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NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

Level 1 Biology, 2013

90927 Demonstrate understanding of biological ideas relating to micro-organisms

9.30 am Thursday 14 November 2013
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 2–9 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.

TOTAL

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You are advised to spend 60 minutes answering the questions in this booklet.

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QUESTION ONE: DIGESTION AND REPRODUCTION PROCESSES

(a) Describe the processes of digestion and reproduction in bacteria and in fungi.
You may use labelled diagrams.

Digestion process in bacteria:

Digestion process in fungi:

Reproduction process in bacteria:

Reproduction process in fungi:

(b) Compare and contrast these processes of digestion and reproduction in bacteria and in fungi.

In your answer:

- explain the process of digestion in bacteria and in fungi
- explain the process of reproduction in bacteria and in fungi
- discuss the similarities and differences between digestion and reproduction in bacteria and in fungi, making links between the structures of the organisms and the processes.

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QUESTION TWO: ANTIBIOTICS

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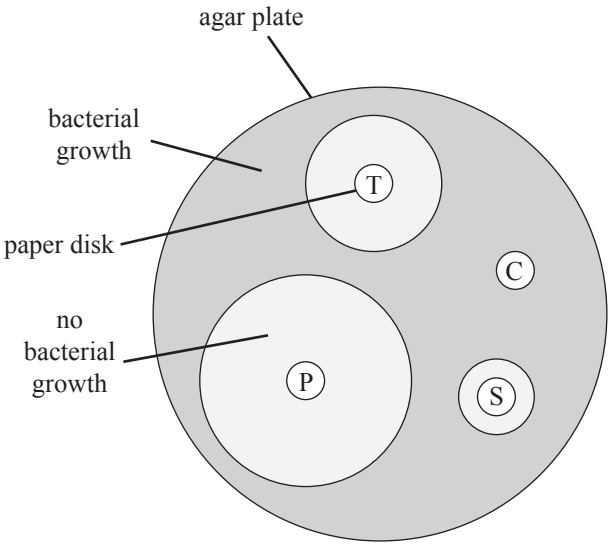
Antibiotics are used routinely to treat infections. Not every antibiotic is effective against every species of bacteria. Scientists can carry out experiments to show how effective an antibiotic will be against specific bacteria. In this experiment, a culture of bacteria is spread over an agar plate using sterile techniques. Then, paper disks containing antibiotic are placed carefully onto the agar plate, which is then incubated for two days. The results of one test are shown below.

Effectiveness of three antibiotics against *E. coli*

Key	
C	Control
P	Penicillin
S	Streptomycin
T	Tetracycline



Discuss the experiment, explaining which antibiotic would be most effective against the *E. coli* infection and how this can be determined.

In your answer you should:

- describe which antibiotic was the most effective and explain how this can be determined
- explain the purpose of the control in this experiment
- explain why the agar plate should be sterile before the bacteria are placed on it
- explain how the agar plate is inoculated to get an even growth of bacteria.

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QUESTION THREE: COMPOST AND NUTRIENT CYCLING

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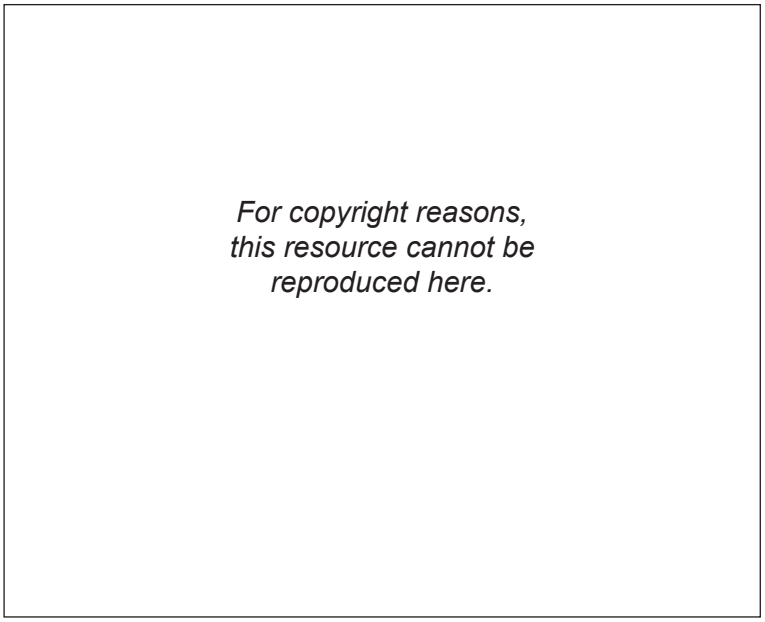
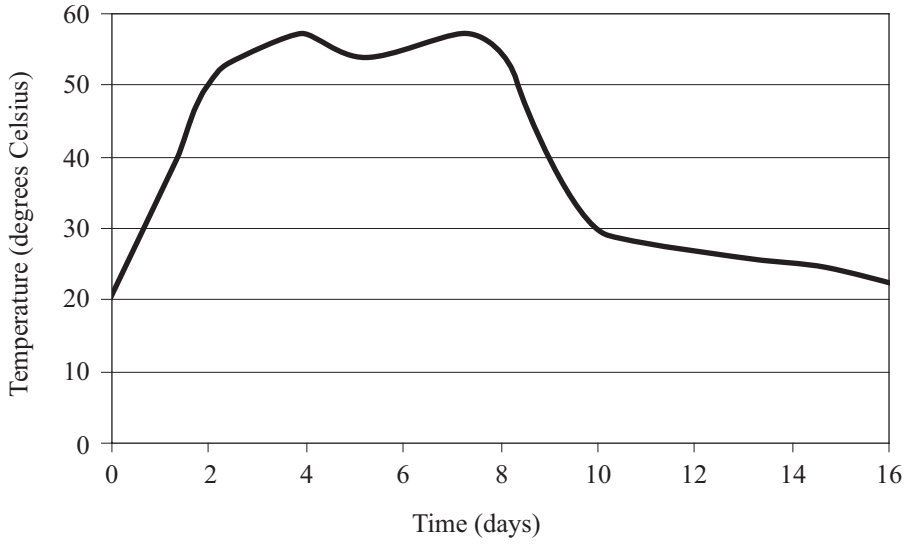
Compost is decayed organic matter. Composting is the process carried out by saprophytic micro-organisms turning organic matter such as vegetable matter and manure into compost. A successful compost heap requires good air flow. Compost, carbon dioxide, water, and heat are produced.

A compost heap



http://1.bp.blogspot.com/_GlLzJHICkiY/TDt17qzpW_I/AAAAAAAAAKQ/q-ZfyI5I-Ic/s1600/compost_lower.jpg

Temperature changes in compost over the first few days



(a) Describe the term saprophyte.

(b) Refer to the graph opposite, and explain the temperature changes that occur in the compost.

Link these temperature changes to the life processes of the micro-organisms and the process of composting.

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Question Three continues on the following page.

(c) Discuss the role of composting in the cycling of carbon.

In your answer, consider why good air flow is needed in composting, and link this to a life process.

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

QUESTION NUMBER

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