

# Level 1 Science, 2006

## 90188 Describe aspects of biology

Credits: Five  
9.30 am Tuesday 28 November 2006

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 answer 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 2–10 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.**

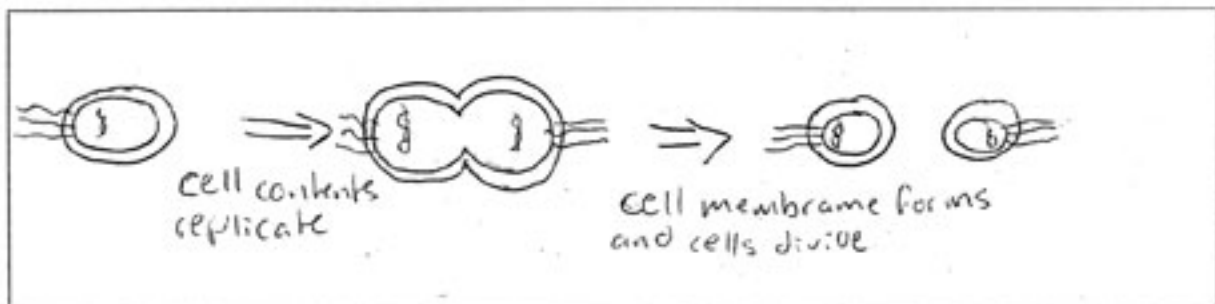
<i>For Assessor's use only</i>			<b>Achievement Criteria</b>		
<b>Achievement</b>		<b>Achievement with Merit</b>		<b>Achievement with Excellence</b>	
Describe aspects of biology	<input checked="" type="checkbox"/>	Explain aspects of biology	<input checked="" type="checkbox"/>	Discuss aspects of biology	<input checked="" type="checkbox"/>
<b>Overall Level of Performance</b>					<b>E</b>

You are advised to spend 40 minutes answering the questions in this booklet.

### QUESTION ONE: BACTERIA AND FUNGI

- (a) Describe how bacteria reproduce. A diagram may help your answer.

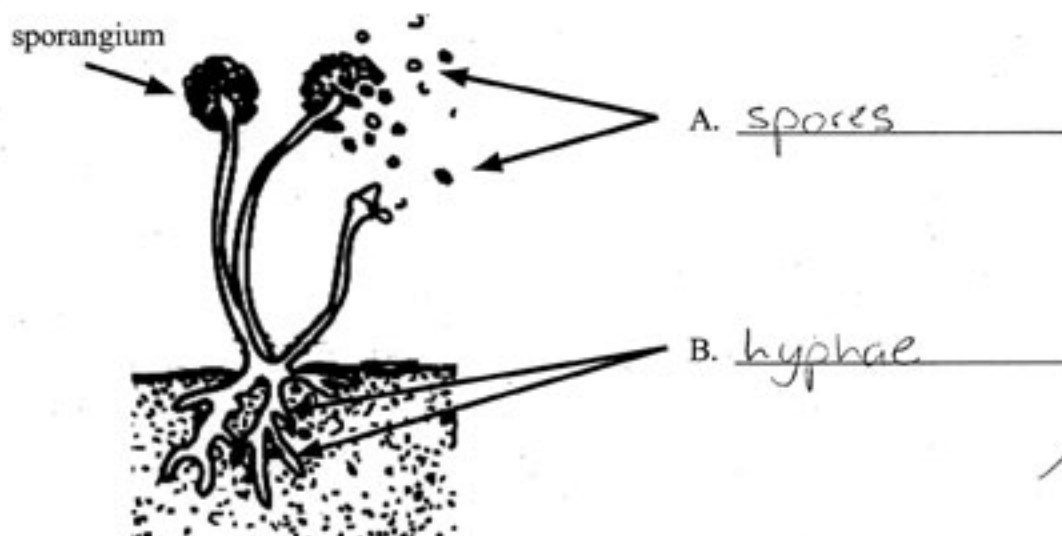
bacteria reproduce via a process called binary fission.



- (b) What is the **main condition** that causes bacteria to undergo anaerobic respiration?

~~being underwater~~ an environment without oxygen

- (c) Label the TWO parts of a fungus indicated on the diagram below.



- (d) Explain why the sporangia in the diagram are **above** the surface.

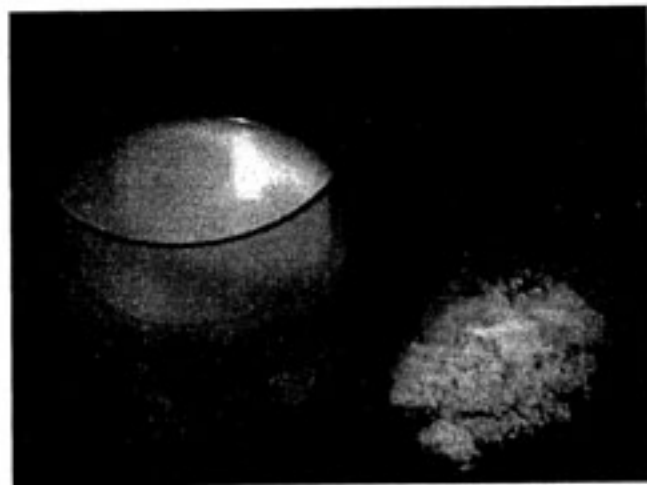
So that when spores are released wind will take the offspring away from the parent plant giving them space to grow. as if they were to be too close to the parent fungi the toxins that the parent excretes would kill its offspring.

- (e) Compare and contrast **digestion** and **reproduction** in bacteria and fungi.

both bacteria & fungi digest food in a process called extra cellular digestion. in bacteria the digestive enzymes are secreted through the cell membrane whereas in fungi the hyphae ~~are~~ are what secrete these enzymes. In bacteria the reproduction is a replication process whereas in fungi the offspring must grow from a spore. also each bacteria can only reproduce one at a time but in fungi multiple spores are released. One fungi that does have a similar process of reproducing however is Yeast, this process is actually called "budding" it is different though because more than one 'bud' will grow at the same time.

The picture shows two forms of milk. On the left is liquid milk; on the right is milk powder.

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- (f) In terms of **temperature** and **water content**, discuss why milk powder can be stored for a longer time than liquid milk.

milk powder can be stored for longer because the ~~aerobic~~ bacteria that ~~grow well in~~ is found in <sup>liquid</sup> milk prefers to grow in the moist and rich in nutrients environment provided that is found lacking in the powder. ~~also~~ the milk powder does not have any moisture content as it is vacuum packed so the bacteria have kind a harsh dry climate that is hard to live in. also if they were both left in a warm place the milk would produce a lot more bacteria over the same period of time the milk powder would have minimal bacteria growth.

E

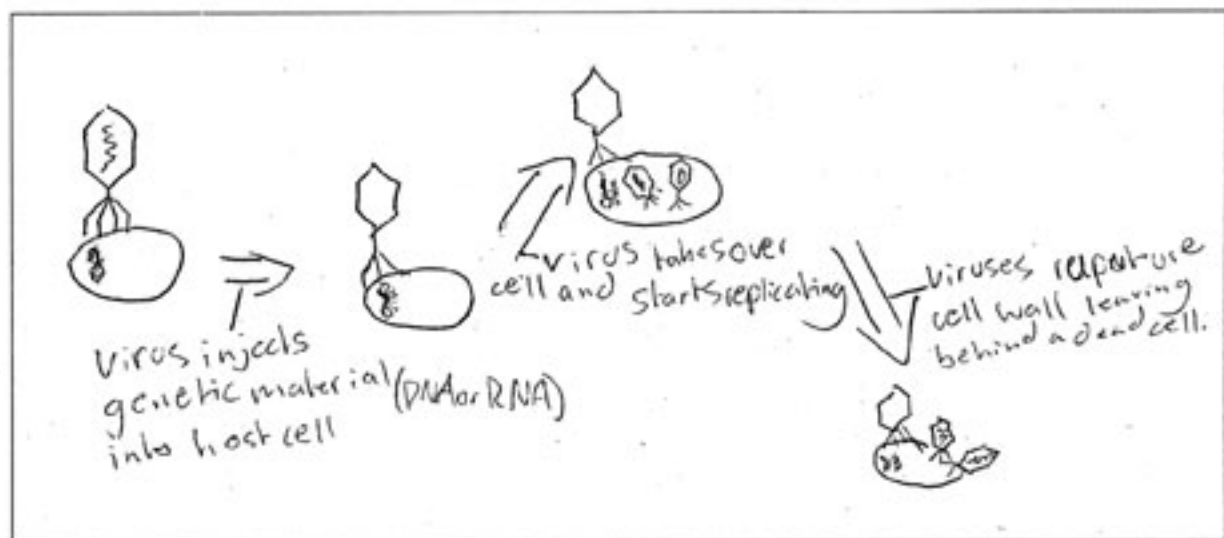
## QUESTION TWO: VIRUSES

Cold sores are caused by a virus.

- (a) Describe why a virus such as the cold sore virus can **not** be cultured on a nutrient agar plate.

because a virus must take over a living cell to reproduce.

- (b) Explain how viruses reproduce. You may draw diagrams to support your answer.



a virus will reproduce by first attaching itself to a cell and then injecting its genetic material into the host cell, it then takes over the host cell and uses it to replicate. ~~it sets~~ The <sup>new</sup> viruses then <sup>rupture</sup> break the cell wall and move on to reproduce in the next cell.

## QUESTION THREE: GENETICS

- (a) There are 78 chromosomes in the body cell of an adult Shar-Pei dog. How many are found in the gamete?

39



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- (b) Define the term heterozygous.

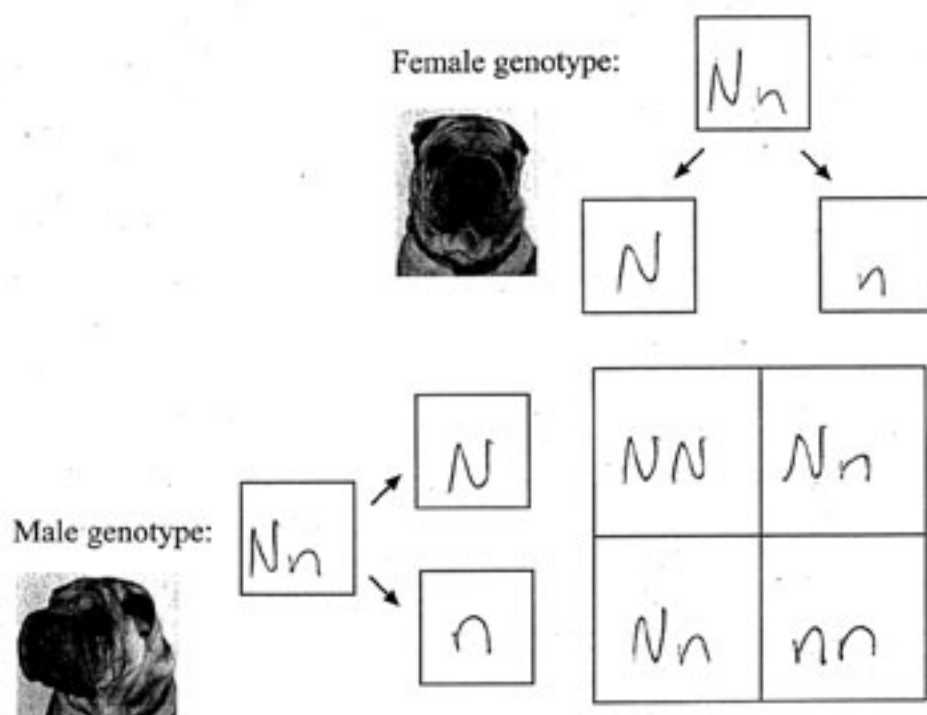
heterozygous is when someone has both a dominant and recessive allele, but only the dominant is displayed

N

In a Shar-Pei dog, the length of its coat is controlled by a gene. Normal coat (short) (N) is dominant to long coat (n). A male dog is **heterozygous** for normal coat.

The dog is crossed with a female dog that has the **same genotype**.

- (c) Complete the Punnett Square.



A

- (d) Give the **phenotype ratio** of the offspring of the cross.

3:1 //

N

- (e) This cross resulted in eight puppies, two of which had a normal coat. Explain why this differs from the ratio in Question 3(d).

because of genetic variation, although we can estimate a ratio the offspring will vary rarely follow it exactly. because genes are just the luck of the draw this means that there can be results that fall this far out of the expected range //

- (f) Discuss how you could determine whether a normal-coat dog was homozygous or heterozygous. You may use Punnett squares to help answer the question.

to determine whether the dog was hetero or homo it can be crossed with a homozygous recessive. ~~this is because~~ we can then determine the dog's genotype by observing the offspring. if in case a) there are no dogs displaying the recessive trait then the dog is homozygous dominant <sup>however</sup> if there is a ratio of 1:1 such as in b) then the dog is heterozygous //

<p>a)</p> <table style="margin-left: 20px;"> <tr> <td></td> <td colspan="2" style="text-align: center;">homozygous recessive</td> </tr> <tr> <td></td> <td style="text-align: center;">n/n</td> <td style="text-align: center;">n/n</td> </tr> <tr> <td style="text-align: right;">dog</td> <td style="text-align: center;">N/N<sub>n</sub></td> <td style="text-align: center;">N/n</td> </tr> <tr> <td style="text-align: right;">x</td> <td style="text-align: center;">N/N<sub>n</sub></td> <td style="text-align: center;">N/n</td> </tr> </table> <p>expected ratio of offspring 4:0</p>		homozygous recessive			n/n	n/n	dog	N/N <sub>n</sub>	N/n	x	N/N <sub>n</sub>	N/n	<p>b)</p> <table style="margin-left: 20px;"> <tr> <td></td> <td style="text-align: center;">n/n</td> <td style="text-align: center;">n/n</td> </tr> <tr> <td style="text-align: right;">dog</td> <td style="text-align: center;">N/N<sub>n</sub></td> <td style="text-align: center;">N/n</td> </tr> <tr> <td style="text-align: right;">x</td> <td style="text-align: center;">n/n</td> <td style="text-align: center;">n/n</td> </tr> </table> <p>expected offspring ratio 1:1</p>		n/n	n/n	dog	N/N <sub>n</sub>	N/n	x	n/n	n/n
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x	n/n	n/n																				

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## QUESTION FOUR: CLONING

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Scientists in South Korea have claimed to have produced the first cloned dog.

Snuppy, whose name stands for Seoul National University puppy, was made from a cell taken from the ear of a three-year-old male Afghan hound.

Discuss why a dog produced by cloning looks identical to the biological parent, whereas a dog produced by sexual reproduction looks different from the parent.

because a clone has identical genes <sup>to its parent</sup> and so will therefore display all the same traits. A dog spring produced using sexual reproduction however will receive ~~genetically~~ different genes because of two things: a) ~~only~~ half of the genes come from each parent meaning some recessive traits will not be displayed and b) the cell division process called meiosis that results in the gametes results in four genetically unique daughter cells from one normal body cell. also in cloning <sup>there is</sup> ~~only the~~ only one parent's genes being

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Extra paper for continuation of answers if required.  
Clearly number the question.

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Question  
number

4 used so there is no chance of recessive traits  
not being displayed and all the dominant traits  
will be displayed // seen