

90929



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

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SUPERVISOR'S USE ONLY

## Level 1 Biology, 2013

### 90929 Demonstrate understanding of biological ideas relating to a mammal as a consumer

9.30 am Thursday 14 November 2013

Credits: Three

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of biological ideas relating to a mammal as a consumer.	Demonstrate in-depth understanding of biological ideas relating to a mammal as a consumer.	Demonstrate comprehensive understanding of biological ideas relating to a mammal as a consumer.

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.**

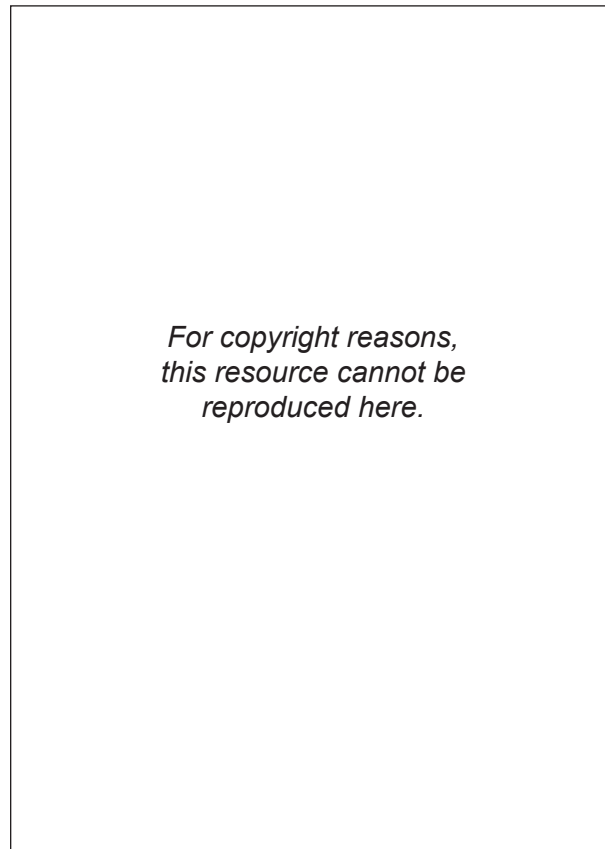
TOTAL

ASSESSOR'S USE ONLY

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

### QUESTION ONE: INTESTINES

The intestines of mammals are divided into two sections. These sections, the small intestine and the large intestine, have quite different roles in digestion. The diagram below shows part of the digestive system of a rat.



[http://www.biologycorner.com/resources/rat\\_colon](http://www.biologycorner.com/resources/rat_colon)

Discuss the roles of the small and large intestines in the digestive process.

In your answer you should:

- describe the structures that make up each intestine
- explain the digestive process occurring within each intestine
- compare and contrast each type of intestine, showing clear links between the structures and their roles, in the process of digestion.

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**QUESTION THREE: ENZYME ACTION AND THE EFFECT OF TEMPERATURE AND pH**

(a) Describe the function of enzymes in digestion.

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Students were investigating the effect of temperature and pH on enzyme activity.

First, they decided to explore how effective the digestive enzyme salivary amylase was at three different temperatures. Salivary amylase changes starch to maltose sugar (two glucose molecules joined together).

The following table shows the results of the investigation.

**The action of the enzyme salivary amylase on starch at three different temperatures**

Time (hours)	Maltose sugar formed from starch solution (%)		
	Temperature 22°C	Temperature 37°C	Temperature 50°C
0.0	0	0	0
0.5	0	2	0
1.0	8	12	3
1.5	20	34	9
2.0	41	65	16
2.5	62	77	21
3.0	74	92	27

(b) Describe the effects of temperature change on the action of salivary amylase.

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Then the students decided to explore how effective the digestive enzyme salivary amylase was at different pH levels. If starch is present, iodine changes colour from brown-yellow to blue-black. If glucose is present, Benedict's solution changes colour from blue to brick red.

**The action of the enzyme salivary amylase at different pH levels**

pH level	Contents	Iodine test result	Benedict's test result
7	Starch + water	Blue-black	Blue
7	Starch + salivary amylase	Brown-yellow	Brick red
6	Starch + salivary amylase + weak HCl (acidic)	Blue-black	Blue
8	Starch + salivary amylase + weak NaOH (basic)	Brown-yellow	Brick red

(c) Describe the effects of pH level change on the action of salivary amylase.

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(d) Discuss why the different temperatures and pH levels cause the results shown in the tables above.

Relate your answer to specific parts of the digestive system of mammals.

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