

Biology Sixth Form Induction Home Learning

Year 12 Biology

Summer Home Learning

- ❑ Create an A3 sized poster to show what is found inside the cell and annotate your drawings with the functions of each organelle as listed on the **specification**.
- ❑ Read the timeline on the development of the Cell Theory. Try to add this information onto your A3 sheet in a more presentable form.
- ❑ Find something in the news linked to Biology that has inspired you. Be prepared to talk about it if asked.
- ❑ Bring your completed A3 sheet to your first Biology lesson.

History of the light microscope and the development of cell theory

Late in the Roman Empire the Romans began to develop and experiment with glass. They noted how objects looked bigger when viewed through pieces of glass that were thicker in the middle than at the edges.

There was little further development of glass lenses until around the 13th century and the invention of spectacles or eye glasses.

The credit for the invention of the light microscope is much disputed. Some ascribe it to two Dutch spectacle makers who invented the telescope when experimenting with multiple glass lenses in a tube in the late 16th century. Others claim it was Galileo Galilei in 1609 who developed the first true or compound microscope (Table 1). Galileo's instrument was the first to be given the name 'microscope'.

Cell theory
The development of cell theory is a good example of how scientific theories change over time as new evidence

is gained and as knowledge increases. Theories are proposed, accepted and can then be later disproved as new evidence comes to light. New evidence can arise in a number of ways, including as technology develops. This is the case with cell theory - as microscopes with higher magnification and resolution were developed, cells could be observed for the first time. Table 1 summarises some of the developments in cell theory.

Table 1. Cell theory timeline

Timeline	Development of cell theory
1665	Cell first observed Robert Hooke, an English scientist, observed the structure of thin sliced cork using an early light microscope. He described the compartments he saw as 'cells' - coining the term we still use today. As this was dead plant tissue he was observing only cell walls.
1674-1683	First living cells observed Anton van Leeuwenhoek, a Dutch biologist, developed a technique for creating powerful glass lenses and used his handcrafted microscopes to examine samples of pond water. He was the first person to observe bacteria and protozoa and described them as 'little animals' or 'animalcules' - today we call them microorganisms. He went on to observe and blood cells, sperm cells, and muscle fibres for the first time.
1832	Evidence for the origin of new plant cells Barthelemy Dumas, a Belgian botanist, was the first to observe cell division in plants providing evidence against the theories of the time, that new cells arise from within old cells or that cells formed spontaneously from non-cellular material. However it was several more years until cell division as the origin of all new cells became the accepted theory.
1833	Nucleus first observed Robert Brown, an English botanist, was the first to describe the nucleus of a plant cell.
1837-1838	The birth of a universal cell theory Matthias Schleiden, a German biologist, proposed that all plant tissues are composed of cells. Jan Purkiné, a Czech scientist, was the first to use a microtome to make ultra-thin slices of tissue for microscopic examination. Based on his observations, he proposed that not only are animals composed of cells but also that the 'basic cellular tissue is clearly analogous to that of plants'. Not long after this, and independently, Theodor Schwann, a German physiologist, made a similar observation and declared that "all living things are composed of cells and cell products". He is the scientist credited with the 'birth' of cell theory.
1844 [1855]	Evidence for the origin of new animal cells Robert Brown, a Polish-German biologist, was the first to observe cell division in animal cells, disproving the existing theory that new cells arise from within old cells. He was not believed at the time however, and Rudolf Virchow, a German biologist, published these findings as his own a decade later in 1855.
1860	Spontaneous generation disproved Louis Pasteur disproved the theory of spontaneous generation of cells by demonstrating that bacteria would only grow in a sterile nutrient broth after it had been exposed to the air.

Resources you will be given

OCR Biology A Specification: <http://www.ocr.org.uk/qualifications/as-a-level-gce/as-a-level-gce-biology-a-h020-h420-from-2015/>

Textbook: A level Biology for OCR (Ann Fullick)

Resources that may be useful

Revision Guide: OCR A Year 1 & 2 Complete Revision and Practice (CGP)

Maths Revision Guide: Essential Maths Skills for A-Level Biology (CGP)

Practical Skills: Practical Biology A and B (Richard Fosbery)

Biological Sciences Review

Maths for Biologists: <http://www.ocr.org.uk/qualifications/by-subject/biology-related/maths-for-biology/>

<https://www.khanacademy.org/science/biology>