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NZQA

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Level 1 Biology, 2015

90929 Demonstrate understanding of biological ideas relating to a mammal(s) as a consumer(s)

2.00 p.m. Friday 20 November 2015
Credits: Three

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

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.

Not Achieved

TOTAL 7

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QUESTION ONE: TEETH FOR LIFE

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The pictures below show the skull of a carnivore and the skull of a herbivore. They have different structures to assist with the digestion of the different types of foods eaten.

Cat skull

http://illuminationstudios.com/wp-content/uploads/2011/10/catskull.jpg

Sheep skull

http://www.cpr-savers.com/assets/images/prodimages/T30018.jpg

(a) Define the term digestion.

Digestion is the process of breaking down complex ~~physical/chemical~~ bonds of foods into simple molecules ~~for absorption of nutrients~~

(b) Explain how the teeth and jaws of cats and sheep are adapted to deal with their different types of food.

In your answer you should:

- name the type of digestion that uses the teeth
- explain how each animal's teeth are adapted to suit each animal's typical diet
- compare the teeth and jaw of the cat with the teeth and jaw of the sheep, and explain how and why they are different.

Teeth is used in physical digestion for chewing hard to swallow foods into smaller portions. Each animal's teeth of different species varies depending on their diet. Herbivores are animals that thrive on

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mostly plants and no meat. Carnivores thrive on mostly meat and no plants. The teeth of herbivores are flat and spade like with a strong jaw obtained from chewing plant material thoroughly. The teeth of carnivores are sharp and resemble fangs on the sides of the mouth in order to rip flesh or meat. There is not much chewing done for carnivores.

An example of this is a cat (carnivore) compared to a sheep (herbivore). You can clearly see that the teeth of a sheep is flat and spade-like, and also has extra space that separates the teeth from the mouth. This is because herbivores or sheep do a lot of chewing compared to the cat - a carnivore who has sharper molars and fangs on each side of the mouth. There is also no extra space between the teeth and the mouth of the cat/carnivore. The fang like teeth are used for gripping into a flesh of another animal and ripping it.

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(c) The rates of substrate breakdown by salivary amylase and pepsin were tested across a range of different pH values, and the results are shown in the graph below.

Pepsin and Salivary Amylase Activity at Different pH Values

http://www.skill-guru.com/228/mcas-high-school-biology-test-spring-2011/questions

Referring to each of these enzymes, explain how these results relate to digestion in the mouth and in the stomach.

Your answer should include:

- a definition of chemical digestion
- a description of where each enzyme is produced, and where it carries out its function
- a discussion of how each enzyme's activity is affected by the pH changes that occur as food moves through the digestive system.

Chemical digestion is the process of breaking down complex chemical bonds of food into simple molecules in order for absorbtion of nutrients.

Salivary amylase is an enzyme produced by salivary glands in the mouth and is released in saliva while chewing. The salivary amylase helps to break down starch (carbohydrates) into simpler chemical bonds. (maltose)

Pepsin is an enzyme produced in the stomach and is highly acidid in order for digesting protein into ~~protease~~ amino acids.

(the mouth)
The pH of salivary amylase is more or less neutral (7±) compared to the pH of in the stomach of 2 which is highly acidic in for ~~digesting~~ breaking down complex protein into amino acids.

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QUESTION THREE: DIGESTION AND TRANSPORT

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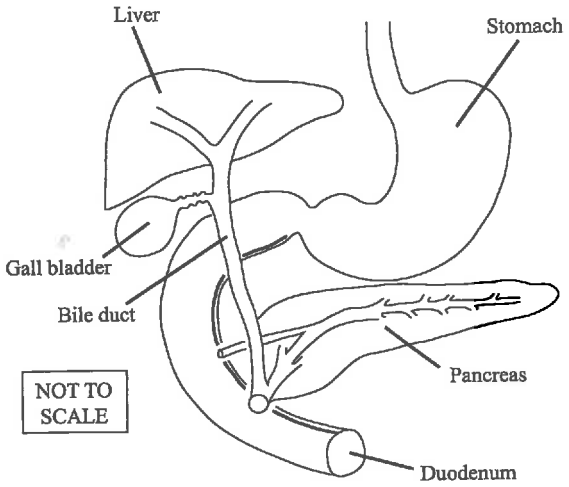
Once chyme (a thick semifluid of partly digested material) leaves the stomach, it enters the first part of the small intestine (duodenum), where further digestion can occur.

(a) Explain how digestion occurs in the small intestine.

In your answer you should:

- complete the table below
- explain how digestion is carried out by named enzymes and other substances that are released into the small intestine, including the substrates used and the products formed.

Digestive tract from the stomach to the duodenum



Adapted from: http://www.upmc.com/patients-visitors/education/gastro/Pages/ercp.aspx

Table of digestive enzymes and their substrates

Substrate	Enzyme	Product(s)
Fat	Lipase	Fatty acids & Glycerol
Protein	~~Protease~~ Pepsin	Amino acids
Starch	~~Maltose~~ Amylase	Glucose

Digestion starts ~~occurs~~ in the mouth where salivary amylase breaks down starch (carbohydrates) into maltose. It then travels to the stomach where pepsin is released, by breaking down protein into protease into amino acids. Fat is then ~~digested~~ broken down by lipase, into fatty acids & glycerol. from the liver

(b) Discuss how the structures in the small intestine enable the nutrients to be effectively absorbed, then transported and assimilated into other cells around the body.

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Adapted from: http://www.daviddarling.info/images/small_intestine_cross-section.jpg

In your answer you should:

- explain how the structures in the small intestine help increase absorption and transport of named substances to other cells within the body
- discuss how the final products of digestion are transported to other regions in the body, and what these products are used for in the cells.

Small intestines contains millions of tiny lumps called villi. Villi contains tiny lumps called microvilli. Each.

Villi and microvilli is used for absorbing all the nutrients digested and at the same time, move the chyme "(a thick semifluid of partly digested material)" along the small intestine. There are millions of villi attached to the inside of the small intestine where semifluid of partly digested material moves along while being assimilated by villi. Each villi contains many microvilli which increases the absorbtion of nutrients.

Inside each villi is a bundle of veins, arteries and

A3

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

QUESTION NUMBER

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Capillaries that carry different nutrients to different parts of the body.

Annotated Exemplar Template

Non-Achieve exemplar for 90929 2015		Total score	07
Q	**Grade score**	**Annotation**	
1	A4	a. Definition not correct – no mark b. Correctly identified physical digestion correctly Rest of b. just talks about teeth and doesn't name any teeth type therefore no A marks c. Definition of chemical digestion wrong Salivary amylase produced in salivary gland in mouth = A Pepsin produced in stomach = A, Pepsin works at pH = 2 and digests protein → amino acids correct but nothing about optimum reaction therefore can't get M Mouth pH = 7 A Lots of A statements	
2	N0	Not attempted	
3	A3	a. Fat row correct = A Protein had correct answer protease crossed out and pepsin is incorrect as it is only produced in the stomach Starch row correct = A Nothing else in part a. b. Villi increases absorption = A	