



*Rewarding Learning*

**General Certificate of Secondary Education  
2013**

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**Double Award Science: Biology**

Unit B2

Foundation Tier

[GSD41]

**WEDNESDAY 5 JUNE, AFTERNOON**

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**MARK  
SCHEME**

## **General Marking Instructions**

### **Introduction**

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

### **The Purpose of Mark Schemes**

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

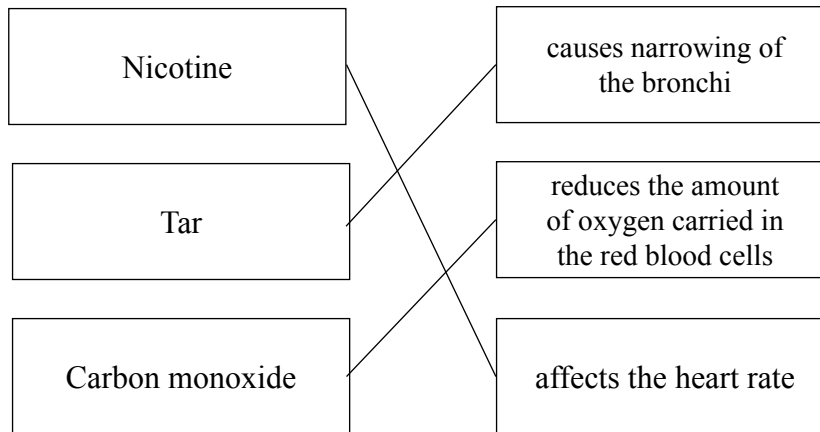
The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

1 (a)

**Substances in cigarette smoke**

**Effect on the body**



1 correct = [1]

All three correct = [2]

[2]

(b) (i) Less adults smoking/decreased/the % of adults smoking decreased;  
The number of cases of lung cancer decreased;  
More smokers = more cases of lung cancer; [2]

Both lines decrease = [1]

(ii) Smoking ban in public places/labelling on cigarette packets/ban on advertising/TV/sport venues/age limit to buy cigarettes/proving age to buy cigarettes/cigarettes not on display; [1]

(iii) Tar; [1]

(c) An individual's health – damage to liver/**liver** cancer/cirrhosis/depression;

Society – cost to NHS/family conflict/violence/unwanted pregnancies/money spent to educate/treat people/working days lost/anti-social behaviour/vandalism/extra policing; [2]

(d) (i) She drinks **more** than the recommended **daily allowance**/she drinks **8.8 units**; at **one time** (on one night); [2]

(ii) Any **two** from

- Increase price of alcohol/no special offers/no happy hours;
- More police presence to monitor/check IDs
- Education/show effects of drink/adverts
- Bar staff refuse to serve people when they have had too much to drink/stop serving alcohol earlier/close earlier
- Get young people involved in something else/drop-in centres [2]

AVAILABLE MARKS

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- 2 (a) Any **two** from  
 Section of/a short length;  
 of a chromosome/DNA;  
 codes for a protein;  
 inherited/from your parents like eye colour; [2]
- (b) Length of nails; [1]
- (c) Height; [1]
- (d) Continuous; [1]

5

3

Feature	Type of cell division	
	Mitosis	Meiosis
Exact copy made of cells	✓	✗
Used to replace damaged cells	✓	✗
Produces 4 haploid cells	✗	✓

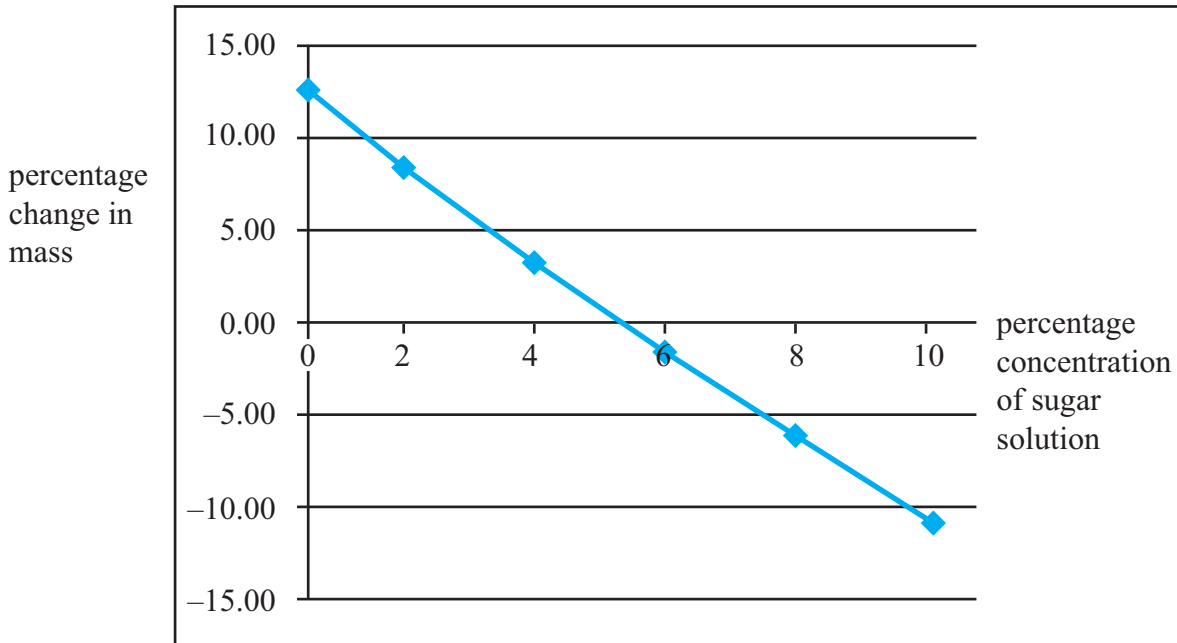
([1] for each correct row, do not penalise if no ✗) [3]

3

- 4 (a) (Correct gametes for parents)
- H and h;
  - h and h;
  - Punnett square constructed (  $\begin{array}{|c|c|} \hline & h & H & \\ \hline H & & & \\ h & & & \\ \hline \end{array}$  );
  - Correct cross for offspring from this cross (2Hh, 2hh); Apply CM [4]
- (b) Phenotypes = long hair and short hair;  
 Ratio 1:1 or 2:2 or 50%:50%; Apply CM  
 If cross correct but phenotypes not specified, allow ratio from their Punnett  
 If cross wrong **must** specify phenotypes in order to get ratio marks [2]

6

- 5 (a) (i) Change in mass =  $-0.7$ ;  
 Percentage change in mass =  $(-0.7/6.7) \times 100 = -10.44\%$ ; [3]
- (ii) Initial/starting masses were different/easier to compare; [1]
- (b) (i) Plotted correctly (5 or 6 points = [2]; 3 or 4 = [1]);  
 Line drawn; [3]



- (ii) Concentration of sugar solution from graph = 5.4% – **from their graph**;

Explanation: no change in mass/concentration of sugar solution inside the carrot = same as concentration of sugar solution outside/  
 no movement of water/no osmosis; [2]

6 (a) To prevent evaporation of water from the flask/beaker/from surface of water

(b) **Indicative content**

- Record the mass of the apparatus containing the plant initially/at start
- Leave for a given time
- Record mass at end/change in mass/take final mass from original
- Divide change in mass by time (to work out rate)
- A named variable constant – temperature/humidity/wind speed/same type/species of plant
- Repeat with reduced surface area/remove leaves/less leaves/smaller/larger leaves
- Keep **another** variable constant – temperature/humidity/wind speed/same type/species of plant
- Repeat for reliability, repeat to get average

Response	Mark
Candidates must use appropriate specialist terms throughout to describe how they would use this apparatus and explain in logical sequence, how to compare the rate of water uptake for a plant with a large surface area and then a reduced surface area (using <b>five or more</b> of the above points). They use good spelling, punctuation and grammar and form and style are of a high standard.	[5]–[6]
Candidates use some appropriate specialist terms to describe how they would use this apparatus and explain in logical sequence, how to compare the rate of water uptake for a plant with a large surface area and then a reduced surface area (using <b>three or four</b> of the above points). They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
Candidates give some explanation of how they could use this apparatus, using at least one of the above points. However they are not presented in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1]–[2]
Response not worthy of credit.	[0]

[6]

(c) Greater water uptake/loss in mass for plant with **larger** surface area of leaves; or converse  
**More** evaporation/**more** transpiration of water/**more** stomata/**more** pores (with more leaves); or converse

[2]

(d) Line on graph = greater gradient;  
 still starts at zero;

[2]

(e) Any **two** from

- support/turgor/stop wilting
- transport/movement of minerals
- transpiration
- photosynthesis

[2]

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7 (a) (i)

Secondary sexual characteristics	Males	Females	Both
Growth of breasts		✓	
Growth of pubic hair			✓
Voice deepens	✓		
Hips widen		✓	

[4]

(ii) Testes – testosterone;  
Ovaries – oestrogen; [2]

(iii) Haploid/23 chromosomes;  
restores diploid number in zygote/to give 46 chromosomes;  
**or**  
tail;  
swim (to egg); [2]

(b) oviduct;  
mitosis;  
uterus;  
foetus;  
amniotic fluid;  
placenta; [6]

(c) **Indicative content**

Any **three** correct methods named:

- Rhythm method/abstinence
- Femidom/female condom
- (Hormone) implant/**hormone** injection
- Coil
- (Contraceptive) pill
- **Morning after** pill
- Condom
- Diaphragm/cap
- Vasectomy/sterilisation
- Female sterilisation

AVAILABLE  
MARKS

**Explanations:**

(Condom)

– prevents **sperm meeting egg/getting into oviduct**

**Not** stops sperm getting into body

(Pill)/(hormone implant)

– prevents ovulation;

(Vasectomy)

– sperm ducts cut/tied; egg and sperm can't meet/no sperm in ejaculate

**Not** no sperm produced

(Female sterilisation)

– oviducts/Fallopian tubes cut/tied;

– egg and sperm can't meet

**Not** no eggs produced

(Diaphragm/femidom)

– placed in vagina;

– egg and sperm can't meet;

(Cap)

– placed over cervix;

– egg and sperm can't meet;

(Coil)

– placed inside uterus; prevents implantation;

(Rhythm/abstinence)

– sperm and egg can't meet/no fertilisation;

Response	Mark
Candidates must use appropriate specialist terms throughout to name <b>at least two</b> methods of contraception and describe how each prevents pregnancy. They use good spelling, punctuation and grammar and form and style are of a high standard.	[5]–[6]
Candidates use some appropriate specialist terms to name <b>one or two</b> methods of contraception and describe how each prevents pregnancy (account must include at least one description of how pregnancy is prevented). They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
Candidates name <b>one or two</b> methods of contraception or give one method and describe how it prevents pregnancy. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1]–[2]
Response not worthy of credit	[0]

[6]

20



			AVAILABLE MARKS	
8	(a) (i)	Blood passes through the heart twice; to go round the body once;	[2]	10
	(ii)	X – pulmonary artery; Y – hepatic vein;	[2]	
	(b) (i)	Cholesterol/fat/atheroma;	[1]	
	(ii)	Lack of oxygen/glucose; Less respiration/less energy; Heart (muscle) cells die/heart <b>muscle</b> dies/a section of heart dies; Any <b>two</b>	[2]	
	(iii)	10 times the risk;	[1]	
	(iv)	Reduced the risk from 4 to 2 times/half the chance/50% less;	[1]	
	(c)	Brain;	[1]	
9	(a)	Use a condom/abstinence/fewer partners/don't share needles/don't use dirty needles/use sterilised needles; Athlete's foot; Bacteria; Airborne droplet infection/in the air/breathing in/airborne/sneezing/coughing;	[4]	
	(b)	Blood clotting = prevents microorganisms from entering a cut; (Ignore blood loss) Mucous membrane = <b>traps</b> microbes/microbes stick to/in mucus/mucus catches microbes; Phagocytosis = engulfs/surrounds; and digests/breaks down microorganisms;	[4]	
	(c)	<ul style="list-style-type: none"> <li>• Antibodies attach to <b>antigen</b>;</li> <li>• because antibodies are specific/fit/match/complementary to A;</li> <li>• Cause the bacteria (A) to clump together;</li> <li>• Prevents microorganisms dividing/reproducing/easier for phagocytosis/moving around the body/immobilises;</li> <li>• Antibodies not a match/fit/specific to/complementary for antigens on B;</li> </ul> Any <b>four</b>	[4]	
<b>Total</b>				<b>12</b>
				<b>90</b>