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90927



909270



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SUPERVISOR'S USE ONLY

Level 1 Biology, 2016

90927 Demonstrate understanding of biological ideas relating to micro-organisms

9.30 a.m. Wednesday 23 November 2016

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of biological ideas relating to micro-organisms.	Demonstrate in-depth understanding of biological ideas relating to micro-organisms.	Demonstrate comprehensive understanding of biological ideas relating to micro-organisms.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–8 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

Achievement

TOTAL

12

ASSESSOR'S USE ONLY

QUESTION ONE: PRESERVING FOOD

Fresh food can be spoiled and go off due to the presence of micro-organisms. Freeze-drying is one way of preserving food so that it can be stored for a long time before use. The diagram below shows how freeze-drying is carried out.



Adapted from: <http://www.lio-licious.com/useful-info>

Discuss how the process of freeze-drying helps to preserve food.

Your answer should:

- describe the environmental factors required for micro-organisms to carry out life processes
- describe where the micro-organisms that spoil food come from
- explain how micro-organisms carry out life processes that cause food to spoil or go off
- explain what the freeze-drying process does that helps to preserve food.

The micro-organisms need to carry out the seven life processes, Movement, Reproduction, Sensitivity, Growth, Respiration, Excretion and Nutrition. To do these, the micro-organisms need to be in an environment with the correct amount of moisture

temperature and oxygen (whether it be enough of or not of). The micro-organisms that spoil food can come from a variety of places such as the surface of the food is on or other things touching them but if stored incorrectly the spoiling micro-organisms can come from other food. When micro-organisms perform the life process of excretion when they are on the food, they are leaving waste products which spoils the food and can potentially harm humans and other creatures, when consumed. The freeze-drying process helps to preserve food by cooling down the environment and that the bacteria micro-organisms are in and removing the moisture so that the micro-organisms can no longer survive because they will freeze to death or can no longer perform their life processes.

A4

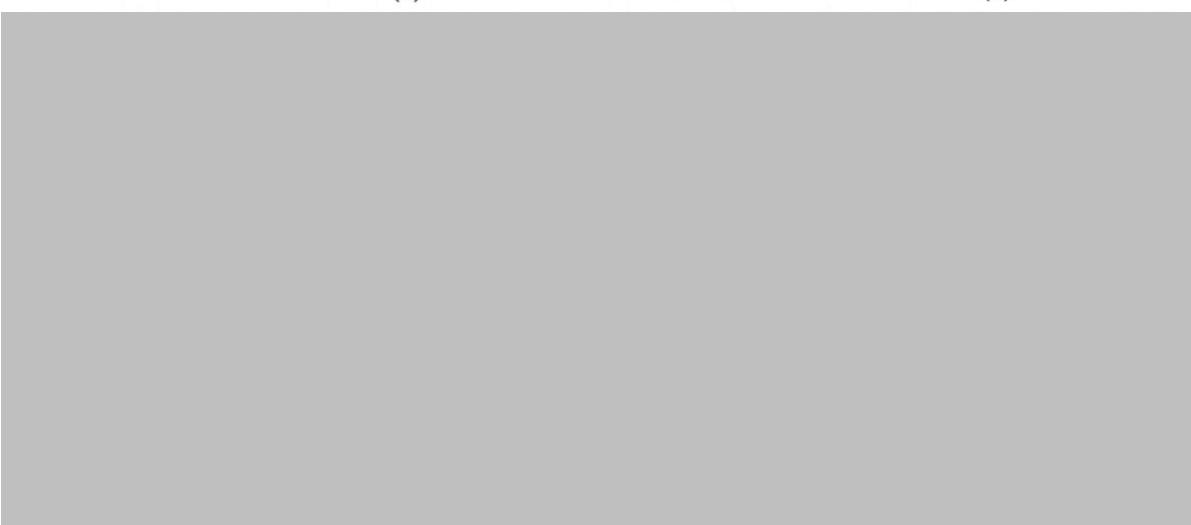
QUESTION TWO: FUNGI AS PLANT PATHOGENS

Loss of crops or food spoilage due to fungal diseases caused by fungal pathogens can have a large impact on human food supplies.



(a)

(b)



(c)

(d)

Some fungal pathogens include (a) green mould on grapefruit, (b) powdery mildew on a zinnia, (c) stem rust on barley, and (d) grey rot on grapes.

Source: www.boundless.com/biology/textbooks/boundless-biology-textbook/fungi-24/fungal-parasites-and-pathogens-152/fungi-as-plant-animal-and-human-pathogens-600-11819

Discuss how fungi feed, grow, and reproduce as pathogens on plants, and how damage to crops or food spoilage from fungal pathogens can be minimised.

Your answer should:

- define the term pathogen
- explain how fungi feed, grow, and reproduce on plants
- explain how environmental factors allow fungi to grow quickly on plants
- explain how crop damage or food spoilage from fungal growth could be minimised
- compare the links between the methods used to control fungi and the expected changes to fungal growth and reproduction.

A pathogen is a micro-organism that causes disease. Fungi feed using extra-cellular digestion to absorb the nutrients on the plant they are on by secreting enzymes, they reproduce by releasing spores that spread out around them. The spores then feed so that they can grow and reproduce themselves. If the temperature and available nutrients in the environment are suitable the fungi can grow and perform its life processes and but if the temperature is just right and there are many available nutrients the fungi will grow more quickly. Food spoilage and crop growth, can be minimized by poisoning the fungi but not the plant or by making the environment unsuitable for the fungi to live. All the methods to control fungi involve prohibiting them from performing their life process processes so that the fungi can't harm the crops and food.

A4

QUESTION THREE: NUTRIENT CYCLING

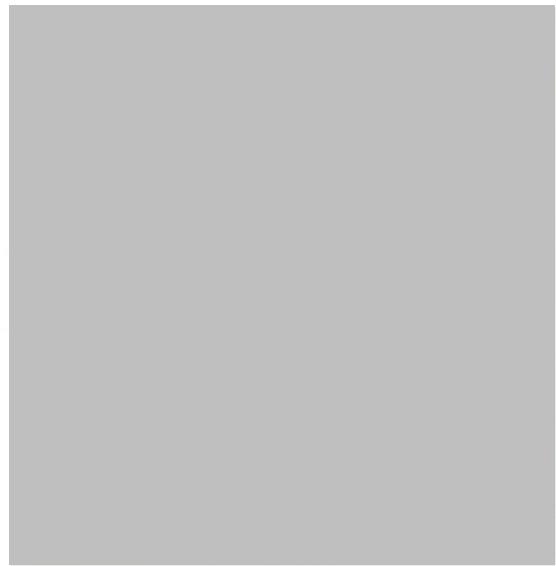
Nitrogen and carbon are two essential nutrients cycled by micro-organisms.

The Nitrogen Cycle



Sources: https://en.wikipedia.org/wiki/Nitrogen_fixation

The Carbon Cycle



www.thinglink.com/scene/700750299547041793

Compare and contrast the role of micro-organisms in nutrient cycling in the nitrogen and carbon cycles.

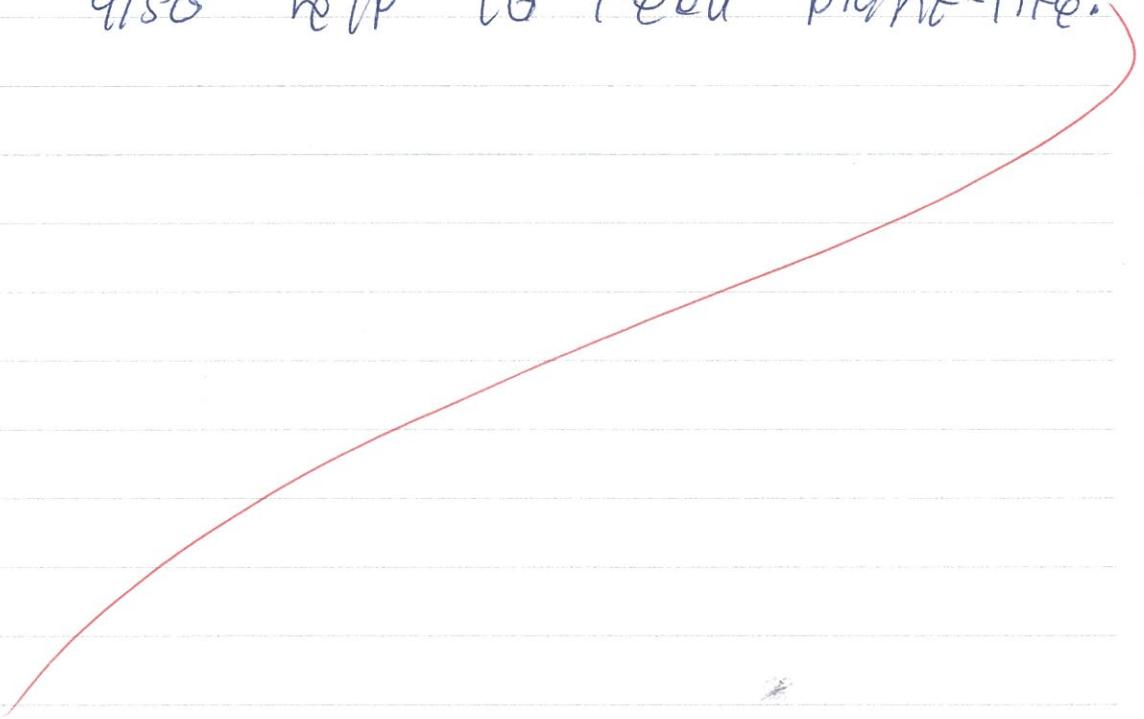
Your answer should:

- describe the role of micro-organisms in nutrient cycling in the nitrogen cycle
- describe the role of micro-organisms in nutrient cycling in the carbon cycle
- explain why nutrient cycling is important to the ecosystem
- discuss the similarities and the differences in the role of micro-organisms in nutrient cycling for the nitrogen and the carbon cycles.

In the Nitrogen cycle, micro-organisms help to decompose plants back into sand and excrete Ammonium back into the earth which then becomes a Nitrate for the plants to feed on or for denitrifying bacteria to release back into the atmosphere which then goes back into the earth which Nitrogen fixing bacteria then use to make Ammonium. In the carbon cycle micro-organisms decompose waste

products or dead things which they then use to excrete the carbon back into the atmosphere. Nutrient cycling is important to the ecosystem because all living things require nutrients so if plants couldn't perform photosynthesis, they couldn't produce nutrients which animals could then use to as a food source and if the denitrifying bacteria didn't release nitrogen back into the atmosphere all the animals would suffocate and die.

In both nutrient cycles ~~both nitrogen~~ micro-organisms decompose the dead and waste products ~~but~~ and return nitrogen and carbon to the atmosphere but in the Nitrogen cycle the micro-organisms ~~else~~ also help to feed plant-life.



**Extra paper if required.
Write the question number(s) if applicable.**

Annotated Exemplar Template

Achievement exemplar 2016

Subject:		Biology	Standard:	90927	Total score:	12
Q	Grade score	Annotation				
1	A4	<p>This is an A4 because it demonstrates understanding of biological ideas relating to micro-organisms. It does this by providing evidence of at least 4 relevant biological ideas relating to the effect on environmental factors of the freeze-drying process, on micro-organism life processes. For example, it describes moisture, correct temperature and oxygen as environmental factors required for micro-organisms to carry out life processes, the source of micro-organisms that spoil food, how micro-organisms spoil food and how the freeze-drying process helps to preserve food. In order to gain M5 the response would need to provide evidence of in-depth understanding by explaining a relevant biological idea.</p>				
2	A4	<p>This is an A4 because it demonstrates understanding of biological ideas relating to micro-organisms. It does this by providing evidence of at least 4 relevant biological ideas in relation to the life processes of fungi, the environmental factors required for these life processes to be carried out or how the growth of fungal pathogens could be minimised. For example, the response defines the term pathogen, describes fungal extra-cellular digestion, describes the effect of temperature and nutrients on fungi and describes possible control methods of fungi. In order to gain M5 the response would need to provide evidence of in-depth understanding by explaining a relevant biological idea.</p>				
3	A4	<p>This is an A4 because it demonstrates understanding of biological ideas relating to micro-organisms. It does this by providing evidence of at least 4 relevant biological ideas in relation to the role of micro-organisms in nutrient cycling in the carbon and nitrogen cycles. For example, it describes the role of micro-organisms as decomposers in the nitrogen and the carbon cycles, the role of bacteria in the steps involved in cycling nitrogen and it describes the importance of nutrient cycling in the ecosystem. In order to gain M5 the response would need to provide evidence of in-depth understanding by explaining a relevant biological idea.</p>				