



Rewarding Learning

**General Certificate of Secondary Education
2012**

Science: Double Award (Non-Modular)

Paper 1
Foundation Tier

[G8401]

WEDNESDAY 30 MAY, AFTERNOON

**MARK
SCHEME**

/ 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; <i>not chloroplast/not chlorophyll</i>	[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; <i>if in wrong order then [1] maximum</i>	[2]	
	(b) Any two from: <ul style="list-style-type: none"> • dead/weakened dose of microbe/disease • antigen or microbe or disease recognised by WBC • presence of antigen • lymphocyte produces antibodies 	[2]	4

		AVAILABLE MARKS
7	(i) coronary (artery);	[1]
	(ii) no oxygen/sugar (<i>not just blood</i>); no respiration/no energy;	[2]
8	(a) arrow lungs to LA ; LV to aorta past split towards head and arms;	[2]
	(b) X on LV; <i>X must be inside the heart and below the level of the valve</i>	[1]
	(c) A renal artery ; B vena cava;	[2]
9	(a) liver;	[1]
	(b) insulin;	[1]
	(c) hepatic portal vein = X; <i>not hpv, not hepatic on its own</i>	[1]
	(d) diabetes;	[1]
10	(a) it gets bigger/dilates/widens/gets bigger;	[1]
	(b) optic nerve;	[1]
	(c) nervous system;	[1]
11	(a) (i) arrow from beaker to potato;	[1]
	(ii) osmosis;	[1]
	(b) Any two from: heavier; longer; firmer;	[2]
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]

		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]
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; <i>not easier</i> 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]
		3
		15

- 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;
consequential marking from their food chain [3]
- (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
not lack of food [1]
- (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;
not square [1]
- (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]

AVAILABLE
MARKS

		AVAILABLE MARKS
	<p>(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)</p>	31
16	<p>(a) (i) GG; Gg;</p> <p>(ii) Gg and Gg parents; Punnett; 1 cross correct; 1 circle around gg;</p> <p>(b) (i) male – because have (X chromosome and) Y chromosome/because they have a Y;</p> <p>(ii) Down’s syndrome; extra chromosome/three chromosome 21s/47 chromosomes;</p> <p>(iii) cystic fibrosis/colour blind/dwarfism/albino/haemophilia/muscular dystrophy/Huntington’s/PKU; <i>accept Down’s syndrome if not in answer for (ii)</i></p> <p>(c) (i) Any two from: • The cancer cell has larger nucleus • thicker membrane/bigger membrane/darker membrane • less cytoplasm <i>accept reverse</i></p> <p>(ii) UV light; <i>not light on own</i></p> <p>(iii) Any two from: • spread • bigger • darker in colour/change in colour • irregular border/ragged edges/changed shape/different shape <i>not weeping/bleeding, not size/colour on own</i></p>	<p>[2]</p> <p>[4]</p> <p>[1]</p> <p>[2]</p> <p>[1]</p> <p>[2]</p> <p>[1]</p> <p>[2]</p> <p>[2]</p>
	Total	110