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| **Lesson** |  | **By the end of the lesson, you should be able to do the following:** |
| 1: Introduction to Microbes |  | * State that the three types of microorganisms are viruses, bacteria and fungi. * Describe how microorganisms undergo rapid growth by doubling. * Perform simple calculations to estimate the number of microorganisms present after a given period of time. * Give examples of how microorganisms are used to produce food and other materials. * State that pathogenic microbes cause disease. * State that some microbes can cause disease and infection and give two examples. |
| 2: Growth of Microbes |  | * State that growth of microbes depends on food, water, warm temperature and a suitable pH. * Describe how to grow microorganisms on nutrient agar using aseptic techniques. * Plan and carry out an investigation into the effect of temperature on the growth of microorganisms on nutrient agar. |
| 3: Preventing Disease |  | * Describe how barriers to infection provide a first line of defence, for example skin, mucus and stomach acids. * Describe how handwashing and covering the mouth while coughing/sneezing can control the spread of disease. * Give an informed opinion on the use of mask wearing to prevent the spread of Covid-19. |
| 4: Immune System and vaccinations |  | * Describe how the immune system protects the body if the first line of defence is breached through the action of white blood cells and production of antibodies. * State that vaccines reduce disease. * Describe how the process of vaccination protects the body from disease by injecting a weak form of the disease in order to prevent a more dangerous form harming the patient. |
| 5: Antifungal Investigation |  | * Plan and carry out an investigation to compare how effective antifungal creams are in preventing the growth of fungi. * Identify the independent (input) and dependent (output) variables in an investigation. * Explain the use of a control experiment in an investigation. * Identify examples of controlled variables in an investigation and explain why controlling these variables improves the validity of the investigation. * Draw a bar chart. |
| 6: Water Contamination |  | * Describe how microbes can contaminate water. * Describe methods to control growth of microbes in water, such as filtration, boiling and chemical sterilisation. * Carry out an investigation to investigate the effectiveness of different water purification methods. * Use counting colonies to estimate the number of microorganisms on an agar plate. * Calculate an average. * Calculate a percentage change. * Produce a scientific report of my investigation, including an aim, method, results, conclusion and evaluation. * Suggest at least two ways in which my experiment can be improved. |
| 7: Biodegradation |  | * State that microbes in the environment around us decompose different materials such as paper, leaves and vegetable matter. * Describe how some microorganisms break down food causing it to be inedible or harmful if eaten. * Describe the role of bacteria in the gut in aiding digestion. * Use information on the time taken for different materials to break down to form a timeline for decomposition. |
| 8: OPTIONAL - Producing Yoghurt |  | * State that bacteria make yoghurt by converting lactose in milk to lactic acid. * Describe how to make yoghurt. |