



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:

Lesson 1: Aerobic respiration: To investigate aerobic respiration. To produce a word equation for the process. To produce a balanced symbol equation

Lesson 2 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.

Lesson 3 Anaerobic respiration in other organisms to investigate anaerobic in yeast and some uses.

Assessment: Homework- What is the effect of exercise – google form quiz

Sequence 2:

Lesson 4 Photosynthesis: To produce the word equation for photosynthesis to produce a balanced symbol equation for photosynthesis.

To describe how to test a leaf for starch.

Lesson 5 Looking at leaves: To describe how the tissues in leaves are adapted for photosynthesis.

Lesson 6 Investigating stomata: To investigate the distribution of stomata.

Assessment- Homework 2 Do plants really need carbon dioxide, low stakes testing.

Sequence 3:

Lesson 7 Investigating photosynthesis: To identify the factors which can affect photosynthesis. **RP: Investigating light and photosynthesis.**

Lesson 8 In-depth assessment- Photosynthesis 6-mark question/ leaf adaptation

Lesson 9 Plant minerals: To describe how water and minerals are transported around the plant.

Assessment- low stakes testing

Sequence 4:

Lesson 11 Test

Lesson 12: Reflection and improvement

Assessment: End of unit test

Big picture

This unit has several 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 some 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 student's 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.
- 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.



Types of reactions and Chemical energy

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:

Lesson 1: What are chemical reactions? To identify that a chemical reaction has taken place to define a chemical reaction.

Lesson2 Speeding up reactions: RP Concentration and rate of reaction.

To investigate the effect of concentration on the rate of a reaction to explain the effect in terms of the collision theory.

Lesson 3: Surface area and rate of reaction to investigate surface area on rate of reaction to explain in terms of collision theory.

Assessment Homework 1 Types of reaction, low stakes testing

Formative Assessment and Homework

Sequence 2:

Lesson 4 Catalysts: To describe what a catalyst is to investigate a catalyst and rate of reaction.

Lesson 5 Combustion: To investigate some properties of fuels. To compare the effectiveness of two fuels to produce a word equation for combustion.

Lesson 6 Thermal decomposition to describe thermal decomposition to investigate thermal decomposition in carbonates.

To write word equations and know state symbols for the reaction.

Assessment and Homework 2 Types of reaction -Burning products of combustion **Check point Reactions and Word Equations**

Formative Assessment and Therapy:

Sequence 3:

Lesson 7 Conservation of mass: To state the law of conservation of mass to observe and explain mass changes that occur in chemical reactions.

Lesson 8 Endothermic and exothermic reactions to investigate endothermic and exothermic reactions to interpret energy level diagrams. **(H)**

Lesson9 Reversible reaction: To investigate an example of a reversible reaction. To describe the energy changes in the reaction

Formative Assessment and Homework3 What is needed for iron to rust.

Formative Assessment and Homework

Sequence 4:

Lesson 10 Test

Lesson 11: Reflection and improvement

Summative Assessment and Therapy

Big picture

This unit has several 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, recognising 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 a homework, which is reviewed in the next sequence to Space Learning.
- Every third lesson 'Memory joggers' are formally completed as the Do Now, these will be evidenced in the student's 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.

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:

Lesson 1: Contact and non-contact forces: To revisit various forces. To categorise as contact and non-contact forces. To measure forces

Lesson 2 Balanced (zero resultant force) and unbalance (non-zero –resultant force) To sketch the forces acting on an object and label their size and direction. To calculate resultant forces

Lesson 3: Friction and drag: To describe the effect of forces on falling objects. To understand the term terminal velocity

Lesson 4: Factors affecting frictional forces: To investigate the factors that affect frictional forces.

Assessment and Homework 1 Unbalanced forces **Checkpoint Drag, Friction and Forces at a Distance**

Formative Assessment and Homework

Sequence 2:

Lesson 5: Squashing and stretching RP: To investigate force on a spring.

Lesson 6: Pressure and stress in solids: To identify the factors that affect the size of pressure on a solid.

To calculate pressure exerted using formula $P=F/A$ and know the units

Lesson 7: Pressure in gases: To describe the motion of particles in a gas. To calculate fluid pressure with support. To state the cause of atmospheric pressure.

Assessment Homework 2 Friction **Check point Force Arrows and Hooke's Law**

Formative Assessment and Homework

Sequence 3:

Lesson 8: Floating and sinking: To investigate the measurement of up thrust to apply ideas about up thrust **memory jogger 3.**

Lesson 9: Revision

Lesson 10 Test

Lesson 11: Reflection and improvement

Formative Assessment- completion of assessment

Big picture

This unit has several 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 a 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 student's 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.

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.