مدرسة القديسة مريم الكاثوليكية الثانوية – دبي

ST. MARY'S CATHOLIC HIGH SCHOOL, DUBAI

Lesson Plan

Subject	**Biology**
Class/ Section	**Yr 9 B- F**
Week	**Week 3 : 12th September to 16th September,2021**
Work send to students by	**Google classroom**
Total number of lessons per week	**3**
Unit/Topic	**SB1- Key biological concepts: SB 1a: Microscopes**
Key Vocabulary	**Magnification, resolution, objective lens, eyepiece**
Live Zoom lesson along with face to face instruction for students present on a particular day **Work will be assigned in google classroom which will be matched to the students ability.**	**Lesson 1: Topic SB 1a: Microscopes** **Specific Learning objectives:** Explain how changes in microscope technology, including electron microscopy, have enabled us to see cell structures with more clarity and detail than in the past. **Specific Intended Learning Outcomes:** • State the function of parts of a light microscope. • Differentiate between the working of light and electron microscope. • Describe how a microscope can be used to view biological slides. **Tasks:** Teacher Ask students what a microscope is and why this is called a 'light microscope'. Students must watch the video link given below on https://www.youtube.com/watch?v=YRuX39Owjvc Students create a table to compare the advantages and disadvantages of the use of light & electron microscope.

Assessment Criteria/ Essential questions:	**Support:** Identify the purpose of a lens in a microscope **Stretch:** Enlist few advantages and disadvantages of the use of light & electron microscope. **Extend:** Explain why can't we see mitochondria in the light micrograph of a cell.
Resources:	PowerPoint /Board work, Textbook & Video link
	Lesson 2: Topic SB 1a: Microscopes **Specific Learning objectives**: Demonstrate an understanding of size and scale in relation to microscopy, including magnification calculations. **Specific Intended Learning Outcomes:** • Calculate the magnification of the specimen viewed using the formula M = O/ A. • Calculate the actual length and observed length of a specimen. **Tasks:** Teacher points out that an eye test is testing resolution. A 'digital zoom' uses electronics to magnify part of an image. Students must watch the video link given below on https://www.youtube.com/watch?v=VBdVARYWq1c https://www.youtube.com/watch?v=FdaLMkoHF2o Teacher discusses how to calculate magnification and length of specimen through model problems. Students to complete Worksheet 1a.3 turn in their work in GC.
Assessment Criteria/ Essential questions:	**Support:** Identify the magnifications of light and electron microscope. **Stretch:** Estimate the size of a bacterium from a given image and magnification. Calculate the magnification of the specimen when the actual length is given. **Extend:** Flu virus particles are about 130 nm in diameter. What magnification will be needed in order to produce an image in which the flu virus is 2.6 cm in diameter?
Resources	PowerPoint /Board work, Textbook, Worksheet &Video l

	Lesson 3: Topic SB 1a: Microscopes **Specific Learning objectives**: Demonstrate an understanding of size and scale in relation to microscopy, including magnification calculations. **Specific Intended Learning Outcomes:** • Convert the derived dimensions as required cm- mm/mm- µm/ µm- nm. • Describe the use of scale bar to calculate actual & measured dimensions. **Tasks:** Teacher reviews the previous topic through a round of questions and Writes up $A \times 10^n$ on the board and explain how standard form works. Use arrows to illustrate how the unit moves by the number of times shown by the power of ten, both to the left and right for positive and negative powers. Students must watch the video link given below on https://www.youtube.com/watch?v=pjA4dXh3EWk https://www.youtube.com/watch?v=DPwhJ8FJ9LU&t=1s Students to complete the Textbook questions related to Magnification calculations on pgs 2-3 turn in their work in GC.
Assessment Criteria/ Essential questions:	**Support:** Write a given length in standard form. **Stretch:** Convert the given length as required cm- mm/mm- µm/ µm- nm. Use a scale bar to estimate the size of a mitochondrion from a given image. **Extend:** Ribosomes were not identified until the 1950s, 300 years after Hooke and van Leeuwenhoek identified living cells. Explain why this was and what developments had taken place in that period to make this possible
Resources:	PowerPoint /Board work, Textbook &Video link

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Lesson Plan

Subject	**Biology**
Class/ Section	**Yr 10 A-F**
Week	**Week 3 : 12th September to 16th September,2021**
Work send to students by	**Google classroom**
Total number of lessons per week	**4**
Unit/Topic	**SB3-GENETICS**
Key Vocabulary **Lessons 1,2,3 –Live Zoom lesson along with face to face instruction for students present on a particular day** **Work will be assigned in google classroom which will be matched to the students ability**	**Lesson 1: SB3d-PROTEIN SYNTHESIS** **Specific Learning objectives:** Describe the stages of protein synthesis- Transcription and Translation **Specific Intended Learning Outcomes:** ➢ Differentiate the role of mRNA, t RNA & r RNA in protein synthesis. ➢ Identify the role of key components in transcription & translation. ➢ Describe the stages of translation & transcription in detail. ➢ Define and explain the significance of triplet codon, codon and anti-codon. **Tasks:** 1. Review the stages of transcription and translation in protein synthesis. 2. **Students must watch the video link given below on** https://www.youtube.com/watch?v=gG7uCskUOrA 3. Read Text book Page-58-59 4. Complete the questions 8-10,S1 , E1 and exam style question (pg 55-59) assigned from the Biology text book in the notebook. Students will be put in break out rooms during Zoom lesson to encourage collaborative learning.

Assessment Criteria/ Essential questions:	**Support:** What is the role of mRNA, t RNA & r RNA in protein synthesis? What is the end product of translation? What is the end product of transcription? **Stretch:** Explain how the order of the substances in chain P is determined. ***Extended:*** Describe the stages of translation & transcription in detail.
Resources:	The **ALDS** video *SB3d Protein synthesis* Text Book, PowerPoint /Board work &Video link Edexcel GCSE(9-1) Biology Textbook Interactive power point from Board works
	Lesson 2: SB3e-GENETIC VARIANTS AND PHENOTYPES **Specific Learning objectives: a.** Describe how genetic variants in the non-coding DNA of a gene can affect phenotype by influencing the binding of RNA polymerase and altering the quantity of protein produced. **b.** Describe how genetic variants in the coding DNA of a gene can affect phenotype by altering the sequence of amino acids and therefore the activity of the protein produced. **Specific Intended Learning Outcomes:** ➢ Identify the role of RNA polymerase in protein synthesis. ➢ Predict factors altering the quantity of proteins produced . ➢ Differentiate introns & exons . ➢ Explain the importance of triplet code /genetic code in sequence of amino acids and therefore the activity of the protein produced. ➢ **Explain** how mutations can influence RNA polymerase binding and so alter protein production. ➢ **Describe** the possible effects of mutations on amino acid sequences and protein activity. **Tasks:** 1. Review the role of RNA polymerase in protein synthesis. **2. Students must watch the video link given below on** https://www.youtube.com/watch?v=M4ut72kfUJM 3. Read Text book Page-60-61 4. Complete the questions 5,7,8 and exam style question (pg 60-61) assigned from the Biology text book in the notebook. Students will be put in break out rooms during Zoom lesson to encourage collaborative learning.
Assessment Criteria/ Essential questions:	**Support**: Ask students to work in pairs to answer question S1 in the Student Book .Once pairs have completed their answers they should join with another pair to discuss their responses and refine them.

Resources:	**Stretch**: Ask students to draw a concept map to explain how mutations can cause too much of a protein, too little, or proteins that do not function well highlighting the key points or ask students to work in groups to produce two flow charts to show how mutations in the non-coding region before a gene and in the gene itself can both cause effects in a cell. **Extend:** Ask students to write down eight base triplets from an mRNA molecule. They then translate this, using diagram A from the Student Book or one of the worksheets. Students then mutate the original sequence in various ways and determine the effects on the final protein. The **ALDS** presentation *SB3e Genetic* variants and phenotypes illustrates the effects of point mutations in the genetic code. Text Book, PowerPoint /Board work &Video link Edexcel GCSE(9-1) Biology Textbook Interactive power point from Board works
	Lesson 3 & 4 : SB3j-GENE MUTATION-HUMAN GENOME PROJECT-HGP **Specific Learning objectives:** State that most genetic mutations have no effect on the phenotype, some mutations have a small effect on the phenotype. Discuss the outcomes of the Human Genome Project and its potential applications within medicine **Specific Intended Learning Outcomes:** ➢ Define Mutation and Identify the cause of mutations ➢ Describe how gene mutations change the DNA sequence. ➢ Explain how sickle cell mutation and mutation in the coding and non coding region. ●Beneficial effects of mutation ●Categorise mutations as harmful, beneficial and neutral in humans with examples. ➢ Explain how mutation occurs in skin cells and causes skin cancer. ➢ **Identify** the implications of sequencing the human genome (HGP). ➢ **Evaluate** the ethical issues related to HGP. **Tasks:** 1. Differentiate a gene and genome **2. Students must watch the video link given below on** https://www.youtube.com/watch?v=mmR2R8XB-JU https://www.youtube.com/watch?v=scMk0SAF4vI https://www.youtube.com/watch?v=O5VZKVCS7FY 3. Read Text book Page-70-71 4. Complete the questions 4-8 and exam style question (pg 70-71) assigned from the Biology text book in the notebook. Students will be put in break out rooms during Zoom lesson to encourage

	collaborative learning. **5. DISCUSSION ON TEXT BOOK QUESTIONS-** **SB3ci-DNA, SB3cii-DNA Extraction, SB3d-Protein synthesis.** **Page 54-59.**
Assessment Criteria/ Essential questions:	**Support:** Differentiate gene and genome. What is human genome project? **Stretch:** Give 2 ways in which information about a person's genome could be useful in medicine. **Extended:** Explain the ethical issues related to HGP
Resources:	Video on Human Genome Project and explain how mapping a person's genome can indicate their risk of developing diseases. Text Book, PowerPoint /Board work &Video link Edexcel GCSE(9-1) Biology Textbook Interactive power point from Board works

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Lesson Plan

Subject	**Biology**
Class/ Section	**Yr 11 A -F**
Week	**Week 3 : 12th September to 16th September**
Work send to students by	**Google classroom**
Total number of lessons per week	**5**
Unit/Topic	**SB6-Plant structure and their functions**
Key Vocabulary	**Transpiration, Translocation,xylem vessels, apoplast,stymplast,phloem, sieve tubes ,lignin, companion cells, epidermis, cuticle.**
	Lesson 1: SB6a-Factors that affect photosynthesis **Specific Learning objectives:** • Investigate the effect of light intensity ,temperature and

	carbon dioxide concentration on the rate of photosynthesis • Test a lef for the presence of starch & importance of chlorophyll **Specific Intended Learning Outcomes:** • Plan experiment to investigate the effect of light intensity on the rate of photosynthesis. • **Identify** controlled, independent & dependent variables for the experiment planned . • Describe how each variable can be controlled**.** • **Predict** how increase /decrease of light intensity affect rate of photosynthesis • Sequence & explain the significance of each stage in testing starch presence in a leaf • Use of variegated leaves & Elodea for photosynthesis experiments **Tasks:** 1.Students plan an investigation to test the effect of light intensity ,temperature and carbon dioxide concentration on the rate of photosynthesis 2.Identify the dependent and independent variable of the investigations. **3. S**tudents write the controlled variable in each experiment. **4.** Teacher explains why there is relationship between the rate of photosynthesis and other three factors.(light intensity ,temperature and carbon dioxide concentration) 5. Complete question 7 a & b in the student book page no.127. Students will be put in break out rooms during Zoom lesson to encourage collaborative learning.
Assessment Criteria/ Essential questions	**Support:** Explain why carbondioxide can be a limiting factor for photosynthesis. **Stretch**: In a forest, some plants grow in the shade and have very large, dark green leaves. Explain this, using the term 'limiting factor' in your answer. **Extend:** The hydrogen carbonate indicator also ensures that there is plenty of carbondioxide dissolved in the solution around the algal balls.Explain the purpose of making sure that there is good supply of carbondioxide.
Resources	ALDS video on rate of photosynthesis. Biology 9-1 student book b.6.3, b6.4, b6.6 https://www.youtube.com/watch?v=CEYr0hyxEzw https://www.youtube.com/watch?v=MZTwiM8SM4A

	Lesson 2& 3: SB6d-Transpiration **Specific Learning objectives:** • Describe how water and mineral ions are transported through the plant by transpiration, including the structure and function of the stomata. **Specific Intended Learning Outcomes:** • Describe how transpiration occurs • Identify few factors affecting transpiration. • Describe how various factors affect transpiration in plants. • Explain the effects of environmental factors on the rate of transpiration (light intensity, air movement, temperature, humidity • Show the skill to collect data and present in appropriate table form • Investgate the factors affecting transpiration using a photometer. • **Analyse & interpret** the data linked to transpiration. • Describe how to measure the rate of transpiration. **Tasks:** 1.Review the adaptions of xylem tissues. **2.**Teacher would show the ALDS animation *CB6d Transpiration* explains how various parts of the plant transport water and mineral ions. Clicking on each part of the plant opens a self-contained animation explaining transpiration in that area. **3.Students explain** what happens in a drinking straw and explain that the intermolecular forces between water molecules hold them close to one another and provide enough force to stop the water column from breaking. **4.**Challenge students to find out about capillary action and how that helps water to travel up xylem tubes. 5.Complete the text book questions on page 133 . Students will be put in break out rooms during Zoom lesson to encourage collaborative learning.
Assessment Criteria/ Essential questions:	**Support:**State two ways in which transpiration helps a plant. **Stretch :** Explain why water enters sieve tubes from neighbouring xylem vessels as sucrose is pumped to xylem vessels **Extend:** In an experiment with photometer ,a faster wind speed causes the air bubble to move more quickly than a slow wind speed .Explain this observation.
Resources	ALDS Animation on the transport of water and mineral ions. Biology student book B6.11B,B6.14B **https://www.youtube.com/watch?v=SI68H7-0DYY** **https://www.youtube.com/watch?v=vgkaW9-vFaI**

	Lesson 4& 5: SB6d-Translocation. **Specific Learning objectives:** • Describe how sucrose is transported around the plant by translocation. **Specific Intended Learning Outcomes:** • **Differentiate** between glucose and sucrose. • **Explain** the role of diffusion, osmosis and active transport in the movement of sucrose. • Compare the transport of water, mineral salts & sucrose in plants . • **Describe** how translocation occurs **Tasks:** 1.Review the adaptions of phloem tissues, **2.**Teacher would show the ALDS animation *CB6d translocation* explains how various parts of the plant transport sucrose. Clicking on each part of the plant opens a self-contained animation explaining transpiration in that area. 3.Identify the role of companion cells in translocation. 4. Teacher would explain the process of translocation using power point. 5. Students will design a table to compare transpiration and translocation. 6. Complete the text book questions on page 133 . Students will be put in break out rooms during Zoom lesson to encourage collaborative learning.
Assessment Criteria/ Essential questions	Support:Describe how phloem cells are adapted for translocation of sucrose. Stretch: Explain how sucrose is moved in plant tissue. Extend:Explain why sucrose is pumbed into the sieve tubes as water enters sieve tubes from neighbouring xylem cells.
Resources	ALDS Animation on the translocation.. Biology student book B6.11B,B6.14B https://www.youtube.com/watch?v=QXdujo4PZ7c

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Lesson Plan

Subject	Biology
Class/ Section	Yr 12 – Batch A/B (Mrs. Honey .A.S)
Week	Week 3 : 12th September to 16th September, 2021
Work send to students by	Google classroom
Total number of lessons per week	3
Unit/Topic	1.1 -Biological Molecules
Key Vocabulary	• Polymer, Starch, Oligosaccharides, Amylose, Amylopectin, Glycogen, Lipids, Fatty acid, Glycerol, Ester bond, Saturated fatty acid, Unsaturated fatty acid, Monounsaturated fatty acid, Polyunsaturated fatty acid, Esterification
Lesson 1,2,3 - Live Zoom lesson along with face to face instruction for students present on a particular day **Work will be assigned in google classroom which will be matched to the students' ability.**	**Lesson -1&2** ♠ **Specific Learning objectives:** ➢ Explain how monosaccharides join to form polysaccharides through condensation reactions forming glycosidic bonds; and how these can be split through hydrolysis reactions. ➢ Describe how the structure of polysaccharides relates to their functions. ♠ **Specific Intended Learning Outcomes:** • **Students will be able to** • **Explain**, with the aid of diagrams, the structure of glycogen • **Describe** the molecular structure of polysaccharides including starch (amylose and amylopectin), glycogen and cellulose and relate these structures to their functions in living organisms • Compare and contrast the structure and functions of starch (amylose) and cellulose ♠ **Tasks:** • **Independent student-led activity:** Draw and label the structure of maltose, starch and glycogen. They compare the properties of polysaccharides Give examples of the types of polysaccharides seen in plants and animals. Challenge groups to draw alpha and beta glucose and ribose from memory. Students peer mark then check against the textbook.

Assessment Criteria/ Essential questions:	• ***Support***: Students produce a concept map including starch, cellulose and glycogen. They should highlight which structural and functional features these share and which they do not • ***Stretch***: To find out more about carbohydrates and food health visit www.nhs.uk and search for 'carbohydrates – live well' • **Extended** -.Write a short account of the differences between amylose and amylopectin on the glycaemic index of food and the possible implications for people with diabetes **DIFFERENTIATION STRATEGIES TO ACHIEVE THE SUCCESS CRITERIA** **Support-** Textbook-Q.NO -1-page no 24 **Stretch-** Textbook-Q.NO -2 -page no 24 ***Extended* – Exam style question-1—Page no-34**
Resources:	Edexcel AS/A level Biologty 1 Textbook www.science.co.uk/biology/biologicalmolecules.html, www.internet4classrooms.com **[BOARD WORKS –Biological molecules-No -9-12]**
	Lesson -3 ♠ **Specific Learning objectives:** • Explain the synthesis of a triglyceride, including the formation of ester bonds during condensation reactions between glycerol and three fatty acids • Describe the differences between unsaturated and saturated fatty acids ♠ **Specific Intended Learning Outcomes:** • **Students will be able to** Define lipids and give examples. • Describe how the structure of lipids relates to their role in energy storage, waterproofing and insulation Explain the structure and properties of phospholipids in relation to their function in the cell membranes. ♠ **Tasks:** • **Independent student-led activity:** Students produce a series of diagrams to explain how the structure of lipids enables their role in energy storage, waterproofing and insulation. • ***Support***: Students may find it difficult to remember exactly which groups are involved when ester bonds form. The use of good visuals and repeated practice of drawing condensation and hydrolysis reactions using templates or models will support such students. • ***Stretch***: Research the recent evidence and advice regarding dietary fats and health. A good place to start is www.sciencedaily.com. Perform a search for 'dietary fat'

Assessment Criteria/ Essential questions:	**DIFFERENTIATION STRATEGIES TO ACHIEVE THE SUCCESS CRITERIA** • **Support**- TB questions 1 –page no 27 • **Stretch**- TB questions 1 and 2 –page no 27 • ***Extended*** *–Describe the difference between saturated and unsaturated fatty acids* • ***Homework:*** Produce an advertisement for a margarine high in polyunsaturated fatty acids. Include information about the margarine's molecular structure that can be understood by an audience that includes the general public
Resources:	Edexcel AS/A level Biologty 1 Textbook www.science.co.uk/biology/lipids.html, www.lipids.co.uk **Biological molecules-No -13,17,26]**

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Lesson Plan

Subject	**Biology**
Class/ Section	**Yr 12 Batch A &B (Mrs. Mary Augustine & Mrs. Deepa Varghese)**
Week	**Week 3 : 12th to 16th September, 2021**
Work send to students by	**Google classroom**
Total number of lessons per week	**3**
Unit/Topic	**Topic 2 .2– Prokaryotes & Topic 2 .1– Eukaryotes**

Key Vocabulary	**Cocci . Bacilli , Spirochaete , Vibrio , faculatative & obligate aerobes and anaerobes, F1 particle ,Cristae, Euchromatin, Heterochromatin, matrix ,nucleoplasm**
Live Zoom lesson along with face to face instruction for students present on a particular day **Work will be assigned in google classroom which will be matched to the students ability.**	**Lesson 1:** **Specific Learning objectives:** Classify Bacteria based on cell wall structure ,shape & mode of respiration **Specific Intended Learning Outcomes:** **Students able to** ●Categorise bacteria based on cell shape – bacilli, cocci, spirillum & vibrio ●Differentiate facultative & obligative aerobes & anaerobes with relevant examples ●Explain how bacteria are classified based on cell wall structure, respiration & shape **Tasks:** ● Use of video to show ways of classifying bacteria . ● Use of ppt. to explain ways by which bacteria are classified **Students to complete worksheet on** Prokaryote & text book questions pg.97 Q.1-3 ●Students will be put in break out rooms during Zoom lesson to encourage collaborative learning.
Assessment Criteria/ Essential questions:	**Support : Give** scientific names given to bacteria based on **shape** **Stretch**: Describe adaptive features of facultative & obligative aerobes & anaerobes with relevant examples **Extension :** How is antibiotic resistance developed in bacteria based on bacterial cell wall .
Resources:	●Boardworks : AS Biology , cell structure & ppt. on classification in bacteria ●Video link : **https://www.youtube.com/watch?v=7AZ41PZBwFc** ●AS Biology student book: **Text book :** 2.2.1 ● **Worksheet on** Prokaryote & text book questions pg.97 Q.1-3

	Lesson 2: **Specific Learning objectives:** Describe the ultra structure of Nucleus **Specific Intended Learning Outcomes:** **Students able to** Draw & label the various parts of the nucleus. Describe the role of nuclear membrane, nuclear pore , nucleolus , euchromatin & heterochromatin **Tasks:** ●Students to write an introduction to the organelle – nucleus in less than 30 words. They then share their ideas with the class. ●Use of videos/ ppt. to show structure of nucleus & discuss the structural & functional details of . ● the nucleus and nucleolus ●**Students to** Draw annotated diagrams of the detailed structure of nucleus &**research on ultra structure of mitochondria** ●**Students will be put in break out rooms during Zoom lesson to encourage collaborative learning.**
Assessment Criteria/ Essential questions:	**Support :** Identify the various parts of nucleus **Stretch**: Differentiate outer nuclear membrane & inner nuclear membrane **Extension :** Compare euchromatin & Heterochromatin
Resources:	**Resources:** AS Board works & ppt on nucleus structure & Video link **https://www.youtube.com/watch?v=nD2Fd0KyICA** **https://www.youtube.com/watch?v=oy0nhMMDL1M** AS Biology student book: **Text book :** 2.1.3
	Lesson 3: **Specific Learning objectives:** Describe the ultra structure of Mitochondria **Specific Intended Learning Outcomes:** Draw & label the various parts of the mitochondria. Describe the role of mitochondrial membrane, cristae, F1 particles & matrix . Significance of 70S ribosome & mitochondrial DNA **Tasks:** ●Students to write an introduction to the organelle –mitochondria in less than 60 words. They then share their ideas with the class.

	●Use of videos/ ppt. to show structure of mitochondria & discuss the structural & functional details of . mitochondria ●**Students to** Draw annotated diagrams of the detailed structure of mitochondria ●**Students to complete text book questions pg. 90 Q.1&3** ●**Students will be put in break out rooms during Zoom lesson to encourage collaborative learning.**
Assessment Criteria/ Essential questions:	**Support :** Identify the various parts of mitochondria **Stretch**: Describe how the various parts of mitochondria are related to cellular respiration **Extension :** Compare structure of Nucleus & mitochondria
Resources:	AS Board works & ppt on mitochondria structure & Video link **https://www.youtube.com/watch?v=1xX8qoEUMQM** **https://www.youtube.com/watch?v=c4JsEBI9u6I** AS Biology student book: **Text book :** 2.1.3

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Subject	**Biology**
Class/ Section	**Yr 13 – Batch A/B (Mrs. Honey .A.S / Mrs. Avita Franco)**
Week	**Week 3 : 12th September to 16th September, 2021**
Work send to students by	**Google classroom**
Total number of lessons per week	**3**
Unit/Topic	**8.1-Genetic information**
Key Vocabulary	• Homozygote, Heterozygote, Dominance, Recessive, Polygenic Monogenic cross,autosomal linkage.,crossing over,chromosome map
Lesson 1,2,3 - Live Zoom lesson along with face to face instruction for students present on a particular day **Work will be assigned in google classroom which will be matched to the students' ability.**	**Lesson -1and 2** ♠ . **Specific Learning objectives:** ♠ Inheritance of two non-interacting unlinked genes. ♠ Use chisquared (χ^2) tests to test the significance of the difference between observed and expected results ♠ **Specific Intended Learning Outcomes:** • **Students will be able to** **Analyse** genetic diagrams to solve problems involving co-dominance ,multiple alleles crosses **Apply** the chi-squared test to test the significance of differences between observed and expected results ♠ **Tasks:** • **Independent student-led activity:** Display the numbers of offspring of different phenotypes for example crosses. Ask students to calculate the ratios of each phenotype in the offspring.Use this activity to introduce and explains the idea of chi squared. If the ratios are close to a predicted pattern, how close is good enough to accept that our prediction is correct?

Assessment Criteria/ Essential questions:	• ***Support***: Outline the effects of mutant alleles on the phenotype in thefollowing human conditions:haemophilia and Huntington's disease • ***Stretch***: – Practice exam-style questions involving chi squared. Finish with an exercise in which students take it in turns to instruct you on how to complete the next step in a calculation written on the board • Extended – **Find out more about how eye colour is inherited. What genes and alleles are involved?** How to apply chi- squared test in genetic disorders **DIFFERENTIATION STRATEGIES TO ACHIEVE THE SUCCESS CRITERIA** • **Support**- TB questions 1 and 4 –page no 145[Students draw genetic diagrams for multiple alleles and co-dominance] • **Stretch**- TB questions 1 -2 page no 149[Students use the probability to predict the outcome of complex crosses] • ***Extended*** **–** TB questions 3 page no 149[Students use the chi-square test to analyse the results,] •
Resources:	Edexcel AS/A level Biologty 2 Textbook **BOARD WORKS –Inheritance -No-3-20]** **Video and PPT: : Continuous and discontinuous variation Gene and chromosome mutations** **:**www.science.co.uk/biology/genetics.html, www.internet4classrooms.com
	Lesson -3 ♠ **Specific Learning objectives:** ▪ Understand that autosomal linkage results from the presence of alleles on the same chromosome and that the results of crosses can be explained by theevents of meiosis, including black/grey body and long/vestigial wing in Drosophila. ▪ Explain how autosomal gene linkage results from the presence of alleles on the same chromosome, and that the results of the crosses can be ▪ explained by the events of meiosis ▪ Construct genetic crosses and pedigree diagrams. ♠ **Specific Intended Learning Outcomes:** • **Students will be able to** Discuss ethical, social, and medical issues that surround human disorders;. **Explain** the terms linkage and crossingover.

Assessment Criteria/ Essential questions:	Compare the sex linkage on the x chromosome and y chromosome. **Describe** chromosome mapping. **Predict** the results of autosomal linkage diagrams. **Explain** the difference between genetic diagrams and genetic pedigree diagrams. • **Interpret** the significant difference between the expected frequencies and the observed frequencies in color and texture, analyseand evaluate the quantitative data. ♠ **Tasks:** **Independent student-led activity:** • Compare autosomal linked disorders and sex linked disorders, homogametic and heterogametic, • An interactive *Drosophila* breeding activity to show linkage can be found at www.kscience.co.uk. • Click on 'Animations' then scroll down to the activity on *Drosophila* linkage. • Animations and problems on haemophilia and sex linkage are available online. Try searching for 'DNA from the beginning' ***Support***: –. **Predict** the results of • monohybrid crosses involving dominant, recessive and codominant alleles ***Stretch*** ;crosses involving multiple alleles and sex-linked characteristics. **DIFFERENTIATION STRATEGIES TO ACHIEVE THE SUCCESS CRITERIA** **Support-** TB questions 1 and 2 –page no 152 **Stretch-** TB questions 1 -3 –page no 155 ***Extended*** **–**Research how genetic markers are used to produce genetic maps. **Complete the 'Thinking Bigger' activity at the end of Chapter 8.1 in the Student Book.** • Complete the questions at the end of Section 8.1.5 and Section 8.1.6 in the Student Book.
Resources	Edexcel AS/A level Biologty 2 Textbook **BOARD WORKS –[Inheritance 3-20]** **Video and PPT:** Autosomal linlage and sex linkage. **:**www.science.co.uk/biology/linkageandcrossover..html, www.internet4classrooms.com

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Subject	**Biology**
Class/ Section	**Yr 13 Batch A/B (Mrs. Mary Augustine)**
Week	**Week 3 : 12th September to 16th September, 2021**
Work send to students by	**Google classroom**
Total number of lessons per week	**3**
Unit/Topic	**Topic 7.2:- Factors affecting Gene Expression**
Key Vocabulary	**DNA methylation/Acetylation , Histone modification, Homeobox genes, Epistasis & X chromosome inactivation .**
Live Zoom lesson along with face to face instruction for students present on a particular day **Work will be assigned in google classroom which will be matched to the**	**Lesson 1:** **Specific Learning objectives:** Explain how gene expression can be changed by epigenetic modification, including non-coding RNA, histone modification and DNA methylation that leads to diseases in humans **Specific Intended Learning Outcomes:** ●Define epigenetics ●Identify the role of DNA methylation/Acetylation & histone modification that leads to various forms of cancers in human

students ability.	**Tasks:** ●Students in groups asked to find out more about DNA methylation & demethylation , histone modification and non-coding RNA linked to gene expression .One member in each group to summarise their findings ●Use of boardworks/ppt to discuss concepts related to epigenetics **Students to research on** Moulting in insects & cause of bowel cancer, lung cancer & breast cancer **●Students will be put in break out rooms during Zoom lesson to encourage collaborative learning.**
Assessment Criteria/ Essential questions:	**Support :** Give examples of human diseases caused due to epigenetic effect . Worksheet 1 Q.1-3,Worksheet 2 Q.1 & 2 **Stretch :** Explain how various human disorders are caused due to epigenetic effect . Worksheet 1 Q.4&5&Worksheet 2 Q.3 **Extension:** Research on how coat color is controlled in Siamese cat & in mice. How is coat color in Siamese cat & in mice control different from epigenetic mechanism.
Resources:	A2 Board works ,PowerPoint on epigenetics & Video link **https://www.youtube.com/watch?v=JMT6oRYgkTk** A2 Biology student book: **Text book : 7.2.2**
	Lesson 2: **Specific Learning objectives:** Role of homeobox genes favouring development in organisms and epistasis **Specific Intended Learning Outcomes:** ●Correlate gene expression to growth & development in organisms – Homeobox genes . ●Role of DNA methylation/Acetylation , histone modification & non coding RNA in conversion of foetal haemoglobin to adult haemoglobin . **Tasks:** ●Use of video to discuss role of homeobox genes in growth & development in organisms ●Use of ppt. to discuss epigenetic mechanism involved in human growth & development

	Students to research on X chromosome inactivation – **in coat coloration & human &** complete **exam style questions from text book** Section 7.2.2 in the Student Book.***Q.1-3*** ●**Students will be put in break out rooms during Zoom lesson to encourage collaborative *learning.***
Assessment Criteria/ Essential questions:	**Support :** identify role of homebox genes in growth & development in insects **Stretch :** Explain how epigenetic mechanism is involved in growth & development in humans **Extension:** Research on how coat color is controlled in Siamese cat & in mice. How is coat color in Siamese cat & in mice control different from epigenetic mechanism.
Resources:	A2 Board works ,PowerPoint on epigenetics & Video link **https://www.youtube.com/watch?v=1Ecm8UgiXBU** A2 Biology student book: **Text book : 7.2.2**
	Lesson 3: **Specific Learning objectives: X** chromosome inactivation in coat coloration in animals . **Specific Intended Learning Outcomes:** ●Describe how X chromosome inactivation is linked to formation of Calico cats ●Explain how epistasis leads to coat coloration in mice. Role of environment in coat color of Siamese cat **Tasks:** ●Use of video to clear the concepts of X chromosome inactivation & boardworks to discuss the phenomenon of epistasis & coat color in Siamese cat . ● Students will be put in break out rooms during Zoom lesson to encourage collaborative learning. ● Quiz conducted on gene expression in organisms with use of A2 Biology boardworks **Students to complete worksheet on** Transcription factors, RNA splicing & epigenetics

Assessment Criteria/ Essential questions:	**Support :** Define epistasis& epigenetics **Stretch : Explain role of X chromosome inactivation in human chromosomal disorders** **Extension:** Co relate epistasis & epigenetics in growth and development in organisms
Resources:	A2 Board works ,PowerPoint on epistasis & X chromosome inactivation & Video link **https://www.youtube.com/watch?v=Y9vXhmI5FXM** **https://www.youtube.com/watch?v=IPs-pP2JuPY** A2 Biology student book: **Text book : 7.2.2**