

90188

Level 1 Science, 2006

90188 Describe aspects of biology

Credits: Five

You should answer ALL the questions in this booklet.

Interactive paper

Type your answers in the fields provided and use the *Comment and Markup Tools* to draw diagrams. Once you have finished, click the **Show Answers** button at the end of the paper, mark each question and enter the grades (N, A, M or E) in the boxes provided. Your totals and final grade will appear below.


<i>For Assessor's use only</i>		
Achievement Criteria		
Achievement	Achievement with Merit	Achievement with Excellence
Describe aspects of biology.	Explain aspects of biology.	Discuss aspects of biology.
Overall Level of Performance		

<i>Achievement</i>	<i>Merit</i>	<i>Excellence</i>
Total of EIGHT opportunities answered at Achievement (or higher). 8 × A	Total of NINE opportunities answered with FOUR at Merit level and FIVE at Achievement level. 4 × M + 5 × A	Total of TEN opportunities answered with TWO at Excellence level, THREE at Merit level and FIVE at Achievement level. 2 × E + 3 × M + 5 × A

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

QUESTION ONE: BACTERIA AND FUNGI

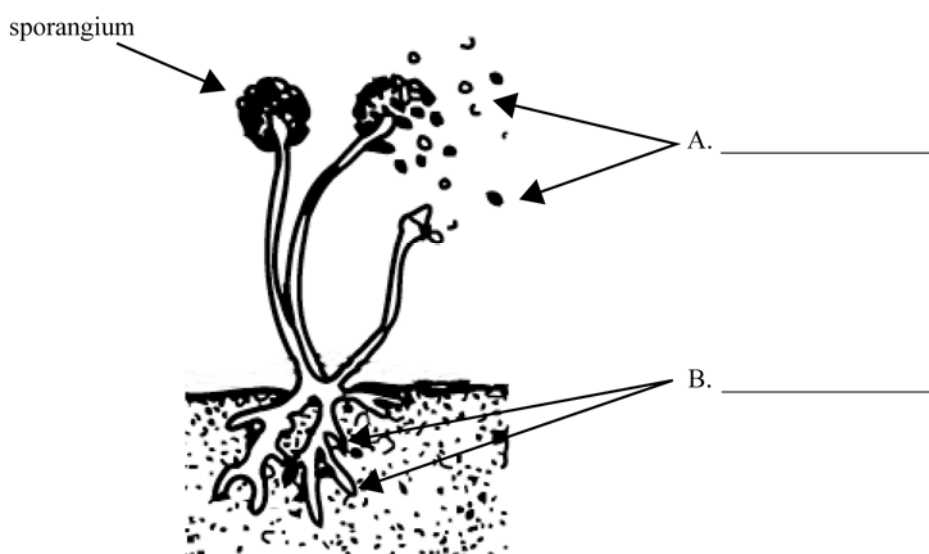
(a) Describe how bacteria reproduce. A diagram may help your answer.

1a	Description and/or annotated diagram that shows cell dividing into two identical cells by binary fission.  Chromosome is copied and cell gets longer, then chromosomes separate and cell wall and membrane pinch in. Finally two separate but identical cells form.	A Correct description
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(b) What is the **main condition** that causes bacteria to undergo anaerobic respiration?

1b	Lack of, or no, oxygen.	A Correct answer
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(c) Label the TWO parts of a fungus indicated on the diagram below.



1c	A – Spore(s) B – Hypha(e) (mycelium/rhizoid)	A Both correct
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(d) Explain why the sporangia in the diagram are **above** the surface.

1d	The sporangia are above the surface so that dispersal can take place. Spores need to disperse to reduce competition, to access new food supplies and so that more space is available.	A Idea of dispersal or release for reproduction M Idea of dispersal and one reason for dispersal
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(e) Compare and contrast **digestion** and **reproduction** in bacteria **and** fungi.

1e	Both bacteria and fungi feed by extra-cellular digestion through the excretion of enzymes. Fungi secrete enzymes through the hyphae, but bacteria don't have hyphae. Bacteria and fungi both reproduce asexually. Bacteria split in two, fungi produce many spores at once. Fungi may reproduce sexually, yeast reproduce by budding.	A Description of two life processes for one organism. OR Description of one life process for each M One comparison of digestion and one comparison of reproduction between bacteria and fungi E Three comparisons encompassing both digestion and reproduction
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The picture shows two forms of milk. On the left is liquid milk; on the right is milk powder.



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

1f	Micro organisms need water to reproduce and milk contains water so it needs to be stored in the fridge to limit bacterial reproduction by lowering the temperature. Milk powder that has been treated at a high temp has no bacteria so there are none to reproduce. Milk powder does not need to be stored in the fridge as bacterial growth is already limited by the lack of water.	A Description of any two aspects of temperature, water content or storage time for milk OR powder M Explanation of how temperature OR water content impacts on micro organism activity E Discusses how temperature and moisture impact on micro organism activity in powder compared with milk
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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.

2a	Viruses need living cells to replicate or reproduce. Nutrient agar plates do not contain living cells.	A 1 correct statement
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- (b) Explain how viruses reproduce. You may draw diagrams to support your answer.

2b	Virus injects DNA/RNA into host cell. The host cell replicates DNA/RNA to make more viruses. The new viruses burst out of cell.	A Correct answer
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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?

3a	39	A Correct answer
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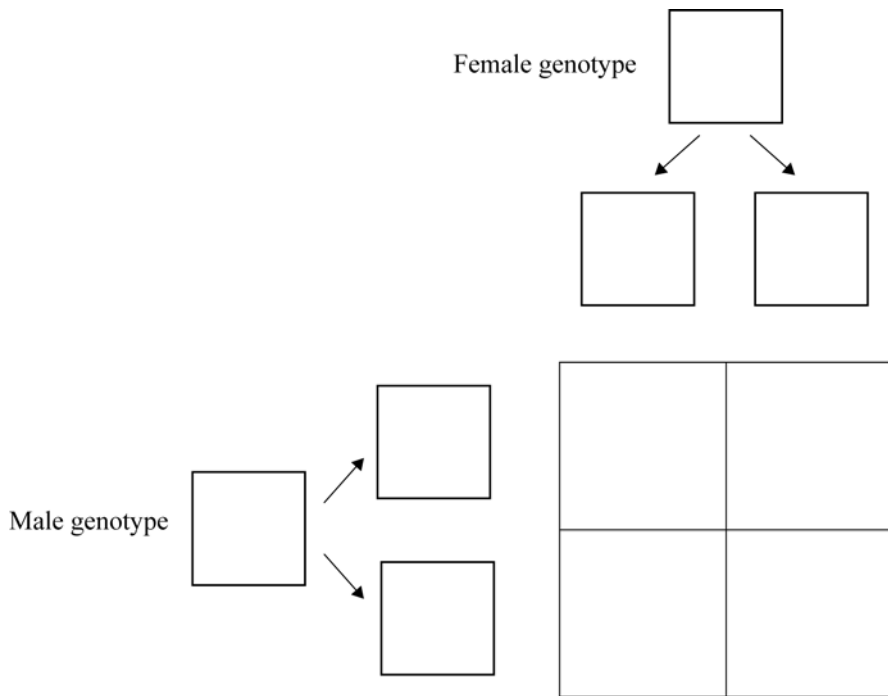
- (b) Define the term heterozygous.

3b	Heterozygous means the genotype of the individual has two different alleles for a given gene or trait.	A Correct answer
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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.



3c		<p>A All parts completed correctly using the correct letters</p>
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(d) Give the **phenotype ratio** of the offspring of the cross.

3d	3 normal coats :1 long coat	<p>A Any suitable numeric expression of the correct ratio that includes the phenotypes</p>
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(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).

3e	<p>There is always a 25% chance of a puppy having long hair. In this case, eight puppies is too few to show the expected ratio of 3:1.</p>	<p>A Answer recognises that the sample size is too small OR that each outcome (puppy) is an independent event M Explanation links expected outcome to sample size</p>
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- (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.

3f	A test cross with a homozygous recessive is carried out. If some offspring are long coated, the parent must be heterozygous. If all of the offspring are short haired, it is probable that the parent is homozygous (NN).	A States a test cross is carried out. OR Describes cross with a homozygous recessive M Uses the results of one cross to support the parent being either homozygous or heterozygous E Uses the results of both crosses to identify the heterozygous parent with certainty and the homozygous parent as probable
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QUESTION FOUR: CLONING

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.

4	The cloned offspring is genetically identical to the biological parent because it does not involve meiosis, it only involves mitosis. One cell undergoes mitosis so all cells are genetically identical. Sexual reproduction involves gametes produced by meiosis. The resulting offspring will have a unique set of genes.	A Describes why either the cloned offspring looks identical to biological parent OR why it looks different to the parent in sexual reproduction M Explanation of how both processes provide or restrict genetic variation E Discussion of how both processes result in the given appearance with reference to meiosis
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