



# **Year 13 Biology Learning Journey**

**YEAR GROUP: 13**      **SUBJECTS: Biology AC**

When?	Knowledge	Understanding	Assessment
<b>Section 5 – 11 Photosynthesis</b>	<p>Will be able to:</p> <ul style="list-style-type: none"> <li>● Explain the light dependent and light independent reactions</li> <li>● Describe, explain and analyse data of photosynthesis investigations including limiting factors</li> <li>● Investigate and identify leaf pigments using chromatography</li> <li>● Investigate and use an appropriate statistical test on the rate of dehydrogenase activity</li> </ul>	<ul style="list-style-type: none"> <li>● Students should be able to identify environmental factors that limit the rate of photosynthesis</li> <li>● Students should be able to evaluate data relating to common agricultural practices used to overcome the effect of these limiting factors.</li> <li>● Students devise and carry out experiments to investigate the effect of named environmental variables on the rate of photosynthesis using aquatic plants, algae or immobilised algal beads</li> </ul>	<p><b>Assessment:</b> Photosynthesis assessment (33 marks)</p>
<b>Section 5 – 12 Respiration</b>	<p>Will be able to:</p> <ul style="list-style-type: none"> <li>● Describe the reactions and where they take place for aerobic and anaerobic respiration</li> <li>● Describe and explain the roles of FAD and NAD and electron transfer associated with oxidative phosphorylation and anaerobic respiration</li> <li>● Explain chemiosmosis and role of ATP synthase</li> <li>● Plan and investigate the rate of respiration in yeast using appropriate statistical test</li> <li>● Analyse and explain data from respiration investigations</li> </ul>	<ul style="list-style-type: none"> <li>● Students use a redox indicator to investigate dehydrogenase activity.</li> <li>● Students should be able to plan and investigate the rate of respiration in yeast using appropriate statistical test</li> <li>● Students should be able to analyse and explain data from respiration investigations</li> <li>● Students should be able to plan and investigate the rate of respiration in yeast using appropriate statistical test</li> <li>● Students should be able to analyse and explain data from respiration investigations</li> </ul>	<p><b>Assessment:</b> Respiration assessment (37 marks)</p>

When?	Knowledge	Understanding	Assessment
<b>Section 7 – 17 Inherited change</b>	<p>Will be able to:</p> <ul style="list-style-type: none"> <li>● Explain genetic terms</li> <li>● Interpret and explain pedigree analysis diagrams</li> <li>● Draw punnet square diagrams to calculate and predict ratios of genotypes and phenotypes for monohybrid, dihybrid, co-dominance, multiple alleles, sex-linkage, autosomal linkage, and epistasis</li> <li>● Use chi-squared test to compare observed values against predictions</li> </ul>	<ul style="list-style-type: none"> <li>● Students investigate genetic ratios using crosses of Drosophila or Fast Plant</li> <li>● Students use information to represent phenotypic ratios in monohybrid and dihybrid crosses</li> <li>● Students show understanding of the probability associated with inheritance.</li> <li>● Students use the Chi Squared test to investigate the significance of differences between expected and observed phenotypic ratios</li> </ul>	<p><b>Assessment:</b> Genetics assessment (33 marks)</p>

<p style="text-align: center;"><b>Section 8 – 20 Gene Expression</b></p>	<p>Will be able to:</p> <ul style="list-style-type: none"> <li>● Explain causes and different types of mutations</li> <li>● Explain the role of transcription factors and siRNA</li> <li>● Interpret data on gene expression</li> <li>● Explain epigenetics, its causes and uses</li> <li>● Explain different types of stem cells and their uses</li> <li>● Explain the role of oncogenes and tumour suppressor genes, methylation and increased oestrogen</li> </ul>	<ul style="list-style-type: none"> <li>● Students should be able to relate the nature of a gene mutation to its effect on the encoded polypeptide.</li> <li>● Students could produce tissue cultures of explants of cauliflower (<i>Brassica oleracea</i>).</li> <li>● Students should be able to evaluate the use of stem cells in treating human disorders.</li> <li>● Students should be able to interpret data provided from investigations into gene expression</li> <li>● Students should be able to evaluate appropriate data for the relative influences of genetic and environmental factors on phenotype.</li> <li>● Students should be able to evaluate evidence showing correlations between genetic and environmental factors and various forms of cancer • interpret information relating to the way in which an understanding of the roles of oncogenes and tumour suppressor genes could be used in the prevention, treatment and cure of cancer.</li> </ul>	<p style="text-align: center;"><b>Assessment:</b> Gene Expression assessment (38 marks)</p>
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<p style="text-align: center;">Section 8 – 21 Recombinant DNA technology</p>	<p>Will be able to:</p> <ul style="list-style-type: none"> <li>• Explain Sanger sequencing and gel electrophoresis in DNA sequencing</li> <li>• Explain the process and use of restriction endonucleases, PCR and in vivo techniques for amplifying DNA fragments</li> <li>• Explain the applications of recombinant DNA and evaluate the ethical financial and social issues</li> <li>• Explain gene therapy and the difference between somatic and germ line therapy</li> <li>• Explain the use of gene probes and its benefits and issues</li> <li>• Explain genetic fingerprinting</li> </ul>	<p>Students could investigate the specificity of restriction enzymes using extracted DNA and electrophoresis.</p> <p>Students should be able to:</p> <ul style="list-style-type: none"> <li>• interpret information relating to the use of recombinant DNA technology</li> <li>• evaluate the ethical, financial and social issues associated with the use and ownership of recombinant DNA technology in agriculture, in industry and in medicine</li> <li>• balance the humanitarian aspects of recombinant DNA technology with the opposition from environmentalists and antiglobalisation activists</li> <li>• relate recombinant DNA technology to gene therapy</li> </ul> <p>Students should be able to evaluate information relating to screening individuals for genetically determined conditions and drug responses.</p> <p>Students could use gel electrophoresis to produce ‘fingerprints’ of food dyes.</p>	<p style="text-align: center;"><b>Assessment:</b> Recombinant DNA technology assessment (35 marks)</p>
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