WJEC GCSE BIOLOGY

BIOLOGY



EXAM QUESTION PACK

UNIT B1 FOUNDATION TIER 0235 PAPERS

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Surname	Centre Number	Candidate Number
Other Names		0

GCSE

0235/01

SCIENCE
FOUNDATION TIER
BIOLOGY 1

A.M. MONDAY, 28 January 2013

45 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1	**7**	
2	**5**	
3	**6**	
4	**6**	
5	**5**	
6	**6**	
7	**6**	
8	**6**	
9	**3**	
TOTAL	**50**	

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ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.
Write your name, centre number and candidate number in the spaces at the top of this page.
Answer **all** questions.
Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.
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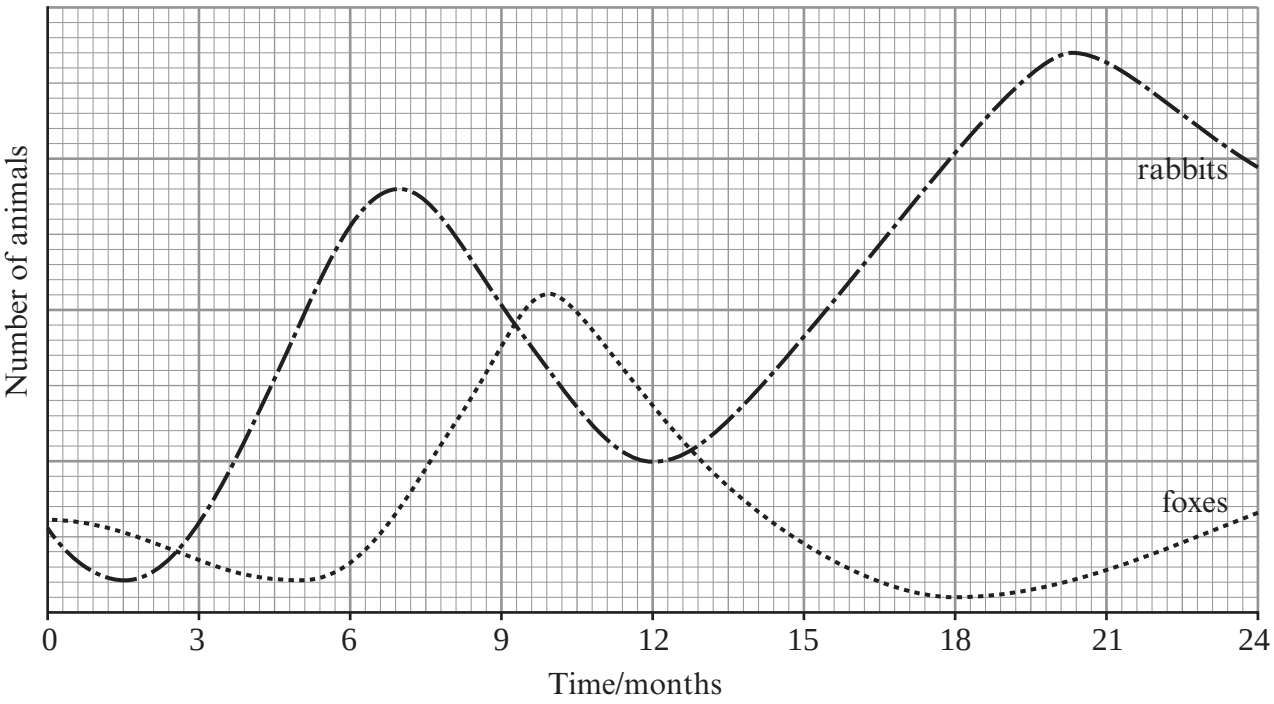
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Answer **all** *questions.*

1. Predation is important in controlling the number of animals.
The graph below shows the numbers of foxes and rabbits in one area over two years.
The foxes eat rabbits.



(a) Name the predator and the prey in this example. [1]

predator ..... prey .....

(b) Using the graph,

(i) State the time when rabbit numbers were lowest [1]

..... months

(ii) What happened to the number of rabbits when the number of foxes was at its lowest? Suggest an explanation. [2]

Answer .....

Explanation .....

.....

(c) State **one** reason for rabbit numbers decreasing naturally, other than predation. [1]

.....

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(d) The photographs below show two rabbits.

Rabbit from a woodland in Wales



Rabbit A



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From the photographs above, state a body feature which would make it difficult for rabbit A to survive in the wild. Give a reason for your answer. [2]

Feature .....

Reason .....

.....

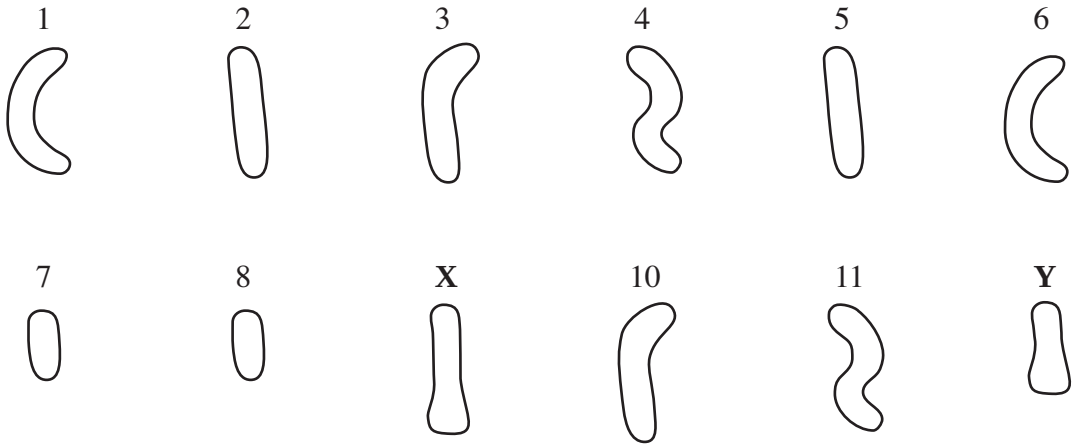
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2. The diagram below shows all the chromosomes in a body cell of an animal.



(a) Using the numbers in the diagram above, match up the pairs of chromosomes. The first one has been done for you. [1]

1 matches with 6

2 matches with .....

3 matches with .....

4 matches with .....

(b) The two chromosomes marked **X** and **Y** are the sex chromosomes. State whether the cell is from a male or female. [1]

.....

(c) There are 12 chromosomes in this body cell. How many chromosomes will there be in a sex cell (gamete) of this animal? [1]

.....

(d) Name the structures which are found arranged along each chromosome. [1]

.....

(e) Name the chemical that chromosomes are made from. [1]

.....

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3. Read the following information.



©*Eduardo Rivero*

A monkey is shown in the photograph above. Monkeys are closely related to humans. Two groups of scientists discussed the use of monkeys in laboratory work.

Scientists in group 1 said:-	Scientists in group 2 said:-
• It is essential to use monkeys in testing new drugs.	• Tests cause monkeys distress and should be avoided.
• New drugs for strokes, AIDS, kidney failure and other human disease have been developed.	• The number of tests on monkeys should be reduced as soon as possible.
• In future, there should be far fewer tests on monkeys.	• The tests could be done using tissue cultures or computers.

From *New Scientist June 2006*

Answer the following questions using **this information only.**

(a) (i) For what purpose do group 1 scientists say they need to use monkeys? [1]

.....

(ii) Give **two** human diseases which can now be treated. [1]

1 .....

2 .....

(b) (i) State **one** reason given by the group 2 scientists for **not** using monkeys. [1]

.....

.....

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(ii) State **two** alternative methods for testing drugs that could be carried out without using monkeys. [1]

1 .....

2 .....

(c) Suggest **one** reason why people may worry more about using monkeys in experiments rather than other animals. [1]

.....

.....

(d) Give **one** example where both groups of scientists were in agreement. [1]

.....

.....

6

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4. The table below shows the content of three drinks and their use in the body.

Content	Use in the body	whole milk (500 cm^3)	skimmed milk (500 cm^3)	fruit juice (500 cm^3)
Energy value (kJ)		1315	1045	513
Protein (g)	Builds and repairs organs	16	18	3
Carbohydrate (mainly sugars) (g)	Provide energy	23.5	24.0	40.0
Fat (g)	Energy store	18.0	5.5	0.0
Calcium (mg)	Healthy bones and teeth	335	350	0

Use the information **in the table** to answer the following questions.

(a) (i) How much more energy is there in 500 cm^3 of whole milk than in 500 cm^3 of skimmed milk? [1]

Answer ..... kJ

(ii) A carton of **whole** milk contains 1000 cm^3. How much energy is contained in the carton? [1]

Answer ..... kJ

(b) Whole milk is changed into skimmed milk by a process called skimming.

(i) What is removed when the milk is skimmed? [1]

.....

(ii) What type of milk should a person choose in order to lose weight? [1]

.....

(c) Give **two** reasons why a dentist suggests you should drink milk instead of fruit juice. [2]

(i) .....

(ii) .....

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5. A spider plant grows little plants on shoots as shown in the photograph below.



The little plants were cut off and put into soil.
They grew into new spider plants.

(a) What type of reproduction is used to produce the little spider plants? [1]

.....

(b) All the plants are genetically identical.
What are genetically identical organisms called? [1]

.....

(c) A new variety of spider plant was produced because of a change in the genes.
What name is used to describe this change? [1]

.....

(d) Name **one** factor in the environment which causes genes to change. [1]

.....

(e) The Latin name for the spider plant is *Chlorophytum comosum*. Why do animals and plants have Latin names as well as their common names? [1]
Underline the correct answer below.

(i) The common name is the same all over the world.

(ii) The Latin name is the same all over the world.

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6. When Gareth heard a sudden loud noise, he jumped up out of his seat.

His response was a reflex action.

(a) State **two** features of a reflex action. [2]

(i) .....

(ii) .....

(b) (i) Fill in the blanks by using some of the words below. [3]

eyes sound ears light receptors

The stimulus in Gareth's reflex was ..... .

The stimulus was detected by ..... in Gareth's

..... .

(ii) In what form is the information transferred to the brain? [1]

.....

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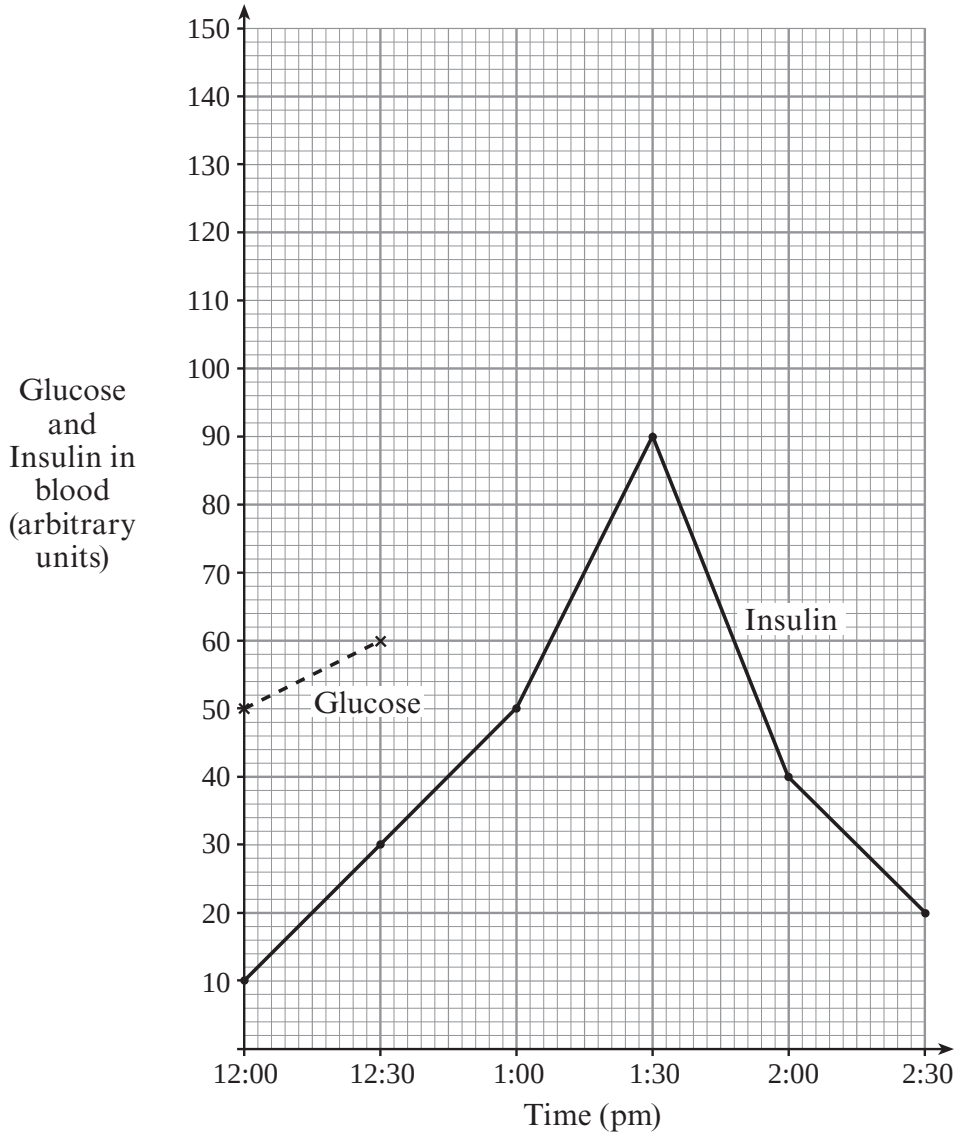
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7. In the human body, *insulin* controls the levels of sugar (glucose) in the blood.

The levels of insulin and glucose in Rehana's blood were measured during an investigation which started at lunchtime.
Rehana is not diabetic and eats lunch. The results are shown in the table and on the graph.

Time (pm)	Glucose in blood (arbitrary units)
12.00	50
12.30	60
1.00	140
1.30	120
2.00	60
2.30	50



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(a) The results for insulin have been plotted as a graph opposite.
Plot the results for glucose onto the same graph. Join the points with a ruler. The first two points have been done for you. [3]

(b) From the graph

(i) How much insulin is in the blood at 1.45 pm? [1]

.....

(ii) Suggest a possible reason for the increase in glucose in Rehana's blood between 12.00 pm and 1.00 pm. [1]

.....

(iii) Rehana rests after 12.00 pm. State what has caused the decrease in glucose between 1.00 pm and 1.30 pm. [1]

.....

6

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8. Gregor Mendel made important discoveries on how characteristics or traits are passed from parents to offspring.
In one of his experiments he crossed pea plants that produced seeds with round coats with plants that produced seeds with wrinkled coats.

Seeds with wrinkled coats

Seeds with round coats



R. W. Van Norman/Visuals Unlimited, Inc

The results of this cross were plants (F1) that only produced round coated seeds. Mendel explained this by saying that pea plants passed on **factors** (alleles) from one generation to the next. He also said that the factor for round seeds is dominant over the factor for wrinkled seeds.

Use the information in the passage and your knowledge to answer the following questions.

(a) (i) Complete the following to show how the F1 plants were produced in Mendel's experiment.

R = allele for round seeds
r = allele for wrinkled seeds

Phenotype of parents	Round	×	Wrinkled
Genotype of parents	**RR**		**rr**
Gametes	....		....

[1]

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(ii) Complete the Punnett square to show the genotypes produced in this cross. [2]

F1

Gametes		

(b) (i) Mendel then crossed two of these F1 plants together. Draw your own Punnett square and complete it to show the genotypes of the offspring that would be produced. [2]

(ii) What is the ratio of round to wrinkled seeds produced above? [1]

..... round: ..... wrinkled

6

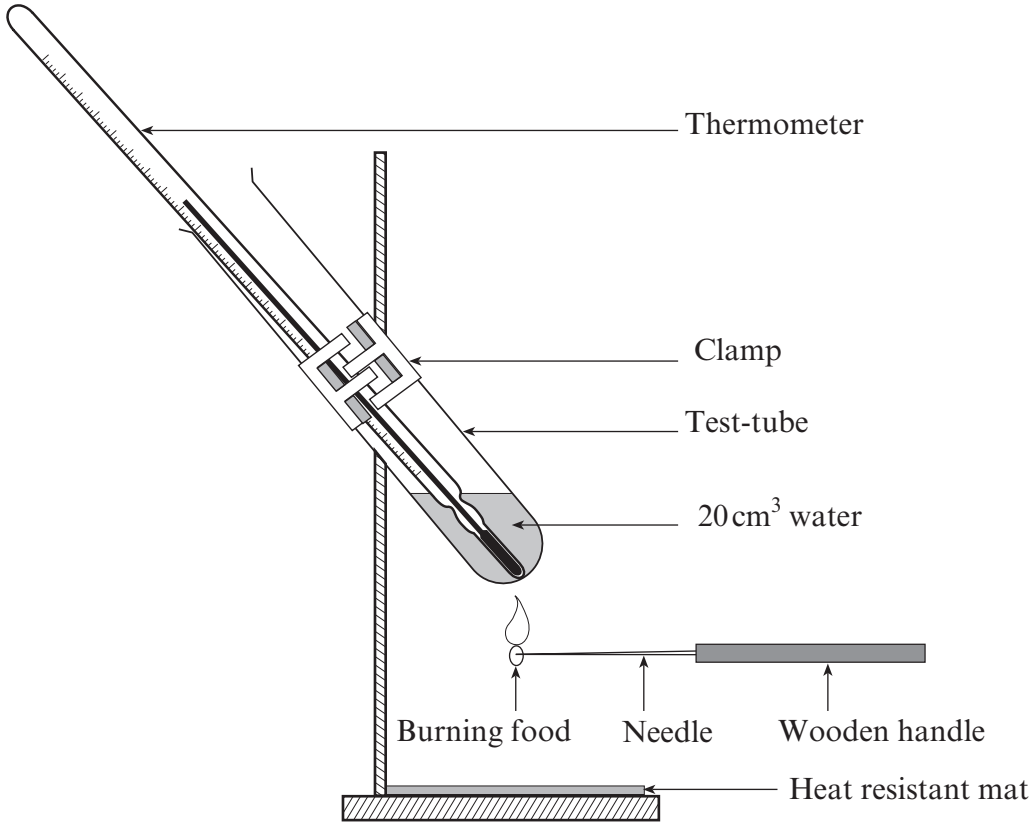
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9. The following apparatus was set up to measure the energy content of a piece of food.



(a) State **two** measurements that you must take in order to find the energy content of the food. [2]

.....

.....

(b) If you were comparing the energy content of two **different** foods state **one** *other* measurement that must be taken. [1]

.....

3

END OF PAPER

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GCSE MARKING SCHEME

SCIENCE - BIOLOGY (LEGACY)

JANUARY 2013

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INTRODUCTION

The marking schemes which follow were those used by WJEC for the January 2013 examination in GCSE SCIENCE - BIOLOGY (LEGACY). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

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B1 (LEGACY) MARK SCHEME - JANUARY 2013

FOUNDATION TIER

Question			Marking details	Marks Available
Q.1			**Predation**	
	(a)		Fox and rabbit;	1
	(b)	(i)	1.5 (months) (allow: 1.2 to 1.8);	1
		(ii)	(large) increase/growth in numbers (not: more rabbits);	1
			Fewer foxes so less predation /fewer foxes to {kill/eat rabbits};	1
			(not: no foxes/ no hunting or catching)	
	(c)		Shortage of food/space/disease/loss of habitat/competition for food;	1
			(not: named disease/habitat loss due to humans)	
	(d)		(they are) white/have white hair (not: paler);	1
			Not camouflaged/can be easily seen (against background)	1
			Question total	**[7]**

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Question		Marking details	Marks Available
Q.2	(a)	5 10 11;	1
	(b)	male;	1
	(c)	6;	1
	(d)	genes;	1
	(e)	DNA;	1
		Question total	**[5]**

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Question			Marking details	Marks Available
Q.3	(a)	(i)	Testing / discovery / developing <u>new</u> drugs;	1
		(ii)	2 from stroke / AIDS / kidney failure; (negate if extra answers) (not: HIV)	1
	(b)	(i)	Cause distress; (not: ref. cruel)	1
		(ii)	Computers; tissue cultures (negate if extra answers)	1
	(c)		Monkeys related to humans more <u>closely</u>;	1
	(d)		Use of <u>fewer</u> monkeys / <u>fewer</u> tests on monkeys in future;	1
			Question total	**[6]**

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Question			Marking details	Marks Available
Q.4	(a)	(i)	270;	1
		(ii)	2630;	1
	(b)	(i)	fat; (not:cream)	1
		(ii)	skimmed; (not:low fat)	1
	(c)	(i)	less sugar; and more calcium; (in milk) (not: acids/ref. to bones)	2
			Question total	**[6]**

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Question		Marking details	Marks Available
Q.5	(a)	asexual;	1
	(b)	clones;	1
	(c)	mutation;	1
	(d)	radiation / uv light / radioactive materials; (not : pollution / chemicals unqualified)	1
	(e)	(ii);	1
		Question total	**[5]**

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Question			Marking details	Marks Available
Q.6	(a)	(i)	Fast / quick / instant / rapid/ immediate;	1
			Not: sudden	
			automatic / without thinking /involuntary /	
			no control / unconscious;	1
			not: protection	
	(b)	(i)	sound; receptor; ears;	3
		(ii)	impulse / electrical {signal / message} / electrical (energy);	1
			Not: electric / electricity/ message	
			Question total	**[6]**

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B1

FOUNDATION AND HIGHER TIER

Question			Marking details	Marks Available
Q.7/1	(a)		Correctly plotted points (± ½ small square; -1 per error);	2
			Line correctly drawn through centre of points;	1
	(b)	(i)	64 →65 (units);	1
		(ii)	Eating/lunch/food/meal or description;	1
			Drinking - if clearly qualified e.g. sugary drink, or valid equivalent);	
			(not: lunchtime)	
		(iii)	(Increased) insulin;	1
			Question total	**[6]**

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Question			Marking details	Marks Available
Q.8/2	(a)	(i)	R R and r	1

(ii)

gametes	R	R
r	Rr	Rr
r	Rr	Rr

Gametes correct; 1

Genotypes correct using gametes given by candidate; 1

(b) (i)

gametes	R	r
R	RR	Rr
r	Rr	rr

Gametes correct; 1

Genotypes correct using gametes given by candidate; 1

(iii) 3:1/75%:25% (not: 75:25 or fraction); 1

Question total **[6]**

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Question		Marking details	Marks Available
Q.9/3	(a)	Initial temperature of (water) (however expressed);	1
		Final temperature of (water) (however expressed);	1
		Change/rise in temperature (2 marks) Allow 1 mark for the temperature of the water Award 2 marks for the difference between the temperature at the start and end. *(*not**:** gap between food and test tube / time taken for food burn) (neutral: volume of water / mass of food)	
	(b)	The mass/weight/grams (of the pieces of food);	1
		Question total	**[6]**

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B1

HIGHER TIER

Question			Marking details	Marks Available
Q.4	(a)	(i)	Spray/treat (the plant) with herbicide and it survives (the genes have successfully introduced)/plant will not be affected by herbicide;	1
		(ii)	Be able to provide sufficient fish oil to supply global demand / conserve fish stocks, owtte;	1
		(iii)	Ethical reasons/ create organisms that we have no control over/morally wrong/genes could spread to other species/long term effects unknown/could create herbicide resistant weeds/concern over eating GM produce (not: playing God/cross contamination/spread to other organisms)	1
	(b)	(i)	All bars correct, 0.25 small square tolerance; (not: on top of bars)	1
		(ii)	As the amount of GM crops grown increases, the amount of non-GM crops grown decreases/inverse relationship, comparison needed;	1
		(iii)	GM maize production 2002 = 12 million hectares GM maize production 2006 = 36 million hectares therefore % increase = 200%; (No evidence of calculation required.)	1
			Question total	**[6]**

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Question			Marking details	Marks Available
Q.5	(a)	(i)	(As the temperature rises) sweat production increases;	1
			urine production decrease;	1
			or ref to numbers	
	(b)	(i)	Explanation (As temperature rises) the sweat <u>glands</u> make more sweat;	1
		(ii)	to cool the body;	1
	(c)	(i)	hairs lie flat;	
			vasodilation occurs/capillaries increase in diameter;	
			not: get bigger/expand/move up/ref. to shivering)	2
		(ii)	Converse of c(i)	
			(allow ref. to shivering)	2
			Question total	**[8]**

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Question		Marking details		Marks Available
Q.6	(a)	(i) – (v)	correct + clearly indicated	4
	(b)	It would prevent the effector / muscle / gland from working / prevent / or slow down impulse reaching effector.		1
	(c)	Electrical; (not : electric / electricity / kinetic)		1
			Question total	**[6]**

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Question			Marking details	Marks Available
Q.7	(a)	(i)	1. Variation in colour/pattern; 2. results from mutation/change in genes/DNA; 3. Natural selection by predation/survival of the fittest; 4. and sexual selection/females select most colourful males to breed; 5. Most colourful males survive/are at an advantage; 6. to pass on genes;	6
			Question total	**[6]**

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Question		Marking details	Marks Available
Q.8	(a)	Reduce / decrease/quicker; (not: improved)	1
	(b)	Concentration of coffee / caffeine / mass of coffee / volume of water;	1
		(not:amount)	
		Gender, age, time between drinking and testing,	[any 3x1]
		fasting, health/hearing/volume of signal;	
		(not:answers to (b)same coffee/computer/body mass /reaction time before test)	
		Question total	**[5]**

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Question			Marking details	Marks Available
Q.9	(a)	(i)	Evolution;	1
		(ii)	(Charles) Darwin;	1
	(b)		Beak Feathers Long legs Long neck Claws on feet (Any 2) (not: no wings/ curved neck/ small head)	2
			Question total	**[4]**

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Surname	Centre Number	Candidate Number
Other Names		0

GCSE

0235/01

SCIENCE
FOUNDATION TIER
BIOLOGY 1

P.M. WEDNESDAY, 30 May 2012

45 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1	**7**	
2	**9**	
3	**6**	
4	**7**	
5	**6**	
6	**7**	
7	**5**	
8	**3**	
Total	**50**	

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In addition to this paper you may require a calculator and a ruler.

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Answer **all** questions.

Write your answers in the spaces provided in this booklet.

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Answer **all** *questions.*

1. The photograph shows a mountain hare. These animals live in northern Britain where snow falls every winter.



Animal Life 2010

Mountain hare facts	
Predators	Fox, eagle, stoat.
Food	Grass, berries, tree bark, some farm crops.
Reproduction	High rate, produces many young.

Use **this information only** to answer the questions about mountain hares.

(a) State **one** feature of this hare's body which helps it to keep warm in winter. [1]

.....

(b) How do the hare's feet help it to move around in icy conditions? [1]

.....

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(c) (i) Name **two** animals which eat mountain hares. [1]

1 ..... 2 .....

(ii) Many hares are eaten but the number of living hares stays about the same from year to year. Suggest a reason for this. [1]

.....

(d) The colour of the hare's fur changes in the autumn. How does this change help it to survive? [1]

.....

(e) (i) Give the reason why the hare is not described as a predator. [1]

.....

(ii) Suggest a reason why some farmers think the hare is a pest species. [1]

.....

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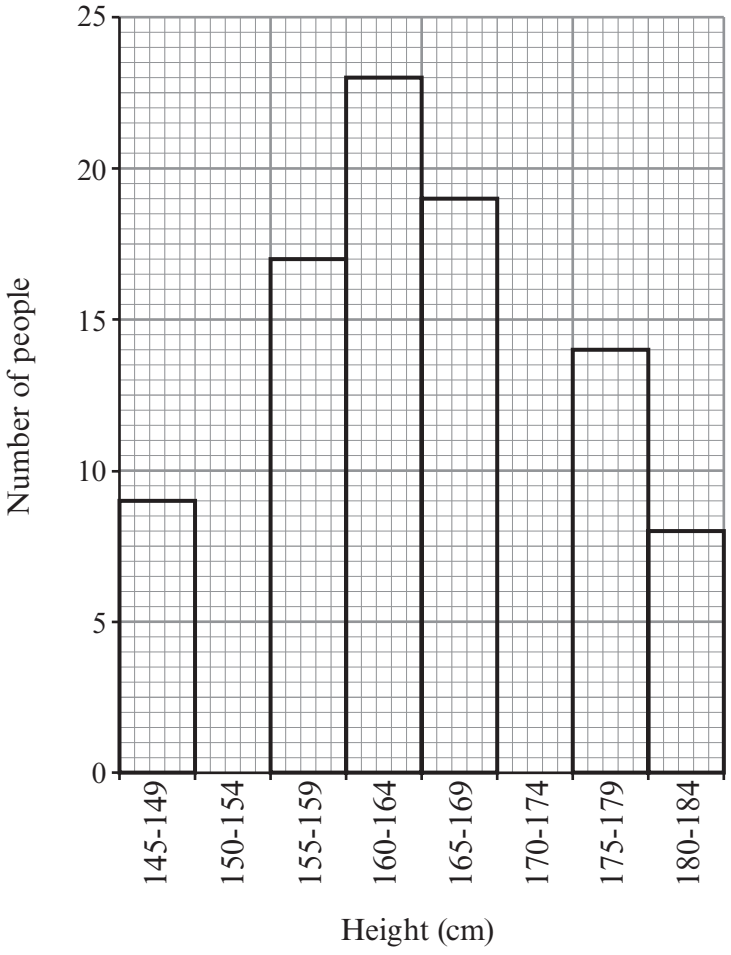
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2. Some students investigated variation in human height.
They measured males who were 17 years old.

The results are shown in the table and bar chart below.

Height (cm)	Number of people
145 - 149	9
150 - 154	11
155 - 159	.....
160 - 164	23
165 - 169	19
170 - 174	13
175 - 179	14
180 - 184	8



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(a) From the bar chart, complete the table for 155 - 159 cm. [1]

(b) From the table, complete the bar chart by drawing bars for 150 - 154 cm and 170 - 174 cm. Use a ruler. [2]

(c) Which height range has the most people? [1]

from ..... cm to ..... cm.

(d) (i) State **one** way in which the students' investigation was a fair test. [1]

.....

(ii) Why would it be necessary for the students to repeat their investigation? [1]

.....

(e) Complete the sentences using some of the words below. [3]

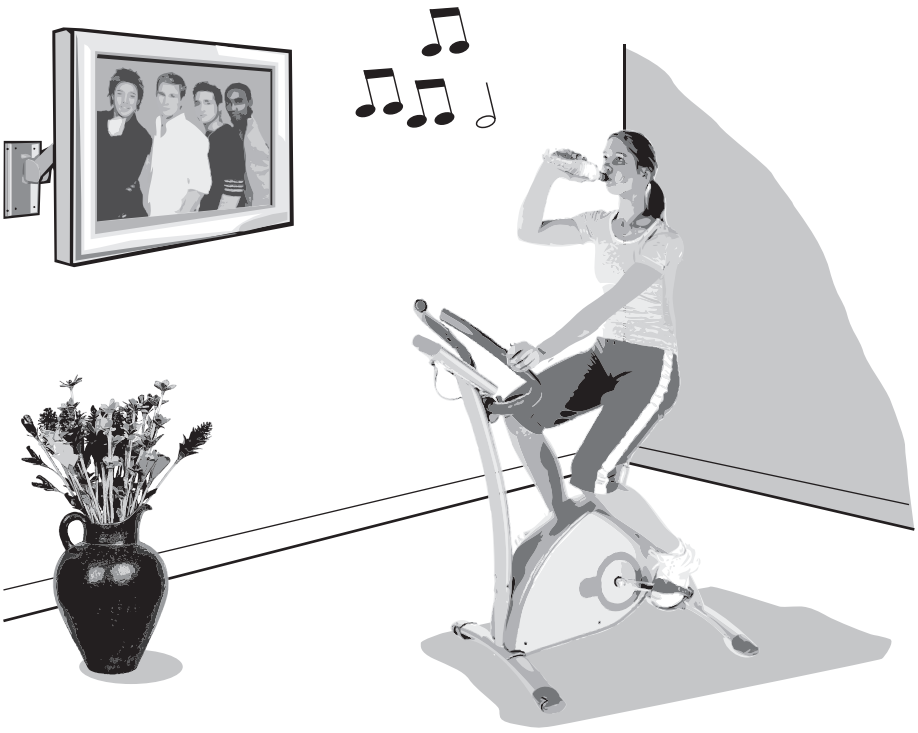
continuous asexual environmental sexual

Variation is increased by ..... reproduction. Human height shows ..... variation and is caused by genetic and ..... factors.

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3. Seren takes a brief rest from exercising.



(a) (i) Complete the table using the words below. You may use the words once, more than once or not at all. [3]

touch chemical sound light temperature

Activity	Stimulus
watching the television	.....
listening to the music	.....
feeling the smooth handlebars	.....
tasting her drink	.....
smelling the flowers	.....

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(ii) Which **two** *sense organs* does Seren use when she is concentrating on the television programme? [1]

1 ..... 2 .....

(b) Complete the sentences. [2]

(i) Sense organs have groups of cells called ..... .

(ii) Sense organs pass ..... signals through nerves to the brain.

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Examiner only

4. *(a)* State the form in which excess food energy is stored in the human body. [1]

.....

(b) Use the information below to answer the questions.

- If a person eats too much energy rich food or does too little exercise, obesity can develop.
- Obese people have an increased risk of heart disease and cancer. Their extra weight can damage knee joints.

Fast food	Energy (kJ) per portion
kebab	1 000
fish sushi	340
super double burger	1 400
sandwiches	520

Activity	Energy used (kJ)	
	Males	Females
½ hour running	250	190
1 hour swimming	350	305
1 hour walking	360	250

Using **this information only**:

(i) State **two** health problems related to obesity. [1]

1 ..... 2 .....

(ii) Which food has the lowest energy content per portion? [1]

.....

(iii) Which activity uses the most energy **per hour**? [1]

.....

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(iv) Martin eats a super double burger. Calculate the time he would need to spend swimming, to use all the energy in it. Show your working. [2]

Answer ..... hours

(c) State **one** way in which a person can try to avoid obesity. [1]

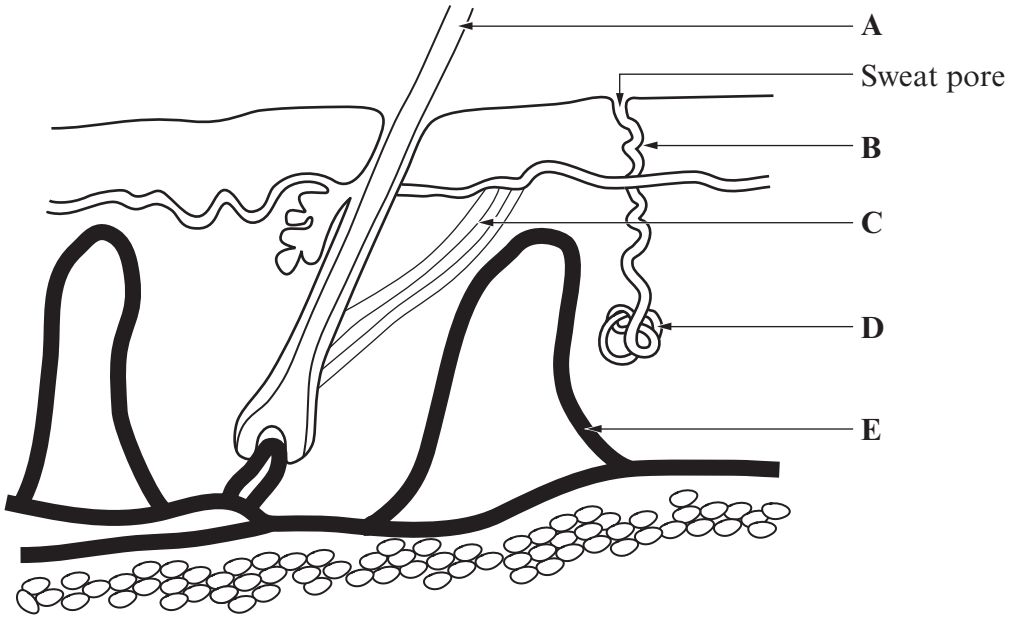
.....

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Turn over.

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5. The diagram shows the structure of human skin.



(a) From the diagram complete the table. [5]

Label	Structure	Function / action
A		becomes erect in cold conditions
B	Sweat duct	
C		contracts in cold conditions
D	Sweat gland	
E		becomes wider in hot conditions

(b) What is the function of the *sweat pore*? [1]

.....

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6. In chickens the comb on the top of the head exists in 2 forms called the rose comb and the single comb.

Rose comb



Single comb



(a) A homozygous rose comb chicken is crossed with one which has a single comb. All the F1 offspring have rose combs.

Using **R** to represent the dominant allele and **r** to represent the recessive allele state the genotype of:

(i) The rose comb parent ..... [1]

(ii) The single comb parent ..... [1]

(iii) The F1 offspring ..... [1]

(b) (i) Complete the Punnett square to show the offspring produced when the single comb parent is crossed with an F1 offspring. [2]

Gametes		

(ii) I. State the meaning of the term *phenotype*. [1]

.....

II. State the ratio of the different phenotypes found in the F2 generation. [1]

..... : .....

7

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7. The photograph shows a sample of cells being taken from a suspect in a criminal investigation.



(a) What chemical from these cells is going to be analysed? [1]

.....

(b) The genetic 'fingerprints' shown below are from a murder case.



(i) Which of the suspects could have been the murderer? Explain your answer. [2]

.....

.....

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(ii) The genetic fingerprints from both suspects would be kept on police records. Why do some people object to this? [1]

.....

.....

.....

.....

(c) State **one** *other* use of genetic 'fingerprinting' apart from in criminal cases. [1]

.....

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8. The spotted owl *(Strix occidentalis)* is an indicator species in the USA. It feeds on squirrels, birds, bats and large insects.



(a) Explain how the spotted owl could be used as an indicator species in its habitat in the USA. [2]

.....

.....

.....

.....

(b) When scientists survey populations of spotted owls they always use its scientific rather than its common name. Explain why. [1]

.....

.....

3

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GCSE MARKING SCHEME

SCIENCE - BIOLOGY (LEGACY)

SUMMER 2012

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INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2012 examination in GCSE SCIENCE - BIOLOGY (LEGACY). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

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UNIT B1 (LEGACY)

FOUNDATION TIER

Question			Marking details	Marks Available
1.	(a)		(Thick) fur Accept hair	1
	(b)		Rough (hair) gives good grip / prevents slipping	1
	(c)	(i)	Any two from Fox / Eagle / Stoat	1
		(ii)	High rate of (re)production / many young produced /	1
	(d)		Camouflage / cannot be seen (by predators) Accept: blends into background	1
	(e)	(i)	Eats only plants/ does not eat animals/ it is a herbivore NOT does not eat meat/ kill other animals/ does not hunt	1
		(ii)	Eats/ takes/ destroys (farm) crops	1
			Question total	**[7]**

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Question			Marking details			Marks Available
2.	(a)		17 (consistent with graph)			1
	(b)		Two bars correct height Tolerance +/- ½ small square			2
	(c)		160 – 164			1
	(d)	(i)	All males / same age			1
		(ii)	Improves reliability/ increases confidence in the results NOT fair test/ accuracy/ precision			1
	(e)		Sexual	Continuous	Environmental	3
					Question total	**[9]**

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Question			Marking details	Marks Available
3.	(a)	(i)	Light Sound Touch Chemical Chemical	3 max (-1 per error)
		(ii)	Eyes, ears	1
	(b)	(i)	Receptors	1
		(ii)	Electrical NOT electric/ electricity	1
			Question total	**[6]**

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FOUNDATION / HIGHER TIER

Question			Marking details	Marks Available
4.	(a)		Fat/ glycogen/ lipids	1
	(b)	(i)	Any two from heart disease / cancer / knee or joint damage/ harm	1
		(ii)	Fish/ sushi	1
		(iii)	Running	1
		(iv)	1400 / 350 4 hours (2 marks for correct answer)	2
	(c)		Increase/ regular/ lots of/ enough exercise (qualified)/ named activity e.g. football/ go to keep fit / OR {Not too much/ decrease} high energy food/ correct comparison from table/ eat less fat or carbohydrate/ eat a balanced diet NOT eat less/ eat healthy/ ref to surgery or medication	1
			Question total	**[7]**

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Question		Marking details	Marks Available
5.	(a)	A hair	1
		B {carries / transports / conveys} sweat/ sweat travels through	1
		C erector muscle	1
		D produces/ makes sweat	1
		E (blood) capillary/ blood vessel	1
	(b)	Releases sweat / allows sweat out (onto skin surface) NOT: water	1
		Question total	**[6]**

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Question			Marking details	Marks Available
6/1	(a)	(i)	RR	1
		(ii)	rr	1
		(iii)	Rr	1
	(b)	(i)	Award 1 mark for all 4 gametes being correct	1
			Award 1 mark for all 4 offspring being correct	1
			Allow e.c.f from (a) if different letters used	

Gametes	r	r
R	Rr	Rr
r	rr	rr

(ii)	I	The {appearance / features/ looks/ characteristic} of an organism that results from the {genotype / genes}.	1
	II	1 rose (comb) : 1 single (comb). (ecf from punnett square) NOT 2:2/ 50:50	1

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Question			Marking details	Marks Available
7/2	(a)		DNA NOT saliva	1
	(b)	(i)	Suspect 1; Has the same {genetic/ DNA} {'fingerprint'/ profile} as found at the scene of the crime; Accept DNA matches the scene of the crime	1 1
		(ii)	Reference to ownership of DNA of innocent suspect/ because it is an {invasion/ breach} of privacy/ it is against human rights	1
	(c)		Disputed paternity / parentage cases / classification/ correct reference to use by insurance companies/ identification of dead bodies.	1
			Question total	**[5]**

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Question		Marking details	Marks Available
8/3	(a)	Number of prey has fallen and so numbers of spotted owls fall ;	1
		Something wrong with environment;	1
		OR	
		More prey species leading to more owls;	
		Showing environment is healthy;	
		To check if there is anything wrong with the environment = 1 mark	
	(b)	Common names are different in different {parts of USA / areas}/	1
		scientific names are the same all over the world (OWTTE)/	
		scientific names are always the same	
		Question total	**[3]**
		TOTAL FOUNDATION TIER	**50**

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HIGHER TIER

Question		Marking details	Marks Available
4.	(a)	{Jellyfish /fluorescent protein} gene/allele is cut out of DNA	1
		OR gene is cut out of jellyfish DNA;	
		Zebrafish DNA (in egg) cut open;	1
		{Jellyfish /fluorescent protein} gene {inserted / spliced} into	
		zebrafish DNA;	1
	(b)	Concerns of escape of gene into wild/ native population/ transfer	1
		gene to other fish;	
		Question total	**[4]**

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Question		Marking details	Marks Available
5.	(a)	Alcohol slows reaction time / the time taken to react is longer with alcohol/ reaction time is increased with alcohol/ reactions are slower with alcohol/ ORA Must be clear whether answer refers to alcohol NOT reaction time decreased/ reduced/ lowered	1
	(b)	Improves reliability / confidence in the results. NOT accuracy/ validity/ fair test	1
	(c)	50%	1
	(d)	Alcohol slows reaction times/ increases thinking time/ Alcohol affects sight / impairs vision; Increases the time taken to brake/ increase likelihood of accident;	1 1
	(e)	liver damage or cirrhosis / mouth cancer/ heart disease/ stomach damage/ kidney damage/ damage to foetus; NOT heart attack.	1
		Question total	**[6]**

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Question			Marking details	Marks Available
6.	(a)		Increased {number/ rate} of mutations or cancers;	1
	(b)	(i)	2.5 mSv Accept any figure 0 – 2.5 mSv (unit must be written correctly)	1
		(ii)	{Time / distance} for radioactivity to {be blown to/ travel to / be carried to/ reach} (Wales) / time for radioactivity to enter food chain.	1
	(c)	(i)	{Meat/ sheep} could not be sold / sheep could not be moved to other areas; NOT less meat sold	1
		(ii)	so loss of income/ lose jobs;	1
			Question total	**[5]**

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Question			Marking details	Marks Available
7.	(a)	(i)	Pancreas	1
		(ii)	DNA	1
		(iii)	Hormones	1
	(b)	(i)	Mitosis (correct spelling)	1
		(ii)	Chromosome	1
	(c)		Any 2 from (Objections) to use of embryos; (Objections) to use of monkeys / animals; genetically modified; animals may respond differently to humans; NOT unethical/ cruel (unqualified)	2
			Question total	**[7]**

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Question			Marking details	Marks Available
8.	(a)		D.C.B.E.A. 4/5 correct = 3 marks 3 correct = 2 marks 2 correct = 1 mark 0/1 correct = 0 marks.	3
	(b)		Any 2 = 1 mark. Protective or stops body being harmed / fast or rapid or quick / automatic or involuntary or does not involve brain/thought;	1
	(c)	(i)	Muscle /any named voluntary muscle	1
		(i)	Spinal cord	1
			Question total	**[6]**

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Question		Marking details	Marks Available
9.	(a)	(Gregor) Mendel (Spelling of Mendel must be correct).	1
	(b)	Medium	1
	(c)	Any 2 from Variation; Medium stem length better adapted; (survival advantage) increased chance of pollination/ reproduction; genes/ DNA/ alleles passed on;	2
	(d)	Any 3 Wind; Soil / pH; minerals / nutrients / water/ rain; Light / shade; Temperature; NOT heat Grazing/ grazers; Salt spray; NOT disease/ habitat destruction/ space/ pollution/ predators/ weather/ climate	3
		TOTAL HIGHER TIER	**50**

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Surname	Centre Number	Candidate Number
Other Names		0

GCSE

0235/01

SCIENCE
FOUNDATION TIER
BIOLOGY 1

A.M. TUESDAY, 24 January 2012

45 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1	**8**	
2	**8**	
3	**6**	
4	**6**	
5	**7**	
6	**6**	
7	**4**	
8	**5**	
TOTAL	**50**	

0235 010001

ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

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Answer **all** *questions.*

1. Read the following information about butterflies and climate change.

- Skipper butterflies live in England and Wales.
- There are two types, A and B, as in the diagram below.



Skipper butterfly
(Epargyreus clarus)

Type **A**
Lays eggs in cool conditions

Type **B**
Lays eggs in warm conditions

- Scientists counted butterflies between 1980 and 2000 in an area. The results are shown below. During this time the temperature of the environment increased because of global warming.

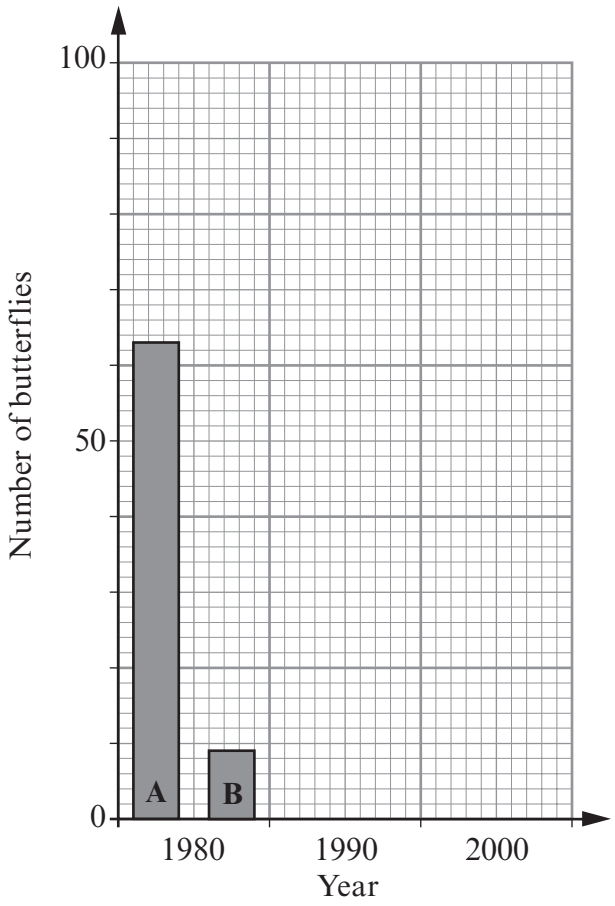
Results

	Number of butterflies		
Type	1980	1990	2000
A	63	38	14
B	9	43	77

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(a) (i) Complete the bar chart to show the results for 1990 and 2000.
Label your bars **A** and **B**. [2]



(ii) From this information, between 1980 and 2000:

I. state what has happened to the number of type **A** butterflies; [1]

.....

II. suggest a reason for the change in numbers shown in type **B**. [1]

.....

(b) The scientists said that the Skipper butterfly had shown *natural selection*. [3]

Complete the sentences using some of the words below.

generation survive species genes

During natural selection some individuals ..... better than others.

They breed and so pass on their ..... to the next

.....

(c) The Mountain Ringlet is a species of butterfly which can only survive in a cool environment.
Suggest what might happen to this species if global warming continues. [1]

.....

0235 010003

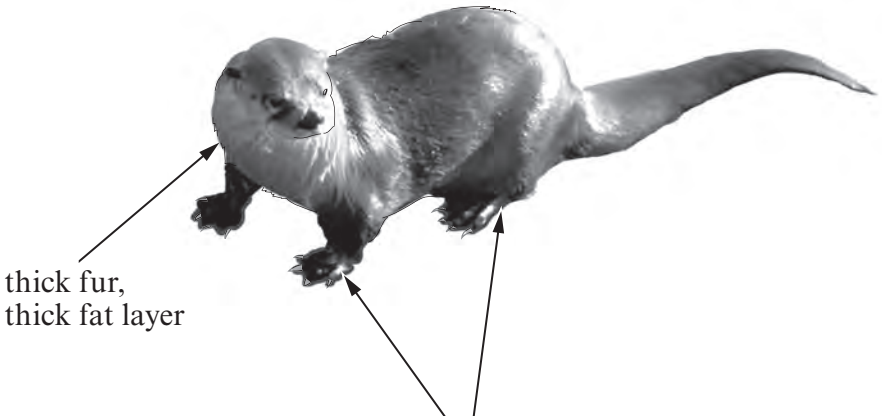
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2. Use the information about otters in the photographs and table to answer the questions that follow.

- Otters are adapted to life in and near water.
- There are two types of otter.

River Otter



Sea Otter



Otter facts

Feature	River Otter	Sea Otter
Time spent in water (%)	50	90
Swimming speed (kilometres per hour)	15.0	9.3
Swimming method	All feet used	Only back feet used
Maximum time underwater (minutes)	8	4
Level of heat produced in body	Very high	Medium
Food	Fish	Fish
Depth of diving	Shallow	Very deep

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Examiner only

From **this information:**

(a) (i) How much faster does a River Otter swim than a Sea Otter? [1]

..... kilometres per hour

(ii) Both otters are streamlined. Suggest why the River Otter is able to swim faster. [1]

.....

(b) (i) Sea Otters can move only slowly on land. Why is this *not* a problem for them? [1]

.....

(ii) From the photograph, give **one** feature of the River Otter that allows it to move quickly on land. [1]

.....

(c) Give **two** reasons why the Sea Otter has more difficulty in keeping warm than the River Otter. [2]

(i) .....

(ii) .....

(d) For each otter, suggest **one** feature which helps it to find as much food as possible. [2]

River Otter .....

Sea Otter .....

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3. • Cystic fibrosis is a condition in which thick mucus collects in the lungs. It is inherited when genes are passed from parents to a child.

• Different forms of a gene are called *alleles*.

(a) (i) Complete the sentence using **one** of the words below. [1]

heterozygous dominant mutant

The allele for cystic fibrosis is recessive and the normal allele is .....

(ii) Complete the table below. [1]

n = Cystic fibrosis allele. N = normal allele

Alleles present	Does the person have cystic fibrosis? (yes or no)
NN	
Nn	
nn	yes

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(b) The diagram shows a family tree.

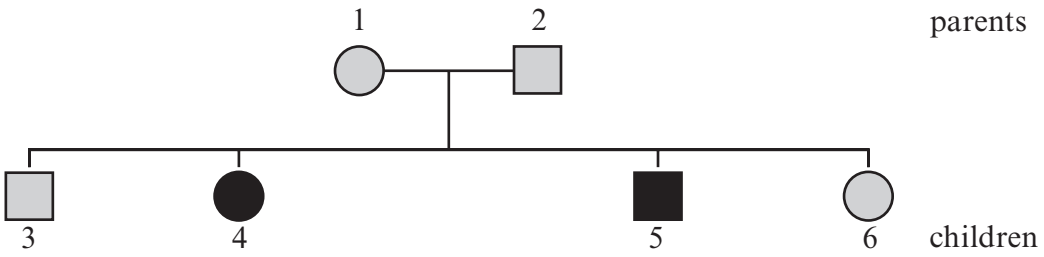
Key:

female, does not have cystic fibrosis

female, has cystic fibrosis

male, does not have cystic fibrosis

male, has cystic fibrosis



From the family tree:

(i) Give a number for

a healthy male; .....

a female with alleles nn; .....

a person whose alleles are Nn. ..... [3]

(ii) In *this family* what proportion of children have cystic fibrosis? [1]
Circle the correct answer.

25% 50% 75% 100%

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4. Read the following information about food and health.

Contents of processed foods

	Savoury Pie 100 g (highly processed)	Baked Beans 100 g (less processed)
Energy (kJ)	950.0	300.0
Fat (g)	9.2	0.2
Salt (g)	4.8	1.7
Fibre (g)	3.8	3.8

Illnesses linked to bad diet.

Diet	Health risk
High fat	Heart disease
High salt	Stroke Kidney damage in young children
Low fibre	Bowel cancer

(a) From **the tables**

(i) State **two** health risks which are greater for an adult eating Savoury Pie every day, than for an adult eating baked beans. Give reasons. [2]

I. Risk 1 .....

Reason .....

II. Risk 2 .....

Reason .....

(ii) Why is a diet of highly processed food not suitable for young children? [1]

.....

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(iii) The energy Geraint needs for one hour of work is 150 kJ. He eats 200 g of baked beans for lunch.

Calculate how long he could work in the afternoon using this energy. Show your working. [2]

..... hours.

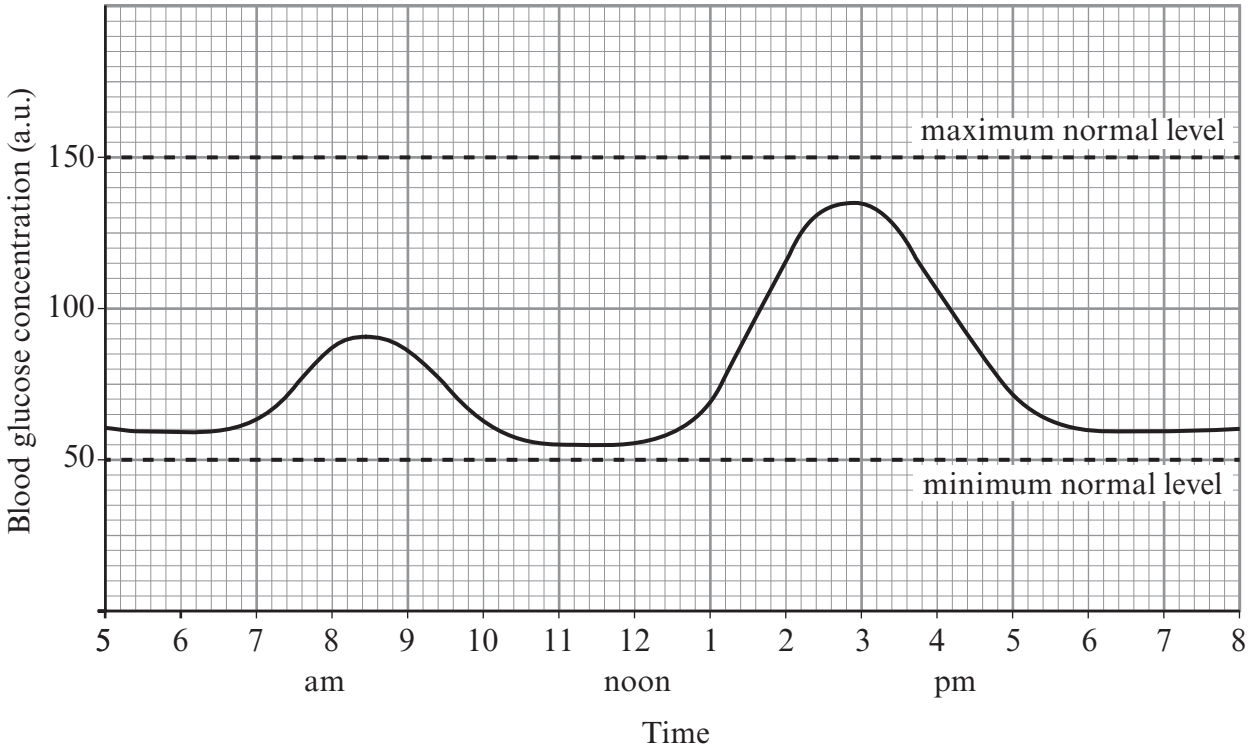
(b) What health problem, not given in the tables, occurs if a person takes in too much energy and does too little exercise over a long period of time? [1]

.....

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5. *(a)* The graph shows the level of glucose in a person's blood during one day.



From the graph:

(i) Complete the sentence by underlining the correct answer. [1]

The level of glucose in the blood needs to be

at a constant high level

at a steady low level

within a certain range.

(ii) What happens to the level of blood glucose between 7.00 am and 10.00 am? [1]

.....

(iii) Suggest a reason for the change in blood glucose level between 12.30 and 2.30 pm. [1]

.....

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(b) A medical condition occurs if a person does not produce enough of the hormone which controls the level of blood glucose.

(i) Name the hormone. [1]

.....

(ii) Name the medical condition. [1]

.....

(iii) A doctor can do a test to find out if a patient has this condition. Circle the correct answers below about the test. [2]

I. Which fluid is taken from the patient?

sweat urine saliva

II. Which substance does the doctor look for in the fluid?

salt protein glucose

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6. John and Tracey are a young couple who each smoke 25 cigarettes a day on average. They have both tried to stop smoking many times without success.

(a) Why do John and Tracey find it so difficult to stop smoking? [1]

.....

(b) Suggest **two** reasons why John and Tracey should wish to stop smoking. [2]

(i) .....

.....

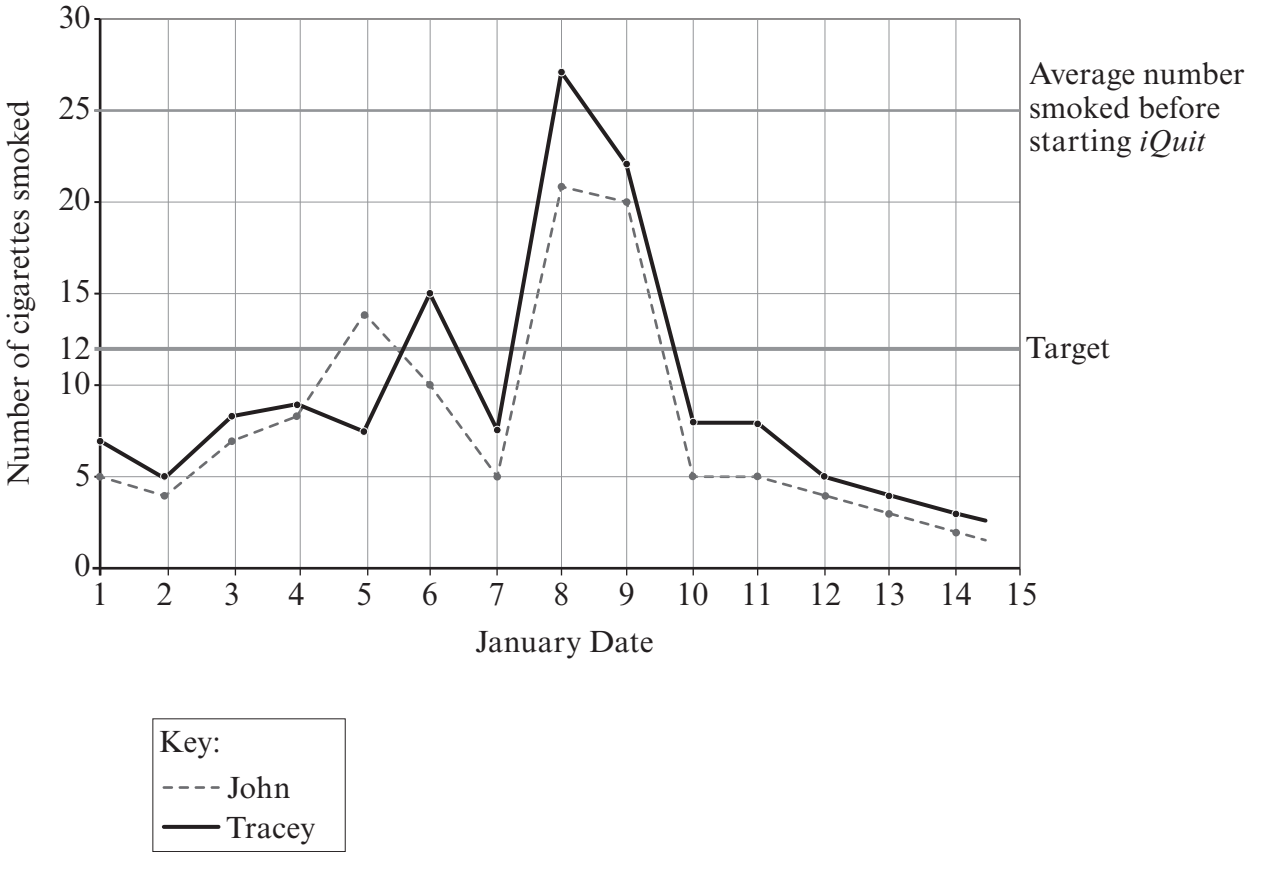
(ii) .....

.....

(c) Both John and Tracey downloaded an 'iQuit Smoking' App to their mobile phones. Using this App they input the maximum number of cigarettes they wish to smoke in a day - the target - and also the **actual** number of cigarettes they smoke each day. The App then produces a graph of the progress made in attempting to stop smoking.

The graph below shows the data from John and Tracey's first 2 weeks of this attempt at stopping smoking.

iQuit Smoking progress chart



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(i) For how many days did John smoke more than his target number of cigarettes? [1]

..... days.

(ii) Use the graph to explain why John and Tracey's attempt at stopping smoking has been a success so far. [2]

.....

.....

.....

.....

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7. The European adder *(Vipera berus)* is a snake found in many parts of Wales. The body colour is usually brown, cream or red with a dark zig-zag pattern along the back.

European adder



(a) What word is used to describe the differences between members of the same species? [1]

.....

(b) Adders whose colour is all black are seen occasionally.

(i) What word is used to describe this sudden change in colour? [1]

.....

(ii) What chemical is altered to cause this change in colour? [1]

.....

(c) State **one** way the offspring produced by sexual reproduction differ from those produced by asexual reproduction. [1]

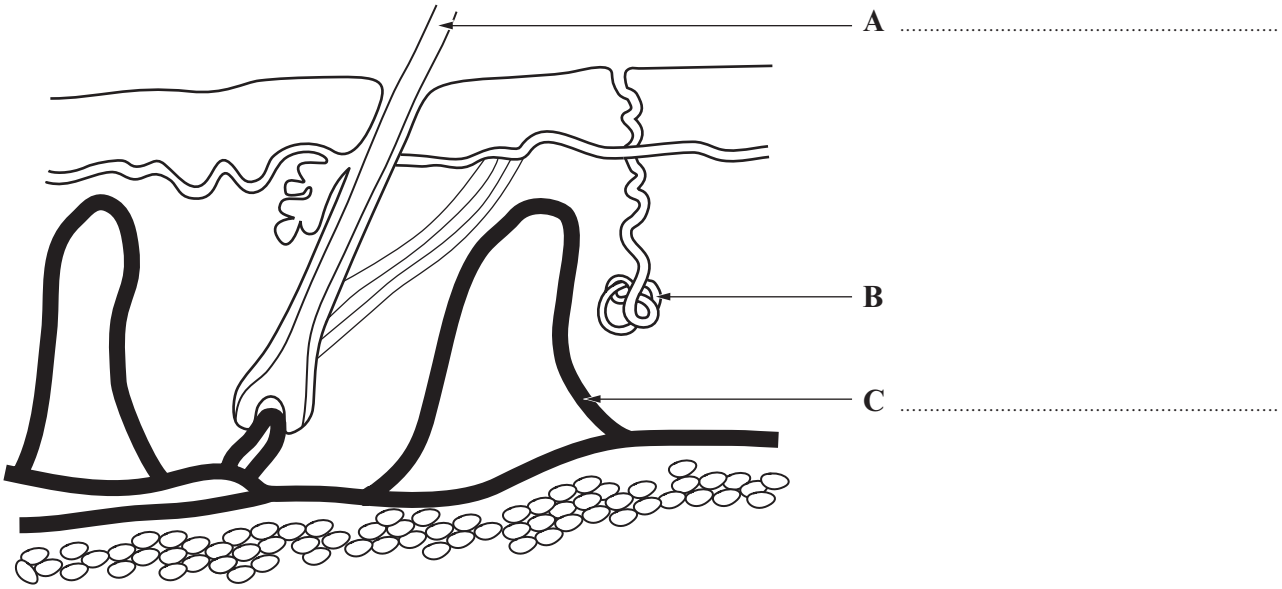
.....

.....

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8. The diagram shows a section through human skin.



(a) Label parts **A** and **C** on the diagram. [2]

(b) When the body temperature rises, explain how part **B** helps to lower it. [3]

.....

.....

.....

.....

.....

.....

5

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WJEC
CBAC

GCSE MARKING SCHEME

SCIENCE – BIOLOGY (LEGACY)

JANUARY 2012

INTRODUCTION

The marking schemes which follow were those used by WJEC for the January 2011 examination in GCSE SCIENCE – BIOLOGY (LEGACY). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

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Unit	Page
B1 (Legacy)	1
B2 (Legacy)	14

UNIT B1 (LEGACY)

Question	Answer	Mark
1. (a) (i)	4 bars - correct height with a label	2
	Tolerance +/- $^1/_2$ small square -1 for each error	
(ii)	I decrease/ decline/ go down	1
	II Warmer conditions/ Global warming AND so more eggs/ young/ caterpillars produced/ more reproduction	1
(b)	Survive genes generation	3
	Become extinct/ died out/ wiped out/ disappeared/ endangered/ decrease in number/ decrease in population NOT died off/ it dies	1
	Total for Question	**8**

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Question	Answer	Mark
2. (a) (i)	5.7	1
(ii)	Uses all feet/ legs / ORA	1
(b) (i)	Most (90%) of life{ in the water/ swimming}/ ORA NOT better adapted to water	1
(ii)	Strong legs / large feet	1
(c) (i)	Not as much/less fat (must be comparative)	1
(ii)	less body heat produced/ medium body heat produced	1
(d)	Long time underwater/ can stay underwater for 8 minutes/ fast swimming/ swims at 15 km/h	1
	(Very) deep diving/ swimming/ 90% time spent in water/ long time spent in water	1
	Total for Question	**8**

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Question	Answer	Mark
3. (b) (i)	dominant	1
(ii)	No, No	1
(c) (i)	2 or 3 4 1 or 2	3
(ii)	50%	1
	Total for Question	**6**

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Question	Answer	Mark
4. (a) (i)	I Heart Disease – contains higher fat	1
	II Stroke – contains higher salt	1
	Answers must be comparative	
(ii)	(Savoury Pie) high in salt SO risk of kidney damage	1
(iii)	Calculation method and numbers correct 300 x 2 / 150 or 600/15	1
	Answer correct with units (4) = 2 marks	1
(b)	Obesity/ overweight/ excessive weight or mass/ diabetes/ high blood pressure	1
	NOT put on weight/ too fat	
	Total for Question	**6**

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Question	Answer	Mark
5. (a) (i)	Within a certain range	1
(ii)	Increase followed by decrease	1
(iii)	Eating (lunch / food/ dinner etc)	1
(b) (i)	Insulin	1
(ii)	diabetes	1
(iii)	I Urine II Glucose	2
	Total for Question	**7**

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FOUNDATION AND HIGHER TIER

Question	Answer	Mark
6/1 (a)	smoking is **addictive**/contains nicotine which is **addictive**/contains a drug or chemical which is **addictive/** they get **addicted**/ **dependent** NOT hooked/ crave/ withdrawal symptoms	1
(b)	any two disease/health related reasons - accept 2 cancers {lung/ throat/ tongue/ bladder/ pancreas} cancer/ lung disease/ emphysema/ narrowed arteries/ heart disease/ reduction of fertility/ may have underweight babies/ decreased life expectancy/ increased chance of miscarriage NOT heart attack/ breathing problems/ bronchitis/ lung damage accept answer related to secondary smoking/ ref to other people breathing their smoke accept answer related to cost of cigarettes	Any 2
(c) (i)	3	1
(ii)	For last five days they have smoked less each day; There is a decrease in the number of cigarettes smoked/ correct numerical answer; Only once in the 2 week period has the previous daily average of 25 cigarettes smoked been reached (therefore considered successful); Most of the time both smoke less than their target Accept answers only referring to one of the people.	Any 2
	Total for Question	**6**

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Question	Answer	Mark
7/2 (a)	variation	1
(b) (i)	mutation	1
(ii)	(change in) DNA (not: change in genetics)	1
(c)	(offspring produced by sexual reproduction) show variation are different or not identical/ have genes from two parents/ have different alleles (accept: are not a clone) ORA NOT have two parents/ have different genes or chromosomes	1
	Total for Question	**4**

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Question	Answer	Mark
8/3 (a)	A - hair	1
	C – (blood) capillary/ blood vessel	1
(b)	(sweat gland) removes salts and water (NOT water alone) /sweat from blood/produces sweat	1
	(poured onto surface of skin (water in)) sweat evaporates	1
	Withdrawing or releases or takes heat from body/ body heat required to evaporate (water in) sweat/ lowers skin or blood temperature/ taking heat with it NOT cools you down/ lets out heat	1
	Total for Question	**5**

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HIGHER TIER

Question	Answer	Mark
4. (a)	Starts off higher	Any 3
	(blood) glucose rises higher/ more rapidly/ falls more rapidly	
	blood glucose takes longer to get back to normal or level off	
	blood glucose drops below normal/ lower than the normal	
	man	
(b)	inject insulin (before eating breakfast)/ use insulin pen	1
	or ensure that the breakfast is very low in glucose/sugar/carbohydrate/fruit	
	or take Metformin/ Novonorm	
(c)	insulin produced which converts glucose to glycogen (in the liver) Spelling must be accurate for glycogen	1
	Total for Question	**6**

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Question	Answer	Mark
5. (a)	Cross 1 - **award 1 mark for all the offspring being Bb**	1

Gametes	B	B
b	**Bb**	**Bb**
b	**Bb**	**Bb**

Cross 2 - **award 1 mark for 50% Bb and 50% bb** 1

Gametes	B	b
b	**Bb**	**bb**
b	**Bb**	**bb**

(b) If the bought rabbit or it was homozygous or BB then all offspring would be black/ there will be no white offspring 1

If the bought rabbit or it was heterozygous or Bb then 50% of offspring would be black and 50% white or some white/ Bought rabbit must be Bb to produce any white rabbits 1

Total for Question 4

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Question		Answer	Mark
6.	(a)	DNA	1
	(b)	Chromosomes / genes	1
	(c)	scientific names are used by all / are constant / do not vary/ it will be the same in all languages/ used by all scientists/ international communication/ universally understood/ common names are different in different countries	1
			(Total 3)
7.		C B E A D	5 x 1
		Total for Question	**5**

Question	Answer	Mark
8. (a)	Decrease in appetite/ makes them not feel hungry	1
	NOT affect appetite	
	so less food is eaten NOT so they do not eat	1
(b) (i)	correct line starts at 70 and shows no decrease in mass (can increase)	1
(ii)	control	1
(c)	Animal rights/ human not same as mice/research on mice is not valid for humans/ might cause mice to starve/ unethical to experiment on animals (not: simple idea of cruelty/ harmed/ suffer)	1
	Total for Question	**5**

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Question	Answer	Mark
9. (a)	Age and gender	2
(b)	Mutation	1
	leading to <u>variation</u>	1
	large brain size advantage/survival value NOT survival of the fittest alone	1
	Genes/ alleles passed on NOT mutation passes on unless qualified by gene	1
(c)	Most believed in creationism/God made humans/ went against religious views/ against bible NOT lack of proof/ against church	1
	Total for Question	**7**
10.	In order: Stimulus – heat/ hot object Receptor – skin/ nerve endings/ sensory cells (NOT hand) sensory neurone/ nerve connecting/ relay/ intermediate/ internuncial neurone or nerve motor neurone/ nerve muscle/ effector synapses - anywhere where correctly referenced Any 5 from 7	(5 x 1)
	Total for Question	**5**

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Candidate Name	Centre Number	Candidate Number
		0

WJEC CBAC

GCSE

235/01

SCIENCE
FOUNDATION TIER
BIOLOGY 1

P.M. TUESDAY, 7 June 2011

45 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1	**7**	
2	**7**	
3	**7**	
4	**7**	
5	**7**	
6	**5**	
7	**7**	
8	**3**	
Total	**50**	

0235 010001

ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

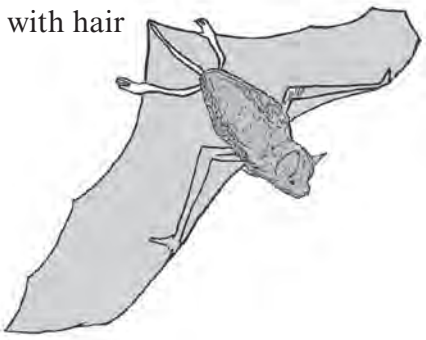
You are reminded of the necessity for good English and orderly presentation in your answers.

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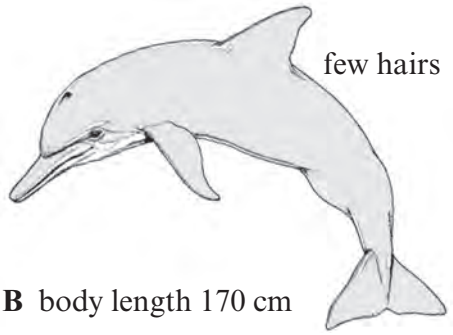
Answer **all** *questions.*

1. The drawings below show six mammals (not drawn to scale).

Body covered with hair

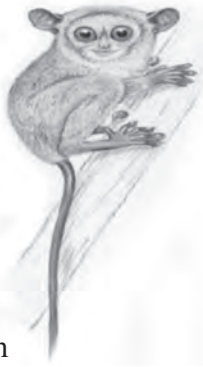


A body length 12 cm



B body length 170 cm

hair on body

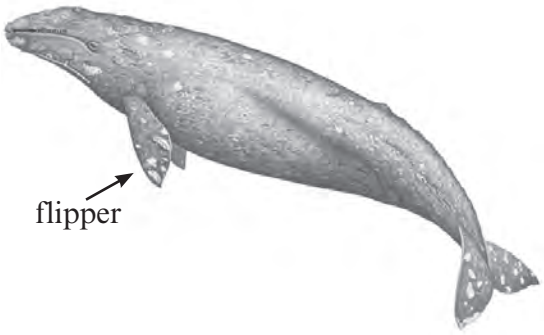


C body length 8 cm



D body length 45 cm

few hairs



E body length 1400 cm



F body length 50 cm

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Use **the information** opposite to answer the questions.

(a) State **one** feature which is present in all these animals. [1]

.....

(b) (i) Complete the table by adding letters **A - F** to put these animals into their correct groups. [3]

Scientific group	Body features	A-F
Primates	Body length 5 cm - 180 cm eyes face forward has fingers	
Chiroptera	Body length 5 cm - 50 cm eyes at side of head has wings	
Cetacea	Body length above 150 cm eyes at side of head has flippers	

0235 010003

(ii) Animals such as **A** are usually known as bats. What name would scientists use for these animals? [1]

.....

(c) Give **one** body feature, shown in the drawing, which would help animal **F** in its life high up in trees and state how this feature would be useful. [1]

Feature .....

How feature is useful .....

.....

(d) Animal **C** is only active during the night. From the drawing, give **one** feature which helps it to search for food. [1]

.....

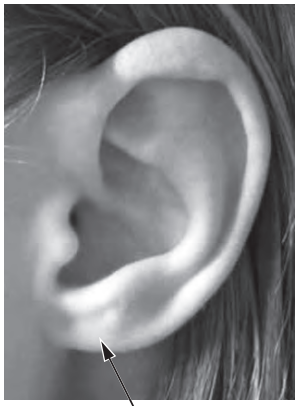
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2. There are two types of ear lobes in humans as shown below.



free ear lobe



attached ear lobe

Students investigated variation in humans.

- They asked 6 people how tall they were.
- They looked at their ears to see if they had free or attached earlobes.
- All the people were 25 year old females.

The results are shown in the table.

Person	Height (cm)	Ear lobes
1	160	free
2	154	attached
3	174	free
4	163	free
5	152	attached
6	170	free

(a) From **this information only**.

(i) What is the difference in height between the shortest and the tallest person? Show your working. [1]

Answer ..... cm

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(ii) The students wanted their investigation to be scientific.

I. State **one** way in which their investigation was a fair test. [1]

.....

II. How could they make their results more reliable? [1]

.....

(iii) Complete the table below by adding **ear lobes** and **height** as examples. [1]

	Continuous variation	Discontinuous variation
Examples	.....	.....

(b) Complete the sentences using some of the words below. [3]

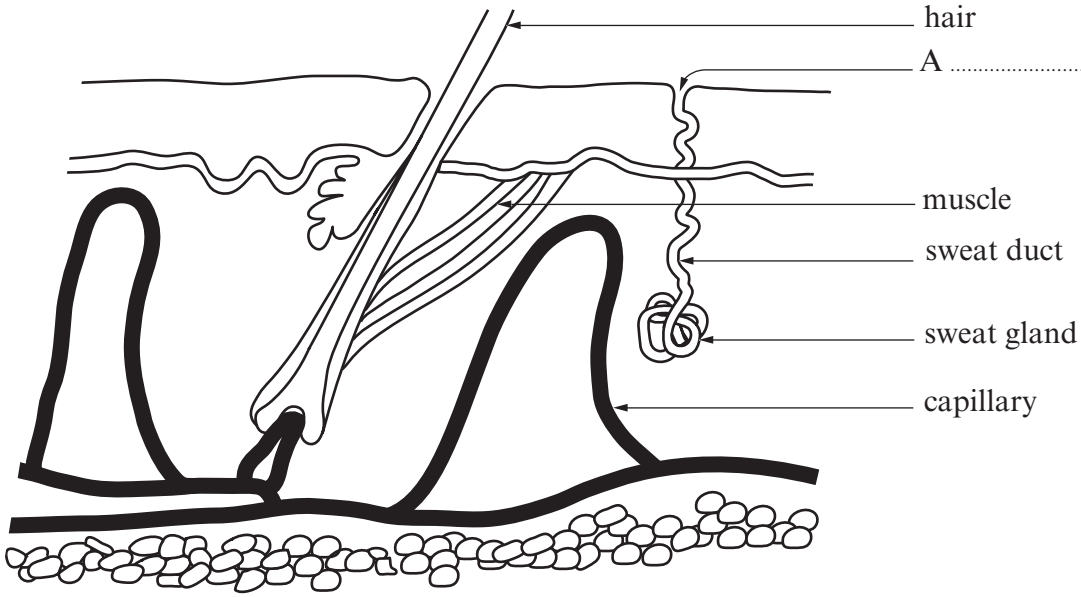
sexual	asexual	identical	different	environment

Variation results from ..... reproduction when two parents produce offspring which have ..... genes. The ..... can also cause variation.

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Examiner only

3. The diagram shows structures in human skin.



(a) Complete the diagram by labelling **A**. [1]

(b) (i) From the diagram, complete the table below by adding the structure for each function. [4]

Function	Structure
Becomes erect in cold temperatures	
Produces sweat	
Carries sweat to skin surface	
Length contracts in cold temperatures	
Diameter increases *(wider)* in high temperatures	

(ii) How does sweat production change if a person moves from a cold room to a warmer room? [1]

.....

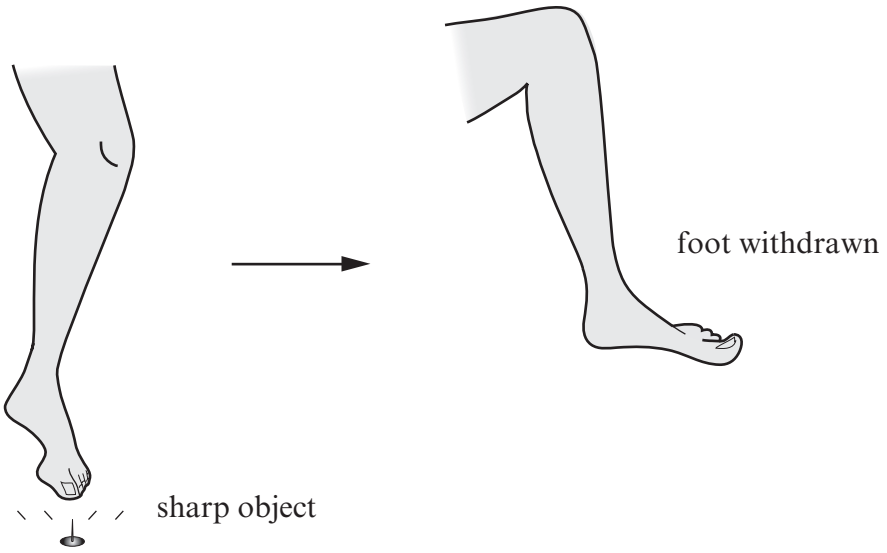
(c) What is the benefit of shivering? [1]

.....

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4. *(a)* The diagram shows a *reflex action*.



(i) Underline the correct answer to complete the sentence below. [1]

very quickly at medium speed very slowly

Reflexes happen .....

(ii) What is the purpose of a withdrawal reflex? [1]

.....

(b) Complete the sentences by using some of the words below. [4]

impulse	electrical	automatic	brain	receptor

When a sharp object touches the skin ..... cells are stimulated. A nerve ..... in the form of ..... signals carries the information into the nervous system. A reflex action is ..... , so it happens without thought.

(c) Name a sense organ which responds to a chemical stimulus. [1]

.....

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5. • Most processed food contains salt.

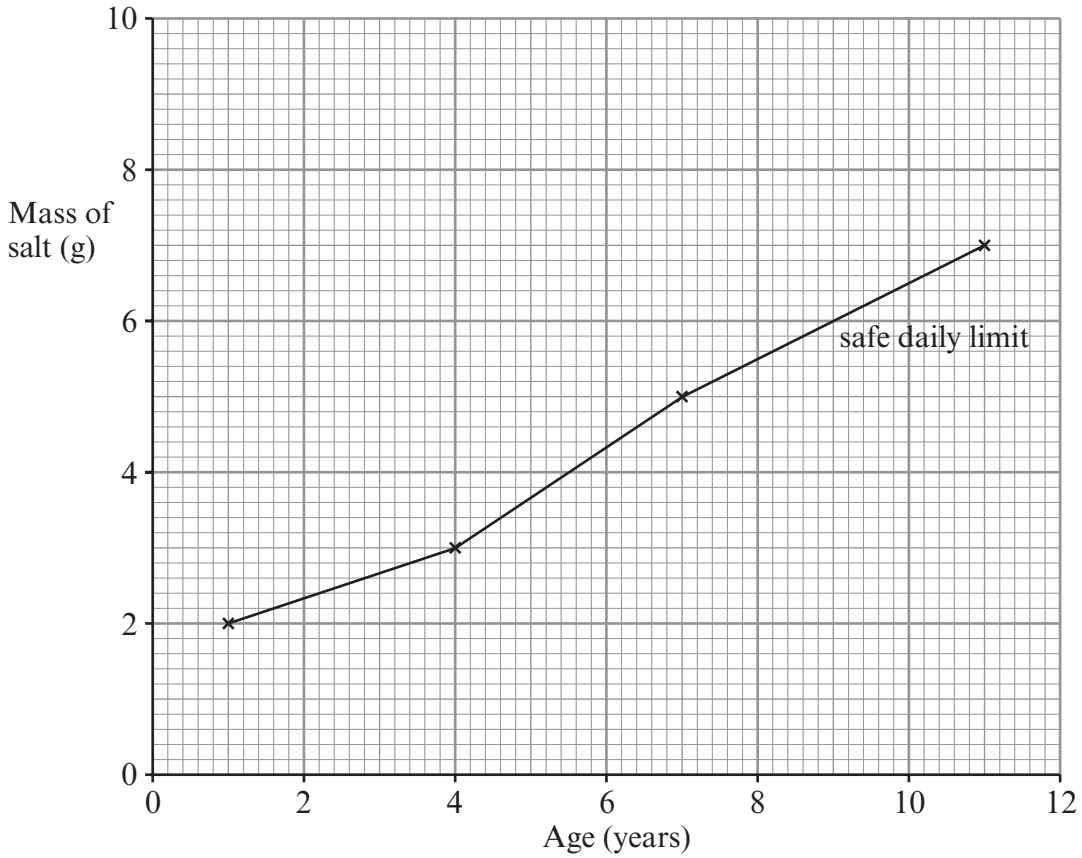
• Eating too much salt can cause health problems, especially in children.

Doctors investigated how much salt children eat each day and compared this with how much it is safe to eat. The results are shown below.

Age (years)	Mass of salt eaten daily (g)	Safe daily limit for salt (g)
0.5	0.2	–
1	2.8	2.0
4	5.1	3.0
7	7.4	5.0
11	9.6	7.0

UK Food Standards Agency 2007

(a) (i) Plot the results for mass of salt eaten daily onto the graph. Join the plots with a ruler. The graph showing the safe daily limit **has been done for you**. [3]



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(ii) From your graph, calculate the difference between the mass of salt eaten daily at age 8 and the safe limit for this age. Show your working. [2]

Answer ..... g

(iii) Describe what the graph shows about the mass of salt eaten by children as they get older. [1]

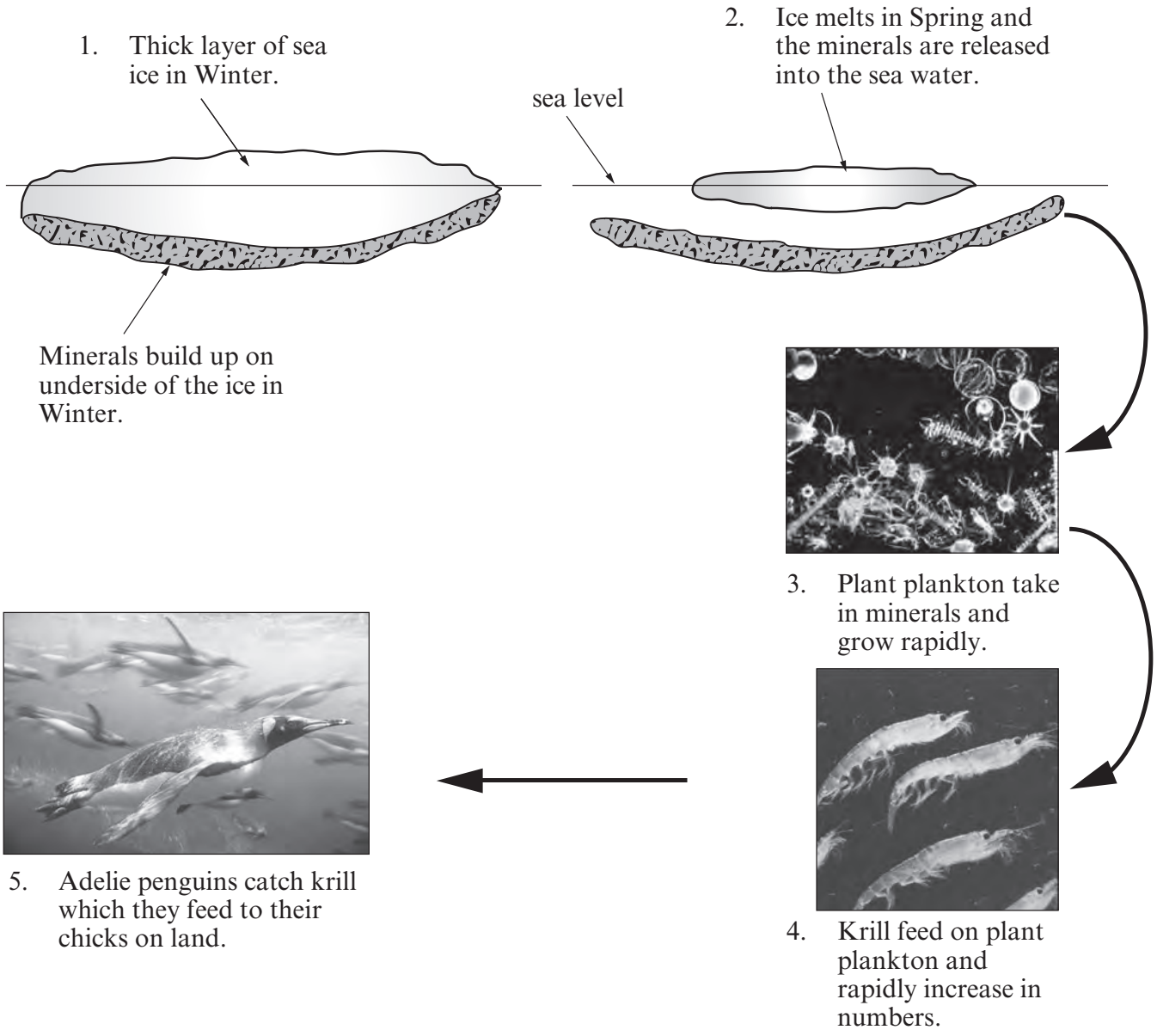
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(b) How can a person find out how much salt is contained in processed food such as a packet of crisps? [1]

.....

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6. Sea ice builds up in the southern oceans around Antarctica every Winter. Vast quantities of minerals build up on the underside of the ice. In the Antarctic Spring the ice melts and releases the minerals into the sea water.



Fact file:

- In the Antarctic Winter of 1995 not so much sea ice formed as usual.
- In the following Antarctic Spring up to 50 Adelie penguin chicks starved to death each day on an Antarctic island.

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(a) Using the information provided opposite, explain why the Adelie penguin chicks starved to death. [3]

.....

.....

.....

.....

.....

.....

(b) Apart from competition for food and minerals, state **two** *other* environmental factors that can affect the size of a population of organisms. [2]

(i) .....

(ii) .....

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7. Nearly 1 in 15 adults in the UK is obese. It is more likely that people will develop diabetes if they are obese.

(a) Suggest **two** ways in which a person could help to reduce the risk of developing diabetes. [2]

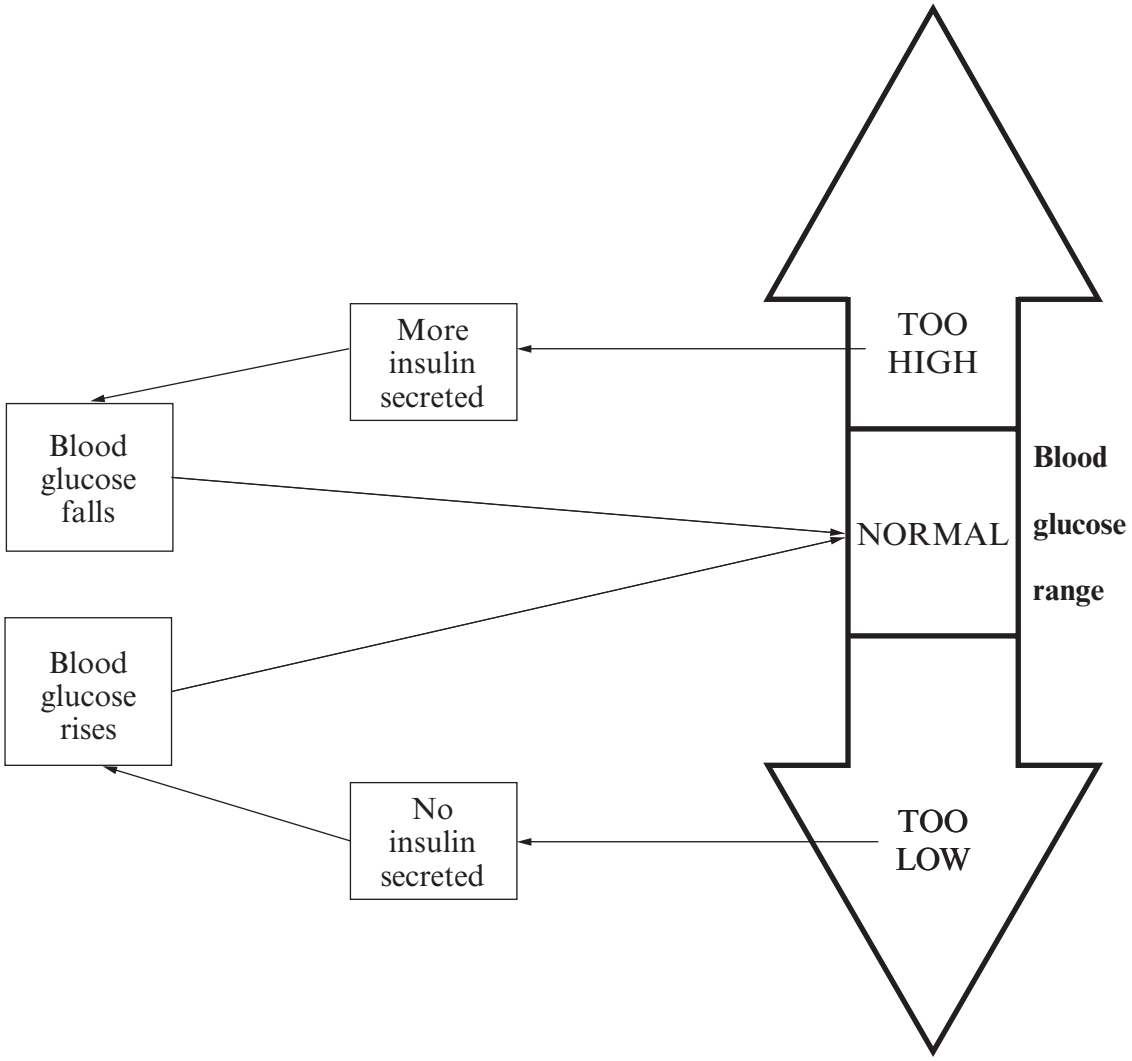
(i) .....

.....

(ii) .....

.....

(b) The diagram shows the mechanism of blood glucose control.



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(i) Use your knowledge and the information in the diagram to explain how the blood glucose level is returned to normal when it rises too high. [3]

.....

.....

.....

.....

.....

.....

(ii) I. How would the mechanism of blood glucose control differ in a person with diabetes? [1]

.....

.....

II. How would this affect the blood glucose level? [1]

.....

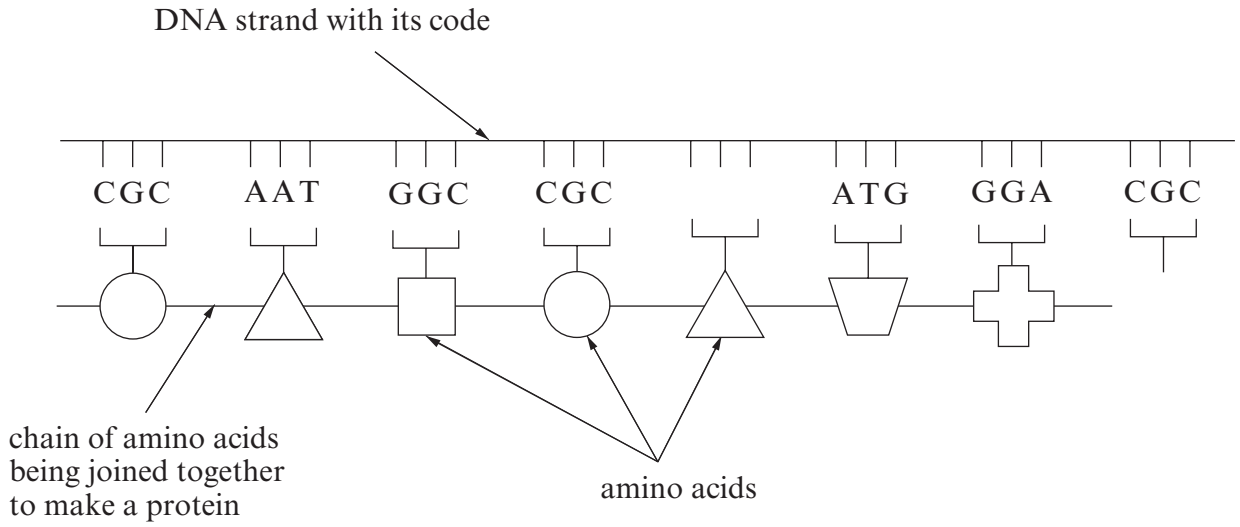
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8. DNA contains a code which arranges amino acids in an order to form proteins. The code is represented by the letters A, G, T and C.

The simplified diagram shows a strand of DNA with its code and amino acids being arranged to form a protein.



(a) Complete the diagram by

(i) drawing the missing amino acid, [1]

(ii) writing in the missing piece of the code. [1]

(b) A mutation occurred which changed the code in the strand of DNA shown above. Suggest what effect this would have on the protein which is formed. [1]

.....

.....

3

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Candidate Name	Centre Number	Candidate Number
		0

GCSE

235/01

SCIENCE
FOUNDATION TIER
BIOLOGY 1

A.M. THURSDAY, 13 January 2011

45 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1	**7**	
2	**4**	
3	**7**	
4	**6**	
5	**11**	
6	**6**	
7	**6**	
8	**3**	
Total	**50**	

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ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

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Examiner only

Answer **all** *questions.*

1. Using only the information given, answer the questions that follow.

- Some penguins live in the Antarctic, where it is very cold.
- Their bodies are streamlined.
- They have webbed feet and wings that act as flippers.
- They have lots of fat under their skin.
- On land they huddle together in large groups.
- The feathers have a layer of oil to waterproof them.
- The black feathers absorb heat from the sun.



Source: wildwildweather.com

(a) State **two** ways in which penguins keep warm. [2]

(i) .....

(ii) .....

(b) State **three** ways in which penguins are adapted for swimming. [3]

(i) .....

(ii) .....

(iii) .....

(c) (i) Underline **one** of the following statements to suggest why it is an advantage for penguins to have heavy, solid bones. [1]

I. to help them fly
II. so they can stay under water
III. to keep them warm

(ii) Suggest **one** reason why most other birds have light, hollow bones. [1]

.....

7

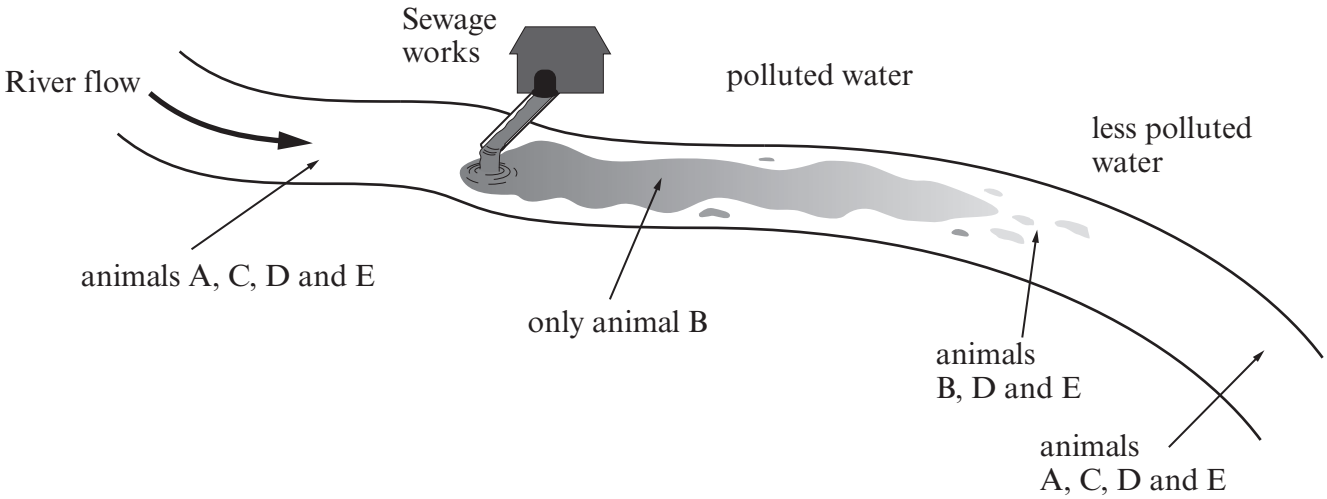
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2. The animals below live in different parts of a river.



A B C D E

The diagram shows where each animal is found.



(a) Which of the animals A-E, is best able to survive in polluted water? [1]

.....

(b) (i) Using the letters A-E, which **two** of these animals cannot live in polluted water? [2]

..... and .....

(ii) These two animals tell us whether the water is polluted or not. [1]
Underline the correct answer below.
They are known as:

Endangered species

Indicator species

Sample species

Rare species

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3. Ladybirds feed on greenfly.
Some ladybirds have 7 spots and are larger than the ones with 6 spots.



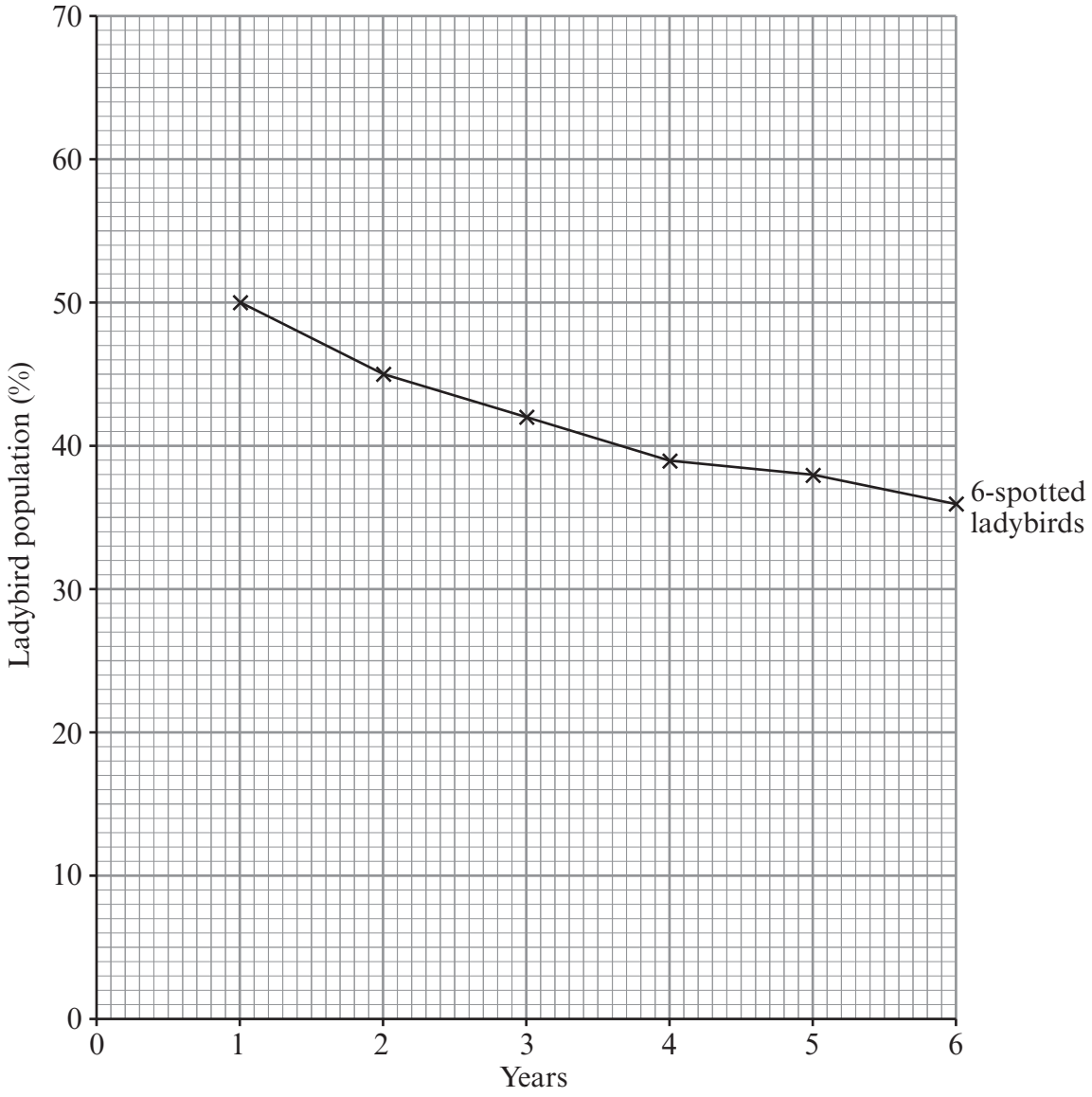
A number of 6-spotted ladybirds were introduced into a field where a population of 7-spotted ladybirds already lived.
The table shows the results in the changes in the populations over 6 years.

	Ladybird population (%)	
Year	6-spotted	7-spotted
1	50	50
2	45	55
3	42	58
4	39	61
5	38	62
6	36	64

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(a) Plot the results for the 7-spotted ladybirds. [3]
The graph for the 6-spotted ladybirds has been done for you.
Join the plots with a ruler.



(b) What has happened to the populations of

(i) 6-spotted ladybirds, [1]

.....

(ii) 7-spotted ladybirds? [1]

.....

(c) Suggest why the numbers of the two types of ladybirds are changing. [2]

.....

.....

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4. When Gareth heard a sudden loud noise, he jumped up out of his seat.

His response was a reflex action.

(a) State **two** features that show it was a reflex action. [2]

(i) .....

(ii) .....

(b) (i) Fill in the blanks by using some of the words below. [3]

eyes sound ears light receptors

The stimulus in Gareth's reflex was ..... .

The stimulus was detected by ..... in Gareth's

..... .

(ii) In what form is the information transferred to the brain? [1]

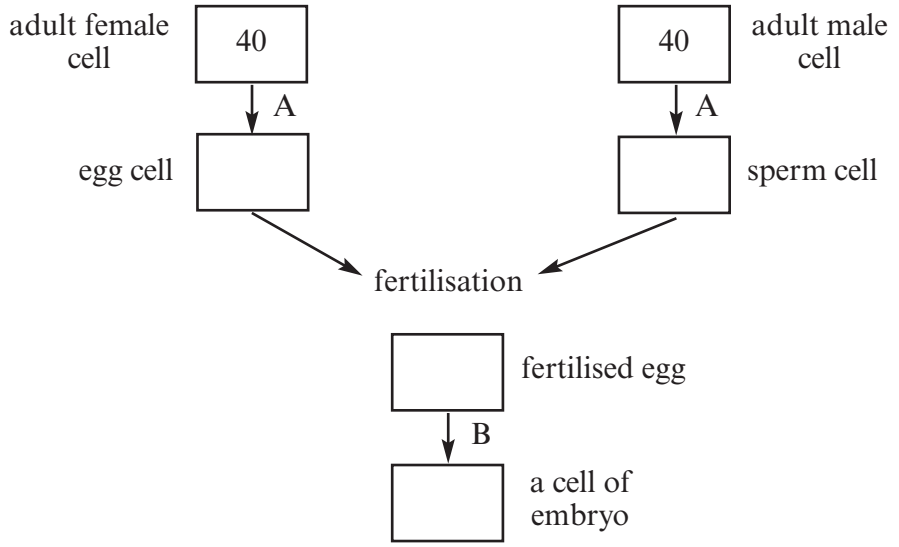
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6

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5. *(a)* Ferret body cells contain 40 chromosomes.
Put the correct number of chromosomes in each box below. [2]





Ferret

(b) Name the type of cell division that is taking place at: [2]

(i) A .....

(ii) B .....

(c) Chromosomes control inherited characteristics.
Fill in the blanks using some of the words below. [3]

DNA genes cytoplasm nucleus

Chromosomes are long strands of a chemical called ..... .

They are found in the ..... of a cell.

Chromosomes carry inherited information in sections called ..... .

(d) The table shows some of the features of a ferret.
Place ticks (✓) in the table to show whether the features are due to inheritance, environment or **both**. [4]

Feature	Inherited	Environmental
female		
white fur on ears		
broken leg		
mass 350 g		

11

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6. In tigers the normal fur colour is mainly orange with black stripes. This orange colour is caused by a dominant allele **R**.

Tiger



Source: *Google Images*

Over a number of years, a pair of heterozygous orange tigers named Sashi and Ravi produced 13 cubs in a Zoo in India. Three of these cubs were white. (White with black stripes).

(a) (i) State the genotypes of Sashi and Ravi. [1]

Sashi ..... Ravi .....

(ii) Complete the Punnett square below to show how the white cubs were produced. [2]

Gametes		

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(b) Complete the Punnett square below to show how an orange tiger mated with a white tiger could produce offspring **all** of which were orange. [2]

Gametes		

(c) The orange tigers and the white tigers are the same species *(Panthera tigris)*.
What name is given to the differences that are found between organisms of the same species? [1]

.....

6

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7. *(a)* (i) Name the organ in the body which produces insulin. [1]

.....

(ii) I. How does insulin reduce the concentration of glucose in the blood? [1]

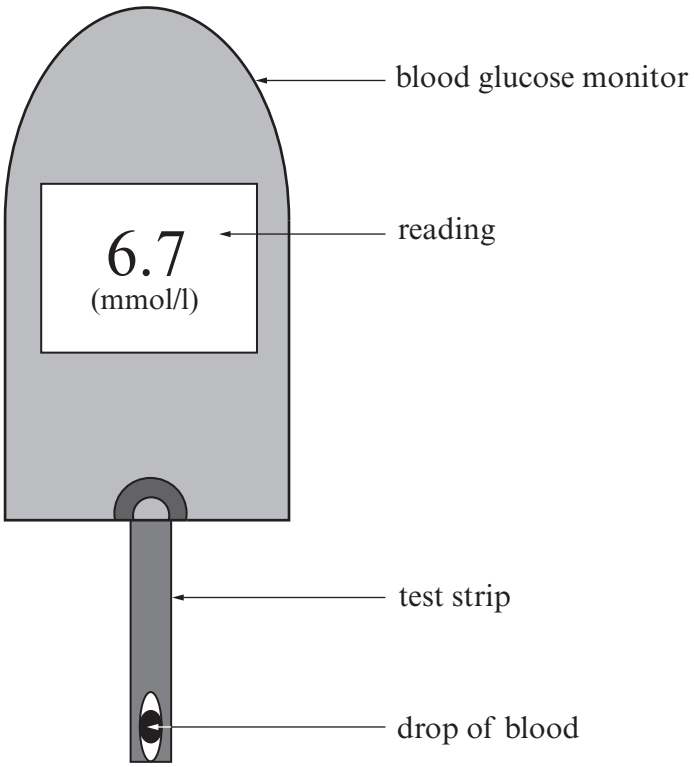
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.....

II. In which organ in the body does this take place? [1]

.....

(b) Owen has diabetes. He measures his blood glucose level using a monitor.



Owen injects himself with a measured dose of insulin before each meal. The dose depends on his blood glucose reading. If the glucose reading is high, Owen injects a higher dose of insulin.

Owen monitors his blood glucose regularly throughout each day. He records his readings in a diary. He tries to keep his blood glucose reading within the normal range of 4.0 - 7.0 (mmol/l).

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The table below shows a section from Owen's diary over a 3 day period.

	Owen's blood glucose level (mmol/l)						
Date	*Before breakfast*	*2 hours after breakfast*	*Before midday meal*	*2 hours after midday meal*	*Before evening meal*	*2 hours after evening meal*	*Before bed*
29 Jan 09	7.0		9.1	6.8	4.3	14.2	12.9
30 Jan 09	9.0	7.5	7.1		6.2		7.9
31 Jan 09	5.3		7.4		2.9		8.2

(i) Suggest a reason for:

I. the high reading 2 hours after the evening meal on 29 Jan (circled); [1]

.....

.....

II. the low reading before the evening meal on 31 Jan (circled). [1]

.....

.....

(ii) Suggest why Owen always measures his blood glucose before bedtime. [1]

.....

.....

6

(Questions continue over page.)

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8. Some people are at higher risk of heart attack because their blood contains a high level of cholesterol.

Simvastatin and Pravastatin are drugs which lower the cholesterol in the blood.

A trial was carried out to find out which of the 2 drugs was more effective in reducing heart attacks.

- The same number of patients were given either Simvastatin, Pravastatin or a placebo (a pill containing neither drug).
- The patients did not know which pill they were taking.
- The level of cholesterol in the blood of the patients at the start of the trial was the same.

The results are shown in the table below.

Treatment	People who had heart attacks (%)
Simvastatin	26
Pravastatin	11
Placebo	33

(a) Suggest what conclusion the researchers came to at the end of the trial. [1]

.....

.....

(b) Suggest **one** reason why a placebo was used in this trial. [1]

.....

.....

.....

(c) Give **one** way in which the trial was kept fair. [1]

.....

.....

3

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