

## Biology S2/3 Elective Course

### Course Content

This is a two year course which will be taught in 8 Units - four in S2 and four in S3. As well as developing your knowledge and understanding of the living world, you will work on a series of problem solving skills.

The 8 units are



#### **Ecosystems**

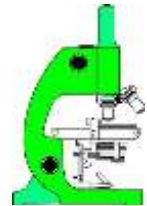
This unit looks at the relationships between living things in their ecosystems. It covers techniques used to estimate the populations of species in an area and measure factors that may affect their distribution. You will learn

how the Earth is divided into different regions called Biomes and how plants and animals have adapted to inhabit all areas of our amazing planet.

**Lessons cover:** Food Chains. Food webs. Measuring abiotic factors such as light, moisture, pH. Sampling techniques. Biomes project. Animal and Plant Adaptations. Calculating Averages. Drawing line graphs.

#### **Cells ( part 1)**

Cells are the basic units of life. In this unit you will build on your knowledge of cell structure from the S1 Cells to Systems unit.



**Lessons cover:** Using microscopes to see cells parts. Experiments investigating diffusion. Cell Growth. Digital tools to create animation of cell processes. Abnormal growth of cancer cells. Research into NHS screening programme. Drawing line graphs and bar graphs.

#### **Species Survival**



In this unit you will learn how animals reproduce asexually and sexually. Stages of the developing baby in humans is covered and compared to the reproduction methods of other species. You will also learn about the effect of different types of behaviour on an animal's survival chances.

**Lessons cover:** Human Reproductive systems. Growth and development of a baby. Behaviour and Survival. Drawing a line graph. Calculating percentages.

## Plants

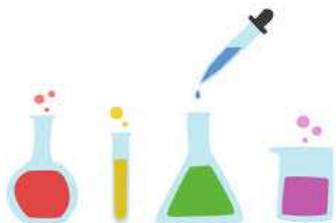
Without plants life on Earth would cease to exist. This unit introduces the vital role that plants play in recycling carbon dioxide and making oxygen and food. Plants achieve this using the biochemical reaction of photosynthesis and have leaves which are specially adapted to carry it out.



**Lessons cover:** Photosynthesis. Leaf Structure. Seed Germination Investigation. Plant reproduction by asexual methods. Drawing a line graph. Calculating Average. Calculating percentage change.

## Cells ( part 2)

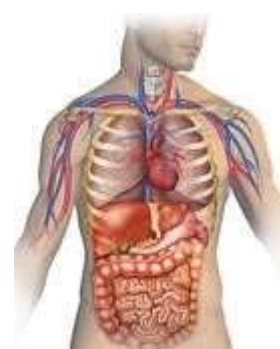
The biochemistry of cells is introduced when we look at enzymes and their essential role in speeding up chemical reactions that take place in cells. We also learn about the crucial reaction that keeps all living cells alive - respiration.



**Lessons cover:** : Experiments investigating enzyme action. Practical work is used to look at Respiration - aerobic and fermentation.

## Body Systems

Time for some human physiology. The unit is divided into two sections - muscles and homeostasis. In the first half, you will find out about the muscles attached to your skeleton, the muscles that make blood flow round your body ie your heart and the muscles in the breathing system. Maintaining constant conditions inside your body is vital for survival, this is called homeostasis. Many systems work together to achieve this. You will study the systems that keep glucose and water levels in the blood constant. You will apply the knowledge you have learned about the kidneys in the important task of analysing urine samples to make a diagnoses of patients' health.



**Lessons cover:** Skeleton. Heart and circulation. Lungs. Blood glucose regulation. Osmoregulation. Drawing a line graph. Drawing a bar graph. Calculating Average. Calculating percentage change. Calculating a ratio.

## Genetics



In this unit you will find out about ways that individuals in a species differ from each other. The genetic basis of some of these differences will be revealed. By performing lots of genetic crosses you will see the patterns of inheritance and allow you to understand family trees. A simple version of gel electrophoresis will introduce you to DNA profiling - a technique used in forensic science.

**Lessons cover:** Variation in species. DNA profiling. Genetic Inheritance. Sex determination. Drawing a bar graph. Calculating Average. Calculating percentage. Calculating a ratio. Research Project.

## Biotechnology



For many years humans have exploited Biology for commercial purposes. You will find out about the variety of industries that rely on microbes some are long established like brewing and cheese making; some are more modern for example genetic engineering.

**Lessons cover:** Using Enzymes in Industry. using Microbes in Industry. Genetic Engineering. Stem Cell Technology. Variety of Problem Solving Skills.

**Teaching Methods** A 'Curriculum For Excellence' approach is used throughout the course. Pupils will learn by discovery, work individually or in small groups, plan investigations, and draw conclusions from results. Learning resources will be delivered via the One Note app on iPad and will include use of a variety of digital learning tools. Pupils will be given opportunities to acquire independent study skills which should help with their studies in the Senior Phase.

**Homework Policy** There will be a variety of Homework tasks in each unit, including tasks to consolidate classwork, research assignments and revision. Homework may be on One Note pages, in Microsoft forms or other digital formats.

**Assessment** Presentations/ posters/ leaflets may be assessed during the units.

At the end of most units there is a written test. The questions will test a mixture of Knowledge and Understanding and Problem Solving skills. Test Practice Questions will be used in class and will be available in the Class Notebook in One Note.

**Progression into the Senior Phase** The S2/3 Biology Course will help you progress into the Biology Course at National 4 & 5 Levels. From there you can proceed to Higher Biology or Human Biology. The S2/3 Biology course will also be useful for progression into Chemistry, Physics National 4 or 5 level or into Science at National 4 level.