**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 Transmission  Viral, Bacterial, Fungal and Protista diseases  Human Defence systems  Plant diseases  Plant defence responses | Vaccination  Antibiotics and Painkillers  Growing Bacteria  Preventing Bacterial Growth - RP  Discovery and development of drugs  Production and Uses of Monoclonal Antibodies  Non-communicable Diseases  Risk factors for Non-communicable Diseases  Cancers | Photosynthesis  Plant use of glucose  Limiting Factors  Rate of Photosynthesis RP  Maximising the rate of photosynthesis (HT)  Aerobic respiration  Anaerobic respiration  Responding to Exercise  Metabolism | Homeostasis (overview) and the Endocrine System  Negative Feedback (HT)  Control of Body Temperature  Maintaining water, ion and nitrogen (amino acids) balance  Kidney Problems  Control of blood glucose concentration and diabetes  Hormones in human reproduction  Contraception  The 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 practicals  Identify areas from mocks that were weak and plan interventions | The human nervous system  Required practical – reaction time  The brain  The eye  Problems with the eye |
| Skills | Application of science and personal, social, economic and environmental implications  Plan experiments to make observations, test hypotheses and explore phenomena | Translate information between graphical and numerical forms  Extract 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 equations  Data and graphical interpretation  Use data to relate limiting factors to the cost effectiveness  Plan experiments to test hypotheses  Discuss Economic links with science and the food industry. | Interpret and explain  simple diagrams  Translate information between graphical and numeric form  Make 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 forms  Evaluate the benefits  and 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  Contraception  IVF (HT)  Plant hormones  Nervous system  Reaction time  Brain  Eye  Problems with the eye | Types of reproduction  Meiosis  Advantages and disadvantages of reproduction types  Inheritance  DNA and genome  Inheritance and disease  Genetic screening  DNA structure  Protein synthesis  Gene expression  Mutations | Variation  Classification  Theories of evolution  Evolution by natural selection  Speciation  Accepting Darwin’s ideas  Evidence of evolution  Fossils and extinction | Selective breeding  Cloning  Genetic 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 bogs  Maintaining biodiversity  Global warming  Impact of environmental change  Trophic Levels  Food production  Paper 1 and Paper 2 revision |
| Skills | Translate information between graphical and numeric form  Make 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 time  Calculating probability  Balancing ethical arguments | Understanding how models and theories change over time  Interpreting evolutionary trees | Considering ethical arguments to write balanced conclusions | Use a variety of models to solve problems, make  predictions and to develop scientific explanations  Recording observations  Interpreting graphs and charts  Planning and conducting investigations  Calculating efficiency  Calculating rate of decay | Interpreting data  Evaluation of environmental impacts  Interpret uncertainties in data  6 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  Sugars  Polysaccharides  Lipids  Proteins  Enzymes  Factors effecting enzymes  Enzyme controlled reactions  DNA and RNA  DNA replication  Eukaryotic and Organelles  Prokaryotic cells and viruses  Cell components  Cell division – mitosis  Investigation mitosis | Antigens  The immune response  Immunity and vaccines  Antigenic variation  ATP  Water  Inorganic ions  Cell membranes  Diffusion  Osmosis  Active transport | Size and surface area  Gas exchange  Gas Exchange in Humans  Effects of lung disease  Interpreting data  Dissecting gas exchange systems  Antibodies in medicine  Interpreting data  HIV and viruses | Digestion and Absorption  Haemoglobin  The circulatory system  The Heart  Cardiovascular disease  Transport 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 enzyme  RP 3 – Osmosis  RP 4 - Membrane Fluidity |  | RP 6 - Aseptic technique  RP 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 Cycles  7B Populations and Evolution | 8A Mutations and Gene Expression  8B Genome Projects and Gene Technologies | 6A Stimuli and Responses  6B Nervous Coordination  6C Homeostasis | Catch up and Revision  Exams | Exams |
| Core knowledge | Photosynthesis and energy  Light-dependent reaction  Light-independent reaction  Limiting Factors of photosynthesis  Photosynthesis experiments  Monohybrid and dihybrid crosses  Linkage  Epistasis  Chi-squared test | Respiration and energy  Aerobic and anaerobic respiration  Mitochondrial reactions  Respiration experiments  Hardy-Weinberg Principle  Variation and Selection  Speciation and Genetic Drift | Mutations  Mutagenic agents  Cancer  Interpreting data on cancer  Stem cells  Stem cells in medicine  Regulation of transcription and translation  Epigenetics  Evaluating data on phenotypes | Survival and Response  Nervous communication  Responses in plants  Receptors  Control of heart rate  Neurones  Synaptic transmission  Muscle structure and contraction  Homeostasis and control of blood glucose concentration  Diabetes  Kidneys  Controlling blood water potential |  |  |
| Skills | RP 7 - Chromatography pigments  RP 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 |  |  |