



'An ambitious curriculum that meets the needs of all'

Medium Term Planning - Topic: Breathing & Respiration

Curriculum Intent	In addition to working further on objectives from KS2, pupils will be taught, following National Curriculum guidelines, the following this topic:
Skills/National Curriculum Links	<p>Gas exchange systems</p> <ul style="list-style-type: none"> 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 impact of exercise, asthma and smoking on the human gas exchange system the role of leaf stomata in gas exchange in plants – in photosynthesis <p>Cellular respiration</p> <ul style="list-style-type: none"> 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.
Spiritual, moral, social, and cultural development	<p>SMSC: Enable students to develop their self-knowledge of their own body. Have an understanding that certain behaviours during pregnancy can have far reaching implications and the impact of smoking and lung disease.</p> <p>PSHE/British Values: Chemical reactions occur in all forms of life such as toothpaste and bee stings. Students will complete teamwork, leadership and put science into everyday situations. They will show mutual respect during classwork.</p> <p>Skills Builder: Listening (Receiving, retaining and processing info), Speaking (The oral transmission of info and ideas), Problem solving (Find a solution to a situation or challenge), Creativity (imagination and generation of new ideas), Staying positive (The ability to use tactics and strategies to overcome setbacks), aiming high (Set clear and tangible goals), Leadership and teamwork</p>
Numeracy	Volume of lungs, increase in volume of dough, reading thermometer at different temperatures, data analysis from tables and graphs.
Literacy	<p>Vocabulary Tier 2: Elastic, plural, remove, rate, depth, composition, structure, adapted, function, increase, decrease, inflate, deflate, reduced, prematurely, endangered, irritates, narrows, infection, substance, converting, strenuous, transfer, rise, appearance.</p> <p>Vocabulary Tier 3: gas exchange, lungs, ribs, respiratory system, trachea, bronchus, bronchiole, alveolus, breathing, inhale, respiration, exhale, condense, contract, diaphragm, lung volume, asthma, passive smoking, stimulant, cilia, mucus, aerobic respiration, plasma, haemoglobin, reactant, products, anaerobic respiration, oxygen debt, fermentation, biotechnology.</p> <p>Reading: Following a written method and read risk assessments. Students may be directed to the textbook; this could be in lesson or at home on Kerboodle.</p> <p>Writing: Describing and explaining scientific phenomenon, free response writing for describing precautions taken, use of word mat to promote sentence formation.</p>

	<p>Oracy: inclusion of BEST resources which are research evidence on common misunderstandings in science, effective diagnostic questioning and formative assessment, constructivist approaches to building understanding, and effective sequencing of key concepts that promote metacognitive talk and dialogue.</p>
Becoming future ready	<p>Careers/Employability:</p> <ul style="list-style-type: none"> •Nutritionist •Doctor •Nurse •Chemist •Surgeon •Dietician
Adaptation	<p>Throughout this topic, quality first teaching will provide differentiation:</p>
QFT/SEND Provision	<p>By product: Linear assessments and differentiated practical work.</p> <p>By resource: Lessons are differentiated per class and students, worksheets are coloured blue if support and assessments are linear.</p> <p>By Intervention: by providing different levels of supervision and support</p> <p>By Progressive Questioning: exploring pupils' understanding through interactive dialogue.</p> <p>By Grouping: according to prior attainment, gender, social preference, preferred learning style.</p> <p>By Task: Pupils should be involved in the identification of targets which are meaningful to them and in the selection of an appropriate task from the given range.</p> <p>By Offering Optional Activities: In class or as homework, to extend learning.</p> <p>This QFT/SEND provision will be explicit within the lesson-by-lesson schemes of work.</p>
Implementation Curriculum Delivery	<p><i>Know</i></p> <ul style="list-style-type: none"> - Name the parts of the gas exchange system. - State that the parts of the gas exchange system are adapted to their function. - State that the composition of the air inhaled and exhaled are different using data provided. <p><i>Apply</i></p> <ul style="list-style-type: none"> - Describe the structure of the gas exchange system. - Describe how the parts of the gas exchange system are adapted to their function. - Interpret data given to compare the difference in the composition of inhaled and exhaled air. <p><i>Extend</i></p> <ul style="list-style-type: none"> - Describe the gas exchange system as an organ system, linking the organs. - Explain how the adaptations of the parts of the gas exchange system help them perform their function. - Interpret data given to explain the difference in the composition of inhaled and exhaled air.
Learning Outcomes (Core Knowledge)	<p><i>Know</i></p> <ul style="list-style-type: none"> - State what happens to the ribcage and diaphragm during inhaling and exhaling. - State what each part of the bell-jar model represents. - State a value of lung volume. - Use apparatus provided to obtain a lung volume. <p><i>Apply</i></p> <ul style="list-style-type: none"> - Describe the processes of inhaling and exhaling. - Describe how a bell jar can be used to model what happens during breathing. - Explain how to measure lung volume. - Use appropriately calibrated apparatus to obtain a lung volume. <p><i>Extend</i></p> <ul style="list-style-type: none"> - Explain how the actions of the ribcage and diaphragm lead to inhaling and exhaling. - Explain the similarities and differences between the bell jar and the breathing system. - Explain in detail how to measure lung volumes. - Use appropriately calibrated apparatus to obtain an accurate lung volume, evaluating the precision of instruments involved.
	<p><i>Know</i></p> <ul style="list-style-type: none"> - Name an effect of tobacco smoke on health. - State whether or not tobacco smoke affects the development of a foetus. - Interpret secondary data and present this data on a bar chart. <p><i>Apply</i></p> <ul style="list-style-type: none"> - Describe the effects of tobacco smoke on health. - Describe the effects of tobacco smoke on pregnancy. - Present secondary data using an appropriate method, interpreting this data to draw conclusions. <p><i>Extend</i></p> <ul style="list-style-type: none"> - Explain how smoking causes disease. - Explain which chemicals in tobacco smoke affect the development of a foetus. - Interpret and present secondary data in an appropriate manner, drawing conclusions, and extrapolating data from trends shown.
	<p><i>Know</i></p> <ul style="list-style-type: none"> - State the requirements for aerobic respiration.



- Give the name of the process by which energy is released in cells.
 - Plan an experiment to measure breathing rates.
- Apply*
- State the word equation for aerobic respiration.
 - Describe the process of respiration.
 - Plan an investigation to measure the effect of exercise on breathing rates.
- Extend*
- Explain how the reactants for respiration get into the cells.
 - Explain the process of aerobic respiration.
 - Plan an investigation to explain the effect of exercise on respiration rates.

- Know*
- State the products of anaerobic respiration.
 - State one difference between aerobic and anaerobic respiration.
 - Identify one source of error in data collected.
- Apply*
- State the word equation for anaerobic respiration.
 - Describe the differences between aerobic and anaerobic respiration.
 - Evaluate data collected, suggesting possible sources of error.
- Extend*
- Explain the uses of the products from anaerobic respiration.
 - Explain the differences between the two types of respiration.
 - Evaluate data collected, showing awareness of potential sources of random and systematic errors.

- Know*
- State what is meant by fermentation.
 - Name the organism used to make bread, beer, and wine.
 - Make observations about the rising of bread dough in an investigation.
- Apply*
- Write the word equation for fermentation.
 - Describe how bread, beer, and wine are made.
 - Carry out an investigation to investigate the effect of temperature on fermentation, recording measurements and drawing a conclusion.
- Extend*
- Explain how the process of fermentation works in relation to the word equation.
 - Explain why temperature is important in the making of bread, beer, and wine.
 - Carry out an investigation to investigate the effect of temperature on fermentation, using results to draw a conclusion, and suggest one way to minimise error.

**Current learning
to be developed in
the future within:**

Before: In KS2 you should have identified and named the main parts of the human circulatory system, and described the functions of the heart, blood vessels and blood. You should have also recognised the impact of diet, exercise, drugs and lifestyle on the way their bodies function and described the ways in which nutrients and water are transported within animals, including humans.,
Future: At GCSE you will learn how the respiratory system that provides the body with oxygen and removes carbon dioxide. In each case they provide dissolved materials that need to be moved quickly around the body in the blood by the circulatory system. You will also learn in more detail about the differences between aerobic and anaerobic respiration.

Assessment

Refer to assessment maps for formative and summative assessment opportunities.

Impact

Attainment and Progress – Refer to assessment results / data review documentation.