundations-in-Biology/Summary/2.6.%20Cell%20Division,%20Cell%20Diversity%20and%20Cellular%20Organisation.pdf>
5. Make a table of the following key words: chromosome, centromere, centrioles, chromatids, spindle fibres, recombinants, bivalents, cytokinesis, interphase.
6. Make two storyboards - one for mitosis and one for meiosis. You need to include descriptions and labels and information about the phases.

## Stem Cells

7. Watch the two videos below and write notes as they play. You may prefer to watch twice and write notes the second time.
  - A stem cell story:  
[https://www.youtube.com/watch?v=2-3J6JGN-\\_Y](https://www.youtube.com/watch?v=2-3J6JGN-_Y)
  - Stem cells - an introduction into iPS cells:  
<https://www.youtube.com/watch?v=Q9-4SMGiKnE>
8. Research into stem cells using the link below and make a mind map about stem cells, including: facts, potential uses, for using stem cells, against using stem cells,  
<https://www.eurostemcell.org/resource-type/factsheet>
9. Write an article about stem cells and the use for treating diseases. If you prefer you could do this as a presentation. Include the following ideas:
  - What are stem cells? Where are stem cells usually found?
  - Explain how stem cells used to treat different diseases.
  - Discuss the ethical reasons why stem cell research should not be used.
  - Contrast the ethical reasons why stem cell research should be used.
  - Evaluate the risks and benefits of using stem cells in treatment of diseases.





## **Section 5: Maths Skills**

Download/View/Save using the link: The Transition from GCSE to A Level

[http://fdslive.oup.com/www.oup.com/oxed/secondary/science/Science\\_A\\_Level\\_Transition\\_Pack\\_Biology.pdf](http://fdslive.oup.com/www.oup.com/oxed/secondary/science/Science_A_Level_Transition_Pack_Biology.pdf)

Work through reading the information and the questions that follow. It is in a logical order and links to the work you have completed on magnification,

As you work through the tasks, write some key notes on the Maths skills that you have been using.

## **Section 6: Exam Questions**

In this section, you will have a go at some AS exam questions, which link to the topics you have been studying.

You should write your answers down and then mark them once you have completed it.

Cell Structure 1 Questions:

<https://pmt.physicsandmathstutor.com/download/Biology/A-level/Topic-Qs/OCR-A/2-Foundations-in-Biology/2.1-Cell-Structure/Set-B/Cell%20Structure%201%20QP.pdf>

Cell Structure 1 Answers:

<https://pmt.physicsandmathstutor.com/download/Biology/A-level/Topic-Qs/OCR-A/2-Foundations-in-Biology/2.1-Cell-Structure/Set-B/Cell%20Structure%201%20MS.pdf>

Biological Molecules 3 Questions:

<https://pmt.physicsandmathstutor.com/download/Biology/A-level/Topic-Qs/OCR-A/2-Foundations-in-Biology/2.2-Biological-Molecules/Set-B/Biological%20Molecules%203%20QP.pdf>

Biological Molecules 3 Answers:

<https://pmt.physicsandmathstutor.com/download/Biology/A-level/Topic-Qs/OCR-A/2-Foundations-in-Biology/2.2-Biological-Molecules/Set-B/Biological%20Molecules%203%20MS.pdf>

