



Year 13 Biology Curriculum Summary



YEAR GROUP: 13

SUBJECTS: Biology AC

| When? | Knowledge | Understanding | Assessment |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Photosynthesis | <p>Will be able to:</p> <ul style="list-style-type: none">• Explain the light dependent and light independent reactions• Describe, explain and analyse data of photosynthesis investigations including limiting factors• Investigate and identify leaf pigments using chromatography• Investigate and use an appropriate statistical test on the rate of dehydrogenase activity | <ul style="list-style-type: none">• Students should be able to identify environmental factors that limit the rate of photosynthesis• Students should be able to evaluate data relating to common agricultural practices used to overcome the effect of these limiting factors.• 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 | <p>Assessment: Photosynthesis assessment</p> |



| When? | Knowledge | Understanding | Assessment |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Respiration | <p>Will be able to:</p> <ul style="list-style-type: none">• Describe the reactions and where they take place for aerobic and anaerobic respiration• Describe and explain the roles of FAD and NAD and electron transfer associated with oxidative phosphorylation and anaerobic respiration• Explain chemiosmosis and role of ATP synthase• Plan and investigate the rate of respiration in yeast using appropriate statistical test• Analyse and explain data from respiration investigations | <ul style="list-style-type: none">• Students use a redox indicator to investigate dehydrogenase activity.• Students should be able to plan and investigate the rate of respiration in yeast using appropriate statistical test• Students should be able to analyse and explain data from respiration investigations• Students should be able to plan and investigate the rate of respiration in yeast using appropriate statistical test• Students should be able to analyse and explain data from respiration investigations | <p style="text-align: center;">Assessment: Respiration assessment</p> |



| When? | Knowledge | Understanding | Assessment |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Inherited change | <p>Will be able to:</p> <ul style="list-style-type: none">• Explain genetic terms• Interpret and explain pedigree analysis diagrams• 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• Use chi-squared test to compare observed values against predictions | <ul style="list-style-type: none">• Students investigate genetic ratios using crosses of Drosophila or Fast Plant• Students use information to represent phenotypic ratios in monohybrid and dihybrid crosses• Students show understanding of the probability associated with inheritance.• Students use the Chi Squared test to investigate the significance of differences between expected and observed phenotypic ratios | <p>Assessment: Genetics assessment</p> |



| When? | Knowledge | Understanding | Assessment |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Gene Expression | <p>Will be able to:</p> <ul style="list-style-type: none">• Explain causes and different types of mutations• Explain the role of transcription factors and siRNA• Interpret data on gene expression• Explain epigenetics, its causes and uses• Explain different types of stem cells and their uses• Explain the role of oncogenes and tumour suppressor genes, methylation and increased oestrogen | <ul style="list-style-type: none">• Students should be able to relate the nature of a gene mutation to its effect on the encoded polypeptide.• Students could produce tissue cultures of explants of cauliflower (<i>Brassica oleracea</i>).• Students should be able to evaluate the use of stem cells in treating human disorders.• Students should be able to interpret data provided from investigations into gene expression• Students should be able to evaluate appropriate data for the relative influences of genetic and environmental factors on phenotype.• 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. | <p style="text-align: center;">Assessment: Gene Expression assessment</p> |



| When? | Knowledge | Understanding | Assessment |
|------------------------|-----------|---------------|------------|
| Gene Expression | | | |



| When? | Knowledge | Understanding | Assessment |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Recombinant DNA technology | <p>Will be able to:</p> <ul style="list-style-type: none"> • Explain Sanger sequencing and gel electrophoresis in DNA sequencing • Explain the process and use of restriction endonucleases, PCR and in vivo techniques for amplifying DNA fragments • Explain the applications of recombinant DNA and evaluate the ethical financial and social issues • Explain gene therapy and the difference between somatic and germ line therapy • Explain the use of gene probes and its benefits and issues • Explain genetic fingerprinting | <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"> • interpret information relating to the use of recombinant DNA technology • evaluate the ethical, financial and social issues associated with the use and ownership of recombinant DNA technology in agriculture, in industry and in medicine • balance the humanitarian aspects of recombinant DNA technology with the opposition from environmentalists and antiglobalisation activists • relate recombinant DNA technology to gene therapy <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;">Assessment:</p> <p style="text-align: center;">Recombinant DNA technology assessment</p> |



| When? | Knowledge | Understanding | Assessment |
|-----------------------------------|-----------|---------------|------------|
| Recombinant DNA technology | | | |