

## Subject Vision

The study of Biology plays a key role in ensuring our young people leave school being able to confidently lead healthy, purposeful lives and make rational, sound and well-informed decisions about their own health and bodies as well as the world around them. Biology is necessary for students so that they can engage with conclusions and developments presented to them through media and in their workplace, evaluate their validity and importance and base their beliefs and thinking around a sound understanding and appreciation of the subject. The study of Biology should develop analytical skills that make students valuable members of society, willing to ask challenging questions of the systems around them and of themselves.

## End Points: by the end of year 11 students will

**EP1. Demonstrate a deep understanding of science and how it relates to the world around us.**

**EP2. Conduct practical science safely and accurately**

**EP3. Visualise physical, chemical and biological processes**

**EP4. Solve problems, communicate ideas, Enquire and Analyse information**

**EP5. Numeracy and manipulation of mathematical equations**

## Subject Domains of Knowledge

- D1. Cells
- D2. Organisation
- D3. Disease and Pathogens
- D4. Homeostasis
- D5. Genetics
- D6. Bioenergetics
- D7. Biodiversity
- D8. How Science works

## Subject Key Concepts

- C1. Cell structure and function
- C2. Cell transportation
- C3. Cell division
- C4. Levels of organisation
- C5. Human systems structure and function
- C6. Enzymes
- C7. Plant transport systems

- C8. Communicable and non-communicable disease
- C9. Acquired and innate immunity
- C10. Drug development and resistance
- C11. Plant disease
  
- C12. Nervous system
- C13. Endocrine system
- C14. Negative feedback
- C15. Thermo, osmo and glucose regulation
- C16. Promoting and inhibiting fertility
  
- C17. Genetic and inherited variation
- C18. Patterns of inheritance
- C19. Evolution, adaptation and classification
  
- C20. Photosynthesis
- C21. Respiration
- C22. Metabolism
  
- C23. Ecosystems and interdependence
- C24. Climate change
- C25. The role of decay
- C26. Feeding relationships
- C27. Food production
  
- C28. Microscopy
- C29. Accurate collection of data, recording and analysis
- C.30 Interpretation of numerical and graphical data
- C.31 General numeracy

## Medium Term Curriculum Plan Y7

### Year 7: Biology

Units	Unit 1 Genes	
Unit Sections	Human Reproduction	
Unit Overview	<p>In this unit, students will learn about the male and female reproductive system, the stages of development of the foetus and the role of the menstrual cycle in fertility. Students will also learn about how the lifestyle choice of a pregnant woman can have an impact on the growth and development of the unborn foetus.</p>	
Lesson Sequence	<ol style="list-style-type: none"> <li>1. <b>Reproductive organs</b> - In this lesson students will learn about the structure and function of a male female reproductive systems</li> <li>2. <b>Fertilisation</b> - In this lesson students will learn what will happen during fertilisation of an egg cell</li> <li>3. <b>The menstrual cycle</b> - In this lesson students will learn about the different stages of the menstrual cycle</li> <li>4. <b>Pregnancy</b> - can this lesson the students will learn about the different stages of pregnancy</li> <li>5. <b>Protecting a baby</b> - In this lesson students will learn about the different substances that can pass between the Mother and foetus and how it's important to protect the baby in the womb</li> <li>6. <b>IVF and infertility</b> - In this lesson students will learn about the different reasons for infertility</li> </ol>	1.

	and how IVF is used to help couples have a baby.	
<b>Key Domains and Concepts taught in this Unit / Term</b>	D1. Cells D2. Organisation D3. Disease and Pathogens D5. Genetics C1. Cell structure and function C3. Cell division C5. Human systems structure and function C16. Promoting and inhibiting fertility C17. Genetic and inherited variation C18. Patterns of inheritance C21. Respiration C29. Accurate collection of data, recording and analysis	
<b>KS4 End Points</b>	<b>EP1. Demonstrate a deep understanding of science and how it relates to the world around us.</b> <b>EP3. Visualise physical, chemical and biological processes</b> <b>EP4. Solve problems, communicate ideas, Enquire and Analyse information</b>	
<b>Declarative Knowledge (Students should know)</b>	<p>The menstrual cycle prepares the female for pregnancy and stops if the egg is fertilised by a sperm.</p> <p>The developing foetus relies on the mother to provide it with oxygen and nutrients, to remove waste and protect it against harmful substances.</p> <p>The menstrual cycle lasts approximately 28 days. If an egg is fertilised, it settles into the uterus lining.</p>	

	<p>The effect of cigarettes, alcohol, or drugs on the developing foetus</p>	
<p><b>Procedural Knowledge (Students should be able to)</b></p>	<p>Explain whether substances are passed from the mother to the foetus or not.</p> <p>Use a diagram to show stages in development of a foetus from the production of sex cells to birth.</p> <p>Describe causes of low fertility in male and female reproductive systems.</p> <p>EXTEND- Identify key events on a diagram of the menstrual cycle</p> <p>EXTEND- Explain why pregnancy is more or less likely at certain stages of the menstrual cycle.</p> <p>EXTEND- Make deductions about how contraception and fertility treatments work.</p> <p>HOW SCIENCE WORKS - Relate advice to pregnant women to ideas about transfer of substances to the embryo enabling students to communicate ideas, construct explanations, critique claims justify opinions, examine consequences, review theories and Interrogate sources</p>	

Developing T3  
Literacy and  
Numeracy

**Use the following Keywords correctly:**

**Gamete:** The male gamete (sex cell) in animals is a sperm, the female an egg.

**Fertilisation:** Joining of a nucleus from a male and female sex cell.

**Ovary:** Organ which contains eggs. **Testicle:** Organ where sperm are produced.

**Oviduct,** or fallopian tube: Carries an egg from the ovary to the uterus and is where fertilisation occurs.

**Uterus, or womb:** Where a baby develops in a pregnant woman.

**Ovulation:** Release of an egg cell during the menstrual cycle, which may be met by a sperm.

**Menstruation:** Loss of the lining of the uterus during the menstrual cycle.

**Reproductive system:** All the male and female organs involved in reproduction.

**Penis:** Organ which carries sperm out of the male's body.

**Vagina:** Where the penis enters the female's body and sperm is received.

**Foetus:** The developing baby during pregnancy.

	<p><b>Gestation:</b> Process where the baby develops during pregnancy.</p> <p><b>Placenta:</b> Organ that provides the foetus with oxygen and nutrients and removes waste substances.</p> <p><b>Amniotic fluid:</b> Liquid that surrounds and protects the foetus.</p> <p><b>Umbilical cord:</b> Connects the foetus to the placenta.</p>	
<p><b>Assessment</b></p> <p><b>Summative and Formative</b></p>	<p>Formative – questioning in class, live marking and MS Forms online homework</p> <p>Summative – End of unit test</p>	
<p><b>Links to Prior Learning</b></p>	<p>KS2 Science notice that animals, including humans, have offspring which grow into adults</p>	
<p><b>Next steps in learning</b></p>	<p>Yr7 Genes Variation Yr8 Genes Evolution and Inheritance</p>	
<p><b>Common Barriers to learning in this unit</b></p>	<p>Some students find the subject matter embarrassing and difficult to learn in a group environment</p>	

Units	Unit 2 Organisms	
Unit Section	2.1 Cells	2.2 Photosynthesis and Respiration
Unit Overview	In this unit, students will be able to identify different types of cells and know the functions of the different parts of a cell. They will also develop and understanding of how cells, tissues and organs support life in multicellular organisms	In this unit, students will learn the word and symbol equation for photosynthesis and respiration and describe the conditions required for photosynthesis. In terms of respiration, students will learn about the role of this process in metabolism and exercise
Lesson Sequence	<ol style="list-style-type: none"> <li><b>Cells</b> – In this lesson students will learn what cells are and the similarities and differences between plant and animal cells</li> <li><b>Microscopes</b> – In this lesson students will learn how to set up and use a light microscope to look at cell specimens</li> <li><b>Specialised cells</b> – In this lesson students will learn about the importance of a range of specialised cells and how they are adapted for a specific function</li> <li><b>The heart as an organ</b> – In this lesson students will learn about the different tissues of the heart and its role as a pump in multicellular organisms</li> <li><b>Cell transport</b> – In this lesson students will learn how water and other substance can move into and out of cells</li> </ol>	<ol style="list-style-type: none"> <li><b>Photosynthesis basics</b> – In this lesson students will link plant cell structure to the process of photosynthesis</li> <li><b>Leaf structure</b> – In this lesson, students will understand how structures in the leaf allow for efficient photosynthesis</li> <li><b>Photosynthesis experiment</b> – In this lesson, students will investigate the effect of limiting factors on rate of photosynthesis</li> <li><b>Respiration basics</b> – In this lesson students will learn about the importance of respiration and where it occurs in the cell</li> <li><b>Metabolism</b> – In this lesson students will learn what metabolism is and why respiration is important in these processes</li> <li><b>Exercise</b> – In this lesson students will make links between the process of respiration and the effect of exercise on the body.</li> </ol>
Key Domains and Concepts taught in this Unit / Term	D1. Cells D2. Organisation D5. Genetics D8. How Science works C1. Cell structure and function C4. Levels of organisation C5. Human systems structure and function	D1. Cells D2. Organisation D6. Bioenergetics C1. Cell structure and function C4. Levels of organisation C20. Photosynthesis C21. Respiration



	<p>C7. Plant transport systems            C12. Nervous system            C17. Genetic and inherited variation            C18. Patterns of inheritance            C19. Evolution, adaptation and classification            C20. Photosynthesis            C21. Respiration            C28. Microscopy            C29. Accurate collection of data, recording and analysis            C.30 Interpretation of numerical and graphical data            C.31 General numeracy</p>	
<p><b>KS4 End Points</b></p>	<p><b>EP1. Demonstrate a deep understanding of science and how it relates to the world around us.</b>  <b>EP2. Conduct practical science safely and accurately</b>  <b>EP3. Visualise physical, chemical and biological processes</b>  <b>EP4. Solve problems, communicate ideas, Enquire and Analyse information</b>  <b>EP5. Numeracy and manipulation of mathematical equations</b></p>	<p><b>EP1. Demonstrate a deep understanding of science and how it relates to the world around us.</b>  <b>EP2. Conduct practical science safely and accurately</b>  <b>EP3. Visualise physical, chemical and biological processes</b>  <b>EP4. Solve problems, communicate ideas, Enquire and Analyse information</b></p>
<p><b>Declarative Knowledge (Students should know)</b></p>	<p>Multicellular organisms are composed of cells which are organised into tissues, organs, and systems to carry out life processes.</p> <p>There are many types of cell. Each has a different structure or feature so it can do a specific job.</p> <p>Both plant and animal cells have a cell membrane, nucleus, cytoplasm and mitochondria.</p>	<p>Plants and algae do not eat, but use energy from light, together with carbon dioxide and water to make glucose (food) through photosynthesis. They either use the glucose as an energy source, to build new tissue, or store it for later use. Plants have specially-adapted organs that allow them to obtain resources needed for photosynthesis.</p> <p>Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Most living things use aerobic respiration but</p>

	<p>Plant cells also have a cell wall, chloroplasts and usually a permanent vacuole</p>	<p>switch to anaerobic respiration, which provides less energy, when oxygen is unavailable.</p>
<p><b>Procedural Knowledge (Students should be able to)</b></p>	<p>Use a light microscope to observe and draw cells.</p> <p>Use a scale to calculate the size of a cell.</p> <p>Explain why multi-cellular organisms need organ systems to keep their cells alive.</p> <p>Suggest what kind of tissue or organism a cell is part of, based on its features.</p> <p>Explain how to use a microscope to identify and compare different types of cells.</p> <p>Explain how unicellular organisms are adapted to carry out functions that in multi-cellular organisms are done by different types of cell.</p> <p>EXTEND - Make deductions about how medical treatments work based on cells, tissues, organs and systems.</p> <p>EXTEND - Suggest how damage to, or failure of, an organ would affect other body systems.</p> <p>EXTEND - Deduce general patterns about how the structure of different cells is related to their function.</p> <p>EXTEND - Find out how recreational drugs might affect different body systems.</p>	<p>Describe ways in which plants obtain resources for photosynthesis.</p> <p>Explain why other organisms are dependent on photosynthesis.</p> <p>Sketch a line graph to show how the rate of photosynthesis is affected by changing conditions.</p> <p>Use a word equation to describe photosynthesis in plants and algae.</p> <p>Use word equations to describe aerobic and anaerobic respiration.</p> <p>Explain how specific activities involve aerobic or anaerobic respiration</p>

	<p>How Science Works -Identify the principal features of a cheek cell and describe their functions enabling students to Communicate ideas and Construct explanations</p>	
<p>Developing T3 Literacy and Numeracy</p>	<p><b><u>Use the following Keywords correctly:</u></b></p> <p><b>Cell:</b> The unit of a living organism, contains parts to carry out life processes.</p> <p><b>Uni-cellular:</b> Living things made up of one cell. Multi-cellular: Living things made up of many types of cells.</p> <p><b>Tissue:</b> Group of cells of one type.</p> <p><b>Organ:</b> Group of different tissues working together to carry out a job.</p> <p><b>Diffusion:</b> One way for substances to move into and out of cells.</p> <p><b>Structural adaptations:</b> Special features to help a cell carry out its functions.</p> <p><b>Cell membrane:</b> Surrounds the cell and controls movement of substances in and out.</p> <p><b>Nucleus:</b> Contains genetic material (DNA) which controls the cell's activities.</p>	<p><b><u>Use the following Keywords correctly:</u></b></p> <p><b>Fertilisers:</b> Chemicals containing minerals that plants need to build new tissues.</p> <p><b>Photosynthesis:</b> A process where plants and algae turn carbon dioxide and water into glucose and release oxygen.</p> <p><b>Chlorophyll:</b> Green pigment in plants and algae which absorbs light energy.</p> <p><b>Stomata:</b> Pores in the bottom of a leaf which open and close to let gases in and out.</p> <p><b>Aerobic respiration:</b> Breaking down glucose with oxygen to release energy and producing carbon dioxide and water.</p> <p><b>Anaerobic respiration (fermentation):</b> Releasing energy from the breakdown of glucose without oxygen, producing lactic acid (in animals) and ethanol and carbon dioxide (in plants and microorganisms).</p>

	<p><b>Vacuole:</b> Area in a cell that contains liquid and can be used by plants to keep the cell rigid and store substances.</p> <p><b>Mitochondria:</b> Part of the cell where energy is released from food molecules.</p> <p><b>Cell wall:</b> Strengthens the cell. In plant cells it is made of cellulose.</p> <p><b><u>Numeracy</u></b></p> <p>Use a scale to calculate the size of a cell.</p>	
<b>Assessment</b>	Formative – questioning in class, live marking and MS Forms online homework	Formative – questioning in class, live marking and MS Forms online homework
<b>Summative and Formative</b>	Summative – End of unit test	Summative – End of unit test
<b>Links to Prior Learning</b>	KS2 Science find out about and describe the basic needs of animals, including humans, for survival (water, food and air)	KS2 Science find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
<b>Next steps in learning</b>	Yr 7 Communication Systems Yr8 Organisms Breathing and Digestion	Yr 7 Communication Systems Yr8 Organisms Breathing and Digestion
<b>Common Barriers to learning in this unit</b>	None	None

Units	Unit 3 Ecosystems 1	
Unit Section	<b>3.1 Interdependence</b>	<b>3.2 Microbes and Disease</b>
Unit Overview	In this unit, students will be able to construct and analyse food chains and webs, predicting the effects of changing populations within the food webs and the impact of environmental factors.	In this unit, students will learn the features of bacterial cells as well as the basic features of viruses, fungi and protists. Students will learn what our bodies do to naturally fight disease as well as learn about various biological technologies humans have developed to further fight disease
Lesson Sequence	<ol style="list-style-type: none"> <li><b>What eats what?</b> - In this lessons James will learn how to construct a labeled food chain correctly</li> <li><b>Food webs</b> - In this lesson students will learn how to interlink through chains to make food webs for different habitats</li> <li><b>Changes to food webs</b> - In this lesson students will learn how a change in the numbers of one organism in a food web affects other organisms</li> <li><b>Interdependence</b> – In this lesson student will learn how organisms may be affected by their environment and other organisms within that environment</li> <li><b>Pollination and food security</b> – In this lesson students will learn how pollinators are essential for sustaining life on Earth.</li> </ol>	<ol style="list-style-type: none"> <li><b>Microbes</b> - In this lesson students will learn about four different types of microbes</li> <li><b>Researching disease</b> - In this lesson students will learn about different human and plant diseases</li> <li><b>Investigating bacterial growth (optional)</b> - In this lesson students will learn how to carry out an investigation into bacterial growth</li> <li><b>Fighting infection</b> - In this lesson students will learn how the body naturally fights disease and prevents infection</li> <li><b>Antibiotics</b> – In this lesson students will learn how antibiotics can be used to fight bacterial infections</li> <li><b>Vaccinations</b> - in this lesson students will learn how vaccinations work and why they are important in controlling infections</li> <li><b>Useful microorganisms (optional)</b> - In this lesson students will learn how microorganisms can be used for our own benefit</li> </ol>
Key Domains and Concepts taught in this Unit / Term	D7. Biodiversity D8. How Science works  C4. Levels of organisation	D1. Cells D3. Disease and Pathogens D5. Genetics D8. How Science works

	<p>C5. Human systems structure and function C6. Enzymes C7. Plant transport systems</p> <p>C17. Genetic and inherited variation C18. Patterns of inheritance C19. Evolution, adaptation and classification</p> <p>C23. Ecosystems and interdependence C26. Feeding relationships C27. Food production</p> <p>C29. Accurate collection of data, recording and analysis</p>	<p>C1. Cell structure and function C3. Cell division</p> <p>C8. Communicable and non-communicable disease C9. Acquired and innate immunity C10. Drug development and resistance</p>
<p><b>KS4 End Points</b></p>	<p><b>EP1. Demonstrate a deep understanding of science and how it relates to the world around us.</b> <b>EP2. Conduct practical science safely and accurately</b> <b>EP3. Visualise physical, chemical and biological processes</b> <b>EP4. Solve problems, communicate ideas, Enquire and Analyse information</b> <b>EP5. Numeracy and manipulation of mathematical equations</b></p>	<p><b>EP1. Demonstrate a deep understanding of science and how it relates to the world around us.</b> <b>EP2. Conduct practical science safely and accurately</b> <b>EP3. Visualise physical, chemical and biological processes</b> <b>EP4. Solve problems, communicate ideas, Enquire and Analyse information</b> <b>EP5. Numeracy and manipulation of mathematical equations</b></p>
<p><b>Declarative Knowledge (Students should know)</b></p>	<p><b>Organisms in a food web (decomposers, producers and consumers) depend on each other for nutrients. So, a change in one population leads to changes in others</b></p> <p><b>The population of a species is affected by the number of its predators and prey, disease,</b></p>	<p><b>The names of the four types of pathogens - Fungi, Bacteria, Viruses, Protists</b> <b>How the features of the four types of pathogens are linked to how they cause disease.</b> <b>The role of white blood cells in fighting disease</b> <b>How vaccinations work</b></p>

	<p><b>pollution and competition between individuals for limited resources such as water and nutrients.</b></p> <p><b>Insects are needed to pollinate food crops</b></p>	
<p><b>Procedural Knowledge (Students should be able to)</b></p>	<p><b>Describe how a species' population changes as its predator or prey population changes.</b></p> <p><b>Explain effects of environmental changes and toxic materials on a species' population.</b></p> <p><b>Combine food chains to form a food web. Explain issues with human food supplies in terms of insect pollinators</b></p> <p><b>HOW SCIENCE WORKS: Use a model to investigate the impact of changes in a population of one organism on others in the ecosystem</b></p>	<p><b>Draw diagrams to model the four types of disease</b></p> <p><b>Explain how antibiotics work</b></p> <p><b>Describe the risks associated with antibiotic resistance.</b></p> <p><b>Discuss why some people are against vaccinations describe the symptoms, mode of transmission and treatment of 5 diseases.</b></p> <p><b>HSW Investigate bacterial growth</b></p>
<p><b>Developing T3 Literacy and Numeracy</b></p>	<p><b><u>Use the following Keywords correctly:</u></b></p> <p><b>Food web:</b> Shows how food chains in an ecosystem are linked.</p> <p><b>Food chain:</b> Part of a food web, starting with a producer, ending with a top predator.</p> <p><b>Ecosystem:</b> The living things in a given area and their non-living environment.</p> <p><b>Environment:</b> The surrounding air, water and soil where an organism lives.</p> <p><b>Population:</b> Group of the same species living in an area.</p> <p><b>Producer:</b> Green plant or algae that makes its own food using sunlight.</p>	<p><b>Antibodies:</b> chemicals produced by some white blood cells to attach pathogens</p> <p><b>Antigens:</b> markers on the surface of a pathogen that the antibodies recognise and attack</p> <p><b>Antibiotics:</b> medicines which are used to treat bacterial infections</p> <p><b>Immunity:</b> when your body can fight an infection quickly so you don't develop symptoms</p> <p><b>Antibiotic resistance:</b> when bacteria adapt and are no longer affected by antibiotics</p>

	<p><b>Consumer:</b> Animal that eats other animals or plants.  <b>Decomposer:</b> Organism that breaks down dead plant and animal material so nutrients can be recycled back to the soil or water.</p>	<p><b>Vaccination:</b> an injection which helps you develop immunity to a disease</p> <p><b>Anaerobic respiration:</b> respiration without oxygen</p> <p><b>Genetic engineering:</b> changing the genes of an organism to give it different characteristics</p>
<p><b>Assessment</b></p> <p><b>Summative and Formative</b></p>	<p>Formative – questioning in class, live marking and MS Forms online homework</p> <p>Summative – End of unit test</p>	<p>Formative – questioning in class, live marking and MS Forms online homework</p> <p>Summative – End of unit test</p>
<p><b>Links to Prior Learning</b></p>	<p>KS2 Science notice that animals, including humans, have offspring which grow into adults</p>	<p>Year 7 cells and cell structure</p>
<p><b>Next steps in learning</b></p>	<p>At GCSE, students will learn about ecology and deepen their understanding of interdependence.</p>	<p>At GCSE students learn in more detail about pathogens and the body's response to infection</p>
<p><b>Common Barriers to learning in this unit</b></p>	<p>C19 Missed KS2 content</p>	<p>Some students may hold misconceptions regarding vaccinations Unfamiliar vocab</p>