Yr12 Medical Science – Unit 3

MAGHULL HIGH SCHOOL – CURRICULUM MAP

	Sequence		
TOPIC (S) **Applicataion of techniques to culture and identify microorganisms**	1. Following standard operating procedures and complying with legislation 2. Categorising biological agents in line with legislation 3. Use of PPE, biosafety classification levels and biosadety cabinets 4. Methods of sterilisation and disinfection 5. Aseptic technique	6. Safe and effective culturing of microorganisms 7. Observing microorganisms using various methods 8. Staining techniques 9. Growth characteristics in broths 10. Colony morphology identification on plates 11. Limitations of staining techniques	12. Calculating magnification 13. Types of media used when culturing organisms 14. Methods of cell culture 15. Counting populations 16. Serial dilutions, streak/spread plating 17. Principles of advanced quantitative techniques
Knowledge & Skills development	• Explain the importance of following standard operating procedures undertaking risk assessments, and compliance with relevant legislation such as Control of Substances Hazardous to Health 2002 (COSHH). • Understand current legislation relating to the use of microorganisms in the workplace, including the categorisation of biological agents according to hazard and containment requirements. • Describe the use of biosafety cabinets, biosafety classification levels, and understand the use of personal protective equipment (PPE). • Carry out different methods of sterilisation and disinfection. • Demonstrate aseptic technique: to include reducing activity in the immediate vicinity of the area, reducing exposure, use of sterile equipment, consideration of airflow in the vicinity, use of Bunsen burner flame to draw air currents upwards, flaming the neck of bottles, use of a sterile loop, pipette or spreader, sterilisation and safe disposal after exposure. • Demonstrate safe culturing of microorganisms, to include implications of temperature, contamination and sealing the Petri dishes, incubation time • Use a microscope to observe microorganisms, to include hanging drop method • Use a microscope to view protists; preparation of a smear	• Describe growth characteristics in broths, to include turbid, pellicle, sediment, flocculent • Carry out colony morphology identification on plates, to include form, elevation, margin • Describe limitations of staining techniques and morphological studies for identifying • microorganisms. • Be able to carry out calculations using magnification formula (image size = actual size × magnification) including conversion of units, rearrangement of the formula, and use of standard form. • Describe how to prepare nutrient media, nutrient broth, nutrient agar • Describe use of selective media, to include MacConkey agar, mannitol salt agar, blood agar, • potato dextrose agar. • Describe different methods of cell culture to include: stab cultures, pour plates, streaking, lawn spreads, slant tubes and broth cultures • Descibe isolation of pure cultures from mixed populations. • Carry out quantitative analysis of microbes to include total population count using a haemocytometer, counting chamber and turbidimetric methods. • Carry out viable counts: serial dilutions, streak/spread plating.	

	slide, to include air drying, fixing, use of oil • Immersion lens • Use staining techniques, to include Gram staining of bacteria, methylene blue stain and India ink staining for capsules around bacteria and yeast cells, use of mordants	• Principles of advanced quantitative techniques including flow cytometry, use of biosensors, quantitative real-time PCR (qPCR)
Assessment / Feedback Opportunities	**Formative Assessment** Teacher questioning Discussions	**Summative assessment** Final Assignment Submission
Personal Development (Including British Values, RSE, Citizenship)	• **Healthy Lifestyles** : Understanding the importance of diet • **Personal Development:** Collaborative problem solving • **Respect and Tolerance:** conflict of interest and other concepts with regards to ethical issues in Biology	
Literacy/Reading Opportunities	Subject specific vocabulary introduced before reading of related texts Word etymology from Latin and Greek roots Reading of simple and complex sentences, paragraphs, articles • Scientific writing for coursework assignments	
Key Vocabulary	Independent Variable, Dependent Variable, Control Variables, Method, Conclusion, Precaution, Evaluation, Reliable, Precision, Valid, Anomaly, Describe, Explain, Compare, Analyse, Calculate, Suggest, Absolute, Uncertainty, Error, COSHH, Haemocytometer, Incubation, Streaking, Aseptic	
Cross-Curricular Links	Numeracy/Maths – averages (means), reading scales, graph plotting, lines of best fit, using and rearranging equations, using scientific calculators Sport – Understanding processes within the human body Health and Social Care – Understanding how disorders impact everyday life, Human Lifespan	
Careers Opportunities	Forensics, , Archaeology, Biological Scientists, Microbiology, Biochemistry, Medicine, Pathology, Nursing, Health Visitor, Health Care Assistant, Paramedic Radiologist	