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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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 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.
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| 8: OPTIONAL -Producing Yoghurt |  | * State that bacteria make yoghurt by converting lactose in milk to lactic acid.
* Describe how to make yoghurt.
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