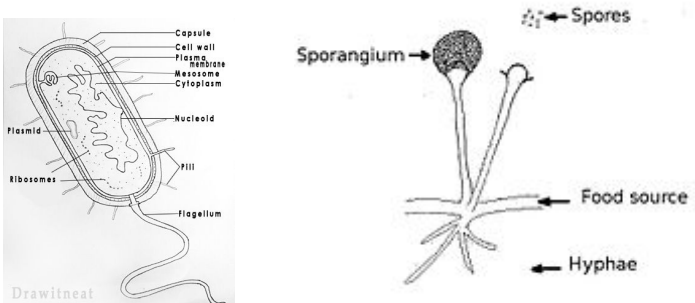


Assessment Schedule – 2019**Biology: Demonstrate understanding of biological ideas relating to micro-organisms (90927)****Evidence Statement**

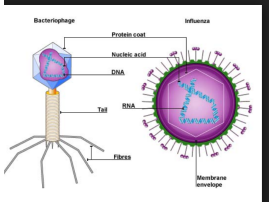
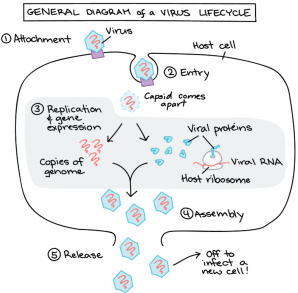
Q	Achievement	Merit	Excellence
ONE	<p>Describes (single, simple ideas):</p> <ul style="list-style-type: none"> • how fungi feed / respire / excrete OR how bacteria feed / respire / excrete • decomposition • carbon cycle. <p>Examples of possible description include:</p> <ul style="list-style-type: none"> • Fungi / bacteria feed through the process of extra-cellular digestion. • Fungi / bacteria secrete digestive enzymes through the hyphae walls. • Fungi / bacteria decompose dead material through the life process of feeding / nutrition. • Fungi / bacteria respire using oxygen (aerobic fungi) and the products of digestion to release energy for other life processes / word or symbol equation. • Fungi / bacteria cycle carbon by respiring (aerobically) releasing carbon dioxide as a waste product / word or symbol equation. • Excretion products described (lactic acid, oxygen, alcohol). • Anaerobic respiration describe / equation. 	<p>Explains (gives reasons how or why and provides examples):</p> <ul style="list-style-type: none"> • explains how fungi feed / respire / excrete • explains the role of fungi in the carbon cycle. <p>Examples of possible explanation include:</p> <ul style="list-style-type: none"> • Fungi / bacteria feed through the process of extra-cellular digestion. They do this with enzymes from the hyphae, so that the food material, e.g. the dead log is broken down into molecules small enough to be re-absorbed (or diffused) through the hyphae wall. • One of the products of digestion, glucose, is used in respiration to release energy (ATP) for the fungi to use for other life processes. The glucose containing carbon, is broken down in the process of respiration, and the carbon becomes carbon dioxide, which is excreted into the air through the hyphae walls. • Explain carbon cycle breaks down food / nutrients that can be recycled because otherwise would remain 'locked up'. 	<p>Discusses (makes links between explanations):</p> <p>Links the life processes to their importance in carbon cycling.</p> <p>Examples of possible discussion include:</p> <ul style="list-style-type: none"> • Fungi / bacteria feed through the process of extra-cellular digestion. They do this by releasing enzymes through the hyphae wall / cell membrane so that the food material, e.g. a dead log, is broken down into molecules small enough to be re-absorbed through the hyphae wall / cell membrane. The process of extra-cellular digestion (and the reabsorption of the products of digestion) are important to cycling carbon because this process is what breaks the food down into molecules, e.g. carbon, so that it can be recycled. Recycling of carbon would not be possible without this life process of fungi / bacteria because the carbon would remain locked up and inaccessible. <p>One of the products of digestion, glucose, is used in respiration to release energy for the fungi / bacteria to use for other life processes. The glucose (digested food) containing carbon, is broken down in the process of respiration, and the carbon becomes combined with oxygen to make carbon dioxide. The process of respiration in bacteria and fungi is important in cycling carbon because it breaks down the products of digestion even further to release the carbon, which is then combined with oxygen to make carbon dioxide.</p>

N0	N1	N2	A3	A4	M5	M6	E7	E8
No response / no relevant evidence.	ONE relevant idea given.	TWO relevant ideas given.	THREE relevant ideas given.	FOUR relevant ideas given.	Explains ONE relevant idea.	Explains TWO relevant ideas.	Links ONE life process to its importance in carbon cycling.	Links TWO life processes to their importance in carbon cycling.

Q	Achievement	Merit	Excellence
TWO	<p>Describes (single, simple ideas):</p> <ul style="list-style-type: none"> structure of fungi (can be labelled diagram) (<i>hyphae, food source, reproductive reference</i>) Structure of bacteria (can be labelled diagram) (<i>capsule/slime coat, cell wall, genetic material/RNA/DNA</i>) function of fungi / bacteria structures. <p>Examples of possible ideas include:</p>  <ul style="list-style-type: none"> Furry colonies are likely fungi. Shiny, round colonies are probably bacteria. Fungi grow via hyphae. Hyphae secrete enzymes for feeding. Fungi have sporangia with spores. Sporangia produce spores for reproduction. Some bacteria have flagella, which help with movement. Viruses will not be present / only living microbes (bacteria/fungi) can be cultured. Describes agar as a food source. Describes how fungi / bacteria reproduce, e.g. binary fission makes two daughter cells. Describes Plate B / warm temp microbes grow more/high number of colonies. Describes Plate A / hot temperatures kills microbes / stops growth / reproduction. Describes Plate C / cold temperatures slow growth/reproduction of 	<p>Explains (gives reasons how or why and examples):</p> <ul style="list-style-type: none"> the role of agar the links between structure and function of fungi / bacteria explains the effect of temperature on the life processes of fungi / bacteria. <p>Examples of possible explanations include:</p> <ul style="list-style-type: none"> Agar is an important part of the culturing process for fungi / bacteria. This is because it provides a source of food or nutrients, which are added to the agar. This enables bacteria / fungi to feed and therefore respire to release energy for other life processes such as growth. Agar provides nutrients (food) for microbes, sterilised surface, so growth is consistent. In order to feed, bacteria / fungi secrete enzymes onto the substrate (in this case agar) outside their bodies / cell membrane / hyphae where the food is digested and the smaller food molecules are re-absorbed. This process is called extra-cellular digestion. Explains cold temperatures will not kill bacteria only slow the growth / reproduction because of enzymes. Explains at hot temperatures enzymes denature and this stops reproduction / growth. 	<p>Discusses (makes links between explanations):</p> <ul style="list-style-type: none"> Links the effect of temperature on the rate respiration feeding / reproduction / growth. <p>Examples of possible discussions include:</p> <ul style="list-style-type: none"> We can see from the graph and the photographs that the ideal temperature for the growth of colonies of fungi and bacteria is “warm”. The photo shows us that in “warm” temperatures, the colonies are bigger and there are more of them, and the graph reflects this. This is because life processes that occur in the microbes rely on enzymes, and enzymes work most quickly and effectively at optimal temperatures. For example, the life process of feeding relies on the enzymes digesting the food extra-cellularly. The enzymes work most efficiently at warm temperatures, allowing food to be digested more quickly. This means that more food can be re-absorbed more quickly and the microbe will then have the materials required for respiration or energy release more quickly, enabling the process of respiration (also enzyme dependent) to occur efficiently. In order to feed, bacteria / fungi secrete enzymes onto the substrate (in this case agar) outside their bodies / cell membrane / hyphae where the food is digested and the smaller food molecules are re-absorbed. This process is called extra-cellular digestion. Temperatures effect how enzymes work. Cold temperatures will not kill bacteria only slow reproduction (life process) because of enzymes AND hot temperatures denature enzymes and this stops/slows reproduction / growth.

	microbes. • Describes microbes grow best at optimal temperatures/ideal temperatures.		
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NØ	N1	N2	A3	A4	M5	M6	E7	E8
No response / no relevant evidence.	ONE relevant idea given.	TWO relevant ideas given.	THREE relevant ideas given.	FOUR relevant ideas given.	Explains ONE relevant idea.	Explains TWO relevant ideas.	Links the effect of temperature on ONE life processes (including growth).	Links the effect of temperature on TWO life processes (including growth).

Q	Achievement	Merit	Excellence
<p>THREE</p>	<p>Describes (single, simple ideas)</p> <ul style="list-style-type: none"> • reproduction of viruses • causes of the symptoms of chickenpox • structure and function of a virus. <p>Examples of possible ideas include:</p>  <p>GENERAL DIAGRAM of a VIRUS LIFECYCLE</p>  <ul style="list-style-type: none"> • Chickenpox symptoms are caused by the virus reproducing in the body cells. • Viruses need living cells (attached to host cell) to reproduce. • A vaccine causes the body to make antigens / protects against the actual disease. • A vaccine is made from a weakened form of the virus. • Viruses are not living and only carry out reproduction therefore (antibiotics) ‘nothing’ to kill. • Antibiotics ‘work’ on bacteria because they are living. • Describes how viruses spread. • Antibiotic block / stop bacteria from carrying out any life processes. 	<p>Explains (gives reasons how or why and examples):</p> <ul style="list-style-type: none"> • viral reproduction • parts of the virus and their function • why they are easily spread • why / how antibiotics are effective against bacteria. <p>Examples of possible explanations (gives reasons for how or why) include:</p> <ul style="list-style-type: none"> • To reproduce, the virus attaches itself to a specific host cell (the cell in which it will reproduce), in this case human cells. The virus is therefore able to inject its genetic material into the host cell so that the host cell can be made to produce new viruses. This causes the living cell to die and open up, releasing the new viruses, so that they can be spread to cells and organisms. • Viruses, such as the one that causes chickenpox, are easily spread and transferred from person to person because they are airborne or travel in the air. So if a person infected with the virus is in the same room as other people, it may spread from the one person to many others. Another reason they are easily spread is because a person may be infected and contagious before they realise they have the disease. This is because it takes a number of days for the symptoms to show. • The virus has a number of structures that allow it to reproduce quickly. • Explains how vaccines work and identifies for treatment this occurs before getting the viruses, e.g. vaccine is weakened form of viruses and causes the body to make antigens. • Explains the function of antibiotics, e.g. antibiotics prevent the growth of bacteria reproduction by preventing the cell wall formation. 	<p>Discusses (makes links between explanations):</p> <ul style="list-style-type: none"> • reasons for the effect of antibiotics on bacteria • reasons why antibiotics are ineffective against viruses. <p>Examples of possible discussions include:</p> <ul style="list-style-type: none"> • Antibiotics are effective against bacteria, but not viruses. This is because antibiotics are effective only against living things, and bacteria are living carrying out the life processes of MRS GREN. Antibiotics kill living bacterial cells, while leaving human cells alone. This is because, although there are similarities between bacteria and human cells, there are many differences as well. Antibiotics work by affecting things that bacterial cells have but human cells don’t. For example, human cells do not have cell walls, while many types of bacteria do. The antibiotic, e.g. penicillin, works by keeping a bacterium from building a cell wall. The bacterium cannot function without a cell wall because it is responsible for providing structure to the bacterial cell and maintaining the contents of the cell. Bacteria and human cells differ in that human cells do not have a cell wall, and also in the structure of their cell membranes and the machinery they use to build proteins or copy DNA. • Antibiotics can kill bacteria by damaging the cell wall and preventing life processes (reproduction / growth) without causing harm to a person. • Antibiotics damage the cell membrane of just bacterial cells, preventing life processes, but not human cells. • Antibiotics affect protein-building or DNA-copying machinery that is specific to bacteria, whereas viruses are not living, and therefore cannot have their life processes disrupted. <p>(Must refer to chickenpox context for E8)</p>

	<ul style="list-style-type: none"> • Antibiotics do not ‘work’ on viruses because they have no cell wall (for attachment). • Describes how viruses reproduce, e.g. viruses insert genetic material and cell makes new viruses. 		
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NØ	N1	N2	A3	A4	M5	M6	E7	E8
No response / no relevant evidence.	ONE relevant idea given.	TWO relevant ideas given.	THREE relevant ideas given.	FOUR relevant ideas given.	Explains ONE relevant idea.	Explains at least TWO relevant ideas.	Discusses the effect of antibiotics on bacteria OR reason for their ineffectiveness on viruses. (one for either)	Discusses the effect of antibiotics on bacteria AND reason for their ineffectiveness on viruses. (one for both)

Cut Scores

Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
0 – 7	8 – 13	14 – 19	20 – 24