Year 8 Biology – Photosynthesis

Learning about this topic is important because: Photosynthesis is arguably the most important biological process on earth. Photosynthesis **helps control the makeup of our atmosphere**, understanding photosynthesis is crucial to understanding how carbon dioxide and other "greenhouse gases" affect the global climate. Photosynthetic plants are at the beginning of all food chains, they produce organic molecules that can be consumed and passed along to all other living organisms in the food chain. Without plants and photosynthesis there would be no other life on Earth! You will have the opportunity to take part in practical work, become familiar with new lab equipment and learn to work safely. Throughout the unit you will continue to make progress with important practical skills such as recording observations and identifying variables. You will also continue to develop your mathematical, thinking and research skills throughout this unit of work.

This builds on: Knowledge of the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant from KS2 studies, you might have also investigated the way in which water is transported within plants. The topic will also build on your knowledge of plant cells from Y7 'Cells, tissues & organs', in addition to this some ideas from the prior topic 'Plant Reproduction', will be required.

This leads to: Studying photosynthesis again in Y10; it is part of the 'Bioenergetics' section of the Biology GCSE. You will build upon your knowledge to explore how plants harness the Sun's energy in photosynthesis to make food. You will extend your learning to be able to describe the type of reaction, investigate limiting factors and artificial growing systems, as well as carrying out required practical work on the rate of photosynthesis in an aquatic organism such as pondweed. You will also be able to link ideas to organisation of plants in Y10 as well as the 'Cells and microscopes' topic in Y9.

We will learn:

- The reactants in, and products of, photosynthesis, and a word summary for photosynthesis
- The dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules
  that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere
- The adaptations of leaves for photosynthesis
- The role of leaf stomata in gas exchange in plants
- Plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots

We will develop/practise skills including:

- Curiosity - ask questions and develop a line of enquiry based on observations of the real world alongside prior knowledge and experience.
- Make predictions using scientific knowledge and understanding
- Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate
- Use appropriate techniques, apparatus, and materials during fieldwork and laboratory
  work, paying attention to health and safety
- Make and record observations and measurements using appropriate methods, including tables and graphs
- Evaluate risks – complete risk assessments for practical work
- Explaining data, using specific terminology confidently, in relation to predictions and hypotheses
- Extended writing

Year 8 Biology – Photosynthesis

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	• Mathematical skills – calculating the mean, estimating population size from sampling techniques and graph work • Practical skills – testing a leaf for starch and sampling techniques • Creating – building a model leaf (leaf jigsaw) • Analysing data • Linking concepts and ideas
Some of the vocabulary that we will use includes: Photosynthesis, stomata, diffusion, chlorophyll, glucose, starch, iodine	You could learn more about this topic by: Read: What is photosynthesis? - Respiration and gas exchange - KS3 Biology - BBC Bitesize - BBC Bitesize Watch: BBC Two - The Private Life of Plants, Growing, Photosynthesis at work BBC Four - Oak Tree: Nature's Greatest Survivor, How important is the discovery of photosynthesis? Listen: In Our Time - Photosynthesis - BBC Sounds
Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: • HOME LEARNING: Explain how veins and stoma are related to the functioning of the leaf cells. Teacher assessed. • TASK: Look at the diagrams (page 17 of the workbook). On your worksheet predict the results, by drawing and colouring a diagram of the leaf after it was tested for starch. Explain your prediction. Teacher assessed. • TASK: Draw an appropriate graph of your results and then write a conclusion to describe and explain your results. Teacher assessed. • End of topic assessment. This is teacher assessed.	

Your new learning will continue to build on the ideas from Y7 and enable you make exciting links throughout your studies in Biology. We will build on practical skills, mathematical skills and ability to write scientifically, as well as being able to apply your knowledge, think for yourselves and challenge you!

Year 8 Biology – Respiration, breathing & movement

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Learning about this topic is important because: Studying cellular respiration is important because **it releases the energy for living organisms to perform all necessary functions to maintain life**, it is one of life's main key processes. Can you remember MRS GREN? Breathing, in humans, is vital for the exchange of gases to enable respiration to continue and sustain life. Energy released from respiration can be used for muscle contraction, this allows living organisms to respond to changes in the environment, control movement and support the skeleton! You will have the opportunity to take part in practical work, become familiar with new lab equipment and learn to work safely. Throughout the unit you will continue to make progress with important practical skills such as recording observations and identifying variables. You will also continue to develop your mathematical, thinking and research skills throughout this unit of work.

This builds on: Knowledge of the requirements that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat from KS2 studies. You will also have learnt that humans and some other animals have skeletons and muscles for support, protection, and movement. The topic will also build on your knowledge of plant cells from Y7 'Cells, tissues & organs'.

This leads to: You will study cell biology again in Y10, linking to diffusion (transport across cells) and adaptations of the lung as an efficient gas exchange surface. This will link to further studies of respiration, also, in Y10, as part of the 'Bioenergetics' section of the Biology GCSE. You will build upon your knowledge to explore different types of respiration and uses in the food industry. You will extend your learning to investigate the effect of vigorous exercise on the body, lactic acid production and oxygen debt.

We will learn:

Nutrition and digestion

- content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed
- calculations of energy requirements in a healthy daily diet

Cellular respiration

- aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life
- a word summary for aerobic respiration
- the process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration
- the differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism

Gas exchange systems

- the structure and functions of the gas exchange system in humans, including adaptations to function
- the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume

The skeletal and muscular systems

We will develop/practise skills including:

- Curiosity - ask questions and develop a line of enquiry based on observations of the real world alongside prior knowledge and experience.
- Pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility
- Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate
- Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety
- Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements
- Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions
- Present reasoned explanations, including explaining data
- Use and derive simple equations and carry out appropriate calculations
- Mathematical skills calculate results, present observations and data using appropriate methods, including tables and graphs. Understand and use SI units.

Year 8 Biology – Respiration, breathing & movement

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• the structure and functions of the human skeleton, to include support, protection, movement and making blood cells • biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles • the function of muscles and examples of antagonistic muscles.	• Practical skills – investigating how much energy is in food, measuring lung capacity, mighty movers • Creating – building a model of the lungs • Analysing data • Linking concepts and ideas
Some of the vocabulary that we will use includes: Balanced diet, carbohydrate, protein, fat, vitamins & minerals, energy, digestion, enzymes, aerobic respiration, skeleton, antagonistic muscles, synovial joint, mitochondria, trachea, bronchi, bronchioles, alveoli, diaphragm, oxygen, carbon dioxide, inhalation, exhalation, anaerobic respiration, fermentation	You could learn more about this topic by: Read: The skeletal system - Skeleton - Living organisms - KS3 Biology - BBC Bitesize BBC Bitesize Watch: Balanced diet | Health | Biology | FuseSchool - YouTube Listen: Respiratory System 5, Podcast on breathing - YouTube
Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: • CLASSWORK / HOME LEARNING: Eatwell plate. Teacher assessed. • PROGRESS CHECK: Explain what happens to a molecule of starch taken in during a meal, include the names of the organs of the digestive system that it passes through. Work independently, this is teacher assessed. • HOME LEARNING: Complete arm movements worksheet. Write a paragraph that links mitochondria, aerobic respiration, and movement. Teacher assessed. • TASK: Write a step-by-step method for measuring lung volume. Teacher assessed. • End of topic assessment. This is teacher assessed.	

Your new learning will continue to build on the ideas from Y7/8 and enable you make exciting links throughout your studies in Biology. We will build on practical skills, mathematical skills and ability to write scientifically, as well as being able to apply your knowledge, think for yourselves and challenge you!