Year 13: Teacher B

All numbers refer to specification points

Timing	Unit Title	Key Question	Knowledge	Assessing understanding
Autumn Autumn 2	**3.5 Energy transfers in and between organisms Specification references: 3.5.1/3.5.2** **3.7.1 inherited change**	**How does Life depend on continuous transfers of energy?** **How are characteristics inherited ?**	• In photosynthesis, light is absorbed by chlorophyll and this is linked to the production of ATP. • In respiration, various substances are used as respiratory substrates. The hydrolysis of these respiratory substrates is linked to the production of ATP. • In both respiration and photosynthesis, ATP production occurs when protons diffuse down an electrochemical gradient through molecules of the enzyme ATP synthase, embedded in the membranes of cellular organelles. • The process of photosynthesis is common in all photoautotrophic organisms and the process of respiration is common in all organisms, providing indirect evidence for evolution. • In communities, the biological molecules produced by photosynthesis are consumed by other organisms, including animals, bacteria and fungi. Some of these are used as respiratory substrates by these consumers. • Photosynthesis and respiration are not 100% efficient. • The individuals of a species share the same genes but usually have different combinations of alleles of these genes, and the individual inherits alleles from their parents. While this process is universal, the way in which the alleles interact to	**How understanding is assessed** Students will be assessed on their ability to: • Recall the knowledge covered • Explain the Biological processes covered. • Interpret graphical and experimental data, • Make connections between different areas of understanding. **Skills** • Description • Explanation • Evaluation • Comparison • Planning and carrying out investigations • Carrying out statistical tests and applying maths formulae Students will also be assessed on their ability to effectively carry out the following: <u>Required practical 7</u>: Use of chromatography to investigate the pigments isolated from leaves of different plants, eg, leaves from shade-tolerant and shade-intolerant plants or leaves of different colours. <u>Required practical 8:</u> Investigation into the effect of a named factor on the rate of dehydrogenase activity in extracts of chloroplasts

			produce the characteristics of the new individual depends on the type of inheritance involved. Sometimes one allele is dominant to another and so expresses itself, at other times the two alleles are equally dominant and the offspring have intermediate features.	Required practical 9: Investigation into the effect of a named variable on the rate of respiration of cultures of single-celled organisms. ***Jan mocks – everything up to and including inheritance***
Spring	**3.7.2 -3.7.3 Inheritance Populations Evolution and speciation**	**How do genes determine who we are?**	• The theory of evolution underpins modern Biology. • All new species arise from an existing species. • This results in different species sharing a common ancestry, as represented in phylogenetic classification. • Common ancestry can explain the similarities between all living organisms • The individuals of a species share the same genes but (usually) different combinations of alleles of these genes. An individual inherits alleles from their parent or parents. • A species exists as one or more populations. There is variation in the phenotypes of organisms in a population, due to genetic and environmental factors. Two forces affect genetic variation in populations: • Genetic drift and natural selection. • A change in the allele frequency of a population is evolution. • If a population becomes isolated from other populations of the same species, there will be no gene flow between the isolated population and	**How understanding is assessed** Students will be assessed on their ability to: • Recall the knowledge covered • Explain the Biological processes covered. • Interpret graphical and experimental data, • Make connections between different areas of understanding. **Skills** • Description • Explanation • Evaluation • Comparison • Planning and carrying out investigations • Carrying out statistical tests and applying maths formulae

			the others. This may lead to the accumulation of genetic differences in the isolated population, compared with the other populations. These differences may ultimately lead to organisms in the isolated population becoming unable to breed and produce fertile offspring with organisms from the other populations. This reproductive isolation means that a new species has evolved. Specification references : 3.7.1 -3.7.3	
Summer	**3.8 the control of gene expression**	**How can we use the knowledge we have about genes?**	An understanding that : ● Although the cells within an organism carry the same coded genetic information, they translate only part of it. ● In multicellular organisms, this control of translation enables cells to have specialised functions, forming tissues and organs. ● There are many factors that control the expression of genes and, thus, the phenotype of organisms. ● The expression of genes is not as simple as once thought, with epigenetic regulation of transcription being increasingly recognised as important. ● Humans are learning how to control the expression of genes by altering the epigenome, and how to alter genomes and proteomes of organisms. This has many medical and technological applications.	How understanding is assessed **Students will be assessed on their ability to:** ● Recall the knowledge covered ● Explain the Biological processes covered. ● Interpret graphical and experimental data, ● Make connections between different areas of understanding. **Skills :** ● Description ● Explanation ● Evaluation ● Comparison ● Planning and carrying out investigations ● Carrying out statistical tests and applying maths formulae

			• Consideration of cellular control mechanisms underpins the content of this section. Students who have studied it should develop an understanding of the ways in which organisms and cells control their activities. This should lead to an appreciation of common ailments resulting from a breakdown of these control mechanisms and the use of DNA technology in the diagnosis and treatment of human diseases. Specification references: 3.8	