

Mark schemes

Q1.

(a) •



accept 'dragonfly'

accept 'housefly'

if more than two animals are given, deduct one mark for each incorrect answer minimum mark zero

accept one ring extending around both

2 (L3)

(b) • cat
squirrel

answers may be in either order

***both** answers are required for the mark*

if more than two animals are given, award no mark

1 (L3)

(c) (i) • lizard
snake

*answers may be in either order **both** answers are required for the mark*

if more than two animals are given, award no mark

1 (L3)

(ii) • (dry) scales

accept 'scaly skin'

accept 'leathery eggs'

non-unique features of reptiles e.g. 'cold blooded' or 'tail' or 'eyes' are insufficient

1 (L4)

[5]

Q2.

(a) (i) • 5 ppm

1 (L5)

(ii) • it increased

accept 'it went up'

accept 'it goes from 5 (ppm) at Pine Bridge to

20 (ppm) at 2.5 km'

'It went from 5 (ppm) to 24 (ppm)' is insufficient

1 (L5)

(b) any **one** from

• further than 2.5 km

accept 'at 2.5 km'

• beyond 2.5 km

accept a single distance from 2.5 km to 3 km (inclusive)

the unit is required for the mark

1 (L5)

(c) any **one** from

- stonefly nymphs
accept 'nymphs'
- mayfly nymphs
accept 'stonefly'
accept 'mayfly'
- caddis fly larvae
accept 'caddis fly'
accept 'larvae'
'fly' is insufficient
*do **not** accept 'freshwater shrimps'*
'trout' is insufficient

1 (L5)

(d) any **two** from

- rat-tailed maggots
*accept 'rat-tailed' **or** 'maggots'*
*'rat' **or** 'sludge' **or** 'blood' are insufficient*
- sludge worms
- bloodworms
*if the type of worm is not specified, accept 'worms' for one mark (e.g. 'bloodworm' **and** 'worm'); award two marks for 'rat-tailed maggots' **and** 'worm'*
responses may be given in any order

2 (L6)

(e) any **one** from

- less food available for the trout
accept 'they die of starvation'
*do **not** accept 'no food is available for the trout' **or** 'all their food is killed'*
- the food chain may be affected
- the trout may have left the area to find food
*do **not** accept 'humans **or** predators have caught the trout'*
*do **not** accept 'all the trout are killed'*
'the water is polluted' is insufficient
- the oxygen level is too low (to allow the trout to breathe)
*accept 'it reduces the oxygen level' **or** 'the oxygen level is lower'*
*do **not** accept 'there is no oxygen'*
accept 'not enough oxygen'
'the oxygen level is low' is insufficient
- they are more likely to catch disease

accept 'the trout may be poisoned **or** killed'
 'the trout have died' is insufficient as the cause may not be directly attributable to the pollution

1 (L5)

[7]

Q3.

(a)

part	description
• oviduct	
• testes	
• ovary	

accept 'fallopian (tube)' for oviduct
 'egg tube' is insufficient
 accept 'testis' **or** 'testicle(s)' for testes
 do **not** accept 'ovules' for ovary
 accept only the technical terms given

3 (L5)

(b) • 9

accept '9 ½'
 accept a number in the range of 37– 42 only if the unit is changed to 'weeks'

1 (L5)

• contract

accept 'contractions'
 'tense' is insufficient
 accept 'contract and relax'
 'squeeze' is insufficient
 accept '(muscles) get shorter'
 'get smaller' is insufficient as the volume of the muscles does not change

1 (L5)

• umbilical cord

accept 'cord' **or** 'umbilical'
 'tube' is insufficient

1 (L5)

[6]

Q4.

(a)

soil	pH of soil	acidic	neutral	alkaline
A	4.5	✓		
B	5.5	✓		

C	6.3	✓		
D	7.0		✓	
E	7.8			✓

for all **five** ticks correct, award two marks
for any **three** or **four** ticks correct, award one mark
for any **one** or **two** ticks correct, award no marks
if more than one tick is placed in any one row, do not credit that row

2 (L5)

- (b) • yes ✓
as pH increases the flowers become darker pink **or** less blue
*accept 'as pH **or** acidity changes the flower colour changes'*
accept 'acid soil has blue flowers and alkaline soil has pink flowers'
both the tick box **and** a consistent explanation are needed for the mark

or

- no ✓

any **one** from

- there is no change between pH 5.5 – 6.3
- there is insufficient data

1 (L6)

(c) any **one** from

- type of hydrangea
accept 'type of plant'
*accept 'size **or** age of plant'*
- amount of water **or** rainfall
'how much it is watered' is insufficient
- amount of light **or** shade
accept 'light'
- soil composition
accept 'type of soil'
*'the acidity **or** pH of the soil' is insufficient*
- nutrients **or** minerals **or** ions in the soil
*accept named nutrients, minerals **or** ions*
- weather **or** temperature
accept 'climate'
accept 'pH of rain'

1 (L5)

(d)

•	blue
•	violet

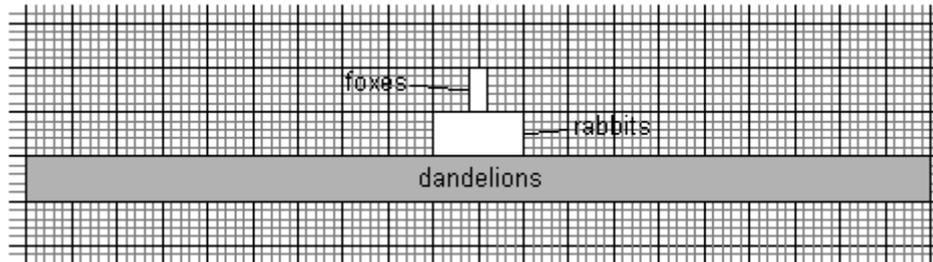
accept 'purple' for violet

2 (L6)

[6]

Q5.

- (a) • blackbirds eat more snails so they eat fewer caterpillars
accept 'blackbirds eat snails instead of caterpillars'
'blackbirds eat more snails' is insufficient
*do **not** accept 'blackbirds stop eating caterpillars'* 1 (L6)
- (b) • blackbirds eat the snails, owls eat the blackbirds
accept 'the owls eat many blackbirds'
accept 'blackbirds eat many snails'
'snails eat the poison' is insufficient 1 (L7)
- the poison (passes up the food chain and) becomes more concentrated
accept 'bioaccumulation'
accept 'the poison accumulates'
accept 'animals do not excrete the poison'
accept 'the poison persists (in the body)'
'owls eat a large amount of poison that has been passed up the food chain' is insufficient
'owls are bigger' is insufficient 1 (L7)
- (c) any **one** from
- throw the quadrat (randomly) and count the number of dandelions
 - take several readings and find an average
*for **two** marks, an answer must contain one of the first two marking points **and** an indication that the number will be multiplied by the area* 1 (L7)
 - multiply the number by the total (grassland) area 1 (L7)
- (d) • a pyramid of numbers drawn to scale with dandelions on the bottom where:
 rabbits cover 50 small squares
 foxes cover 10 small squares



accept an otherwise correct response that is not aligned to the centre

*one mark for labelled boxes in the correct order as shown
one mark for correctly sized bars (even if not labelled)*

2 (L7)

[7]

Q6.

(a) any **three** from

- energy is released more quickly
*accept 'more energy is needed'
'the muscles work harder' is insufficient*
- cells respire more quickly
*accept 'respiration is quicker'
accept 'muscles **or** they respire more quickly'
'blood contains oxygen' is insufficient*
- glucose is used up **or** supplied more quickly
*accept 'more glucose is used **or** needed'*
- oxygen is used up **or** supplied more quickly
*accept 'more oxygen is used **or** needed'*
- carbon dioxide **or** waste is produced **or** removed more quickly
*accept 'more carbon dioxide is produced **or** removed'*
- water is removed more quickly
*accept 'more water is produced **or** removed'*
- blood transports oxygen **or** glucose **or** carbon dioxide **or** waste
*accept, for **two marks**, 'blood transports more oxygen' **or**
'blood carries carbon dioxide more quickly' as they cover the
fourth **or** fifth and seventh marking points*
- heat is produced **or** removed more quickly
*accept 'more heat is produced **or** removed'*

3 (L7)

(b) any **one** from

- less food is absorbed
'less blood gets to the digestive system' is insufficient
- the digestive system slows down
*accept 'less food is digested'
accept 'it may cause a stitch **or** cramp'*

accept 'less blood goes to the muscles than is needed'
do not accept 'no food can be digested or absorbed'

1 (L7)

(c) any **one** from

- the brain **or** brain cells will die if there is less **or** no oxygen **or** glucose
accept 'otherwise brain damage could occur'
'the brain will die' is insufficient as it does not explain what the brain needs
- the person might faint **or** feel dizzy **or** lack concentration
- the brain needs a regular supply of oxygen **or** glucose

1 (L7)

[5]

Q7.

(a) (i) • blackbird *and* robin

both answers are required for the mark answers can be in either order

1 (L3)

(ii) • 2

accept 'blue tit and sparrow'

1 (L3)

(iii) • seeds

1 (L3)

(iv) • robin

1 (L3)

(b) • feathers

accept 'down'

'fat' is insufficient

1 (L3)

(c) any **one** from

- to feed their young
accept 'they are more active'
'it needs more energy' is insufficient
'they have babies' is insufficient
'to (help them) reproduce' is insufficient
do not accept 'to feed the eggs'
- to produce eggs
accept 'to make eggs' or 'collect nesting materials'
accept 'to keep eggs warm'
accept 'to attract mates'
do not accept 'there is less food in winter'
do not accept an answer indicating that birds are born

1 (L4)

[6]

Q8.

- (a) • A

accept 'up'

1 (L3)

- (b) any **two** from

- water

accept 'H₂O'

'rain' is insufficient

accept 'moisture'

- minerals

accept a named mineral

*award **two** marks for two different named minerals*

accept 'nutrients' or 'salts' or named examples

*do **not** accept 'food'*

award one mark for 'mineral' and a named mineral or nutrient or salt

accept 'oxygen'

answers may be in either order

2 (L4)

- (c) • predator ✓✓

if more than one box is ticked, award no mark

1 (L4)

- (d) (i) • leaf **or** leaves

accept 'stem'

accept 'chloroplast' or 'chlorophyll'

1 (L4)

- (ii) any **one** from

- growth **or** to grow

accept 'to produce new cells'

- energy

accept 'respiration'

accept 'to survive winter'

1 (L4)

[6]

Q9.

- (a) • being out of breath easily ✓✓

- heart disease ✓✓

- lung cancer ✓✓

*if **all three** answers are correct, award two marks*

*if **two** answers are correct, award one mark*

*if only **one** answer is correct, award no mark*

if more than three boxes are ticked, deduct one mark for each incorrect tick

2 (L3)

- (b) (i) • group A ✓
if more than one box is ticked, award no mark 1 (L3)
- (ii) • group A ✓
 group B ✓
both boxes are required for the mark
if more than two boxes are ticked, award no mark 1 (L4)
- (c) • they both breathe in smoke
accept 'they spend time in smoky places'
accept 'they breathe in second-hand smoke'
accept 'they are passive smokers'
do not accept 'they both smoke' 1 (L4)
- (d) • Peter ✓
if more than one box is ticked, award no mark 1 (L4)

[6]

Q10.

- (a) any **two** from
- smooth **or** streamlined
accept 'slimy or aerodynamic body'
accept 'long and thin'
'long' or 'thin' is insufficient
 - fins
'flippers' is insufficient
'large tail' is insufficient
 - powerful **or** flat tail
accept 'gills'
'can breathe underwater' is insufficient
- 2 (L3)
- (b) any **one** from
- they are warm blooded
accept 'not cold blooded'
 - they breathe air **or** have lungs
accept 'no gills'
 - they give birth (to live young)
accept 'they do not lay eggs'
 - they suckle their young (on milk)
accept 'they have mammary glands' or 'they produce milk'
 - they have hair **or** fur
accept 'no scales'
accept 'no fins'

'they have flippers' is insufficient
'they are bigger' is insufficient

1 (L4)

(c) any **one** from

- hunting **or** whaling **or** predation
*accept 'more are killed **or** die than are born'*
'they died' is insufficient
- pollution
accept 'oil spills'
- disease
- less (available) food
accept 'no food'
*'global warming' **or** 'climate change' **or** 'greenhouse effect'*
are insufficient

1 (L4)

(d) (i) where they travel ✓

if more than one box is ticked, award no mark

1 (L4)

(ii) any **one** from

- satellite tracking systems have a very large range
*range can refer to either the whale **or** satellite tracking system*
- you can find whales **or** them anywhere (on the planet)
accept 'whales travel long distances'
*accept 'to find them quickly **or** easily'*
accept 'you know where they are'
*accept 'it does not affect the whales' movement' **or** 'cause it stress'*
*do **not** accept 'to count them'*
'to find out where they travel' is insufficient as this is the answer to part (di)

1 (L4)

[6]

Q11.

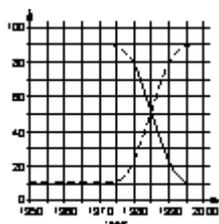
(a) (i) • 1985

1 (L6)

• 22 (%)

1 (L6)

(ii) •



award one mark for a line that passes through 50% at 1985
award one mark for a line that levels off at 10%

2 (L6)

- (b) • it decreased (by 75%)
accept the converse for speckled moths
'it changed by 75%' is insufficient
- in 1956 there was a greater percentage of black moths than in 1996
accept 'there is a greater proportion of speckled moths'
accept 'there are less (black moths)' or 'there are more speckled moths'

1 (L5)

- (c) (i) • it shows more years
accept 'it is more precise or accurate'
'it is accurate' is insufficient
accept 'it is easier to read the percentages'
'it shows how many there are' is insufficient
accept 'it shows (more) continuous data'
'it gives more information' is insufficient
accept 'it shows 1970 as well'
accept 'it shows years other than 1956 and 1996' or an example giving another named year

1 (L6)

- (ii) any **one** from
- it shows different locations
accept 'it shows where the moths are'
'it gives more information' is insufficient
 - it gives geographical detail
 - it covers a wide area

1 (L6)

[7]

Q12.

- (a) • (37 °C is) body temperature
accept 'so the saliva or enzymes would work'
accept 'it is a good or optimum temperature for digestion'
'to make it a fair test' is insufficient
'so they are all the same' is insufficient

1 (L5)

- (b) (i) • the starch is broken down or digested
'there is a reaction between starch and saliva' is insufficient

1 (L6)

- (ii) any **one** from
- starch could not pass through the bag
accept 'starch could not get through the holes'
'the bag is semi-permeable' is insufficient

- starch is too big
'the bag holds it in' is insufficient 1 (L6)
- (c) • for a control ✓
if more than one box is ticked, award no mark 1 (L6)
- (d) (i) • P
if more than one letter is given, award no mark 1 (L6)
- (ii) • R
if more than one letter is given, award no mark 1 (L6)
- (e) • enzymes
accept 'amylase' or 'carbohydrase' 1 (L6)
- (f) any **one** from
 - sweeter **or** sugary
accept 'sugar' or 'sweet'
 - it tastes of sugar (L6) 1

[8]

Q13.

- (a) (i) • absorb **more** light **or** have a larger green area
accept 'they have more chlorophyll'
do not accept 'attract more light'
accept 'the variegated leaves have less chlorophyll'
'catch more light' is insufficient
'absorb more Sun' is insufficient
 - make more food **or** photosynthesise more
accept 'make more glucose or starch or sugar or protein' 2 (L7)
- (ii) • variegated and normal (leaved plants) (IV)
accept 'both types of plant'
a full description of the investigation can be awarded the full marks e.g. 'take both types of plant, count the leaves, give them the same amount of water, repeat the measurement at the end of the experiment and see how much the plants grew' 1 (L7)
 - named factor which can be measured (DV)
e.g. weight of the plant **or** height of the plant **or** number of leaves
accept 'size of leaves'
accept 'weight or mass of plant' 1 (L7)
 - named condition(s) for a fair test (CV) e.g.

temperature **or** amount of water **or** same
species of plant **or** ambient conditions such as
light **or** same size plant at the beginning **or** same age of plant

*'the same place' is insufficient for the CV
'time' is insufficient as it is given in the question*

1 (L7)

- calculate (percentage) change for each type of plant
*accept 'measure both (groups of) plants at the start **and**
measure both (groups of) plants at the finish'*
*accept 'record how much each plant grew over 6 weeks and
compare results'*

1 (L7)

- (b) • respiration ✓

if more than one box is ticked, award no mark

1 (L6)

[7]

Q14.

- (a) (i) any **one** from

- the snail has a shell
accept 'the shell'
- the slug does not have a shell
accept 'patch on back'
references to size are insufficient

1 (L3)

- (ii) any **one** from

- antennae
accept 'tentacles or feelers or horns'
- stalked eyes
- shape of body
accept 'mouth'
accept 'no legs'
accept 'no internal skeleton'
*accept 'they both produce mucus or are slimy or have a wet
body'*
accept 'they have a muscular foot'
accept 'slither along'
references to size are insufficient

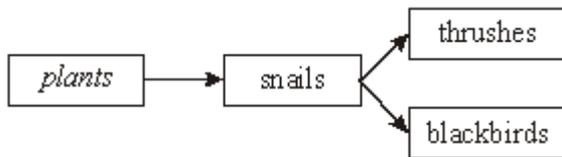
1 (L3)

- (b) • mucus reduces friction ✓

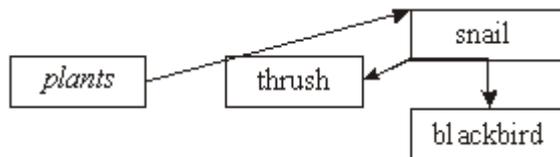
if more than one box is ticked, award no mark

1 (L3)

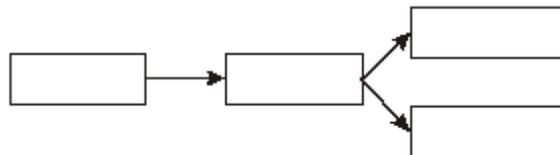
- (c)



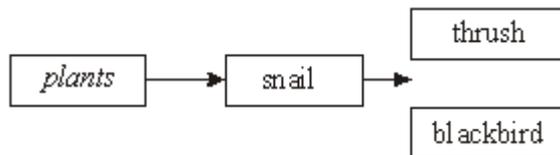
accept, for two marks, other arrangements of arrows that are correct, e.g.



accept, for one mark



accept, for one mark



'thrushes' and 'blackbirds' may be either order
award one mark for the organisms in the correct place
award one mark for the arrows showing the correct energy flow through the food web
all **three** arrows are required for the mark

2 (L4)

(d) any **one** from

- they are camouflaged
accept 'they are harder to see'
'it is easier for them to hide' is insufficient
- they blend into their background
accept 'birds or predators cannot see them'
'fewer will be eaten' is insufficient as it does not refer to protection
'they are disguised' is insufficient

1 (L3)

[6]

Q15.

(a) (i) any **two** from

- one has spots
accept 'the spots' or 'it has different markings'
- one has upright or floppy or pointy ears
accept 'the ears'
- one has a straight or curvy or bent snout
accept '(longer) nose or snout or face'

accept 'shape of head'

- different shaped body
accept 'fatter' **or** 'thinner'
'different shaped' or 'bigger' are insufficient
- one is darker **or** lighter
accept 'they are different colours'
'skin' is insufficient
accept 'length of legs'

2 (L3)

- (ii) • variations ✓
if more than one box is ticked, award no mark

1 (L3)

(b) any **one** from

- upright ears
accept 'the ears'
accept 'shape of head **or** body'
- its snout is longer
accept 'its snout'
- its legs are longer
accept 'its legs'
accept 'thinner' **or** 'it is thin'
'smaller' is insufficient

1 (L3)

(c) (i) • egg cell ✓

1 (L4)

- sperm cell ✓

1 (L4)

if more than two boxes are ticked, deduct one mark
for each incorrect tick minimum mark zero

- (ii) • fertilisation ✓
if more than one box is ticked, award no mark

1 (L4)

[7]

Q16.

(a) • 7 days

1 (L3)

(b) • air temperature and soil moisture ✓
if more than one box is ticked, award no mark

1 (L4)

(c) any **one** from

- he only carried out his experiment at a medium light level
accept 'he did not try other levels'
'it was not a fair test' is insufficient

- he only used one light level
- he did not change the (amount of) light

1 (L4)

(d)

tray	day 4
A	8
B	7
C	5
D	2

accept any whole number from 6 to 8

accept any whole number from 2 to 8

accept any whole number from 0 to 4

award two marks for all four correct answers

award one mark for any two or three correct answers

2 (L4)

[5]

Q17.

(a) (i) feathers

accept 'wings'

'it could fly' is insufficient

accept 'beak'

accept 'hollow or thin bones'

1 (L3)

(ii) scales

1 (L4)

(b) any **one** from

- only the imprint of feathers **or** bones are left or seen

accept 'they do not know whether it had feathers or scales'

'they do not know if it is a reptile or bird' is insufficient

accept 'no feathers were found'

accept 'its flesh or skin is not there'

***or** 'only its bones are there'*

- not enough evidence **or** proof

'no evidence or proof' is insufficient

- it is now extinct

accept 'there are no animals like it around today'

accept 'they have not seen one'

'they do not know what it looked like' is insufficient

'they do not know what colour it was' is insufficient

1 (L4)

(c) fossils

1 (L4)

(d) it is too hot

accept 'they burn or melt'

'they are destroyed' is insufficient

accept 'it is hot'
accept 'heat'

1 (L3)

[5]

Q18.

(a) any **two** from

- it has a flagellum or tail to help it move
accept 'can move or swim'
accept 'it has a tail'
'whip' is insufficient
- it does not have a (cell) wall
accept 'it does not have a fixed shape' or 'it changes shape'
*do **not** accept 'it does not have a membrane'*
'it only has a cell membrane' is insufficient
- it does not have a vacuole
- it has a reservoir (for taking in food)
accept 'it takes in or eats food'
accept 'it has a mouth-like structure'
'it has a mouth' is insufficient

2 (L6)

- (b) • it has chloroplasts
accept 'chlorophyll'
'it makes food' is insufficient

1 (L6)

- (c) • water
accept 'H₂O'

1 (L6)

- oxygen
accept 'O₂'
answers must be in the correct order

1 (L6)

[5]

Q19.

(a) (i) • fewer bacteria

accept 'bacteria have nowhere to breed'
or 'there are no bacteria'
or 'bacteria cannot live'
answers that just repeat
or restate the leaflet are insufficient

- less acid (is produced)
accept 'there is no acid' or 'no acid is produced'
accept, for two marks, 'there are less bacteria producing acid'

2 (L6)

(ii) any **one** from

- it neutralises acid
accept 'to make the acid neutral'
'the alkali cancels out the acid' is insufficient
- it raises the pH of the mouth
accept 'it makes the mouth less acid'
'it reacts with the acid' is insufficient
*do **not** accept 'alkali gets rid of plaque or kills bacteria'*
references to brushing are insufficient

1 (L6)

(b) any **one** from

- it would show how effective brushing is in removing plaque
accept 'to see the effect'
'how clean their teeth have become' is insufficient
- to compare the amount of plaque before and after
accept 'to compare teeth before and after'
'to show how much plaque there is on the teeth' is insufficient
- to see how much plaque is removed
accept 'to see if there was a change in the amount of plaque or red'
'so they can see when the plaque is gone or removed' is insufficient
*do **not** accept 'to see how much decay is removed'*

1 (L6)

(c) (i) any **one** from

- it is more precise
'more reliable' is insufficient
- it is a better estimate
accept 'more accurate'
'accurate or precise' is insufficient
- to see exactly how much
accept 'there are more squares fully shaded so you do not have to count as many fractions'
'to see more clearly or more easily' is insufficient
'it is more detailed' is insufficient

1 (L6)

(ii) • a number from 13 to 17 inclusive

1 (L6)

Q20.

(a) (i) any **one** from

- the pH is too low
'the milk goes off' is insufficient
- it is too acidic
accept 'acid is killing the bacteria'
'the bacteria were dying' is insufficient
accept 'the bacteria could be poisoned'
accept 'not enough nutrients or sugar'
'there is no sugar left' is insufficient

1 (L7)

(ii) the pH was still decreasing on day 5

- accept 'it was going down'*
- do not accept 'it has not reached 0'*
- accept 'the acidity was increasing'*
- 'it has not reached the bottom of the graph' is insufficient*
- 'the line continues' is insufficient*

1 (L7)

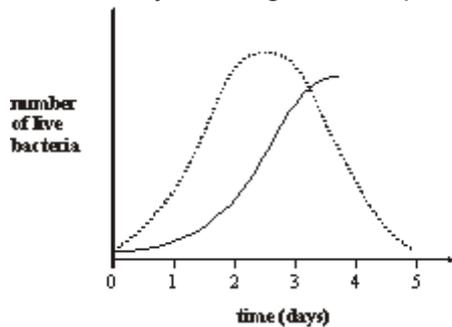
(b) (i) • a line that starts at pH 6.5 and then falls

1 (L6)

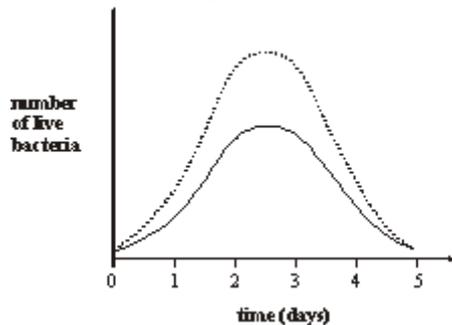
- a response that decreases less than 3.5 over 5 days

1 (L6)

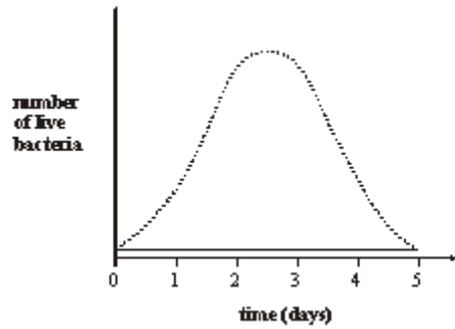
(ii) a graph that indicates that the number of bacteria increases more slowly, starting at same point



accept a lower graph over the same line



the line must be below the dotted line for the first 2.5 days
do not accept a horizontal line above the x axis as shown below



1 (L7)

[5]

Q21.

(a) (i) enzyme(s)

accept 'hydrochloric acid'

do not accept other named acids

accept 'biological catalyst'

'catalyst' is insufficient

accept any named enzyme (e.g. amylase or protease)

'saliva' is insufficient

1 (L7)

(ii) it is broken down (into smaller molecules)

accept 'forms amino acids'

'it is absorbed' is insufficient

accept 'breaks up'

do not accept 'it breaks down into glucose'

1 (L6)

(b) (i) any **one** from

- as a control

accept 'control'

'so that it is a fair test' is insufficient

accept 'as a comparison'

- to show that enzyme digested the jelly

accept 'to show what would happen without the enzyme or pineapple'

- to show that water does not digest the jelly

1 (L7)

(ii) any **one** from

- it took less time to digest the jelly (than B)

accept 'it breaks it down or up more quickly'

an explanation of why it is faster is insufficient

- chopped up jelly digested more quickly

'it is easier to swallow' is insufficient

'it is easier to digest' is insufficient

accept 'it **only** takes an hour to digest'
'it digests in an hour' is insufficient

1 (L6)

- (c) (i) • 5 g cube of (chopped up) jelly **and** same amount **or** 15 cm³ of juice
accept 'use same amount of jelly and juice'
do **not** accept 'water'

1 (L7)

- boil the juice first
accept 'use (fresh) boiled juice'
do **not** accept 'boiling juice'

1 (L6)

- (ii) the jelly was not digested
accept 'how much jelly had broken down'
accept 'nothing happened'
'nothing' is insufficient as it implies
nothing is left in the test tube
accept '5 g of jelly (cubes)'
accept 'a small amount of jelly has dissolved'
'the jelly has not dissolved' is insufficient

1 (L6)

[7]

Q22.

- (a) any **one** from

- less cellulose is needed or fewer cell walls produced **or** less glucose changed to cellulose
accept 'less stalk is made'
- less glucose **or** energy needed **or** used for growth
accept 'less glucose used in respiration'
'less starch is used for growth' is insufficient
accept 'it does not have to grow as much'
- more glucose is available to be changed into starch
accept 'more glucose goes to the grain'
do **not** accept 'the glucose gets to the grain quicker'
accept 'blown over less easily or less frequently'

1 (L7)

- (b) (i) any **two** from

- cross plants with short stalks and low grain mass with plants with long stalks and high grain mass
accept 'breed from varieties A and B'
'mix varieties A and B' is insufficient
- collect **or** plant the seeds
- choose offspring with shortest stalks and which produce

a high mass of grain
accept 'choose the best'

2 (L7)

- repeat with offspring or continue the whole process
a three mark answer must include two of the first three marking points and a reference to repeating or continuing the process

1 (L7)

(ii) any **one** from

- disease resistance
- pest resistance
'increased amount of grain'
or 'number of ears of corn' are insufficient
'more stalks' is insufficient
accept 'corn' for 'wheat'
- drought tolerance
- frost resistance
- resistance to herbicides **or** weed killers
- resistance to wind
accept 'strong stalk' or 'long roots'
accept 'hardy'
accept 'big or long leaves or lots of leaves'
accept 'faster growing'

1 (L7)

[5]

Q23.

(a) oranges ✓

if more than one box is ticked, award no mark

1 (L3)

(b)

amount of vitamin C	increases	decreases	stays the same
in the beans		✓	
in the water	✓		

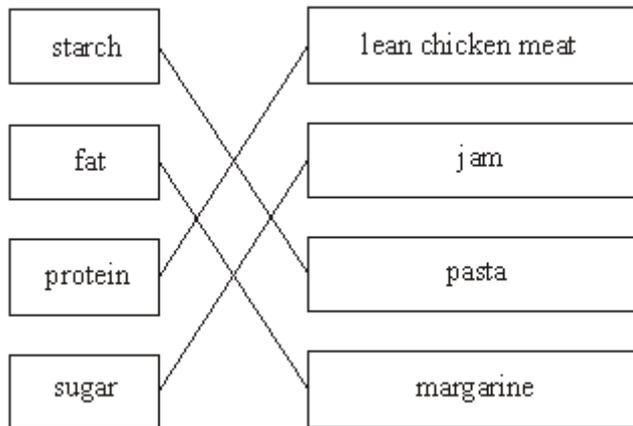
both ticks are required for the mark

1 (L3)

(c) for strong **or** hard teeth **or** bones

accept 'to keep the skeleton strong'
accept 'for (healthy) bones or teeth'
'for toe or finger nails' is insufficient

(d)



all four lines are required for two marks
any two or three lines are required for one mark
if more than one line is drawn from any nutrient,
do not give credit for that nutrient

2 (L3)

(e) (i) R

1 (L4)

(ii) Q

1 (L4)

[7]

Q24.(a) fur **or** hair **or** whiskers

'they are warm blooded' is insufficient
accept 'feed their young with milk'
'feed their young' is insufficient
accept 'producing milk or has nipples'
accept 'give birth to live young'
'they do not lay eggs' is insufficient
accept 'external or visible ears'
'ears' is insufficient

1 (L4)

(b) any **one** from

- webbed **or** wide feet
- streamlined

accept 'aerodynamic'
accept 'smooth body'
accept 'long and thin body'
'long body' or 'thin body' are insufficient
accept 'small ears'
accept 'powerful or long tail'
'tail' is insufficient

accept 'short fur'
'they have fur' is insufficient

1 (L3)

- (c) (i) protection from predators **or** the weather **or** the cold

accept 'keeps them warm'
'it keeps them safe' is insufficient
'for protection' is insufficient

1 (L3)

- (ii) any **one** from

- so otters can breathe
accept 'otters breathe air'
- otherwise cubs would drown (if water entered the burrow)
accept 'otherwise it could fill with water'
'otherwise water can get in' is insufficient
accept 'cubs cannot swim'
'so they do not get wet' is insufficient
accept 'predators could be in the water'
- so the water does not cause the burrow to cave in
accept 'so the burrow does not collapse'

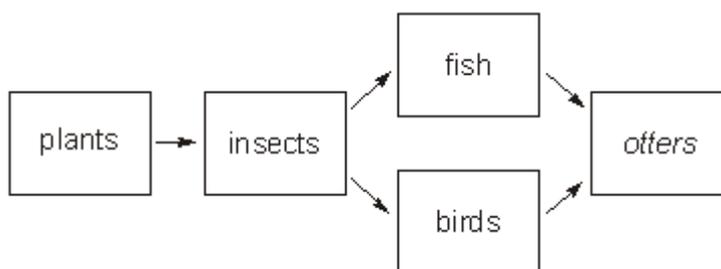
1 (L3)

- (d) predator ✓

*if more than **one** box is ticked, award no mark*

1 (L4)

- (e)



*if **all four** answers are correct, award two marks*
award one mark for either 'plants'
***and** 'insects' in their correct places **or** for 'fish'*
***and** 'birds' in their correct places*
'fish' and 'birds' can be interchanged

2 (L4)

- (f) any **one** from

- so they reproduce
accept 'produce more others'
'to increase otter numbers' is insufficient
- for breeding
accept 'so they can have babies'
- so they mate
'so they protect each other' is insufficient

1 (L3)

Q25.

(a) As **one** muscle contracts, the other relaxes. ✓
if more than one box is ticked, award no mark

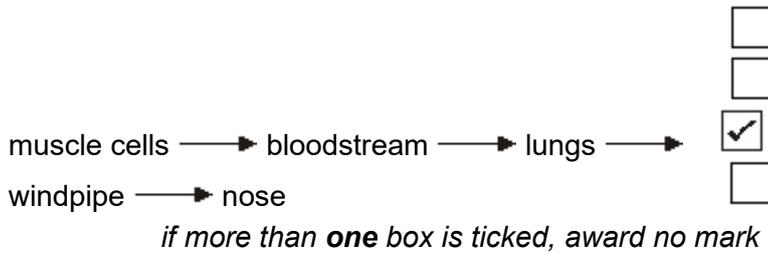
1 (L5)

(b) any **two** from

- she gets more air or oxygen
*accept 'greater volume of air taken in or out'
'she needs more oxygen' is insufficient
accept 'breathes out more carbon dioxide'
'shorter or heavier or louder or harder breaths' are insufficient*
- it gets faster
*accept 'speeds up' or 'she takes more breaths'
'it increases' is insufficient*
- it gets deeper
*accept 'she takes bigger breaths'
'the volume of air in her lungs increases' is insufficient
do **not** accept 'the volume of her lungs increases'
accept, for one mark, 'she breathes more' if not given with
'it gets faster' or 'it gets deeper'*

2 (L5)

(c)



1 (L6)

Q26.

(a) any **one** from

- leaves or stems damaged by strong currents
*accept 'plants or seeds washed away'
references to flowers are insufficient
accept 'they cannot attach themselves to the water bed'*
- roots could be pulled out

accept 'leaves unable to float'

1 (L5)

(b) any **one** from

- there is insufficient light
accept 'too little sunshine'
*do **not** accept 'no light'*
- the water is frozen
*accept 'leaves may be damaged by frost **or** snow **or** ice'*
'too cold' is insufficient
accept 'the plant freezes'
- less **or** no photosynthesis occurs
accept 'not enough energy to produce leaves'

1 (L5)

(c) (i) any **one** from

*a mark may be awarded for part (ci)
if the answer is given in part (cii)*

- large leaves
accept 'flat leaves'
- flexible stems
*accept 'thin **or** long stems'*
- waxy leaves
- the leaves or flowers are able to float
*'it **or** they can float' is insufficient*
- air in the leaves or stems
- roots that cover a wide area
accept 'strong roots'

1 (L5)

(ii) any **one** from

- (large **or** floating leaves **or** thin **or** long stems) to collect sunlight
accept 'for photosynthesis'
*answers must give a function for the adaptation
given in part (ci)*
- (large leaves **or** flexible stem **or** waxy leaves **or** air in the
leaves) to make the leaves float
*a mark may be awarded for part (cii)
if the answer is given in part (ci)*
- (thin **or** flexible stems) to allow the leaves to move
- (floating flowers) for pollination
- (roots that cover a wide area) to stop them being washed away
accept '(strong roots) to hold it firmly in the ground'

1 (L6)

- (d) any **one** from
- (easily) seen by bees or insects
accept 'bees or insects can get to them'
 - attract bees **or** insects
 - provide a landing platform for insects
 - they are more likely to be pollinated above water than underwater
accept 'flowers are above water where fish or water animals cannot eat them'
 - they produce more seeds because they are more likely to be pollinated
*accept 'they produce more seeds'
'they produce seeds' is insufficient*
 - animals are attracted to spread the seeds
 - they produce lots of pollen

1 (L5)

- (e) any **one** from
- leaves absorb the heat **or** light
*accept 'leaves block or reflect the sunlight or heat'
'lilies take the heat' is insufficient*
 - less heat **or** light reaches the pond
*accept 'leaves shade the pond'
references to the Sun are insufficient*

1 (L5)

[6]

Q27.

- (a) any **one** from
- the effect of temperature on the amount dough expanded
*accept 'the best temperature for dough to rise'
do **not** accept 'the effect of temperature on how quickly dough rises'
accept 'the best temperature at which the **yeast** works'*
 - the effect of temperature on volume
'does heat affect the volume of the dough' is insufficient
- (b) (i) any **one** from
- left it for 30 minutes
accept 'length of time'
 - used the same starting volume **or** mass of dough

1 (L6)

*accept 'used same amount of dough'
'same mixture' is insufficient*

- used the same amount of water (in the water bath)
*accept 'she did it at the same time'
accept 'use the same size or type of measuring cylinder'
'use the same measuring cylinder' is insufficient*

1 (L5)

- (ii) the dough could contain a different amount of yeast **or** sugar **or** flour **or** water **or** ingredients

*accept 'different doughs might rise differently'
'it might have different ingredients' is insufficient
accept 'different doughs have different properties'*

1 (L5)

- (c) • as the temperature increased, the volume of dough increased to 60°C

*accept 'it increased up to a volume of 77 cm³'
'it increased' is insufficient
the unit of measurement is required for the mark*

1 (L6)

- it does not rise as much (at temperatures higher than 60°C)

*accept 'it decreases (after 60°C)'
accept, for two marks, 'it has a maximum volume at 60°C'
accept, for two marks, 'it increased to 60°C, then decreased'
accept, for one mark, 'it increased then decreased'*

1 (L6)

- (d) any **one** from

- repeat the experiment without yeast in the mixture

*accept 'do it without yeast'
do **not** accept 'use just yeast'*

- change the amount of yeast

accept 'increase the amount of yeast'

1 (L6)

[6]

Q28.

- (a)
- | <i>True</i> | <i>False</i> | <i>Cannot tell</i> |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

*all **four** ticks are required for two marks
any **two** or **three** correct ticks are required for one mark
if more than one box is ticked in any row,
do not give credit for that row*

(b) (i) any **one** from

- there are a large number of observations
accept 'lots of people made observations'
- the observations are made over a wide area
accept 'people see them in a lot of different places'
accept 'you do not have to pay them'
accept 'it makes it more reliable'
accept 'people knew where to look for conkers'

1 (L5)

(ii) any **one** from

- they are not spread uniformly over the country
- the data is not representative of the conker tree population
accept 'they could count the same conker twice'
- the people may not know what a (ripe) conker looks like
or whether a conker is ripe
- the results may not be very reliable
accept 'people can make it up'
accept 'people may not respond'
if the response 'it makes it more reliable' is given in bi,
do not credit 'it is less reliable' in bii unless they
describe how it is more and less reliable

1 (L6)

(c) they would need to collect data each year or for more than one year

accept 'repeat each year'
'repeat it' is insufficient

1 (L6)

(d) any **one** from

- it is warmer
accept 'it is cooler in the north'
'there is better weather in the south' is insufficient
- there is more energy from the Sun
accept 'the Sun is brighter'
'it is nearer the equator' is insufficient
'there is more sun' is insufficient as there are
more hours of daylight in the north in summer
accept 'they flower earlier'
'they ripen faster' is insufficient

1 (L6)

[6]

(a) any **one** from

- the placenta provides **or** passes oxygen **or** food **or** gets rid of waste
accept responses that refer to a baby rather than a foetus
- the foetus needs oxygen **or** food **or** to remove waste
'the foetus needs blood from the placenta' is insufficient
- as the foetus develops it needs more (food **or** oxygen from the placenta)
'it needs or provides more oxygen' is insufficient as the meaning is ambiguous
*accept, for two marks, 'the placenta provides more oxygen **or** food **or** waste removal'*
*accept, for two marks, 'the foetus needs **more** oxygen **or** food **or** waste removed as it grows'*
*a two mark answer must include one of the first two marking points and a reference to the foetus needing **more** food or oxygen from the placenta*

1 (L7)

1 (L7)

(b) any **one** from

- the number **or** mass of red blood cells increases
accept 'they need (to make) more red blood cells'
'the mass of blood increases' is insufficient
- iron is needed for the formation of red blood cells
accept 'for haemoglobin'
'the number of blood cells increases' is insufficient
'for red blood cells' is insufficient

1 (L7)

(c) placenta
amniotic fluid

***both** answers are required for the mark*
'umbilical cord' is insufficient
answers may be in either order

1 (L7)

(d) (i)

- windpipe
lungs
mother's red blood cells
award a mark for 'windpipe' and 'lungs'
in the first places in the correct order

- placenta
umbilical cord
*accept 'umbilical' **or** 'cord'*

blood of foetus

accept 'umbilical cord' and 'blood of foetus' in either order
award a mark for 'placenta', 'umbilical cord' and 'blood of foetus' in the last three places in an appropriate order
*all **five** answers are required for two marks*

2 (L7)

(ii) any **one** from

- less oxygen passes through the placenta
- less oxygen in the foetus' blood
accept 'the foetus' heart beat rises'
or 'the foetus' blood pressure goes up'
- smaller **or** brain damaged foetus
accept 'less oxygen in the mother's blood'
accept 'less oxygen for the foetus'
*do **not** accept 'no oxygen'*
- baby may be premature
accept responses that refer to a baby rather than a foetus
accept 'the red blood cells of the foetus will contain carbon monoxide'
*do **not** accept 'only carbon monoxide passes through the placenta'*
'it passes to the foetus' blood' is insufficient
'it poisons the foetus' is insufficient

1 (L7)

[7]

Q30.

(a) (i)

- A and C
answers may be in either order
***both** the letters and the reason are required for the mark*
'A and C are the same' is insufficient

any **one** from

- grass has germinated **or** grown
accept 'A and C have hair'
accept 'something has grown in A and C'
accept 'they have hair'
*accept 'they have longer **or** more grass'*
- seeds did not germinate **or** grow in B
accept 'B has no hair'
'seeds need water to grow' is insufficient

1 (L3)

(ii) any **one** from

- it would have longer grass
*accept 'it had more grass **or** more hair'*
- the grass would have grown more
*accept 'it grew more **or** faster'*
accept 'it would have grown less because it was over-watered'

'it would be greener' is insufficient
'it would be healthier' is insufficient

1 (L4)

(b) any **one** from

- it grew towards the light
- that is where the light is coming from
accept 'it grew towards the Sun'
accept 'to get light or sunlight'
accept 'plants or grass need light'
accept 'to get more Sun'
'because of the sunlight' is insufficient
'to get more heat' is insufficient

1 (L3)

(c) (i) • B ✓

if more than one box is ticked, award no mark

1 (L4)

(ii) any **two** from

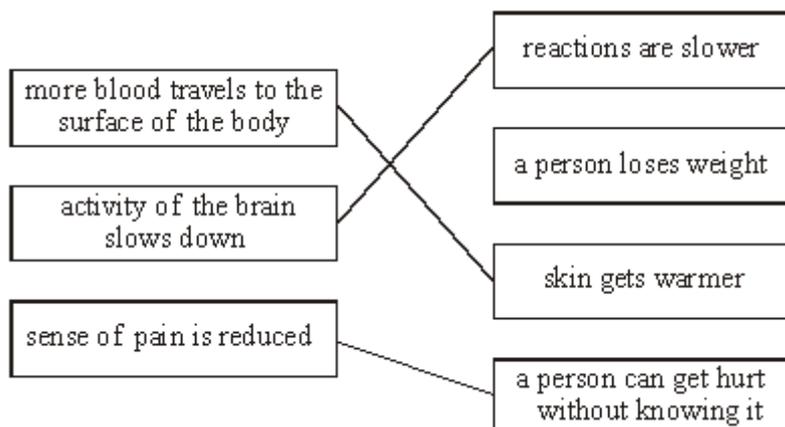
- water
accept 'moisture' or 'dampness'
- oxygen
- minerals
accept a named mineral
accept 'nutrients' or 'salts'
accept, for two marks, two named minerals
such as 'nitrates' and 'phosphates'
do not accept 'plant food' or 'food' or 'nutrition'

2 (L4)

[6]

Q31.

(a) (i) •



*award two marks for **all three** lines correct*
*award one mark for any **two** lines correct*
if more than one line is drawn from any box,
do not credit either line

			2 (L4)
	(ii)	<ul style="list-style-type: none"> reactions are slower <i>accept 'activity of the brain slows down'</i> 	1 (L4)
(b)	(i)	<ul style="list-style-type: none"> placenta <i>accept 'umbilical cord' or 'cord'</i> 	1 (L3)
	(ii)	<ul style="list-style-type: none"> amniotic fluid <i>accept 'fluid'</i> <i>accept 'uterus'</i> 	1 (L4)
(c)	(i)	<ul style="list-style-type: none"> toxic flammable <i>accept 'inflammable'</i> <i>answers must be in the correct order</i> 	1 (L3)
	(ii)	<p>any one from</p> <ul style="list-style-type: none"> they can cause brain damage it makes you less co-ordinated <i>accept 'it makes you dizzy or light-headed'</i> <i>accept 'you can hallucinate'</i> <i>accept 'they affect the brain or liver'</i> fumes stop you breathing or choke you they prevent you taking in oxygen you could become addicted <i>accept 'they damage your lungs'</i> <i>accept 'it burns your throat'</i> <i>accept 'it is poisonous' or 'they can kill you'</i> <i>'it damages or harms your body or makes you ill'</i> <i>are insufficient as they are equivalent to dangerous</i> <i>'they are toxic' is insufficient</i> <i>'it contains solvents' is insufficient</i> <i>'they may dissolve chemicals in the body' is insufficient</i> 	1 (L3)