**The Nottingham Emmanuel School – *Subject* Curriculum Map Biology (2022-2023)**

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| Intent statement | The science curriculum at Emmanuel will provide students with the new knowledge needed to navigate the modern world. This will allow our students to develop their scientific literacy which will enable them to make informed decisions. This will empower and equip our students to be good role models, who are mindful of the word around them and give them the skills to make meaningful contributions to society. We aim to remove barriers to learning through raising aspirations via an inclusive and diverse curriculum for all students. |
| Diversity across the curriculum | Our curriculum represents the diversity of our students by promoting science as accessible to all. We will use inclusive language, images and texts and promote scientific role models that represent the diversity of our school community. We will deliver the science curriculum with an awareness of the different religious beliefs of our students whilst being mindful of any unconscious bias. |
|  |  | AUT 1 | AUT 2 | SPR 1 | SPR 2 | SUM 1 | SUM 2 |
| Year 10 | Title and objectives | **Organisation recap and Infection and response**  | **Infection and response** | **Bioenergetics**  | **Homeostasis****(Hormones)** | **Revision** | **Homeostasis****(Nerves)** |
| Core knowledge | Complete food tests RP and Review organisation topic (especially plant organisation). Communicable Diseases and Preventing TransmissionViral, Bacterial, Fungal and Protista diseasesHuman Defence systemsPlant diseasesPlant defence responses | VaccinationAntibiotics and PainkillersGrowing Bacteria Preventing Bacterial Growth - RPDiscovery and development of drugsProduction and Uses of Monoclonal AntibodiesNon-communicable DiseasesRisk factors for Non-communicable DiseasesCancers | PhotosynthesisPlant use of glucoseLimiting FactorsRate of Photosynthesis RPMaximising the rate of photosynthesis (HT)Aerobic respirationAnaerobic respirationResponding to ExerciseMetabolism | Homeostasis (overview) and the Endocrine SystemNegative Feedback (HT)Control of Body TemperatureMaintaining water, ion and nitrogen (amino acids) balance Kidney ProblemsControl of blood glucose concentration and diabetesHormones in human reproductionContraceptionThe use of hormones to treat infertility (HT)Plant Hormones | Paper 1 revision ready for mocks . Re-teaching key areas for the exams.6 markers practice  Required practicalsIdentify areas from mocks that were weak and plan interventions  | The human nervous systemRequired practical – reaction timeThe brainThe eyeProblems with the eye |
| Skills | Application of science and personal, social, economic and environmental implicationsPlan experiments to make observations, test hypotheses and explore phenomena | Translate information between graphical and numerical formsExtract and interpret information from charts, graphs and tables in terms of risk factors.Use a scatter diagram to identify a correlation between two variables in terms of risk factors. | Balanced symbol equationsData and graphical interpretationUse data to relate limiting factors to the cost effectivenessPlan experiments to test hypothesesDiscuss Economic links with science and the food industry. | Interpret and explainsimple diagramsTranslate information between graphical and numeric formMake recommendations taking into account social and ethical issues.Have due regard for accuracy of measurements, and health and safety | Revisit required practicals. Method writing and variables.  | Use appropriate apparatus to record.Translate information between numerical and graphical formsEvaluate the benefitsand risks of procedures |
| Covid recovery | **Focus on practical skills and retrieval.** |
| Careers |  |  |  | Women in STEM careers fair organised by VWI  |  |  |
| Year 11 | Title and objectives | **Homeostasis**  | **Inheritance** | **Evolution and variation** | **Evolution and variation** | **Ecology**  | **Ecology and Revision** |
| Core knowledge | Recap / finish hormones for triple (3 weeks) Menstrual cycle ContraceptionIVF (HT)Plant hormones Nervous system Reaction time Brain Eye Problems with the eye  | Types of reproductionMeiosis Advantages and disadvantages of reproduction types InheritanceDNA and genomeInheritance and diseaseGenetic screening DNA structure Protein synthesis Gene expression Mutations | Variation Classification Theories of evolution Evolution by natural selectionSpeciationAccepting Darwin’s ideasEvidence of evolutionFossils and extinction  | Selective breeding CloningGenetic engineering Ethics of genetic technology Antibody resistance and MRSA History of genetics  | Importance of communities Organisms in the environment Competition Distribution and abundance Adapting to change Plant adaptations Feeding relationships Decay Water cycle  | Population explosion Pollution Deforestation and peat bogsMaintaining biodiversityGlobal warming Impact of environmental change Trophic Levels Food productionPaper 1 and Paper 2 revision |
| Skills | Translate information between graphical and numeric formMake recommendations taking into account social and ethical issues.Students should be able to extract information and interpret data from graphs | Understanding how models and theories change over timeCalculating probability Balancing ethical arguments | Understanding how models and theories change over timeInterpreting evolutionary trees | Considering ethical arguments to write balanced conclusions | Use a variety of models to solve problems, makepredictions and to develop scientific explanationsRecording observations Interpreting graphs and chartsPlanning and conducting investigations Calculating efficiency Calculating rate of decay | Interpreting dataEvaluation of environmental impacts Interpret uncertainties in data6 markers Required practicals  |
| Covid recovery | **Focus on practical skills and retrieval.** |
| Careers |  | Section dedicated to careers in genetic diseases |  | Women in STEM careers fair organised by VWI |  |  |
| Year 12 | Title and objectives | **1A+B Biological Molecules** **2A Cell structure and division** | **1B Biological Molecules****2B Cell membranes** **2C Cells and immune system** | **3A Transport Systems****2C Cells and immune system continued** | **3B More Exchange and transport****4A DNA, RNA, and protein synthesis**  | **4B Diversity and selection****4C Diversity and classification** **Revision** |  **Revision** **7C Populations in eco systems**  |
| Core knowledge | Molecules of life SugarsPolysaccharides Lipids Proteins Enzymes Factors effecting enzymes Enzyme controlled reactionsDNA and RNA DNA replication Eukaryotic and OrganellesProkaryotic cells and viruses Cell components Cell division – mitosis Investigation mitosis  |  Antigens The immune response Immunity and vaccines Antigenic variation ATP Water Inorganic ionsCell membranes Diffusion Osmosis Active transport  | Size and surface areaGas exchange Gas Exchange in Humans Effects of lung diseaseInterpreting data Dissecting gas exchange systems Antibodies in medicine Interpreting data HIV and viruses  | Digestion and Absorption Haemoglobin The circulatory system The Heart Cardiovascular diseaseTransport in plants DNA Genes and chromosomes RNA and Protein synthesis Transcription Translation Genetic Code and nucleic acids  | Meiosis and Genetic variation Mutations Genetic diversity Natural selection Effects of selection Investigating selection Classification of Organisms Classification using courtship behaviour Classification using DNA Using gene technologies to assess genetic diversity Investigating variation Biodiversity Agriculture and Biodiversity  | Revision for mocks Ecosystems Variation in population size Investigating populations Succession Conservation Conservation evidence and data  |
| Skills | RP 2 - Mitotic index | RP 1 - Variable on enzymeRP 3 – OsmosisRP 4 - Membrane Fluidity |  | RP 6 - Aseptic techniqueRP 5 - Dissection of mass transport |  | RP 12 - Investigating environmental factor |
| Covid recovery | Focus on practical skills and retrieval. | Focus on practical skills and retrieval. | Focus on practical skills and retrieval. | Focus on practical skills and retrieval. | Focus on application style questions  | Focus on application style questions |
| Careers |  |  |  | Women in STEM careers fair organised by VWI |  |  |
| Year 13 | Title and objectives | 5A Photosynthesis 7A Genetics | 5A Respiration 5B Energy Transfer and Nutrient Cycles7B Populations and Evolution  | 8A Mutations and Gene Expression 8B Genome Projects and Gene Technologies | 6A Stimuli and Responses6B Nervous Coordination6C Homeostasis | Catch up and RevisionExams | Exams |
| Core knowledge | Photosynthesis and energyLight-dependent reactionLight-independent reactionLimiting Factors of photosynthesisPhotosynthesis experimentsMonohybrid and dihybrid crossesLinkageEpistasisChi-squared test | Respiration and energyAerobic and anaerobic respirationMitochondrial reactionsRespiration experimentsHardy-Weinberg PrincipleVariation and SelectionSpeciation and Genetic Drift | MutationsMutagenic agentsCancerInterpreting data on cancerStem cellsStem cells in medicineRegulation of transcription and translationEpigeneticsEvaluating data on phenotypes | Survival and ResponseNervous communicationResponses in plantsReceptorsControl of heart rateNeuronesSynaptic transmissionMuscle structure and contractionHomeostasis and control of blood glucose concentrationDiabetesKidneysControlling blood water potential  |  |  |
| Skills | RP 7 - Chromatography pigmentsRP 8 - Dehydrogenase rate of chloroplasts | RP 9 - Rate of respiration | RP 10 - Movement in choice chamber | RP 11 - Dilution series glucose |  |  |
| Covid recovery | Focus on application style questions | Focus on application style questions | Focus on application style questions | Focus on application style questions | Focus on application style questions | Focus on application style questions |
| Careers |  |  |  | Women in STEM careers fair organised by VWI |  |  |