



## Respiration and Photosynthesis

### **KS3 Curriculum Intent:**

This unit Respiration and Photosynthesis includes aerobic and anaerobic respiration and photosynthesis  
The unit seeks to give learners the knowledge they need to pursue further study and understanding at KS4

### **Sequence 1: Respiration**

**Aerobic respiration:** To investigate aerobic respiration. To produce a word equation for the process.

**Anaerobic respiration:** To describe what is meant by anaerobic respiration. To compare aerobic and anaerobic respiration. To explain what is meant by the oxygen debt

**Anaerobic respiration in other organisms:** To investigate anaerobic in yeast and some uses

#### **Checkpoint**

**Assessment:** low stakes testing, homework (google form), marking of checkpoint.

### **Sequence 2: Photosynthesis**

**Photosynthesis:** To know the word equation for photosynthesis. To know where photosynthesis takes place.

**Investigating stomata:** To investigate the distribution of stomata. To know the stomata are open and closed by guard cells.

**Looking at leaves:** To describe how the tissues in leaves are adapted for photosynthesis

**Testing a leaf for starch:** To describe how to test a leaf for starch. To know plants, convert some glucose into starch for storage.

**Investigating photosynthesis :** To identify the factors which can affect photosynthesis.

**In-depth assessment-** Photosynthesis 6 mark question/ leaf adaptation

**Plant minerals:** To know the different minerals needed for healthy plant growth.

**Assessment-** low stakes testing. Homework (google form), marking on 6 mark question. EOU assessment

### **Big picture**

This unit has a number of opportunities for practical work and the embedding of mathematic skills such as constructing graphs from primary and secondary data, calculating a mean.

This unit builds on basic knowledge from KS1 and KS2 whereby students are introduced to cells and plants

The unit develops further understanding of the differences in aerobic and anaerobic, respiration in sport and fermentation and its uses. Exploring risks and control measures when investigating photosynthesis. , Interpreting data and predicting results of investigations.

### **Developing Cultural Capital:**

Learning about the respiration and photosynthesis provides opportunities for students to develop their self-knowledge, self-esteem and self-confidence through group and paired work and develop their knowledge of how scientists have shaped understanding of the world.

Students will have access to IT to research and further their understanding of respiration and photosynthesis

### **Reinforcement and retrieval practice**

- All learning sequences are consolidated through homework, which is reviewed in the next sequence to Space Learning.
- 'Memory joggers' are formally completed as the Do Now, these will be evidenced in the students' books.
- AfL is used regularly to evidence gaps in knowledge and inform planning so that learning is consolidated before being moved on.
- Regular questioning is embedded in all lessons and should be a key feature on learning walks.
- Checkpoints/ DIRT tasks are built in at strategic points in the topic- so misconceptions can be addressed, and key ideas revisited.
- End of unit assessment will be cumulative involving questions from previous units.

### **Progression Model:**

- Students will build on and develop practical skills within this topic that will link into further units within science as well as an understanding of the fundamental building block of Biology that allow the higher-level learning to occur later in the GCSE
- The learning will be revisited throughout the KS3 curriculum and KS4 course through cumulative assessments and memory joggers.
- Also, their metacognitive skills will improve as they use self-assessment, low stakes testing, memory joggers and responding to teacher's feedback to take control of their own learning



# Chemical reactions

## KS3 Curriculum Intent:

This unit types of reactions and chemical energy includes what is meant by a chemical reaction, signs of chemical reactions, speeding up chemical reactions. catalysts and reaction energy, combustion and thermal decomposition and conservation of mass.

The unit seeks to give learners the knowledge they need to pursue further study and understanding at KS4

## Sequence 1: Chemical reactions

**What is a chemical reaction:** To identify that a chemical reaction has taken place To define a chemical reaction.

**Elements, mixtures and compounds (Recap):** Recall from year 7 elements, mixtures and compounds.

**Naming word equations (recap):** Recall how to name compounds and write word equations

**Conservation of mass:** To state the law of conservation of mass To observe and explain mass changes that occur in chemical reactions.

**Balancing equations:** To use knowledge of formula to balance equations.

### **Checkpoint**

**Assessment: low stakes testing, homework (google form), marking of checkpoint.**

## Sequence 2: Reversible reactions

**Combustion:** To investigate some properties of fuels. To compare the effectiveness of two fuels. To produce a word equation for combustion

**Thermal decomposition:** To describe thermal decomposition. To investigate thermal decomposition in carbonates

**Endothermic and exothermic reactions:** To investigate endothermic and exothermic reactions. To interpret energy level diagrams

**Reversible reaction:** To investigate an example of a reversible reaction. To describe the energy changes in the reaction

**Making and breaking bonds:** To calculate simple bond energies

**Assessment- low stakes testing. Homework (google form) EOU assessment**

## Big picture

This unit has a number of opportunities for practical work and the embedding of mathematic skills such as how to present data , choose suitable range and interval of values in an investigation

This unit builds on basic knowledge from KS1 and KS2 whereby students are introduced to changes in chemical reactions, physical and chemical changes and burning

The topic develops further understanding of how to carry out a fair test ,write and carry out risk assessments analyse and make conclusions ,comparing exothermic and endothermic reactions and interpreting energy level diagrams ,recognizing the signs of a chemical reaction ,investigating how to speed up a reaction including use of a catalyst, investigating combustion and thermal decomposition and the law of conservation of mass.

## Developing Cultural Capital:

Learning about chemical energy and types of reactions provides opportunities for students to develop their self-knowledge, self-esteem and self-confidence through group and paired work and develop their knowledge of how scientists have shaped understanding of the world.

Students will have access to IT to research and further their understanding of this topic

## Reinforcement and retrieval practice

- All learning sequences are consolidated through homework, which is reviewed in the next sequence to Space Learning.
- 'Memory joggers' are formally completed as the Do Now, these will be evidenced in the students' books.
- AfL is used regularly to evidence gaps in knowledge and inform planning so that learning is consolidated before being moved on.
- Regular questioning is embedded in all lessons and should be a key feature on learning walks.
- Checkpoints/ DIRT tasks are built in at strategic points in the topic- so misconceptions can be addressed, and key ideas revisited.
- End of unit assessment will be cumulative involving questions from previous units.

## Progression Model:

- Students will build on and develop practical skills within this topic that will link into further units within science as well as an understanding of the fundamental building block of Chemistry that allow the higher-level learning to occur later in the GCSE
- The learning will be revisited throughout the KS3 curriculum and KS4 course through cumulative assessments and memory joggers.
- Also, their metacognitive skills will improve as they use self-assessment, low stakes testing, memory joggers and responding to teacher's feedback to take control of their own learning



## Contact forces and pressure

### **KS3 Curriculum Intent:**

This unit Contact and Pressure forces includes, contact and non-contact forces and their effects on objects, forces associated with rubbing and friction, resistance to motion of air and water, Hooke's law and pressure in solids and gases

The unit seeks to give learners the knowledge they need to pursue further study and understanding at KS4

### **Sequence 1: Forces**

**Contact and non-contact forces:** To revisit various forces. To categorize forces as contact and non-contact forces.

**Resultant forces:** To calculate resultant force

**Friction and drag:** To know how friction can be useful. To know how friction can be reduced

**Air resistance and streamlining:** To know the factors affecting air resistance. To discuss streamlining.

**Squashing and stretching:** To investigate Hooke's law

**Moments:** To calculate moments

#### **Checkpoint**

**Assessment:** low stakes testing, homework (google form), marking of checkpoint.

### **Sequence 2: Pressure**

**Pressure in gases:** To describe the motion of particles in a gas. To know what causes gas pressure.

**Pressure in liquids:** To identify the factors that affect pressure in liquids.

**Pressure in solids:** To calculate pressure from a given equation.

**Assessment-** low stakes testing. Homework (google form) EOU assessment

### **Big picture**

This unit has a number of opportunities for practical work and the embedding of mathematic skills such as calculating area, interpreting and drawing graphs calculating resultant forces.

This unit builds on basic knowledge from KS1 and KS2 whereby students are introduced to the idea of forces and their effects

The topic develops further understanding of what forces do and how we measure them and their effects and how to calculate the effects of forces on objects.

### **Developing Cultural Capital:**

Learning about contact and pressure forces can be applied to everyday situations, collecting data and using it to find patterns will improve our understanding of the world. This topic will enable students to develop their self-knowledge, self-esteem and self-confidence through group and paired work

Students will have access to IT to research and further their understanding of forces

### **Reinforcement and retrieval practice**

- All learning sequences are consolidated through homework, which is reviewed in the next sequence to Space Learning.
- 'Memory joggers' are formally completed as the Do Now, these will be evidenced in the students' books.
- AfL is used regularly to evidence gaps in knowledge and inform planning so that learning is consolidated before being moved on.
- Regular questioning is embedded in all lessons and should be a key feature on learning walks.
- Checkpoints/ DIRT tasks are built in at strategic points in the topic- so misconceptions can be addressed, and key ideas revisited.
- End of unit assessment will be cumulative involving questions from previous units.

### **Progression Model:**

- Students will build on and develop practical skills within this topic that will link into further units within science as well as an understanding of the fundamental building block of Physics that allow the higher-level learning to occur later in the GCSE
- The learning will be revisited throughout the KS3 curriculum and KS4 course through cumulative assessments and memory joggers.
- Also, their metacognitive skills will improve as they use self-assessment, low stakes testing, memory joggers and responding to teacher's feedback to take control of their own learning



## Wave effects and properties

### **KS3 Curriculum Intent:**

This unit includes the effects of waves, waves, and energy, modelling waves and the electromagnetic spectrum.  
The unit seeks to give learners the knowledge they need to pursue further study and understanding at KS4

### **Sequence 1: Wave types**

**Wave's introduction:** To know waves transfers energy from one place to another. To know waves can be longitudinal or transverse. To label the parts of a transverse wave.

**Wave speed:** To understand what is meant by its frequency and wavelength. To use the wave equation to calculate their values.

**Longitudinal waves:** To know longitudinal waves vibrate in the direction in which they are travelling. To label parts of a longitudinal wave.

**Ultrasound:** To know humans can hear sounds with a frequency between 20–20000Hz. To know ultrasound is any sound with a frequency of higher than 20000Hz. To give uses of ultrasound.

#### **Checkpoint**

**Assessment:** low stakes testing, homework (google form), marking of checkpoint.

### **Sequence 2: Electromagnetic waves**

**The Electromagnetic spectrum:** To identify the parts of the electromagnetic spectrum.

**Electromagnetic spectrum uses:** To research how waves in the electromagnetic spectrum can be useful / dangerous.

**Ionisation:** To know the higher the frequency of the wave, the higher the energy. To know high energy waves can lead to ionisation, which can damage/ destroy cells. The know ionising waves in the electromagnetic spectrum are gamma, X-rays and ultraviolet rays

**Assessment-** low stakes testing. Homework (google form) EOU assessment

### **Big picture**

This unit has several opportunities for practical work and the embedding of mathematic skills such as using and rearranging formula.

This unit builds on basic knowledge from KS1 and KS2 whereby students are introduced to how sound and light behave.

The topic develops further understanding properties of waves, wave speed, uses and dangers of the electromagnetic spectrum.

### **Developing Cultural Capital:**

Learning about wave effects and properties provides opportunities for students to develop their self-knowledge, self-esteem and self-confidence through group and paired work and develop their knowledge of how scientists have shaped understanding of the world.

### **Reinforcement and retrieval practice**

- All learning sequences are consolidated through homework, which is reviewed in the next sequence to Space Learning.
- 'Memory joggers' are formally completed as the Do Now, these will be evidenced in the students' books.
- AfL is used regularly to evidence gaps in knowledge and inform planning so that learning is consolidated before being moved on.
- Regular questioning is embedded in all lessons and should be a key feature on learning walks.
- Checkpoints/ DIRT tasks are built in at strategic points in the topic- so misconceptions can be addressed, and key ideas revisited.
- End of unit assessment will be cumulative involving questions from previous units.

### **Progression Model:**

- Students will build on and develop practical skills within this topic that will link into further units within science as well as an understanding of the fundamental building block of Physics that allow the higher-level learning to occur later in the GCSE
- The learning will be revisited throughout the KS3 curriculum and KS4 course through cumulative assessments and memory joggers.
- Also, their metacognitive skills will improve as they use self-assessment, low stakes testing, memory joggers and responding to teacher's feedback to take control of their own learning



## Earth climate and Earths resources (Year 9 covering this due to missing out on covid)

### **KS3 Curriculum Intent:**

This unit Earth's climate and Earths resources includes the carbon cycle, the changing earth how the atmosphere is changing and human activities that contribute to this, greenhouse gases and climate change, using and reusing the earth's resources

The unit seeks to give learners the knowledge they need to pursue further study and understanding at KS4

### **Sequence 1: The Earths atmosphere and climate change**

**The atmosphere:** To know the air around us all of the time is known as the atmosphere; it is made up of a mixture of gases. To know the approximate percentages of gases in today's atmosphere.

**The greenhouse effect:** To know gases in the atmosphere which absorb and trap this radiation are known as greenhouse gases, the most known greenhouse gases are carbon dioxide and methane.

**Global warming:** To know Global warming is the gradual increase in temperature of the Earth • This is closely linked to the rise in carbon dioxide levels in the atmosphere. To discuss the environmental impact of an increased Earth temperature.

**Climate change:** To discuss in more detail the impact of climate change and looks at ways we can help to prevent climate change by: • Using renewable energy resources • Using cars less • Buying and wasting less resources

**The carbon cycle:** To know the carbon cycle is the processes by which carbon is naturally transferred to different stores through a range of natural processes. To construct a diagram to show how carbon is recycled in the environment and through living things.

#### **Checkpoint**

**Assessment:** baseline (google form), low stakes testing, marking of checkpoint, homework (google form)

### **Sequence 2: Extracting metals and the importance of recycling**

**Extraction of metals:** To understand how to extract metals from their ores.

**Extraction of copper:** To extract copper from copper carbonate by electrolysis. To evaluate the methods of copper extraction

**Recycling:** To identify some materials that can be recycled. To describe the benefits and limitations of recycling

**Assessment-** Low stakes testing, Homework (google form) EOU assessment

### **Big picture**

This unit has several opportunities for practical work and the embedding of mathematic skills such as interpreting data.

This unit builds on basic knowledge from KS1 and KS2 whereby students are introduced to the changing earth, combustion reactions and earth's resources

The topic develops further understanding of how carbon is reused, how human activities limit or damage resources, the effect of greenhouse gases, how metals can be extracted, the benefits and limitations of recycling

### **Developing Cultural Capital:**

This topic provides opportunities for students to develop their self-knowledge, self-esteem and self-confidence through group and paired work and develop their knowledge of how scientists have shaped understanding of the world including the moral issues of energy use and emissions, environmental issues, and moral and social implications of climate change.

Students will have access to IT to research and further their understanding of this topic

### **Reinforcement and retrieval practice**

- All learning sequences are consolidated through homework, which is reviewed in the next sequence to Space Learning.
- 'Memory joggers' are formally completed as the Do Now, these will be evidenced in the students' books.
- AfL is used regularly to evidence gaps in knowledge and inform planning so that learning is consolidated before being moved on.
- Regular questioning is embedded in all lessons and should be a key feature on learning walks.
- Checkpoints/ DIRT tasks are built in at strategic points in the topic- so misconceptions can be addressed, and key ideas revisited.
- End of unit assessment will be cumulative involving questions from previous units.

### **Progression Model:**

- Students will build on and develop practical skills within this topic that will link into further units within science as well as an understanding of the fundamental building block of Chemistry that allow the higher-level learning to occur later in the GCSE
- The learning will be revisited throughout the KS3 curriculum and KS4 course through cumulative assessments and memory joggers.
- Also, their metacognitive skills will improve as they use self-assessment, low stakes testing, memory joggers and responding to teacher's feedback to take control of their own learning



## B1.1 Cell Biology

### Curriculum Intent:

- This unit covers cells, cell growth and transport in cells. These concepts are fundamental to an understanding of Biology and Health. The unit seeks to give learners the knowledge they need to persevere further study as well as understanding their own health and that of nature around them.

### Sequence 1: Cell structure and cell differentiation

**The world of the Microscope** - To understand the differences in magnification and resolution between a light microscope and electron microscope.

**Animal and plant cells** - To know the main parts and functions of animal and plant cells and describe the similarities and differences between plants and animal cells.

**Required practical 1** - Use a light microscope to observe, draw and label animal and plant cells. Include scale magnification

**Eukaryotic and prokaryotic cells** - To know the similarities and differences between eukaryotic and prokaryotic cells.

**Specialised cells** - To describe how the structure of specialised animal and plant cells relates to their function

#### **Checkpoint**

**Assessment:** low stakes testing, marking of checkpoint, homework (google form)

### Sequence 2: Cell division

**Cell division** - To know the role of chromosomes in cells, the importance of the cell cycle, as well as, how cells divide by mitosis

**Growth and differentiation** - To know how and why cells differentiate and the difference between stem cells and Meristems.

**Stem cells** - To be able to describe where animal and plant stem cells can be obtained.

**Stem cell dilemmas** To be able to evaluate the use of Stem cells and justify their use.(H)

**In-depth marking/ DIRT activity** and consolidation lesson

**Assessment:** low stakes testing, marking of 6-mark question, homework (google form)

### Sequence 3: Transport in cells

**Diffusion** - To know how diffusion takes place and why it is important in living organisms.

**Osmosis** - To describe why osmosis is so important in animal and plant cells.

**Required practical** – describe how to carry out RP2 and evaluate the findings

**Active Transport** - To be able to describe and explain the process of active transport

**Assessment-** Low stakes testing. Homework (google form) EOU assessment

### Big picture

- An understanding of cells forms the basis of Biology as well as understanding how our bodies and nature work.
- This unit has several opportunities for practical work as well as looking at ethical issues and debates that are currently present in the media.
- This unit builds on the basic knowledge of cells developed at KS3.
- The topic develops understanding beyond the simple model of a cell to a closer understanding of cells and their significance in Biology and Medicine.
- How well do our resources match the curriculum and units of work?
- Knowledge Organizers for this topic are to be used to encourage students to be able to understand and relate the often-abstract ideas within this unit together through simplifying and categorizing the knowledge logically.

### Developing Cultural Capital:

- An understanding of the ethical, social and economic issues that relate to the treatment of illness using stem cells is developed in this topic. Allowing students to develop their skills in rational debate and an understanding of different points of view and ideas.

### Reinforcement and retrieval practice

- All learning sequences are consolidated through homework, which is reviewed in the next sequence to space learning
- 'Memory joggers' are formally completed as the Do Now, these will be evidenced in the students' books.
- AfL is used regularly to evidence gaps in knowledge and inform planning so that learning is consolidated before being moved on.
- Regular questioning is embedded in all lessons and should be a key feature on learning walks.
- The required practical's will be in-depth marked. Students will act on feedback as part of their revision and preparation for assessment
- Checkpoints/ DIRT tasks are built in at strategic points in the topic- so misconceptions can be addressed, and key ideas revisited.

### Progression Model:

- Students will build on and develop practical skills within this topic that will link into further units within science as well as an understanding of the fundamental building block of Biology that allow the higher-level learning to occur later in the GCSE
- The learning will be revisited throughout the GCSE course through cumulative assessments and memory joggers.
- Also, their metacognitive skills will improve as they use KO, self-assessment, low stakes testing, memory joggers and responding to teacher's feedback to take control of their own learning



## B1.2 Organisation

### Curriculum Intent:

This unit covers organisation in animals and plants with specific focus on the human digestive and cardiovascular system. These concepts are fundamental to an understanding of Biology and Health. The unit seeks to give learners the knowledge they need to persevere further study as well as understanding their own health and that of nature around them.

### Sequence 1: Organisation and Digestion

**Organisation** - To be able to describe how living things are organised.

**The Human digestive system** - To know the position of the main organs of the human digestive system.

**[Required Practical] The chemistry of food** - To describe how to test for these foods

**Enzymes** – To describe and explain how enzymes speed up reactions

**[Required practical] Enzymes** – To investigate the effect of pH on amylase enzyme.

**Enzymes of the Digestive System** - Describe and explain how food nutrients are broken down into small molecules.

**Making digestion efficient** - Describe the roles of hydrochloric acid and the bile in making digestion more efficient.

**Assessment-** low stakes testing, homework (google form)

### Sequence 2: Cardiovascular System

**Blood components** – To describe the components of the blood and explain their function.

**Structure and function of the heart** – To describe the structure of the heart.

**Circulation** – To explain the direction blood flows through the double circulation

**Blood vessels** – To describe the structure and function of arteries, veins and capillaries

**Heart problems and treatment** – To describe how the heart keeps its natural rhythm.

**Breathing and gas exchange** – To describe the structure and functions of the lungs

**Assessment:** low stakes testing, marking of 6-mark question, homework (google form)

### Sequence 3: Non-communicable Diseases

**Health issues** - describe factors that can lead to increased risk of ill health.

**Non-communicable disease** - describe and explain factors that affect the risk of tumours.

**Smoking and the risk of disease** - know how smoking affects the risk of developing cardiovascular disease

**Diet, exercise and disease** - Explore effect of diet and exercise on health

**Alcohol as a carcinogen** – Describe the alcohol affects the liver and brain of alcohol

**Assessment-** low stakes testing, homework (google form)

### Sequence 4: Organisation in Plants

**Plant organs and Plant tissues** - describe the structure and functions of the main organs of a plant

**Transport in plants – Xylem, Phloem and Stomata** - Describe and explain the role of xylem, phloem and stomata.

**Plant transpiration** – To describe the transpiration stream in plants.

**Assessment-** Low stakes testing. Homework (google form) EOU assessment

### Big picture

- An understanding of organization forms the basis of Biology as well as understanding how our bodies and nature work.
- This unit has a number of opportunities for practical work as well as looking at ethical issues and medical problems that are currently present in the media and the students will be aware of – some sensitivity is required in teaching certain topics (i.e. cancer) that may have affected the learner's families and friends.
- This unit builds on the basic knowledge of cells developed at KS3.
- Knowledge Organisers for this topic are to be used to encourage students to be able to understand and relate the often-abstract ideas within this unit together through simplifying and categorizing the knowledge logically.

### Developing Cultural Capital:

- An understanding of how lifestyle impacts on health is important in helping our young people to make good choices about their future health.

### Reinforcement and retrieval practice

- All learning sequences are consolidated through homework, which is reviewed in the next sequence to space learning
- 'Memory joggers' are formally completed as the Do Now, these will be evidenced in the students' books.
- AfL is used regularly to evidence gaps in knowledge and inform planning so that learning is consolidated before being moved on.
- Regular questioning is embedded in all lessons and should be a key feature on learning walks.
- The required practical's will be in-depth marked. Students will act on feedback as part of their revision and preparation for assessment
- Checkpoints/ DIRT tasks are built in at strategic points in the topic- so misconceptions can be addressed, and key ideas revisited.

### Progression Model:

- Students will build on and develop practical skills within this topic that will link into further units within science as well as an understanding of the fundamental building block of Biology that allow the higher level learning to occur later in the GCSE
- The learning will be revisited throughout the GCSE course through cumulative assessments and memory joggers.
- Also their metacognitive skills will improve as they use KO, self-assessment, low stakes testing, memory joggers and responding to teacher's feedback to take control of their own learning



## B1.3 Infection and response

### Curriculum Intent:

This unit covers infectious diseases and how our body responds to them both in humans and plants. These concepts are fundamental to an understanding of Biology and Health. The unit seeks to give learners the knowledge they need to persevere further study as well as understanding their own health and that of nature around them.

### Sequence 1: Pathogens

**Pathogens** – Explain what pathogens are and how they cause disease.

**Preventing infection** - Describe and explain how pathogens are transmitted.

**Viral disease** - Describe measles, HIV/AIDS and tobacco mosaic virus.

**Bacterial diseases** – Describe salmonella and gonorrhoea.

**Diseases caused by fungi and protists** – Describe malaria and rose blackspot.

#### Checkpoint

**Assessment:** low stakes testing, homework (google form), marking of checkpoint.

### Sequence 2: Body's Defences

**The first line of defense** - Describe and explain how the human body prevents pathogens entering

**Second line of defence** - Explain in detail the three ways white blood cells fight infections.

**Vaccination and Immunity** - Describe what a vaccine contains and explain how it works.

**In-depth marking/ DIRT activity** and consolidation lesson

**Assessment:** low stakes testing, marking of 6-mark question, homework (google form)

### Sequence 3: Medical Solutions

**Antibiotics** - Explain how antibiotics treat only bacterial diseases and how this has saved lives.

**Antibiotic resistance** - Describe and explain how bacteria develop antibiotic resistance

**Painkillers and discovery of drugs** - Compare and contrast different drugs and how they are used effectively

**Drug development** – Describe the stages involved in testing and trialing new drugs and explain why testing new drugs is so important.

**Assessment-** Low stakes testing. Homework (google form) EOU assessment

### Big picture

- An understanding of pathogens forms the basis of microbiology, understanding how our bodies work and how to prevent the spread of infectious diseases
- This unit has a number of opportunities for practical work as well as looking at ethical issues and medical problems that are currently present in the media including drugs trials and the thalidomide scandal.
- This unit builds on the basic knowledge of cells developed at KS3.
- Knowledge Organisers for this topic are used to encourage students to be able to understand and relate the abstract ideas within this unit together through simplifying and categorizing the knowledge logically.

### Developing Cultural Capital:

- An understanding of how lifestyle affects health is important in helping our young people to make good choices about their future health. In addition, it gives students the information they need to make informed decisions about vaccinations in the future.

### Reinforcement and retrieval practice

- All learning sequences are consolidated through homework, which is reviewed in the next sequence to space learning
- 'Memory joggers' are formally completed as the Do Now, these will be evidenced in the students' books.
- AfL is used regularly to evidence gaps in knowledge and inform planning so that learning is consolidated before being moved on.
- Regular questioning is embedded in all lessons and should be a key feature on learning walks.
- The required practical's will be in-depth marked. Students will act on feedback as part of their revision and preparation for assessment
- Checkpoints/ DIRT tasks are built in at strategic points in the topic- so misconceptions can be addressed, and key ideas revisited.

### Progression Model:

- Students will build on and develop practical skills within this topic that will link into further units within science as well as an understanding of the fundamental building block of Biology that allow the higher-level learning to occur later in the GCSE
- The learning will be revisited throughout the GCSE course through cumulative assessments and memory joggers.
- Also, their metacognitive skills will improve as they use KO, self-assessment, low stakes testing, memory joggers and responding to teacher's feedback to take control of their own learning





## B1.4 Bioenergetics

### Curriculum Intent:

This unit covers bioenergetics looking at photosynthesis and respiration. It seeks to provide learners with an understanding of these fundamental concepts of biology as well as how they have influenced the world around us.

### Sequence 1: Photosynthesis

**Photosynthesis** – Describe photosynthesis and that photosynthesis is an endothermic reaction.

**Limiting factors** - Describe and explain graphs of limiting factors of photosynthesis.

**[Required practical] Photosynthesis** – Investigate the effect of light intensity on the rate of photosynthesis

**In-depth marking/ DIRT activity** and consolidation lesson

**Uses of glucose and minerals in plants** - Describe and explain how glucose is used in plants.

**Making the most of photosynthesis** – Describe how humans can influence the rate of photosynthesis

**Assessment:** low stakes testing, marking of 6-mark question, homework (google form)

### Sequence 2: Respiration and Metabolism

**Aerobic respiration** – Describe the process of respiration and explain why it's needed in living organisms.

**Anaerobic respiration** – Explain the importance of anaerobic respiration for rapid energy release

**Checkpoint**

**Response to exercise** – Describe how the body responds to the increased demands for energy during exercise

**Assessment- Low stakes testing. Homework (google form) EOU assessment, marking of checkpoint**

### Big picture

- An understanding of bioenergetics is essential for understanding human health and the biological systems that surround us.
- This unit has several opportunities for practical work and investigating the effect of different factors on plant growth and human respiration.
- This unit links in with several other areas of the science curriculum including the carbon cycle (B2 and C2).
- This unit builds on the basic knowledge of photosynthesis and respiration developed at KS3.
- Knowledge Organisers for this topic are used to encourage students to be able to understand and relate the abstract ideas within this unit together through simplifying and categorizing the knowledge logically.

### Developing Cultural Capital:

- An understanding of how exercise affects our overall health is embedded in this unit

### Reinforcement and retrieval practice

- All learning sequences are consolidated through homework, which is reviewed in the next sequence to space learning
- 'Memory joggers' are formally completed as the Do Now, these will be evidenced in the students' books.
- AfL is used regularly to evidence gaps in knowledge and inform planning so that learning is consolidated before being moved on.
- Regular questioning is embedded in all lessons and should be a key feature on learning walks.
- The required practical's will be in-depth marked. Students will act on feedback as part of their revision and preparation for assessment
- Checkpoints/ DIRT tasks are built in at strategic points in the topic- so misconceptions can be addressed, and key ideas revisited.

### Progression Model:

- Students will build on and develop practical skills within this topic that will link into further units within science as well as an understanding of the fundamental building block of Biology that allow the higher-level learning to occur later in the GCSE
- The learning will be revisited throughout the GCSE course through cumulative assessments and memory joggers.
- Also, their metacognitive skills will improve as they use KO, self-assessment, low stakes testing, memory joggers and responding to teacher's feedback to take control of their own learning