



## NHSG Key stage 3: Unit Overview for 1.3 Respiration

Scheme of Learning	1.3 Respiration
<b>Learning outcomes</b>	<b>Subject Content</b> <ul style="list-style-type: none"> <li>Describe cellular respiration as a universal chemical process continuously occurring that supplies ATP in all living cells.</li> <li>Describe cellular respiration as exothermic reaction.</li> <li>Compare the process of aerobic and anaerobic respiration.</li> <li>Explain the importance of sugars in the synthesis and breakdown of carbohydrates.</li> <li>Explain the importance of amino acids in the synthesis and breakdown of proteins.</li> <li>Explain the importance of fatty acids and glycerol in the synthesis and breakdown of lipids.</li> </ul> <b>Skill set</b> <ul style="list-style-type: none"> <li>Practical to show the gases expelled during the process of respiration.</li> <li>Practical to show the products of fermentation in yeasts.</li> </ul>
<b>Key questions</b>	<p>How the process of respiration is fundamental for living organisms?</p>
<b>Knowledge</b> What key concepts are covered? What key skills are developed? What key terminology is learned (i.e. glossary)?	<b>Key Concepts &amp; Skills Development</b> <ul style="list-style-type: none"> <li>Aerobic and anaerobic respiration describe fully and linked to the process of producing energy Equations must be included</li> <li>Fermentation is a process carried out by yeasts and produced different products.</li> <li>The role of the three food groups in the body and how they are synthesised and the breakdown products utilized.</li> </ul> <b>Key Terminology</b> <ul style="list-style-type: none"> <li>Respire</li> <li>Aerobic respiration</li> <li>Anaerobic respiration</li> <li>Mitochondria</li> <li>ATP</li> <li>Exothermic</li> <li>Lactic acid</li> <li>Oxygen debt</li> <li>Fermentation</li> <li>Monomer</li> <li>Polymer</li> </ul>

<p><b>Ongoing Assessment</b></p>	<p>Retrieval questions at the start of every lesson. These questions refer to previous knowledge of enzymes and reactions from Y7 and 8 which will help them develop further knowledge in Y9.</p> <p>Assessment in the form of gap fill, questions and tasks in the topic book, including</p> <ul style="list-style-type: none"> <li>• 6 mark question on the effects of respiration</li> <li>• Anaerobic respiration- putting the statements in order</li> <li>• Comparison table- anaerobic compared to aerobic</li> <li>• 6 mark question on sprinting and respiration</li> </ul> <p><b>Key misconceptions:</b></p> <ul style="list-style-type: none"> <li>• Anaerobic respiration happens in mitochondria</li> <li>• Cellular respiration solely occurs in the lungs</li> <li>• Cellular respiration only happens during physical activity</li> <li>• Plants don't respire – only animals conduct cellular respiration</li> <li>• Cellular respiration is the same process as breathing</li> </ul> <p><b>Homework:</b></p> <ul style="list-style-type: none"> <li>• Complete 6 mark question on exercise</li> <li>• Complete table for respiration in yeast</li> <li>• Revision checklist: Specification used as revision checklist in front of topic booklet.</li> </ul>
<p><b>Key Assessment</b></p>	<p><b>Practical assessment:-</b></p> <ul style="list-style-type: none"> <li>• Respiration in yeast- table and graph assessment</li> <li>• End of topic test combined with the topic of photosynthesis. Closed book roughly 35 minutes.</li> <li>• Test will assess key skills and content from specification of this unit:</li> <li>• This is an in-class assessment which will be marked by teachers and feedback provided in the form of next steps which students will respond to.</li> <li>• Data is analysed and a colour is given based on the spread of grades outlined in the T&amp;L policy.</li> </ul>
<p><b>Clear sequencing of content</b></p>	<p>This is covered in Y8 and builds on Y7/9 cells knowledge. In Y8 the basic equations are covered and students are introduced to anaerobic respiration in animals and yeast. Misconceptions of the differences between breathing and respiration is tackled as well as the notion that all living organisms respire (including plants).</p> <p>In year 9 the same concepts are built upon and students are introduced to practicals to investigate the rate of respiration and how to interpret experimental data. Students are introduced to ATP and an explanation of energy currency for body processes.</p>

	The concepts from this topic also underpin many topics beyond B1 such as B2- transport into and out of cells, specialised cells and energy transfers in B4.
Links to Careers	<a href="https://nationalcareers.service.gov.uk/job-profiles/nutritionist">https://nationalcareers.service.gov.uk/job-profiles/nutritionist</a> <a href="https://nationalcareers.service.gov.uk/job-profiles/technical-brewer">https://nationalcareers.service.gov.uk/job-profiles/technical-brewer</a> <a href="https://edu.rsc.org/job-profiles/scientist-food-and-pharmaceuticals/4017866.article">https://edu.rsc.org/job-profiles/scientist-food-and-pharmaceuticals/4017866.article</a> <a href="https://nationalcareers.service.gov.uk/job-profiles/physiotherapist">https://nationalcareers.service.gov.uk/job-profiles/physiotherapist</a> <a href="https://www.healthcareers.nhs.uk/explore-roles/doctors/roles-doctors/medicine">https://www.healthcareers.nhs.uk/explore-roles/doctors/roles-doctors/medicine</a> <a href="https://nationalcareers.service.gov.uk/job-profiles/sports-scientist">https://nationalcareers.service.gov.uk/job-profiles/sports-scientist</a> Overview of job progression from sports science degree given in topic booklet.
Diversity and Inclusion	Articles in booklet with questions <ol style="list-style-type: none"> <li>1. on the Bajau sea nomads in south east Asia. Question, is this genetic or acquired?</li> <li>2. Article on sickle cell anaemia and oxygen inadequacy</li> <li>3. Article on Usain Bolt and the proportion of fast twitch muscle fibres in west African people</li> </ol>
Support	<ul style="list-style-type: none"> <li>• Every student receives handout packs including specification</li> <li>• PowerPoints for each lesson are on SharePoint to help catch up with missed lessons or for students to review content.</li> <li>• Biology support club.- students attend if they wish but those who we think will benefit will be directed to attend through their class teacher.</li> <li>• pp and LAT provided with CGP revision workbooks.</li> <li>• Online revision <a href="#">GCSE Biology (Single Science) - OCR Gateway - BBC Bitesize</a></li> <li>• Amoeba sisters videos</li> </ul>
Challenge	Challenge question at the end of the booklet- respiratory substrates, which is more energy dense?  Various science challenges- <ul style="list-style-type: none"> <li>• RSB Biology challenge for Y9/10</li> <li>• The Homerton college Cambridge challenge</li> <li>• The imperial collegeFaculty of Natural Sciences: Science and innovation competition</li> <li>• BioArtAttack 3d</li> <li>• BioArtAttack 2D</li> </ul> 2 stretch and challenge articles with questions to go alongside are provided at the back of the topic booklet.

