CCEA GCSE SCIENCE: DOUBLE AWARD (NON-MODULAR)

SCIENCE



EXAM QUESTION PACK

PAPER 1 FOUNDATION TIER G8401 PAPERS

STEMUP

These questions belong to CCEA, not to us.

The examination questions, mark schemes and examiner reports in this pack were written and published by CCEA. They are past assessment materials, reproduced here so that students can revise from them.

What we do not own

STEMUP is not affiliated with CCEA and does not own, and makes no claim to own, any of the question, mark scheme or examiner report material in this pack. CCEA has not endorsed, approved or been involved in the production of it. CCEA and the qualification titles used here belong to their respective owners and appear for identification only.

Where to find the originals

CCEA publishes its past papers, mark schemes and examiner reports free of charge. Always check the current specification at ccea.org.uk before you revise, because content and wording can change between series.

If you hold the rights to any material in this pack and would like it amended or removed, contact admin@stemup.co.uk and we will act on it.

Rewarding Learning

General Certificate of Secondary Education
2012

Science: Double Award (Non-Modular)

Paper 1
Foundation Tier

[G8401]

WEDNESDAY 30 MAY, AFTERNOON

MARK SCHEME

STEMUP.CO.UK

/ denotes alternative points
; denotes separate points
Comments on marking points are given in italics

				AVAILABLE MARKS
1	**(a)**	B;	[1]	
	(b)	respiratory passages/nose/trachea/bronchi;	[1]	
	(c)	cell wall/vacuole; ***not*** *chloroplast/****not*** *chlorophyll*	[1]	
	(d)	**(**for absorption) of water/minerals; large surface area/has extension;	[2]	5
2	**(a)**	xylem;	[1]	
	(b)	arrow out of leaf;	[1]	
	(c)	support/turgor/transport/solvent;	[1]	3
3		top surface of leaves covered in soot/soot covers the waxy cuticle; less light (for photosynthesis); stomata/pores on lower surface blocked; less O_2 (in or out)/less gas exchange/less CO_2 (in or out) (for photosynthesis);	[4]	4
4	**(a)**	labels correct [1] each	[2]	
	(b)	vagina/cervix;	[1]	3
5	**(a)**	condom; diaphragm;	[2]	
	(b)	condom;	[1]	
	(c)	gonorrhoea/syphilis/chlamydia;	[1]	4
6	**(a)**	engulf/surround/absorb/takes in/ingest; digest/break down/dissolve; *if in wrong order then* [1] *maximum*	[2]	
	(b)	Any **two** from: • dead/weakened dose of microbe/disease • antigen or microbe or disease recognised by **WBC** • presence of antigen • **lymphocyte** produces antibodies	[2]	4

STEMUP.CO.UK

				AVAILABLE MARKS
7	**(i)**	coronary (artery);	[1]	
	(ii)	no oxygen/sugar (***not*** *just blood*); no respiration/no energy;	[2]	3
8	**(a)**	arrow lungs **to LA**; **LV** to aorta past split towards head and arms;	[2]	
	(b)	X on LV; *X must be inside the heart and below the level of the valve*	[1]	
	(c)	A renal **artery**; B vena cava;	[2]	5
9	**(a)**	liver;	[1]	
	(b)	insulin;	[1]	
	(c)	hepatic portal vein = X; ***not*** *hpv,* ***not*** *hepatic on its own*	[1]	
	(d)	diabetes;	[1]	4
10	**(a)**	it gets bigger/dilates/widens/gets bigger;	[1]	
	(b)	optic nerve;	[1]	
	(c)	nervous system;	[1]	3
11	**(a)**	**(i)** arrow from beaker to potato;	[1]	
		(ii) osmosis;	[1]	
	(b)	Any **two** from: heavier; longer; firmer;	[2]	4
12	**(a)**	moves down;	[1]	
	(b)	large surface area/(lots of) alveoli or air sacs/good blood supply close by/ short diffusion distance/thin alveoli/moist/permeable;	[1]	
	(c)	to release energy from food;	[1]	
	(d)	carbon dioxide;	[1]	4

STEMUP.CO.UK

			AVAILABLE MARKS
13	**(a)**	phototropism; [1]	
	(b)	hormones/auxin; [1]	
	(c)	they can trap more light for photosynthesis/grow bigger/grow quicker/ grow taller; [1]	3
14	**(a)**	**(i)** to destarch it so that any starch present at the end was made during the experiment; [1]	
		(ii) to kill the leaf/stop chemical reactions; (boil in) alcohol/ethanol; [2]	
		(iii) turn off Bunsen burner/use electronic water bath; [1]	
		(iv) blue-black; [1]	
	(b)	**(i)** oesophagus; stomach; colon/large intestine; anus; [4]	
		(ii) buccal cavity/mouth; rectum; [2]	
	(c)	Any **two (**adaptation with corresponding explanation) from: Adaptation – microvilli/large surface area; Explanation – increased absorption area/for quicker/more absorption; ***not*** *easier* Adaptation – lots of them; Explanation – more absorption/quicker absorption/more absorption; **or** Adaptation – thin epithelium/one cell thick/thin walls; Explanation – short diffusion distance; **or** Adaptation – permeable or semi-permeable; Explanation – to allow molecules to pass across; **or** Adaptation – good blood supply/blood supply close to the wall; Explanation – maintain diffusion/concentration gradient/quick distribution around body; **or** Adaptation – villi can move/muscle in villi; Explanation – to allow more glucose/products of digestion to come into contact; **or** Adaptation – lacteal; Explanation – to allow absorption of fats/fatty acids and glycerol; [4]	15

STEMUP.CO.UK

AVAILABLE MARKS

15 **(a)** **(i)** sun/sunlight ***not*** *light on its own* [1]

(ii) vegetation → beetle → centipede → toad → fox
arrows in the correct direction from the plant; [2]

(iii) vegetation at bottom and largest;
fox is the smallest and the top;
shape symmetrical and in order; [3]
consequential marking from their food chain

(iv) fox [1]

(v) more toads eaten by foxes;
fewer/less rabbits available to foxes/kestrel/stoats eat more rabbits/
more competition for rabbits/stoat has less voles to eat; [2]

(b) Process A: combustion/burning; ***not*** *pollution*
Process B: respiration;
Process C: photosynthesis; [3]

(c) **(i)** cuts out the light/less light;
so that they can't photosynthesise/less photosynthesis; [2]

(ii) bacteria/fungi; [1]

(iii) lack of oxygen/bacteria respiring [1]
not *lack of food*

(iv) Any **two** from:
- don't spread slurry when it is raining
- don't spread slurry too close to the river
- check weather forecast
- don't spread slurry Oct–Jan (winter)
- large storage tanks [2]

(v) artificial fertiliser/sewage/silage/fertiliser/nitrates/phosphates/chemical fertiliser/detergent/septic tank overflow; [1]

(d) A = stonefly nymphs; *or all three*
B = bloodworms (only);
C = pond snails **or** pond snails and bloodworms; [3]

(e) **(i)** quadrat; [1]
not *square*

(ii) identify plant species;
estimate percentage cover;
calculate average/record;
repeat several times for reliability in one area;
repeat in the other area for comparison;
(Any **four**) [4]
if use co-ordinates/line transect/belt transect/throw/random numbers

Quality of written communication [2]

STEMUP.CO.UK

					AVAILABLE MARKS
		(iii)	heat/temperature; thermometer; sun/light; light meter/LDR; pH; pH meter; rain/rainfall; rain gauge/measuring cylinder; wind; wind gauge/anemometer; soil moisture; moisture meter or oven described; humidity; hygrometer; (Any **pair**)	[2]	31
16	**(a)**	**(i)**	GG; Gg;	[2]	
		(ii)	Gg and Gg parents; Punnett; 1 cross correct; 1 circle around gg;	[4]	
	(b)	**(i)**	male – because have (X chromosome and) Y chromosome/because they have a Y;	[1]	
		(ii)	Down's syndrome; extra chromosome/three chromosome 21s/47 chromosomes;	[2]	
		(iii)	cystic fibrosis/colour blind/dwarfism/albino/haemophilia/muscular dystrophy/Huntington's/PKU; ***accept*** *Down's syndrome if not in answer for* **(ii)**	[1]	
	(c)	**(i)**	Any **two** from: • The cancer cell has larger nucleus • thicker membrane/bigger membrane/darker membrane • less cytoplasm ***accept*** *reverse*	[2]	
		(ii)	UV light; ***not*** *light on own*	[1]	
		(iii)	Any **two** from: • spread • bigger • darker in colour/change in colour • irregular border/ragged edges/changed shape/different shape ***not*** *weeping/bleeding,* ***not*** *size/colour on own*	[2]	15
				Total	**110**

STEMUP.CO.UK

Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2011

Science: Double Award (Non-Modular)

Paper 1
Foundation Tier

G8401

[G8401]

THURSDAY 19 MAY, AFTERNOON

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all fifteen** questions.

INFORMATION FOR CANDIDATES

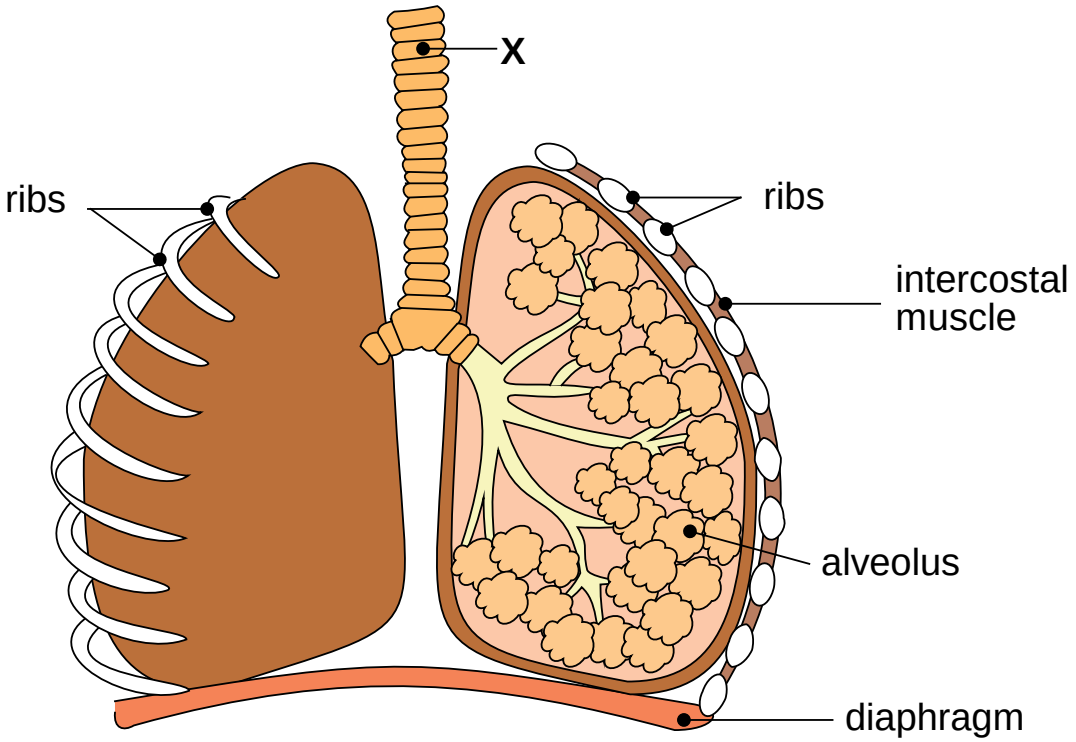
The total mark for this paper is 110.
Quality of written communication will be assessed in question **6(d)**.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Details of calculations should be shown.
Units must be stated in numerical answers where appropriate.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
Total Marks	

STEMUP.CO.UK

Examiner Only	
Marks	Remark

1 The diagram shows the respiratory system.



© CCEA

(a) Name part **X**.

_____ [1]

(b) Name the structure, labelled in the diagram, where gas exchange takes place.

_____ [1]

(c) On the diagram, draw an arrow to show the direction that the diaphragm moves during inspiration (breathing in). [1]

(d) Name the substance, found in cigarette smoke, that causes lung cancer.

_____ [1]

STEMUP.CO.UK

2 After eating a meal the blood sugar level changes.

Examiner Only	
Marks	Remark

(a) Will the blood sugar levels increase, decrease or stay the same after eating a meal?

_____ [1]

(b) Name the chemical that the pancreas produces to control the blood sugar level.

_____ [1]

(c) What type of chemical is this?

_____ [1]

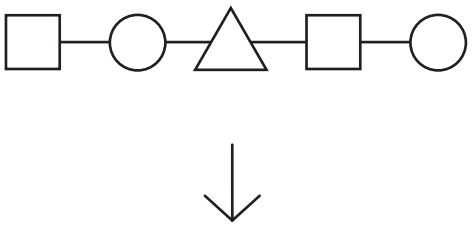
(d) Name the condition that people suffer from if they can't produce this chemical.

_____ [1]

STEMUP.CO.UK

Examiner Only	
Marks	Remark

3 The diagram shows how amino acids link together to form a protein molecule.



(a) Complete the diagram above to show what happens to this protein molecule during digestion in the stomach and small intestine. [2]

(b) The amino acids will then be absorbed into the blood. Name the process involved.

_____ [1]

(c) Give **two** ways the small intestine is adapted for the process of absorption.

1. _____

2. _____ [2]

STEMUP.CO.UK

4 Melanie is trying to recycle more.

(a) How could she recycle vegetable peelings?

_____ [1]

(b) Suggest **two** benefits, to the environment, of recycling.

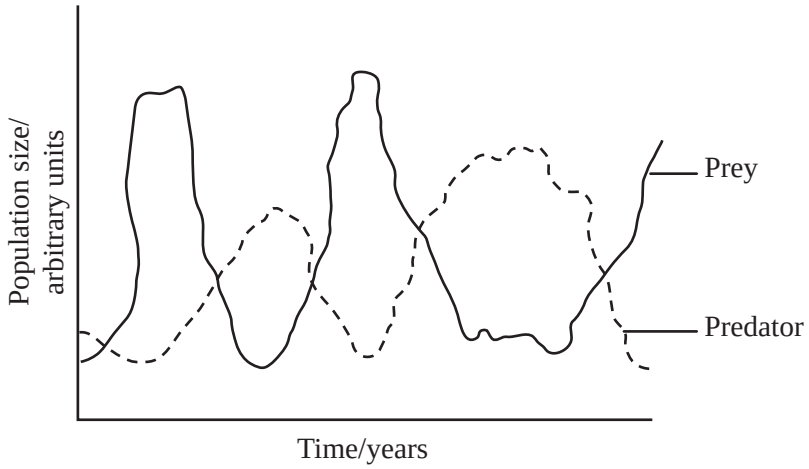
1. _____

2. _____ [2]

Examiner Only	
Marks	Remark

STEMUP.CO.UK

5 The graph shows the population size of a predator and its prey, over a number of years.



© http://scienceaid.co.uk/biology/ecology/predation.html

Use the graph and your knowledge to answer the following question.

(a) What effect does an increase in the predator population have on the population of the prey? Explain your answer.

Effect on prey population _____ [1]

Explanation _____

_____ [1]

There are a number of factors that lead to a change in population size.

(b) Complete the table to show how each factor will affect the population size.

Factor	Effect on population size
Immigration	
Birth rate higher than death rate	
Disease	

[3]

Examiner Only

Marks	Remark

6 The diagram shows a baby just before it is born.



© GCSE biology for CCEA by R McIlwaine & J Napier, published by Hodder Murray, 2007, ISBN 9780340940556. Reproduced by permission of Hodder Education

(a) Where in the body does the baby develop?
Choose your answer from the list below.

Uterus Ovary Vagina Cervix

_____ [1]

(b) Approximately how long does it take for a baby to develop fully?

_____ months [1]

Before it is born, a baby depends on its mother for nutrients and oxygen.

(c) Name one nutrient that the baby receives from its mother.

_____ [1]

Examiner Only

Marks	Remark

STEMUP.CO.UK

Examiner Only	
Marks	Remark

(d) Use the diagram and your knowledge to describe the process of birth.

The quality of written communication will be assessed in this question.

_____

_____

_____

_____

_____ [3]

Quality of written communication [2]

STEMUP.CO.UK

Examiner Only	
Marks	Remark

7 The photograph shows the result of plants grown in different light conditions.



© Nigel Cattlin / Science Photo Library

The plants in Pot B were grown in the dark.

(a) State **one** difference, shown in the photograph between the plants in Pot A and Pot B.
Explain your answer.

Difference _____ [1]

Explanation _____

_____ [1]

(b) What is the plants' growth response to light called?

_____ [1]

STEMUP.CO.UK

Examiner Only	
Marks	Remark

8 The table gives some information about food tests. Complete the table to give the colour of a positive test for simple sugars and protein.

Food	Name of Reagent	Colour at start	Colour of positive test
Starch	Iodine	Brown	Blue-black
Simple sugars	Benedict's	Blue	
Protein	Biuret	Blue	

[2]

9 Explain why, as part of a healthy diet, we should eat more fibre and less saturated fat.

Fibre _____

Saturated fat _____ [2]

10 Water has several functions in a plant. Give **three** functions of water in a plant.

1. _____

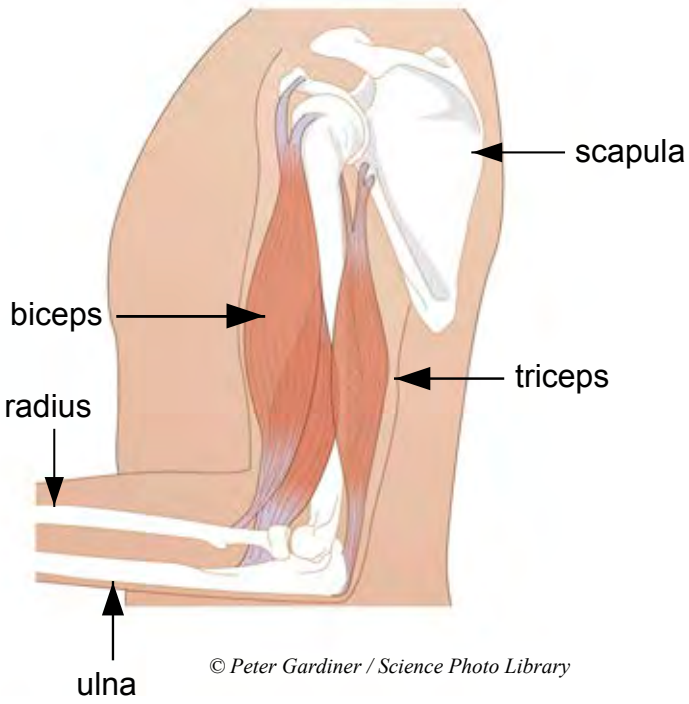
2. _____

3. _____ [3]

STEMUP.CO.UK

Examiner Only	
Marks	Remark

11 The diagram shows the bones and the biceps and triceps muscles of the arm.



© Peter Gardiner / Science Photo Library

Use the diagram and your knowledge to answer the following questions.

(a) Name the **two** bones that the biceps muscle is attached to.

_____ and _____ [2]

(b) Which muscle must be contracted in order to raise the lower arm?

_____ [1]

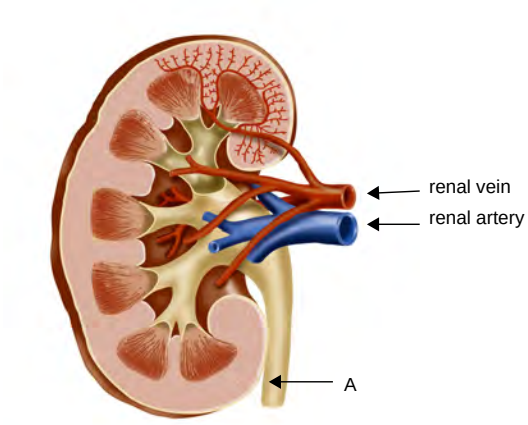
(c) What type of cell carries the electrical impulse to the muscle to make it contract?

_____ [1]

STEMUP.CO.UK

Examiner Only	
Marks	Remark

12 The diagram shows a section through a kidney. The function of the kidney is to filter waste substances from the blood.



© Art for Science / Science Photo Library

(a) Name part **A**. _____ [1]

(b) Name **two** waste substances filtered from the blood by the kidney.

1. _____

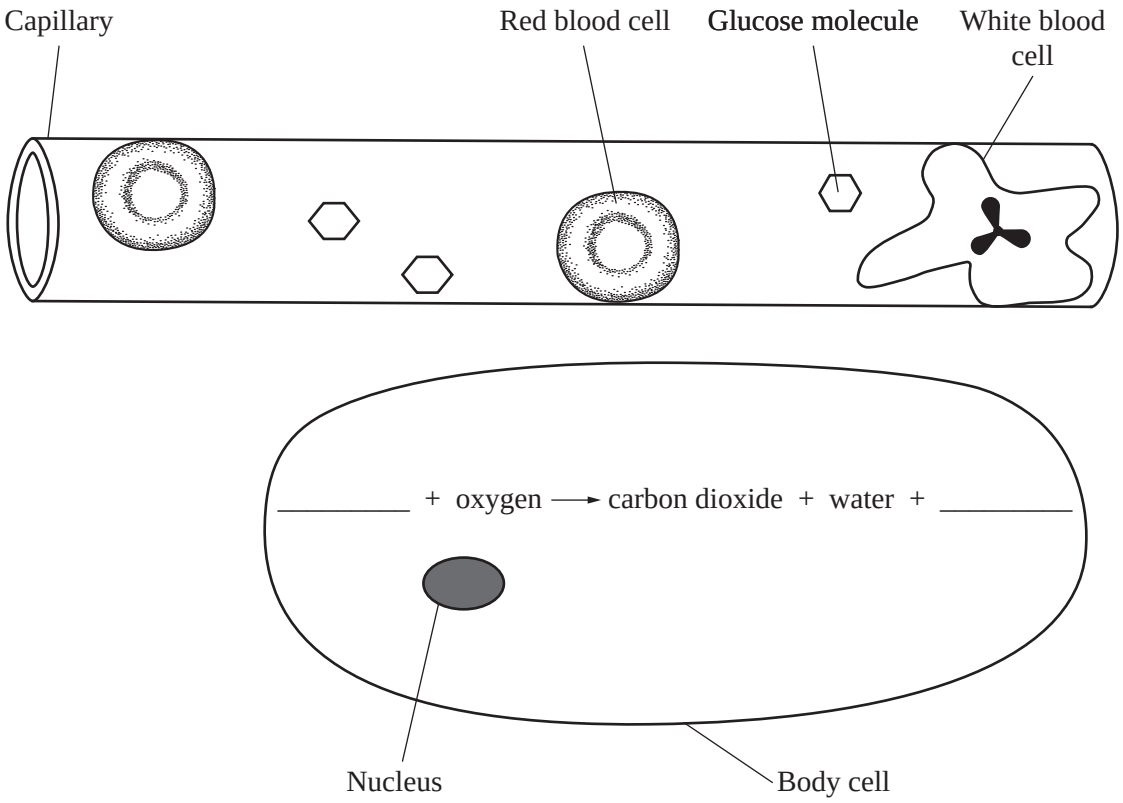
2. _____ [2]

Dialysis is used to treat a person with kidney failure.

(c) Apart from dialysis, what other treatment may be available to a person with kidney failure?

_____ [1]

13 (a) The diagram shows a blood capillary and a body cell.



(i) Complete the word equation for respiration in the body cell. [2]

(ii) How is oxygen carried in the blood capillary?

_____ [1]

(iii) What happens to the carbon dioxide immediately after it has been produced in the body cell?

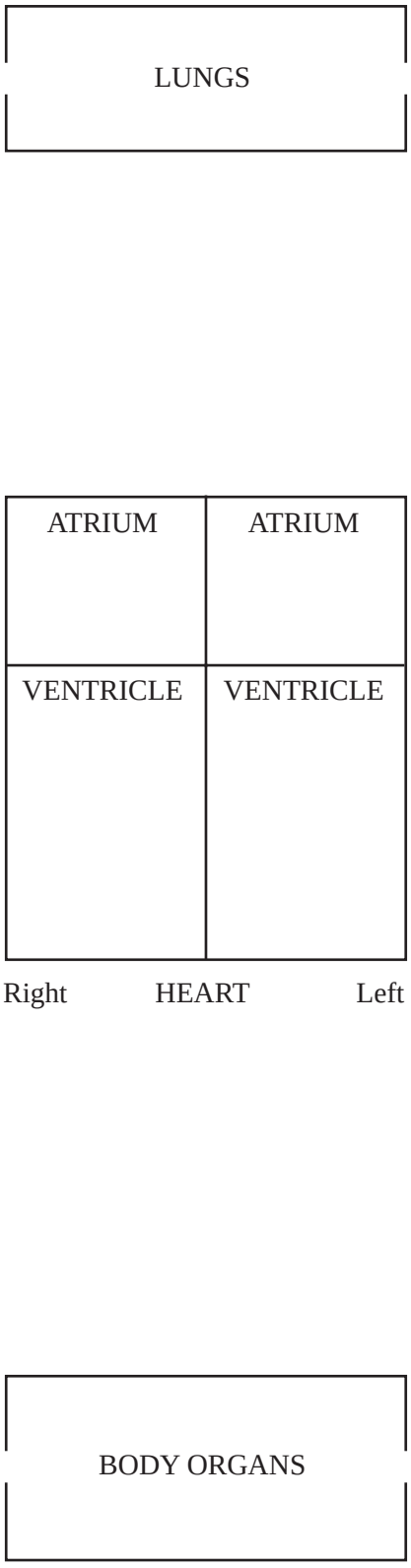
_____ [1]

Examiner Only

Marks	Remark

STEMUP.CO.UK

(b) The diagram shows the lungs, heart and body organs of a mammal.



Examiner Only	
Marks	Remark

STEMUP.CO.UK

(i) Complete the diagram by drawing four blood vessels to show the circulation of blood from:

- the body organs to the heart – label as A
- the heart to the lungs and back – label both as B
- heart to the body organs – label as C. [4]

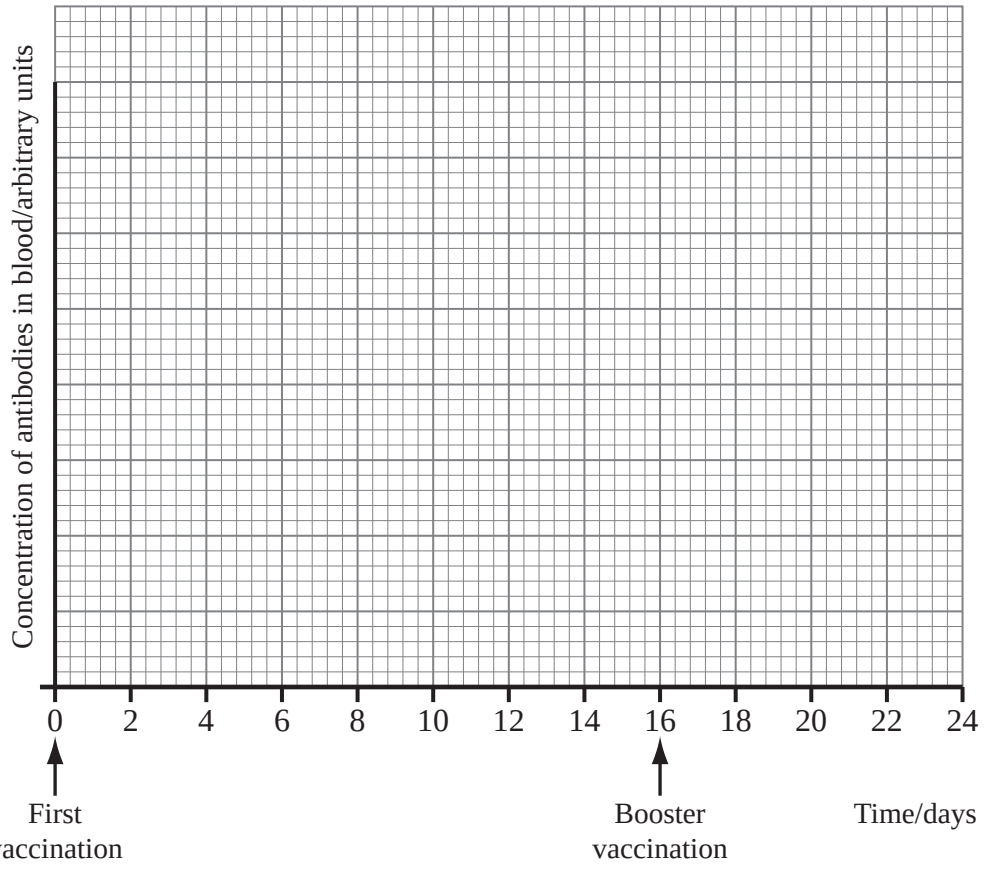
(ii) Name the largest artery in the body. _____ [1]

(iii) Explain why the left ventricle has the thickest muscular wall in the heart.

_____ [1]

(c) Some white blood cells in the body provide immunity by producing antibodies. Most vaccinations introduce a modified disease-causing organism into the body.

Draw a line to show what happens to the concentration of antibodies following a vaccination and a subsequent booster vaccination.



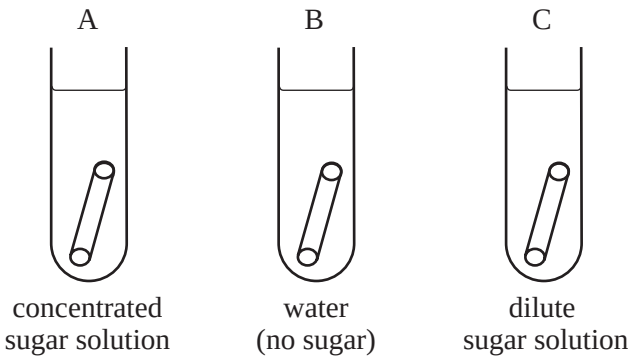
[5]

Examiner Only

Marks	Remark

STEMUP.CO.UK

(d) An investigation into osmosis was carried out with potato cylinders. Three test tubes A, B and C were set up each with a potato cylinder of 50 mm length and a different concentration of sugar solution. The potato cylinders were left for several hours, removed and their final length recorded. The results are given in the table.



Test tube	Solution	Length of potato cylinder at the start/mm	Length of potato cylinder at the end/mm
A	Concentrated sugar solution	50	48
B	Water (no sugar)	50	53
C	Dilute sugar solution	50	50

(i) Why was it **not** necessary to work out the percentage change in length in this experiment?

_____

_____ [1]

(ii) Give **one** factor that should have been kept constant in this experiment.

_____ [1]

(iii) Explain the results for the potato cylinder in test tube A.

_____

_____ [2]

Examiner Only

Marks	Remark

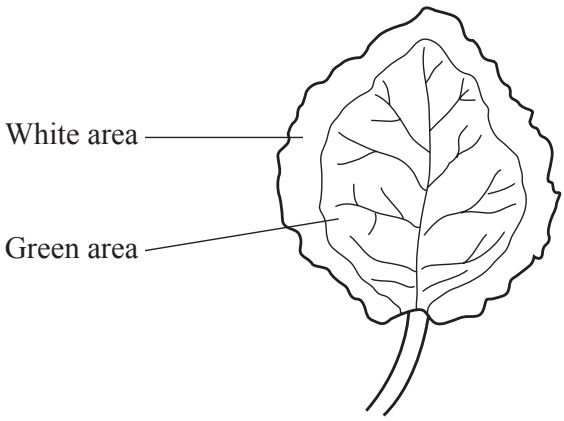
STEMUP.CO.UK

(iv) Draw a diagram of one potato **cell** from the potato cylinder in test tube A as it would appear at the end of the investigation.

Label the cell membrane, cell wall and vacuole on your diagram.

[4]

14 (a) The diagram shows a variegated leaf.



(i) Complete the diagram by shading the area where you would expect to find starch. [1]

(ii) Explain why you would expect to find starch in this area.

_____

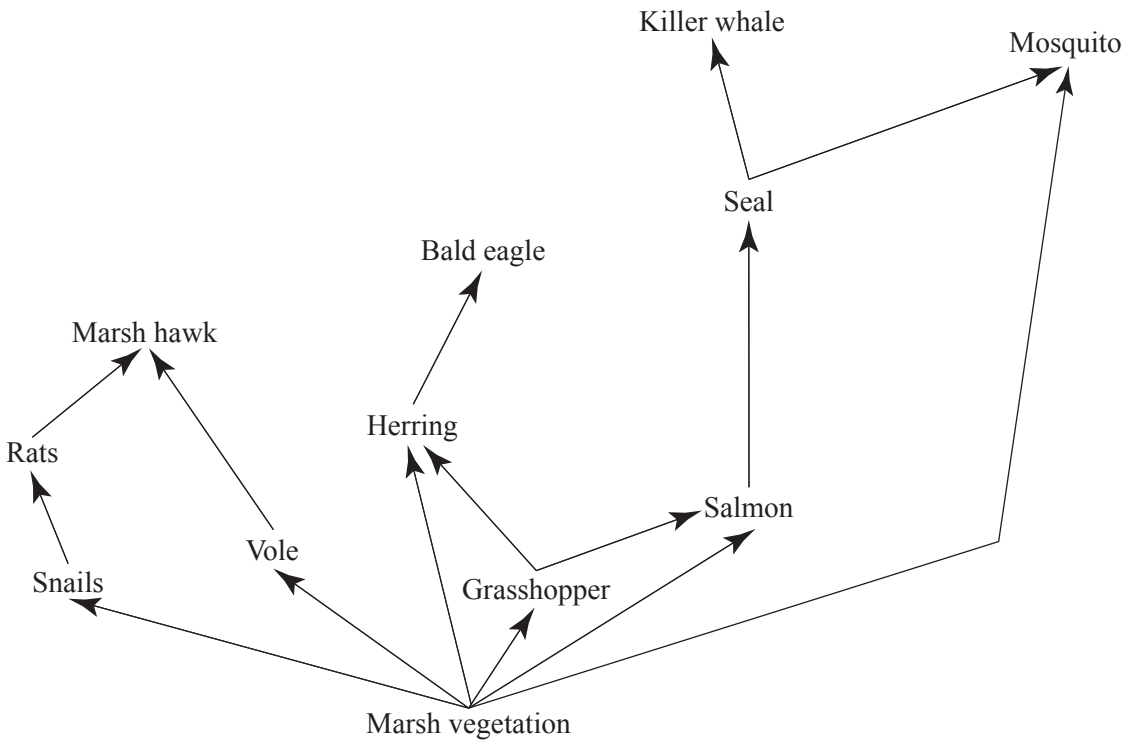
_____ [2]

Examiner Only

Marks	Remark

STEMUP.CO.UK

(b) The diagram shows a food web.



http://www.acklamgrange.org.uk/science/topics/food_web3.jpg

(i) What is the source of energy for this food web?

_____ [1]

(ii) At what two trophic levels is the herring feeding?

_____ and _____ [1]

(iii) Draw the food chain from the food web where the bald eagle is acting as a tertiary consumer.

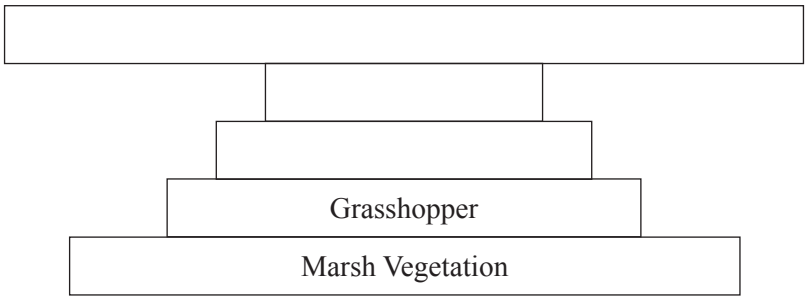
[2]

Examiner Only

Marks	Remark

STEMUP.CO.UK

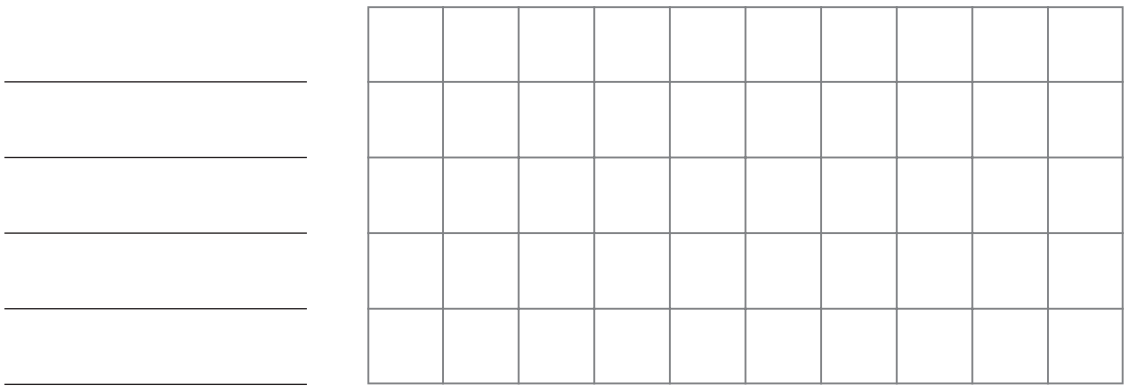
A pyramid of numbers for one of the food chains in the food web is shown below.



(iv) Complete the labels on the pyramid with the correct name of the organisms in the food chain. [2]

(v) On the grid, draw a pyramid of biomass from the pyramid of numbers above.

Beside each level write the name of the organism.



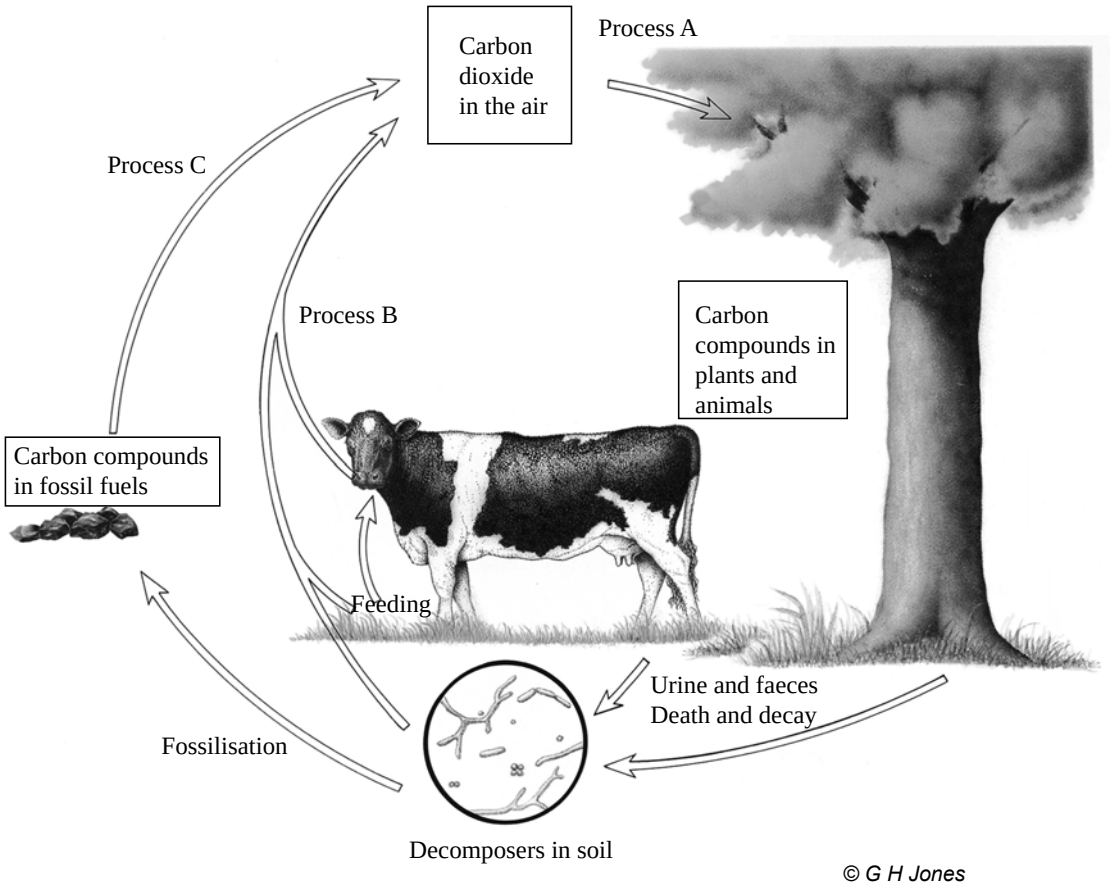
[4]

Examiner Only

Marks	Remark

STEMUP.CO.UK

(c) The diagram shows part of the carbon cycle.



(i) Use the diagram to give the correct name of the processes A, B and C from the list below.

- Combustion (burning)
- Photosynthesis
- Respiration

Process A _____

Process B _____

Process C _____ [3]

Process C causes pollution.

(ii) Name **two** alternative energy sources that could be used instead of fossil fuels to help reduce pollution.

1. _____

2. _____ [2]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

15 (a) The diagrams below show a reproductive cell from a male and a reproductive cell from a female.

Cell A



© www.natracare.com

Cell B



© www.natracare.com

(i) Name each type of cell.

Cell A _____

Cell B _____ [2]

(ii) Where in the human body is each type of cell produced? Choose your answers from the list below.

Uterus, Ovary, Penis, Vagina, Scrotum, Testes.

Cell A _____

Cell B _____ [2]

(iii) Describe and explain **one** way in which cell A is adapted for its function.

_____

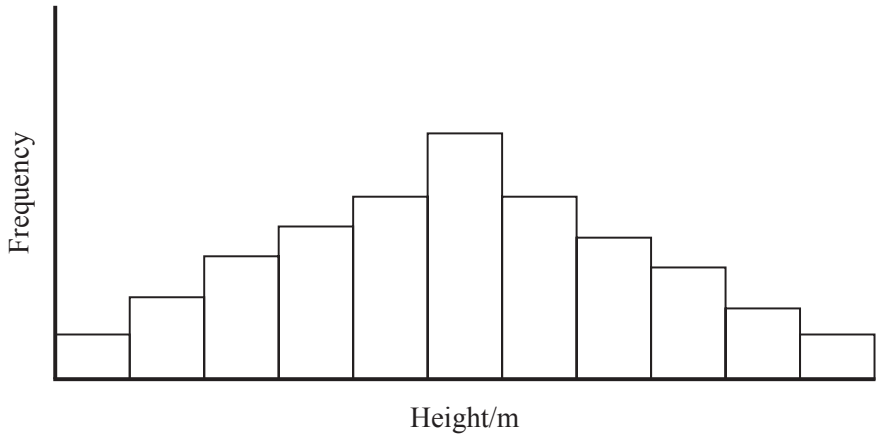
_____ [2]

STEMUP.CO.UK

(iv) Name the process that occurs when cell A and cell B join.

_____ [1]

(b) The graph shows how height in a population of animals varies. Height is an example of continuous variation.



(i) State the two causes of height variation in this population.

_____ and _____ [2]

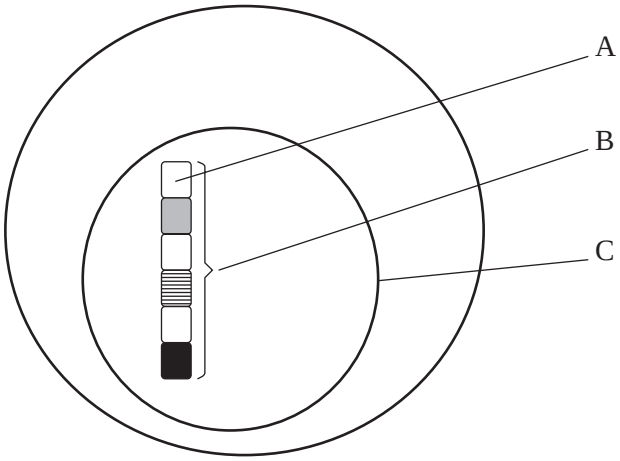
(ii) Suggest the effect on the average height of future populations if the smallest animals couldn't compete for food.

_____ [1]

Examiner Only

Marks	Remark

Genes are short lengths of DNA that control a characteristic.
A number of genes make up a chromosome.
Chromosomes are found in the nucleus of a cell. The diagram shows these structures in a cell.



(c) Use this information and your knowledge to name structures A, B and C.

A _____

B _____

C _____ [3]

(d) Some genes control cell division. If these genes are damaged, cancer may result.

(i) What type of cancer is caused when ultra-violet light damages genes?

_____ [1]

(ii) Suggest **two** ways of reducing the risk of developing this type of cancer.

1. _____

2. _____ [2]

Examiner Only

Marks	Remark

STEMUP.CO.UK

Examiner Only	
Marks	Remark

(e) The colour of the spots in Dalmatian dogs is determined by a gene. The allele (gene) for black spots is dominant to the allele (gene) for brown spots.



© iStockphoto / Thinkstock

Let B represent the allele (gene) for black spots.
Let b represent the allele (gene) for brown spots.

A Dalmatian which is heterozygous for black spots is crossed with a Dalmatian with brown spots.

(i) Give the genotypes for this cross.

Heterozygous Black spotted Dalmatian	×	Brown spotted Dalmatian
_____		_____ [2]

(ii) Use a Punnett square to show the possible genotypes of the offspring.

[2]

(iii) Give the phenotypes of the offspring and the ratio of the phenotypes.

Phenotypes _____ and _____

Ratio _____ [2]

THIS IS THE END OF THE QUESTION PAPER

Permission to reproduce all copyright material has been applied for.
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA will be happy to rectify any omissions of acknowledgement in future if notified.

111229

Rewarding Learning

General Certificate of Secondary Education
2011

Science: Double Award (Non-Modular)

Paper 1
Foundation Tier

[G8401]

THURSDAY 19 MAY, AFTERNOON

MARK SCHEME

STEMUP.CO.UK

				AVAILABLE MARKS
1	**(a)**	trachea/windpipe	[1]	
	(b)	alveoli/air sac not lung	[1]	
	(c)	down	[1]	
	(d)	tar	[1]	4
2	**(a)**	Increase	[1]	
	(b)	Insulin	[1]	
	(c)	Hormone/protein (not amino acid)	[1]	
	(d)	Diabetes	[1]	4
3	**(a)**	1st mark some or all separated molecules; 2nd mark 5 as in diagram – correct shapes	[2]	
	(b)	diffusion	[1]	
	(c)	large surface area; villi; one cell thick; capillary network/ good blood supply	[2]	5
4	**(a)**	compost them/feed them to animals/green or brown bin/compost bin	[1]	
	(b)	not less pollution/cleaner environment unless qualified less fuel used transporting rubbish to landfill; less fuel used in manufacturing new materials; less artificial fertiliser manufactured; less raw materials being quaried less polluting gases/less CO_2/less global warming landfill sites not being filled so quickly less incineration; saves forests/resources/fossil fuels saves energy; (*any two*)	[2]	3

STEMUP.CO.UK

			AVAILABLE MARKS
5	**(i)**	decrease – more prey eaten/killed [2]	
	(ii)	<table><tr><th>Factor</th><th>Effect on population size</th></tr><tr><td>Immigration :</td><td>increase</td></tr><tr><td>Birth rate :</td><td>increase</td></tr><tr><td>Disease :</td><td>decrease</td></tr></table> [3]	5
6	**(a)**	uterus [1]	
	(b)	9 months [1]	
	(c)	glucose/amino acids/vitamins/named vitamins/minerals minerals [1]	
	(d)	Process of Birth (*any three*): (Uterus muscles) contract; Mucus plug comes away; Cervix dilates; head first Amnion ruptures/waters break [3] QWC 2 biological statements [2]	8
7	**(a)**	Plants in Pot A grow to one side [1]	
	(b)	Plants were grown where light is only available to the plant from one side for A [1]	
	(c)	Phototropism/tropism [1]	3
8		Benedict's – brick red/orange/red Biuret – lilac/purple/mauve [2]	2
9		More fibre – prevent bowel cancer/peristalsis; Less saturated fat – reduce risk of CHD/heart attack/lower cholesterol reduce stroke/less/reduce obesity less clogged arteries [2]	2
10		Photosynthesis; *transport* minerals; support; cooling; Solvent for chemical reactions/transpiration; [3]	3

STEMUP.CO.UK

			AVAILABLE MARKS
11	**(a)** radius and scapula	[2]	
	(b) biceps	[1]	
	(c) nerve/motor neuron/neuron	[1]	4
12	**(a)** ureter	[1]	
	(b) water/urea/salts (*any two*)	[2]	
	(c) kidney *transplant*	[1]	4
13	**(a)** **(i)** sugar/glucose; energy;	[2]	
	(ii) red blood cell/haemoglobin	[1]	
	(iii) diffuses into blood/plasma/tissue fluid	[1]	
	(b) **(i)** 1 mark each correct link body organs to right atrium vessel from right *ventricle* to lungs lungs to left atrium left *ventricle* to body organs	[4]	
	(ii) Aorta	[1]	
	(iii) needs to pump blood all around the body	[1]	
	(c) rises; drops; doesn't drop as low as starting point; quickly rises just after Booster (day 16)/steeper gradient rises to higher level;	[5]	
	(d) **(i)** all the same length *at start*	[1]	
	(ii) temp/amount of drying/volume of solution/same diameter cylinders/same type/age of potato	[1]	
	(iii) water moved out/left the cell; more water inside than outside the potato	[2]	
	(iv) plasmolysed cell 1 each correct label	[4]	23

STEMUP.CO.UK

AVAILABLE MARKS

14 **(a)** **(i)** edges – not shaded
centre – shaded [1]

(ii) centre has chlorophyll/chloroplasts;
(to trap light) for photosynthesis; [2]

(b) **(i)** sunlight/sun/light [1]

(ii) 2 and 3 2nd and 3rd [1]

(iii) marsh vegetation → grasshopper → herring → bald eagle
(1 correct food chain; 1 arrows) → but must have marsh veg. at start [2]

(iv) mosquito as top bar; salmon and seal [2]

(v) mosquito at top; mosquito smallest; symmetry + pyramid + steps;
all labels correct rest (ignore top bar) in correct order and relative lengths correctly labelled = 1 [4]

(c) **(i)** Process A – photosynthesis
Process B – respiration
Process C – combustion (burning) [3]

(ii) wind; solar; hydro-electric; wave; tidal power; geothermal;
(*any two*) [2] 18

15 **(a)** **(i)** Cell A – sperm
Cell B – egg/ovum [2]

(ii) Cell A – testes
Cell B – ovary [2]

(iii) tail; for swimming/haploid chromosomes; to restore diploid no; [2]

(iv) fertilisation [1]

(b) **(i)** DNA/inheritance genetic; environment [2]

(ii) animals in population would be taller/average height taller [1]

(c) A – gene/allele;
B – chromosome;
C – nucleus/nuclear membrane; [3]

STEMUP.CO.UK

				AVAILABLE MARKS
(d)	**(i)**	skin	[1]	
	(ii)	*Any two* cover up (e.g. wear hat); stay in the shade or out of the strongest sun (e.g. 11 am–3 pm); use a sunscreen liberally (high SPF); don't use sunbed or u.v. light;	[2]	
(e)	**(i)**	Bb; × bb in this order	[2]	
	(ii)	Punnett square; Correct cross; CM	[2]	
	(iii)	Phenotypes: black (spots) brown (spots); Ratios: 1 : 1 ;	[2]	22
			Total	**110**

Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2010

Science: Double Award (Non-Modular)

Paper 1
Foundation Tier

[G8401]

G8401

FRIDAY 21 MAY, MORNING

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all sixteen** questions.

INFORMATION FOR CANDIDATES

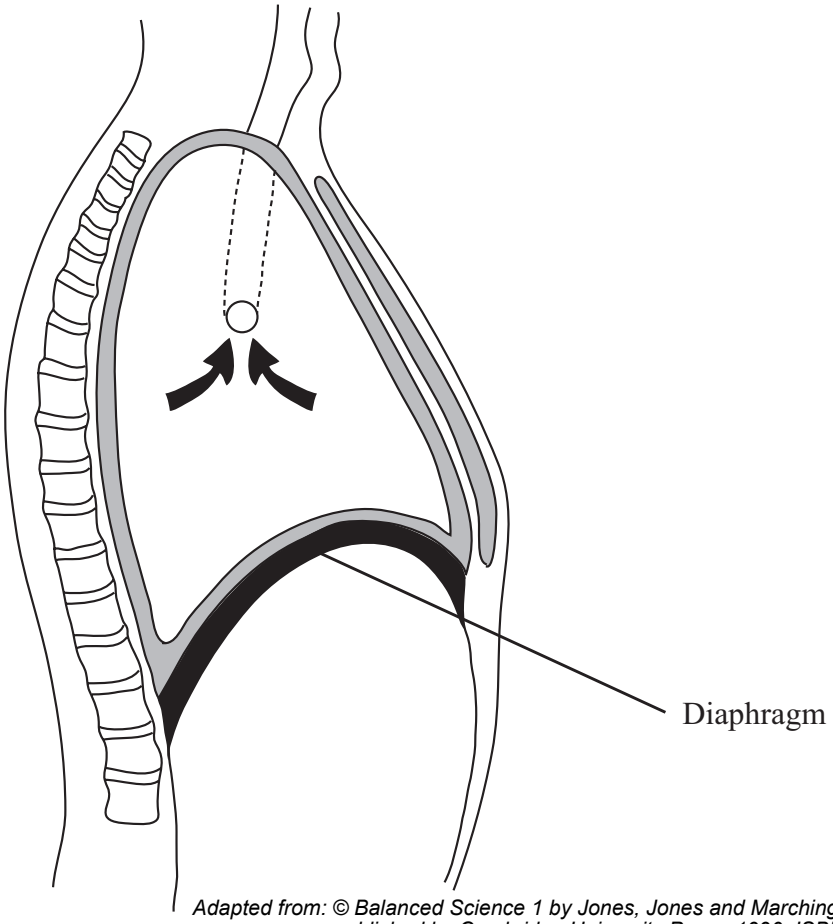
The total mark for this paper is 110.
Quality of written communication will be assessed in question **1(a)**.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Details of calculations should be shown.
Units must be stated in numerical answers where appropriate.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
Total Marks	

STEMUP.CO.UK

Examiner Only	
Marks	Remark

1 The diagram shows the lungs during expiration (breathing out).



Adapted from: © Balanced Science 1 by Jones, Jones and Marchington, page 219, published by Cambridge University Press, 1990. ISBN 0521356893

(a) Describe and explain the mechanism of expiration.

You will be assessed on the quality of written communication in this question.

_____

_____

_____

_____

_____ [4]

Quality of written communication. [2]

(b) Gas exchange takes place in the lungs.

Give **one** way in which the lungs are adapted to carry out this process.

_____ [1]

STEMUP.CO.UK

2 The table shows the results of a survey into the smoking habits of 1000 lung cancer patients.

Number of cigarettes smoked per day	Number of lung cancer patients
0	3
1–4	51
5–14	259
15–24	302
More than 24	385

(a) What trend is shown by these results?

_____ [1]

(b) What do the results show about non-smokers?

_____ [1]

(c) Name one **other** disease that can be caused by smoking.

_____ [1]

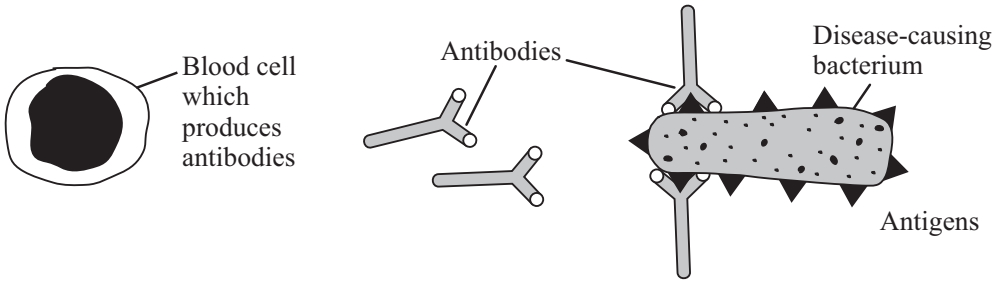
Examiner Only

Marks	Remark

STEMUP.CO.UK

Examiner Only	
Marks	Remark

3 The diagram shows antibodies being produced by a blood cell and a disease-causing bacterium being attacked by them.



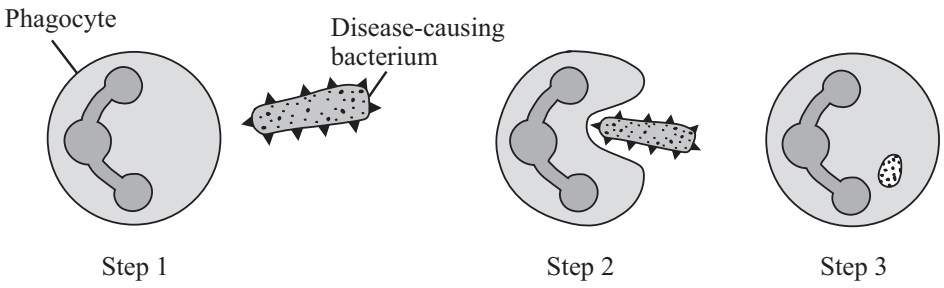
(a) Name the type of blood cell which produces antibodies.

_____ [1]

(b) In the space below, draw a bacterium that would **not** be attacked by the antibodies above.

[1]

Invading bacteria can be killed by blood cells called phagocytes as shown in the diagram below.



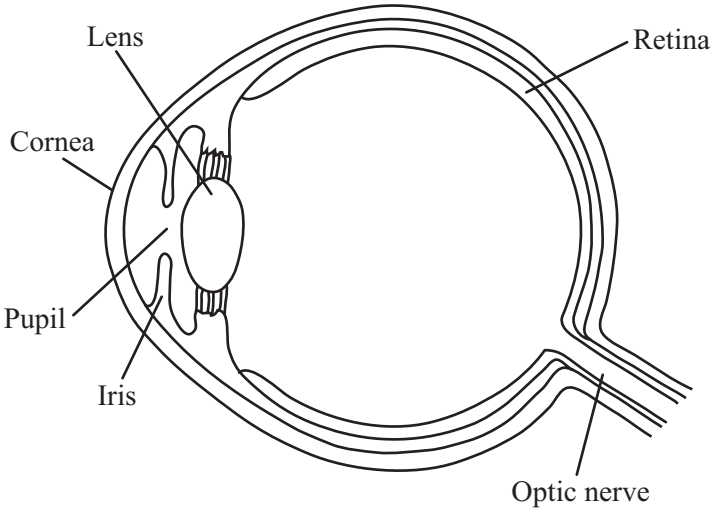
(c) Use the diagram to help describe how phagocytes kill invading bacteria.

_____

_____ [2]

STEMUP.CO.UK

4 The diagram shows a section through the eye.



(a) Which structure, labelled in the diagram,

(i) is stimulated by light _____

(ii) prevents too much light from entering the eye? _____ [2]

(b) Name **one** structure (not shown on the diagram) that helps to prevent dust and dirt from entering the eye.

_____ [1]

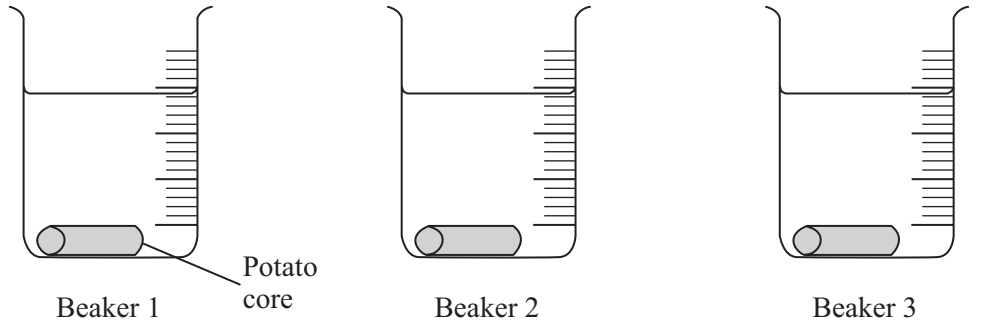
Examiner Only

Marks	Remark

STEMUP.CO.UK

Examiner Only	
Marks	Remark

5 An investigation into osmosis in potato cores was set up as shown in the diagram below.



(a) Name **two** factors that should be controlled during the investigation in order to make it a fair test.

1. _____

2. _____ [2]

(b) How would you know if water had moved out of the potato cores during the investigation?

_____

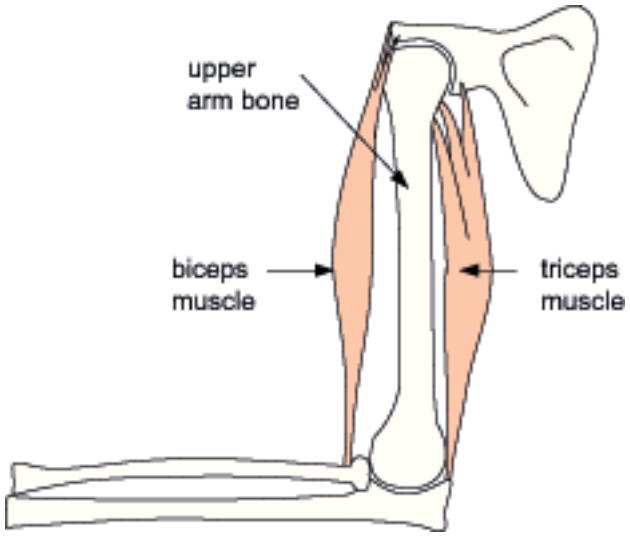
_____ [1]

(c) In which beaker would you expect most water to move out of the potato cores during the investigation?

_____ [1]

Examiner Only	
Marks	Remark

6 The diagram shows the muscles and bones in the arm. The biceps and triceps muscles help to control movement in the arm.



© CCEA

(a) Describe what happens to the biceps and triceps muscles to straighten the arm.

Biceps _____

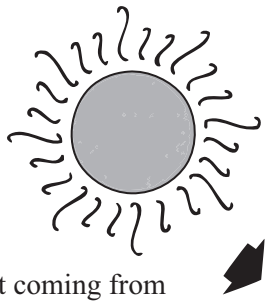
Triceps _____ [2]

(b) The biceps and triceps are **antagonistic** muscles. What does this term mean?

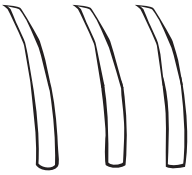
_____ [1]

STEMUP.CO.UK

7 Plant shoots grown on a window sill will grow towards the light.



Light coming from this direction



Shoots

(a) Name this response to light. _____ [1]

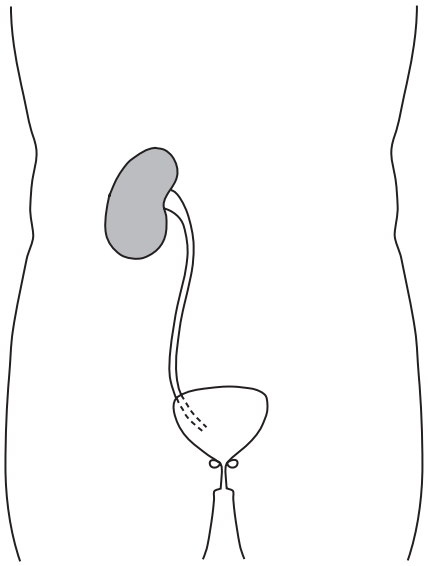
(b) What is the advantage to the plant of this response?

_____ [1]

Examiner Only	
Marks	Remark

STEMUP.CO.UK

8 The diagram shows the position of one of the kidneys in the body.



© CCEA

(a) On the diagram label the

(i) ureter

(ii) bladder [2]

(b) Draw the other kidney on the diagram to show its position. [1]

Examiner Only

Marks	Remark

STEMUP.CO.UK

Examiner Only	
Marks	Remark

9 **(a)** Draw a line to connect the type of drug to its effect on the body.

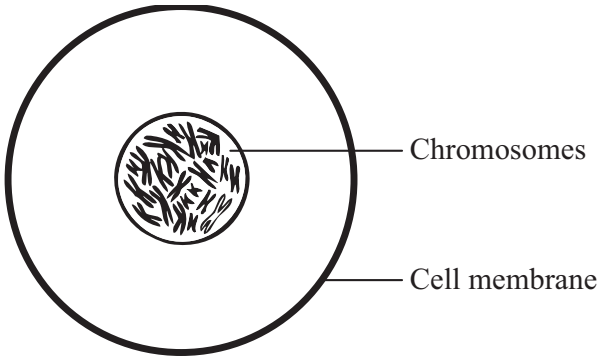
Type of Drug	Effect on the body
Depressant e.g. sleeping pills	drowsiness
Hallucinogen e.g. ecstasy	makes you more alert
Stimulant e.g. caffeine	can cause flashbacks or bad trips

[3]

(b) Suggest how the long-term abuse of some drugs can cause problems for society.

_____ [1]

10 The diagram shows a cell with chromosomes.



(a) Where in the cell are the chromosomes located?

_____ [1]

(b) What are short sections of chromosomes called?

_____ [1]

(c) What chemical are chromosomes made from?

_____ [1]

STEMUP.CO.UK

11 Pea plants can produce peas that are wrinkled or smooth.

The gene (allele) for wrinkled is dominant to the gene (allele) for smoothness.

Let R represent the gene (allele) for wrinkled peas.
Let r represent the gene (allele) for smooth peas.

A plant breeder crossed two heterozygous pea plants.

(a) Use a Punnett square to show the possible genotypes of the offspring of this cross.

[3]

(b) Give the phenotypes of the offspring and the ratio of the phenotypes.

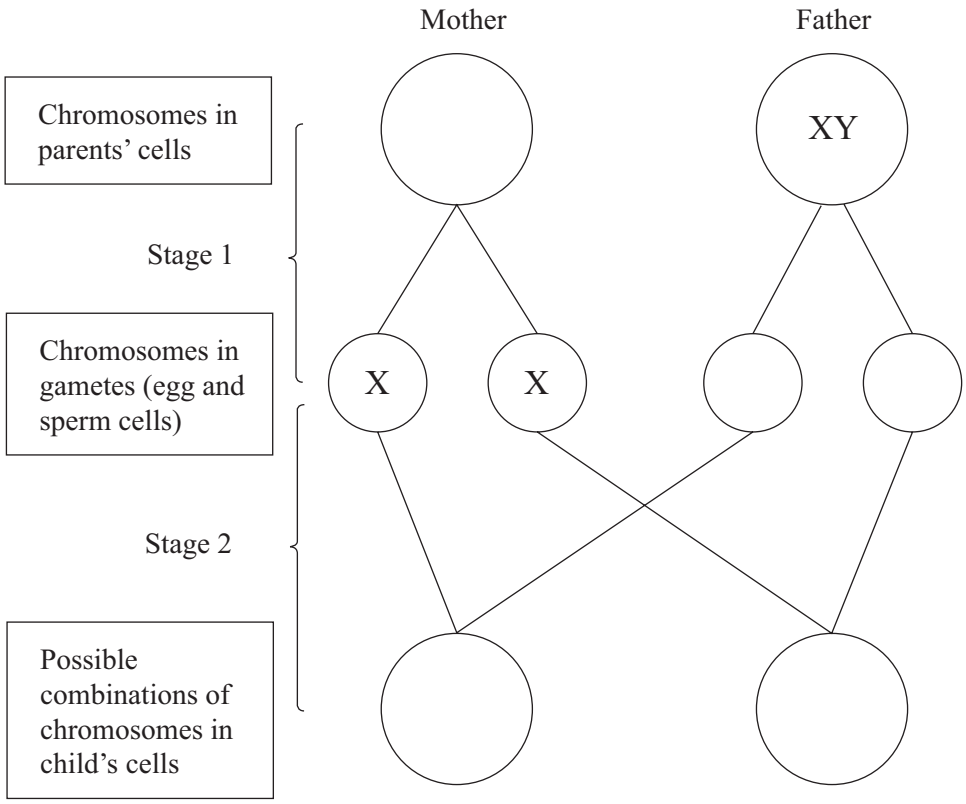
Phenotypes _____ and _____

Ratio _____ [2]

Examiner Only	
Marks	Remark

STEMUP.CO.UK

12 The diagram shows how the sex of a child depends on the chromosomes it inherits from its parents.



Complete the diagram above to show the sex chromosomes found in each cell. [3]

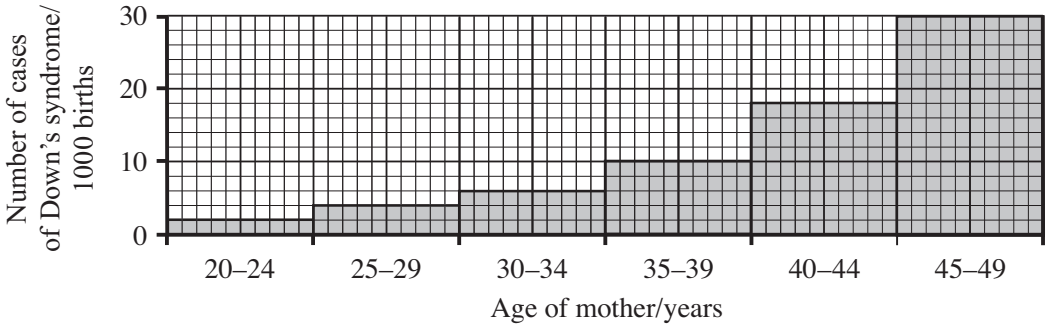
Examiner Only

Marks	Remark

STEMUP.CO.UK

13 Down's syndrome is one example of an inherited disease where all the cells of the individual have 47 chromosomes rather than 46.

The histogram shows how the risk of having a child with Down's syndrome increases with the age of the mother.



(a) Use the histogram to calculate how many times more likely it is for a 42 year old woman to have a Down's syndrome baby than a 32 year old woman. Show your working.

_____ times [2]

During pregnancy it is possible to detect the presence of Down's syndrome in the developing baby by testing a sample of the amniotic fluid.

(b) What must be present in the amniotic fluid so that the test can be carried out?

_____ [1]

Examiner Only

Marks	Remark

STEMUP.CO.UK

Examiner Only	
Marks	Remark

14 **(a)** Photosynthesis occurs in plant leaves.

(i) Name the chemical in leaves that absorbs light for photosynthesis.

_____ [1]

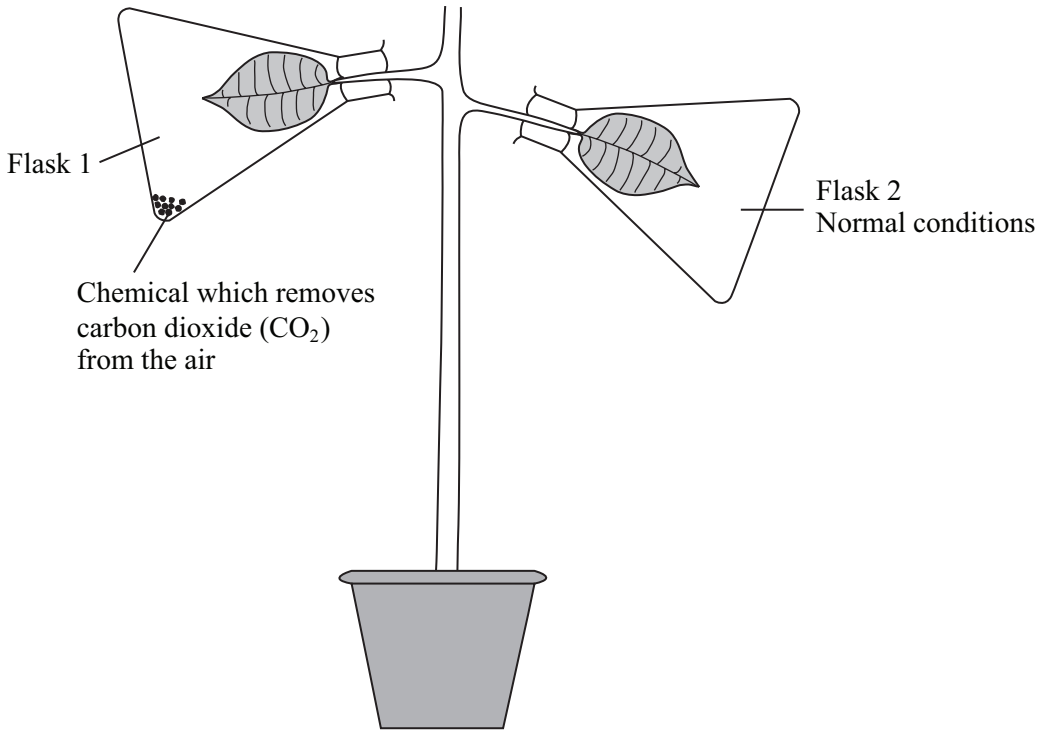
(ii) Complete the word equation for photosynthesis.

	+		Light →	Glucose	+

[3]

(b) The diagram shows the apparatus used to investigate if carbon dioxide is needed for photosynthesis.

The plant was destarched and then the leaves were sealed in glass flasks. The plant was then left in sunlight for 12 hours.

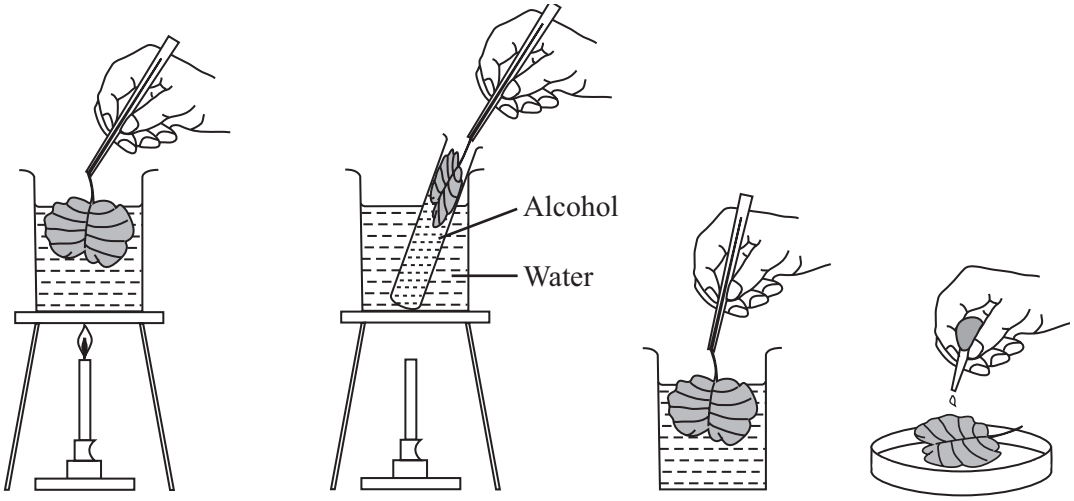


(i) How is the plant destarched?

_____ [1]

STEMUP.CO.UK

The diagrams show the stages in the starch test on the leaves from the plant.



Step 1 Boil in water

Step 2 Heat in alcohol

Step 3 Rinse in warm water

Step 4 Test for starch

© GCSE biology for CCEA by R McIlwaine & J Napier, published by Hodder & Stoughton, 2003, ISBN 9780340858257. 'Reproduced by permission of Hodder Education'

(ii) What is the purpose of

Step 2 _____

Step 3? _____ [2]

(iii) Why is the Bunsen burner turned off before Step 2?

_____ [1]

(iv) In Step 4, iodine solution is added to the leaves to test for starch.

What colour would you expect to obtain when iodine is added to the leaf from

Flask 1 _____

Flask 2? _____ [2]

Examiner Only

Marks	Remark

STEMUP.CO.UK

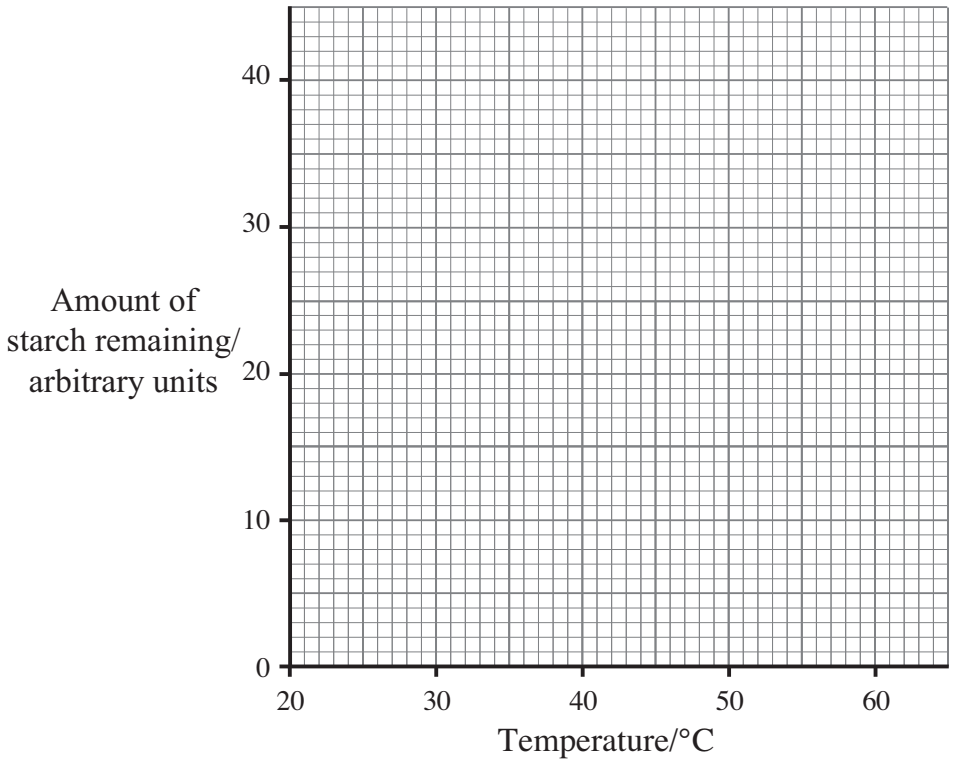
Examiner Only	
Marks	Remark

(c) The enzyme amylase breaks down starch. John carried out an experiment with amylase to see how much starch remained after 15 minutes at different temperatures.

The table gives his results.

Temperature/ºC	Amount of starch remaining/ arbitrary units after 15 minutes
20	30
30	16
40	10
50	25
60	35

(i) Draw a line graph of the results.



[3]

STEMUP.CO.UK

Use the graph and your knowledge to answer the following question.

Examiner Only	
Marks	Remark

(ii) At what temperature was this enzyme least effective?

_____ºC [1]

Explain your answer.

_____

_____ [1]

(d) The body needs a variety of minerals to stay healthy.

(i) Choose two foods from the list below that contain high calcium levels.

Cheese Beef Oily fish Chicken Lamb

_____ and _____ [2]

(ii) Suggest why pregnant women need to eat calcium rich foods.

_____ [1]

(e) The blood transports digested foods to the cells of the body.

(i) Name the mineral needed to make red blood cells.

_____ [1]

(ii) What is the function of red blood cells?

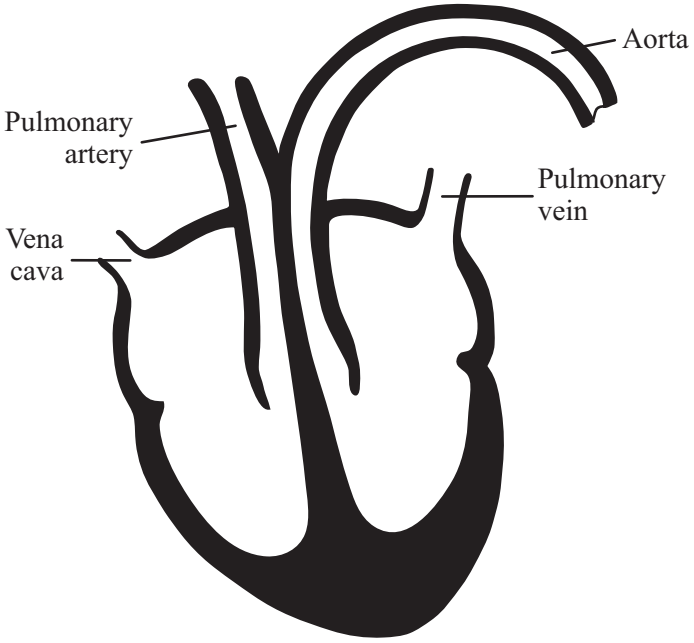
_____ [1]

(iii) The blood travels twice through the heart for one complete circuit of the body. What term describes this type of circulation?

_____ [1]

STEMUP.CO.UK

(f) The diagram shows a cross section of the heart and its blood vessels.



Use the diagram to help answer the following questions.

(i) Name the blood vessel that carries blood from the heart to the lungs.

_____ [1]

(ii) Which **two** blood vessels shown carry oxygenated blood?

_____ and _____ [2]

Examiner Only

Marks	Remark

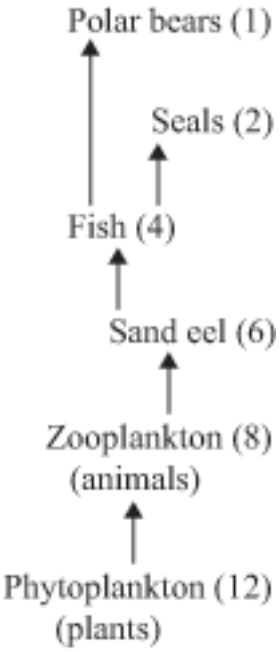
STEMUP.CO.UK

BLANK PAGE

(Questions continue overleaf)

STEMUP.CO.UK

15 (a) The diagram shows a food web for an island in the Arctic.



© CCEA

Examiner Only	
Marks	Remark

STEMUP.CO.UK

Examiner Only	
Marks	Remark

(i) Name the energy source for this food web. _____ [1]

(ii) Use the food web to name

a primary consumer _____

a secondary consumer _____ [2]

(iii) Use the food web to give a food chain with **only** five types of organisms. [3]

_____ → _____ → _____ → _____ _____

(iv) Explain why the phytoplankton (plants) are called producers.

_____

_____ [2]

(v) Suggest why the numbers of zooplankton may decrease during winter.

_____

_____ [2]

(vi) On the grid draw a pyramid of numbers for your food chain in **(iii).**
Use the numbers of organisms shown in the food web.
Beside each level write the name of the organism.

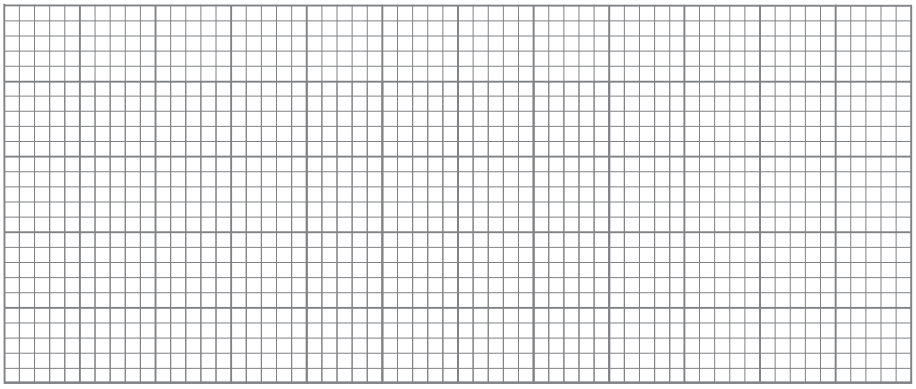
_____

_____

_____

_____

_____



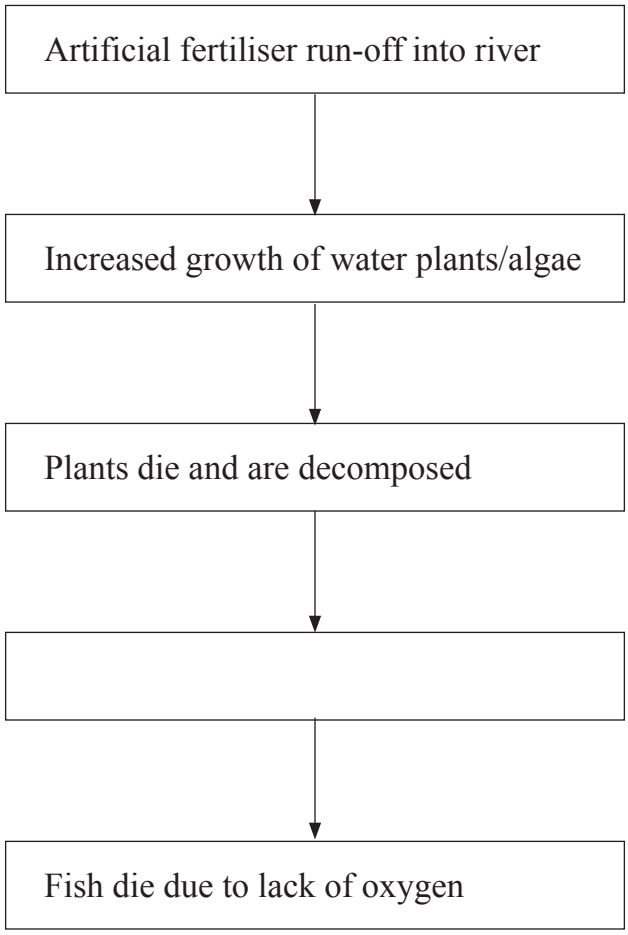
[5]

STEMUP.CO.UK

(vii) Explain why it is an advantage for the polar bear to have more than one food source.

_____ [1]

(b) The flow diagram shows the effects of artificial fertiliser run-off in rivers.



(i) Complete the empty box in this process. [1]

(ii) Name **one** other substance that could cause the same effect if it entered a river.

_____ [1]

(iii) Explain how hot water from cooling processes can lead to the death of fish if added to a river.

_____

_____ [1]

Examiner Only

Marks	Remark

STEMUP.CO.UK

Examiner Only	
Marks	Remark

16 (a) (i) In the space below draw a labelled diagram of a sperm cell.

[3]

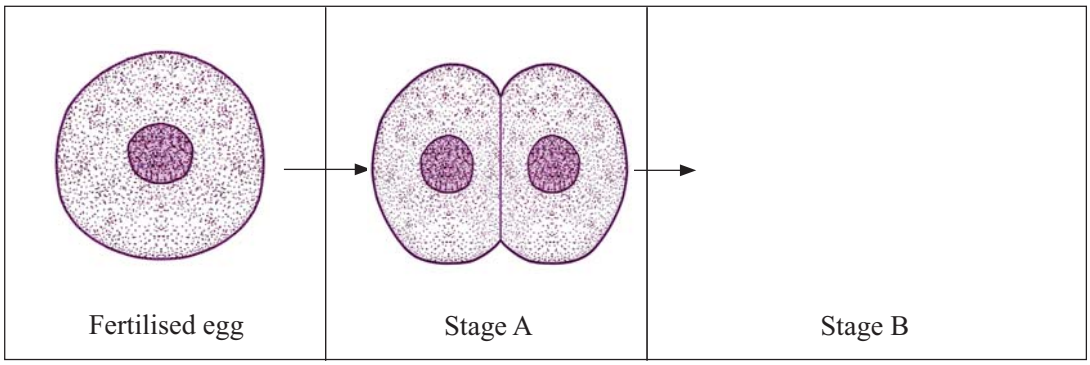
(ii) Give **one** way this cell is adapted for its function.

_____ [1]

(iii) Name the part of the male reproductive system that produces sperm.

_____ [1]

(b) The diagrams show some stages in the development of an egg after fertilisation.



© CCEA

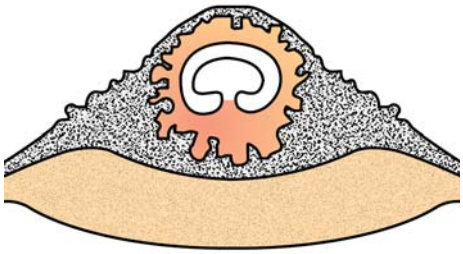
(i) Describe what has happened to the fertilised egg to produce the result at stage A.

_____ [1]

(ii) Complete the diagram at stage B to show what happens next. [2]

STEMUP.CO.UK

A later stage of development is shown in the diagram below.



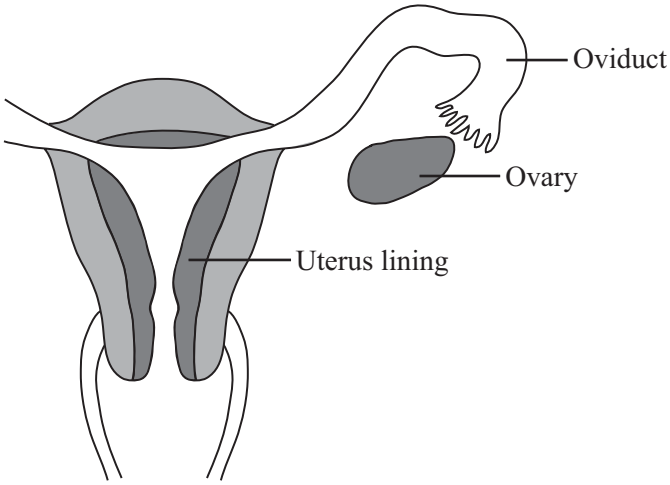
© CCEA

(iii) Describe what has happened to reach this stage.

_____

_____ [1]

(c) The diagram shows part of the female reproductive system.



© Focus Educational Software Ltd

(i) On the diagram mark with an **X** where the process of fertilisation occurs. [1]

(ii) Mark on the diagram with an **I** where implantation will occur. [1]

Examiner Only

Marks	Remark

STEMUP.CO.UK

(iii) Following implantation the placenta develops.

Give two functions of the placenta.

1. _____

2. _____ [2]

Describe one way in which the placenta is adapted for its role.

_____ [1]

(iv) Name the structure that protects the developing baby.

_____ [1]

(v) Name the disease that teenagers are vaccinated against to help protect the developing baby.

_____ [1]

(d) Other diseases such as gonorrhoea are sexually transmitted.

(i) Name the type of organism that causes gonorrhoea. _____ [1]

(ii) The incubation period between getting the disease and showing symptoms can be up to 14 days. How might this lead to the spread of the disease?

_____ [1]

(iii) What is the treatment for this disease? _____ [1]

(iv) Name one other sexually transmitted disease.

_____ [1]

Examiner Only

Marks	Remark

STEMUP.CO.UK

THIS IS THE END OF THE QUESTION PAPER

Permission to reproduce all copyright material has been applied for.
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA will be happy to rectify any omissions of acknowledgement in future if notified.

GCSE

Science: Double Award (Non-Modular)

Summer2010

Mark Schemes

Issued: October 2010

Rewarding Learning

General Certificate of Secondary Education
2010

Science: Double Award (Non-Modular)

Paper 1
Foundation Tier

[G8401]

FRIDAY 21 MAY, MORNING

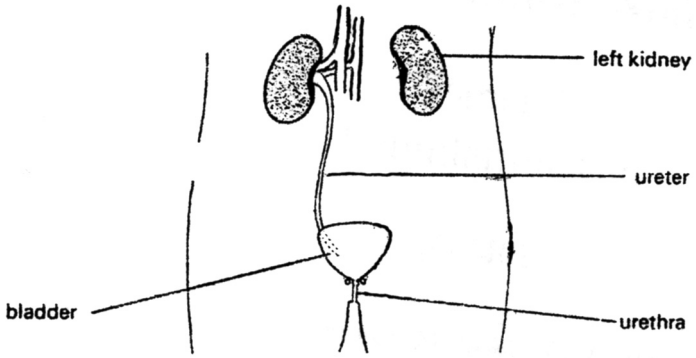
MARK SCHEME

STEMUP.CO.UK

				AVAILABLE MARKS
1	**(a)**	Diaphragm raised/diaphragm relaxed/dome shaped (**not** moves up and out/ up and in) ribs move down and in/ribs move down/in; reference to intercostal muscles (**not** muscles) volume decreases/chest/thorax smaller (**not** lungs decrease) pressure increases; [4] QWC Any 4 [2]		
	(b)	Large surface area/**<u>many</u>** alveoli/moist/short diffusion distance/ permeable/good blood supply/thin walls/thin cell membranes (**not** thin cell walls) [1]		7
2	**(a)**	More cigarettes smoked → more lung cancer [1]		
	(b)	Still get lung cancer – even if don't smoke [1]		
	(c)	mouth/throat cancer/bronchitis/emphysema/CHD/COPD (**not** gum disease/lung disease/fingers stained) [1]		3
3	**(a)**	White/any type of white blood cell [1]		
	(b)	Bacterium drawn with non-matching antigens/any shape that doesn't have triangles [1]		
	(c)	Bacterium engulfed surround; and/digested/broken down; [2]		4
4	**(a)**	**(i)** Retina; (**not** back of eye) [1]		
		(ii) iris; (**not** pupil) [1]		
	(b)	Eyebrows/eyelashes/tears/conjunctiva; (**not** eyelids) [1]		3
5	**(a)**	Temperature; time in solution; volume of **solution**; size of potato; type of potato; (not same volume of water/'amount') [2]		
	(b)	They would have got lighter/shorter/floppier/shrink/thinner [1]		
	(c)	Beaker 3 [1]		4

STEMUP.CO.UK

		AVAILABLE MARKS
6	**(a)** Biceps – relax Triceps – contract/shorten/tighten [2]	
	(b) Work together in opposite ways/one contracts the other relaxes [1]	3
7	**(a)** Phototropism/tropism [1]	
	(b) More light/more photosynthesis/growth in direction of sunlight [1]	2
8	**(a)** **(i)** Ureter	
	(ii) Bladder All correctly labelled [2]	



	(b) Correct position, size and shape of the left kidney [1]	3
9	**(a)**	

Type of Drug	**Effect on the body**
Depressant	Drowsiness
Hallucinogen	Makes you more alert
Stimulant	Can cause flash backs or bad trips

[3]

	(b) increased medical costs/work-related problems/vandalism/time off work etc/violence/increase in crime [1]	4

STEMUP.CO.UK

		AVAILABLE MARKS
10 **(a)** Nucleus	[1]	
(b) Genes/alleles	[1]	
(c) DNA	[1]	3
11 **(a)** Punnett; Correct cross; both parents Rr;	[3]	
(b) wrinkled and smooth 3 : 1 must have correct phenotype to get this mark	[1] [1]	5
12 Mother XX; Gametes (X) (Y) ; XX and XY corresponding	[3]	3
13 **(a)** 18 to 6 3 times	[2]	
(b) Cells from baby/chromosomes/DNA	[1]	3
14 **(a)** **(i)** Chlorophyll/chloroplast;	[1]	
(ii) Water; CO_2 (either order); → oxygen (accept symbols)	[3]	
(b) **(i)** Place in dark cupboard for **1 day or more**	[1]	
(ii) Step 2 – remove chlorophyll/green colour/decolourise (**not** kill chlorophyll) Step 3 – remove alcohol/soften leaf (**not** kill leaf)	[2]	
(iii) Alcohol is flammable/inflammable (**not** dangerous/explosive/using Bunsen burners)	[1]	
(iv) Leaf 1 – yellow/brown/yellow-orange; (**not** red/no colour change) Leaf 2 – blue-black/black (**not** blue on its own) (**not** brown-black)	[2]	

	R	r
R	RR	Rr
r	Rr	rr

STEMUP.CO.UK

				AVAILABLE MARKS
(c)	**(i)**	2 marks for all correct points; (–1 per error) 1 mark – straight lines joining points (allow curve if it join all the points)	[3]	
	(ii)	60/60 **or over**	[1]	
	(iii)	enzyme denatured/described/still a lot of starch left/enzyme doesn't work	[1]	
(d)	**(i)**	Cheese; oily fish;	[2]	
	(ii)	Bones/teeth + – bones and blood growth	[1]	
(e)	**(i)**	Iron/Fe (**not** haemoglobin)	[1]	
	(ii)	Carry Oxygen	[1]	
	(iii)	Double	[1]	
(f)	**(i)**	Pulmonary artery	[1]	
	(ii)	Aorta; pulmonary vein	[2]	24
15	**(a)**	**(i)** Sun/sunlight/light/light energy;	[1]	
		(ii) Zooplankton; sand eel;	[1] [1]	
		(iii) Phytoplankton → zooplankton → sand eels → fish → polar bears [1] mark phytoplankton at start & polar bears at end [1] mark arrow [1] mark organisms in between in correct order (zooplankton – sand eels – fish)	[3]	
		(iv) Produce sugars/food/photosynthesise/starch; (**not** produce energy) Using sunlight;	[2]	
		(v) Less phytoplankton; due to less light/temp (**not** harsh conditions/**not** more sand eels eat them)	[2]	

STEMUP.CO.UK

AVAILABLE MARKS

(vi) Pyramid
Numbers 1 – polar bear
4 – fish
6 – sand eels
8 – zooplankton
12 – phytoplankton

[1] symmetrical and pyramid shape
[1] mark numbers correct
[1] mark phytoplankton at base
[1] mark polar bear top/or seals if CM from (iii)
[1] mark all other labels correct [5]

(vii) If problem with one food source, still have another/if one dies out more to eat; [1]

(b) **(i)** Decomposers use up oxygen/microbes use up oxygen [1]

(ii) Slurry/sewage/silage/detergent/manure/farm waste/urine [1]

(iii) Less O_2 in hot water [1] 19

16 **(a)** **(i)** Sperm – head with nucleus;
tail;
2 for diagram
1 mark for 2 labels (correct)
(Must have nucleus for 3 marks) [3]

(ii) 23 chromosomes/tail/swimming/streamlined/pointed head [1]

(iii) Testes (**not** scrotum) [1]

(b) **(i)** Divided into two/mitosis/divided/duplicated/replicated [1]

(ii) Divided into four and each with a nucleus;
attached; [2]

(iii) Different tissues/organs formed/implantation/embeds/
development of placenta/umbilical cord/amnion/
named tissue or organ forms/moved to uterus [1]

(c) **(i)** In oviduct [1]

(ii) In lining of uterus & must be above indent [1]

STEMUP.CO.UK

			AVAILABLE MARKS
(iii)	• Diffusion/gas exchange/O_2 from mother/CO_2 from foetus; antibodies from mother; nutrients from mother; urea from foetus; (Any two) [2] • large surface area/or described/good blood supply [1]		
(iv)	Amnion/amniotic fluid	[1]	
(v)	Rubella/German measles (**not** measles/mumps/HIB/MMR)	[1]	
(d) (i)	Bacteria	[1]	
(ii)	Spread to someone else **before know you have it**	[1]	
(iii)	Antibiotics/or named	[1]	
(iv)	Gonorrhoea/AIDS/chlamydia/syphilis/HIV	[1]	20
	Total		**110**

STEMUP.CO.UK