





NEW ZEALAND QUALIFICATIONS AUTHORITY MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

Level 2 Biology, 2018

91156 Demonstrate understanding of life processes at the cellular level

9.30 a.m. Friday 23 November 2018 Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence	
Demonstrate understanding of life processes at the cellular level.	Demonstrate in-depth understanding of life processes at the cellular level.	Demonstrate comprehensive understanding of life processes at the cellular level.	

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 2–12 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.

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QUESTION ONE: MOVEMENT OF MATERIALS

In the small intestine, it is the function of the brush border cells to absorb nutrients. When nutrients first enter the intestines, the nutrients can move into the brush border cells by diffusion. The brush border cells can also absorb these nutrients using active transport.



(a) Describe the process of diffusion.

(b) Explain the process of active transport.

(c) Lack of oxygen can affect both cellular respiration and active transport of nutrients into the cells of the intestines.

Discuss how oxygen concentration affects the processes of BOTH cellular respiration AND the absorption of nutrients into the brush border cells of the intestine.

In your answer include:

- an explanation of aerobic respiration that includes the raw materials needed AND the products made
- an explanation of anaerobic respiration that includes the raw materials needed AND the products made
- a discussion of how lowered oxygen concentration would affect cellular respiration AND active transport in the brush border cells.

There is me	ore space for your
answer to t	his question on the
following p	age.

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QUESTION TWO: PHOTOSYNTHESIS AND ENZYMES

Photosynthesis is an important reaction that supports many other life processes in plants.

- (a) Write a complete word equation for photosynthesis.
- (b) Label two parts of a chloroplast on the diagram below AND explain how each of the named parts enables the chloroplast to carry out photosynthesis.

Simplified diagram of a chloroplast





(c) Enzymes are used in photosynthesis reactions. Environmental factors, such as pH and toxins, can influence enzyme activity. Many toxins act as enzyme inhibitors.

Discuss how enzyme inhibitors influence enzyme activity, and compare this with the effects of pH on enzyme activity.

In your answer include:

- a description of what an enzyme is
- an explanation of how enzyme structure is related to its function
- a discussion of how BOTH enzyme inhibitors AND pH affect enzyme activity.

You may use diagrams in your answer.

6

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QUESTION THREE: DNA REPLICATION AND MITOSIS

Mitosis and DNA replication occur at different rates, depending on the time of year, the plant part, and the stage of the plant's life cycle.

Source: www.dreamstime.com/stock-illustration-bean-seed-germination-isolated-white-image56489327

(a) Describe when DNA replication happens, and explain why DNA replication is necessary.



(b) Discuss why the rate of mitosis varies in different parts of a plant, AND why the rate of mitosis changes throughout the year.

Your answer should:

- identify the parts of a plant where mitosis will be greatest AND discuss why the rate of mitosis is greater in these plant parts
- discuss how factors, such as light, temperature, and/or water availability, and the process of photosynthesis, could affect the rate of mitosis in a plant throughout the year.

A detailed discussion of enzyme structure and named plant cells is not required in your answer.

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