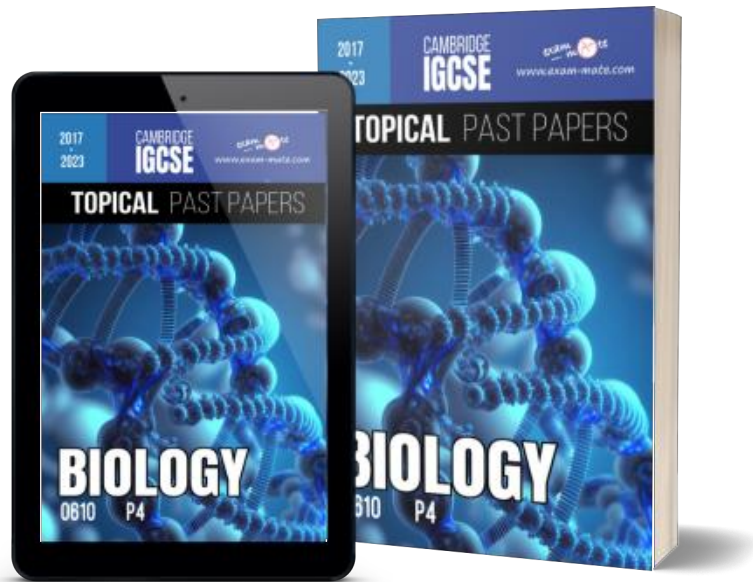


# BIOLOGY

0610 | Paper 6

2017 — 2023

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## BIOLOGY 0610

### TOPICAL PAST PAPER WORKSHEETS

2017 - 2023 | Questions + Mark scheme

#### AVAILABLE PAPERS

<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>P4</b>	<b>P6</b>
1383 Questions	1374 Questions	472 Questions	430 Questions	163 Questions

[www.exam-mate.com](http://www.exam-mate.com)

TOPICS	P1	P2	P3	P4	P6
Characteristics & Classification of living organisms	95	68	34	30	9
Organization & Maintenance of the Organism	66	63	15	12	25
Movement in and out of Cells	63	56	10	9	12
Biological Molecules	31	43	9	11	41
Enzymes	40	51	10	13	16
Plant Nutrition	65	62	33	19	13
Human Nutrition	106	83	35	34	3
Transport in Plants	67	77	22	20	11
Transport in Animals	61	55	19	24	3
Diseases & Immunity	34	35	13	17	0
Gas Exchange in Humans	41	35	13	10	4
Respiration	57	62	20	14	8
Excretion in Humans	39	37	12	7	1
Co-Ordination & Response	104	113	31	31	3
Drugs	43	32	15	7	0
Reproduction	127	114	51	32	6
Inheritance	86	119	26	26	0
Variation & Selection	54	46	19	20	0
Organisms & Their Environment	104	88	35	39	5
Biotechnology & Genetic Engineering	43	75	17	26	3
Human Influences on Ecosystem	57	60	33	29	0

1 - (0610/61\_Summer\_2018\_Q2) - *Organisms And Their Environment, Characteristics And Classification Of Living Organisms*

A student wanted to investigate a garden ecosystem.

She counted the number of insects caught in spider webs in one small section of the garden.

She found six spider webs in the small section of garden sampled.

Diagrams of the spider webs are shown in Fig. 2.1. Each black dot represents one insect caught in a spider web.

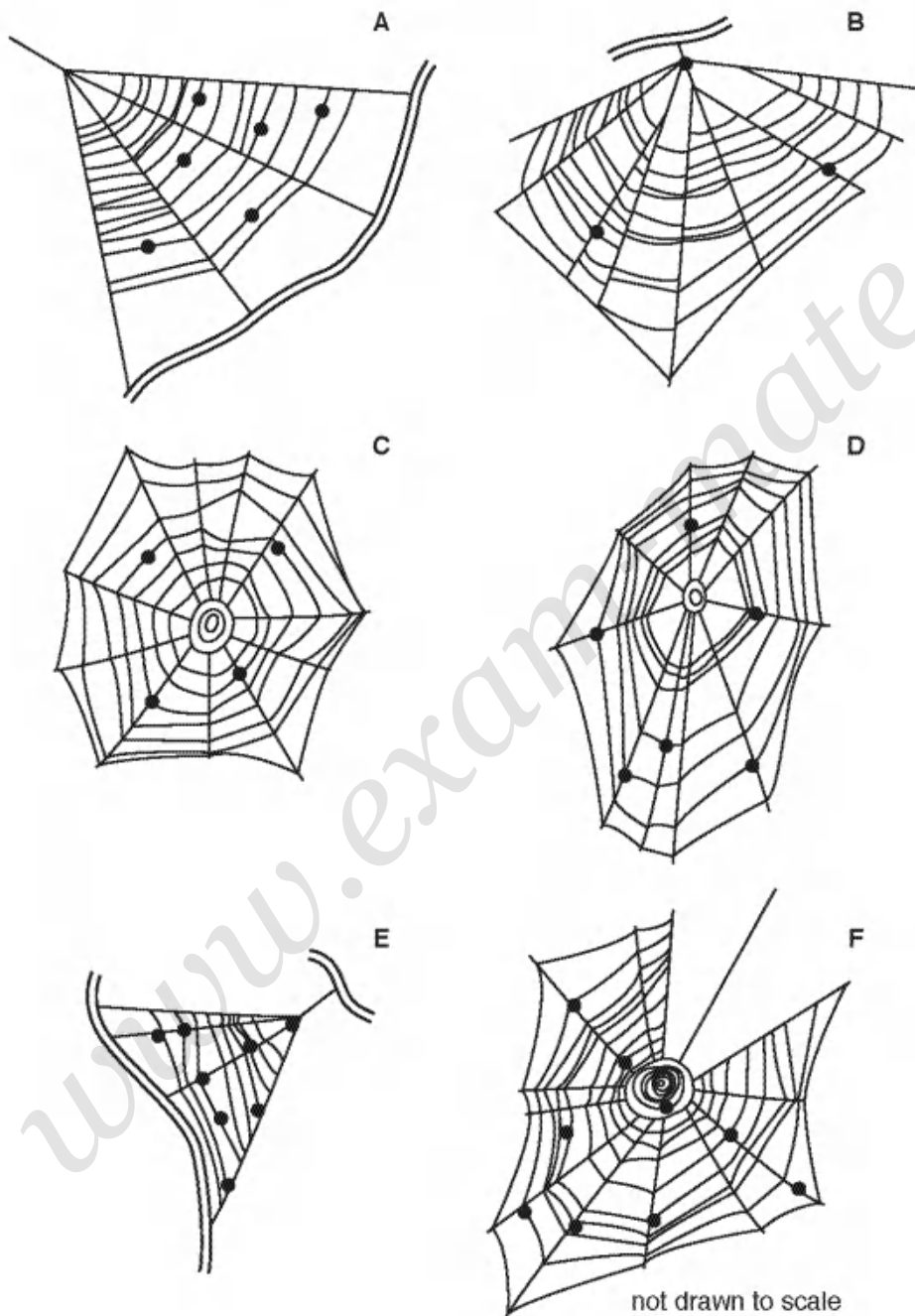


Fig. 2.1

(a) (i) Use Fig. 2.1 to complete Table 2.1.

Table 2.1

spider web	number of insects caught in each web
A	
B	
C	
D	
E	
F	
total	

[2]

(ii) Calculate the average number of insects per web in the small section of garden, using the information in Fig. 2.1 and Table 2.1.

Space for working.

..... [1]

(iii) The student counted the total number of spider webs in the whole garden and found that there were a total of 102 spider webs.

Use this information and your answer to part 2(a)(ii) to estimate the total number of insects caught in webs in the whole garden.

Space for working.

..... [1]

(iv) Suggest **one** reason why the estimated total number of insects caught in webs in the whole garden may not be accurate.

.....  
 .....  
 ..... [1]

(b) Fig. 2.2 is a photograph of a spider.

A spider's body has two main parts. The legs are all attached to the cephalothorax which is the upper part of the body and starts at label X on Fig. 2.2. The lower part of the body is called the abdomen and is nearest to label Y on Fig. 2.2.

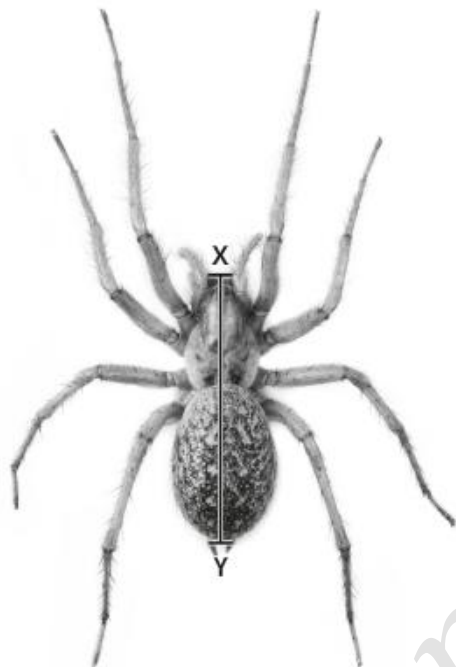


Fig. 2.2

- (i) Make a large drawing of the spider in Fig. 2.2 to show its outline, including its legs.  
Label the abdomen.

[5]

- (ii) Measure the length of the spider between points X and Y on Fig. 2.2. Include the units.

Length of line XY on the spider in Fig. 2.2 .....

Draw a line in the same position on your drawing and measure the length on your drawing.

Length of line XY on the spider in your drawing .....

Calculate the magnification of your drawing using your measurements and the following equation:

$$\text{magnification} = \frac{\text{length of line XY on your drawing}}{\text{length of line XY on Fig. 2.2}}$$

Space for working.

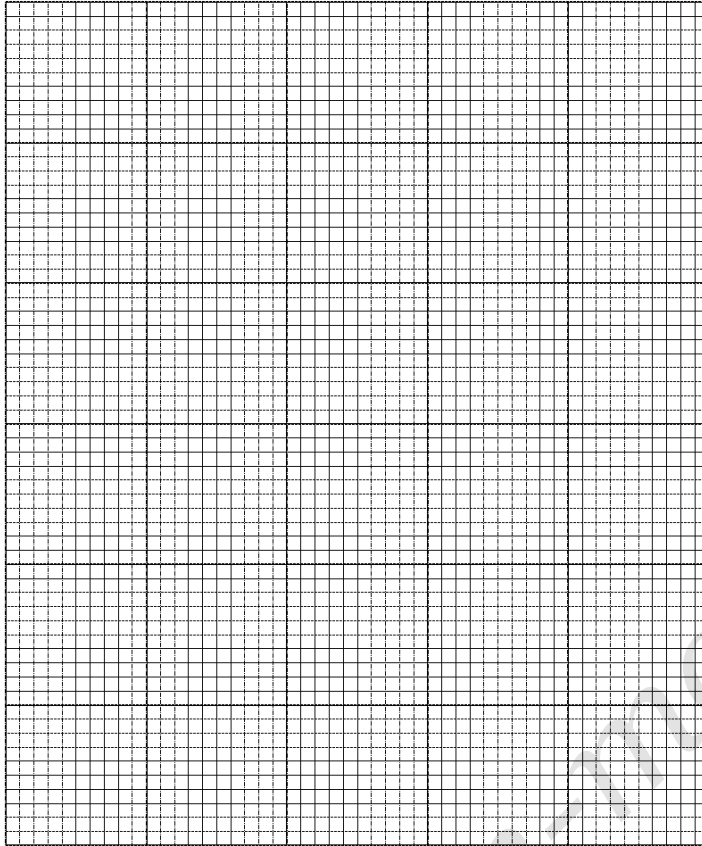
.....  
[3]

(c) Table 2.2 contains some other data collected by the student from the garden ecosystem.

**Table 2.2**

type of organism	number found in the garden ecosystem
trees	2
bushes	5
other plants	37
herbivores	118
carnivores	14

(i) Plot a bar chart of the data in Table 2.2.



[3]

(ii) Herbivores and carnivores are animals.

Use the data in Table 2.2 to calculate the ratio of animals to plants.

Show your working and give your answer in its simplest form.

.....

[2]



2 - (0610/62\_Summer\_2018\_Q2) - Characteristics And Classification Of Living Organisms, Plant Nutrition

Fig. 2.1 shows *Asterionella*, which are microscopic algae that live in fresh water.

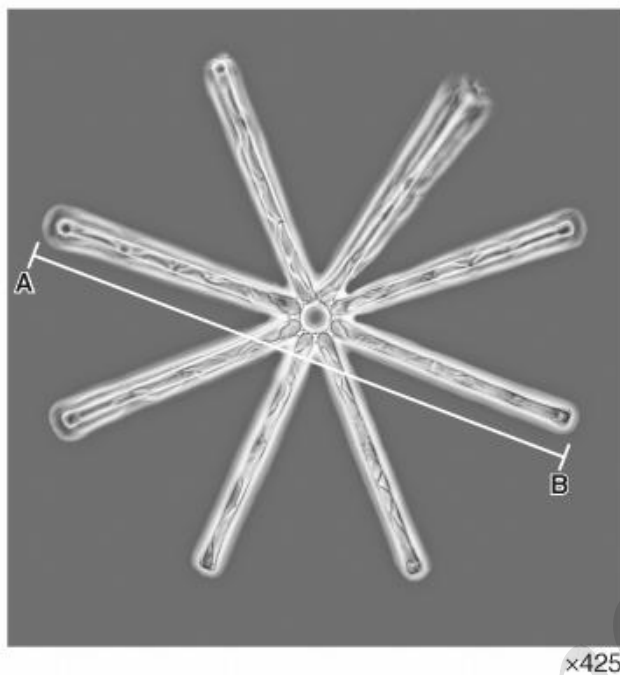


Fig. 2.1

(a) (i) Make a large outline drawing of the algae. Do not label your drawing.

[4]

(ii) Measure the length of the line **AB** in Fig. 2.1. Include the unit.

length of **AB** .....

Use the formula to calculate the actual diameter of the algae shown in Fig. 2.1. Include the units.

$$\text{magnification} = \frac{\text{length of line AB}}{\text{actual diameter of algae}}$$

Show your working.

..... [3]



3 - (0610/63\_Summer\_2018\_Q2) - *Characteristics And Classification Of Living Organisms, Organisms And Their Environment, Biological Molecules*

Fig. 2.1 shows an image of a monarch butterfly, *Danaus plexippus*.

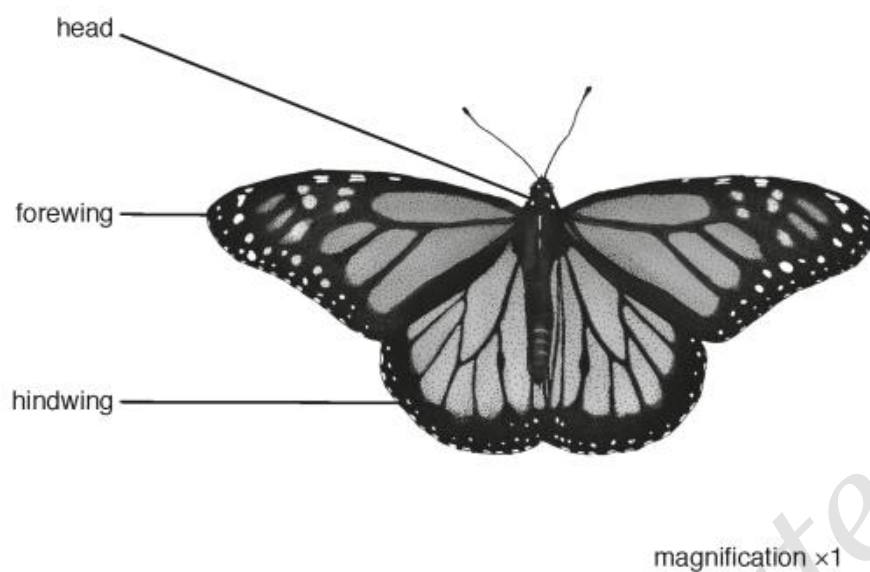


Fig. 2.1

(a) Make a large drawing of **one** of the hindwings of the monarch butterfly shown in Fig. 2.1.

[4]

(b) Fig 2.2 shows an image of a viceroy butterfly, *Limenitis archippus*.



Fig. 2.2

Describe **one** visible similarity and **two** visible differences between the viceroy and the monarch butterflies' wings.

similarity .....

.....

difference 1 .....

.....

difference 2 .....

.....

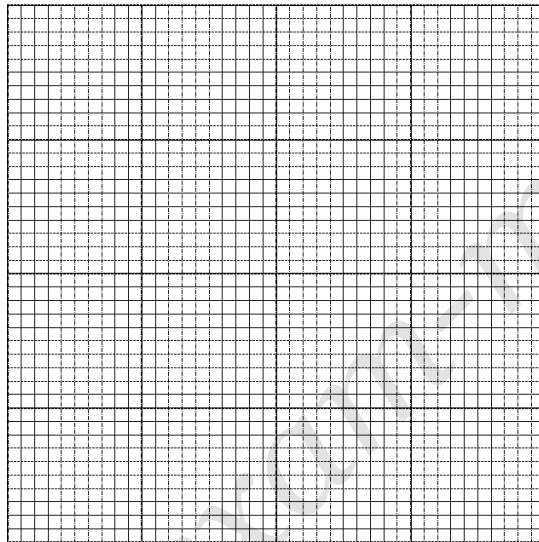
[3]

(c) A student investigated the relationship between the body mass of monarch butterflies and the length of their forewings. The student recorded the data for five butterflies in Table 2.1.

Table 2.1

butterfly	body mass /g	forewing length /mm
A	0.2	38
B	0.3	42
C	0.5	50
D	0.7	58
E	0.8	62

(i) Plot a graph on the grid to show the relationship between body mass and forewing length.



[4]

(ii) Describe the relationship shown on the graph.

.....

.....

.....

..... [1]



# ANSWERS

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1 - (0610/61\_Summer\_2018\_Q2) - *Organisms And Their Environment, Characteristics And Classification Of Living Organisms*

(a)(i)	<b>A</b> 6, <b>B</b> 3, <b>C</b> 4, <b>D</b> 6, <b>E</b> 8, <b>F</b> 9 ; (total) 36 ;	2	
(a)(ii)	6 ;	1	
(a)(iii)	612 ;	1	
(a)(iv)	variation in insect populations in different parts of garden / unrepresentative sample / some webs difficult to see / AW ;  some insects eaten by spiders / or fallen off web ;  some insects, too small to be visible / difficult to count ;  some caught organisms may not be insects ;  AVP ;	1	
(b)(i)	<b>O</b> (outer line) single, clear, continuous lines with no shading ;  <b>S</b> (size) occupies at least half the space provided (must be at least 75 mm in length) ;  <b>D</b> (detail) two body parts <u>and</u> 2 chelicerae (on the cephalothorax) or 2 spinnerets (on abdomen) ;  8 jointed legs, attached to the body in the correct position and in the correct orientation ;  <b>L</b> (label) <u>line</u> labelled <i>abdomen</i> ending on the abdomen ;	5	
(b)(ii)	length of XY on Fig. 2.2 given as 38.5 mm – 41 mm ;  line XY shown on the candidate's drawing in correct position ;  correct calculation ;	3	max 2 if no units given
(c)(i)	<b>A</b> (axes) labelled with units  <b>S</b> (scale and size) even scale bars to occupy at least half the grid in both directions ;  <b>P</b> (plotting) all five bars plotted accurately $\pm$ half a small square bars same width (at least 1 small squares wide) gaps between bars	3	
(c)(ii)	3 : 1 ; ;	2	

2 - (0610/62\_Summer\_2018\_Q2) - *Characteristics And Classification Of Living Organisms, Plant Nutrition*

(a)(i)	<b>O</b> (outline) single clear line no shading ;  <b>S</b> (ize) use at least half available space ( <b>AB</b> greater than 85 mm) ;  <b>D</b> (etail) eight algae ;  <b>D</b> (etail) circle drawn in the centre ;	4	
(a)(ii)	<b>AB</b> = 85 mm or 8.5 cm ;  0.2 (mm) or 0.02 (cm) ; ;	3	<b>A</b> 84–86 mm  ecf wrong <b>AB</b> but correct actual diameter from their measurements for max 2  max 2 if no units given or wrong units given  <b>A</b> correct answer in micrometres

(b)(i)	<p><i>independent variable:</i></p> <p>1 at different light (intensities) ;</p> <p><i>dependent variable:</i></p> <p>2 record colour of hydrogencarbonate indicator after a time or record the time taken to reach a set colour ;</p> <p><i>controlled variables:</i></p> <p>3 same amount / number / mass / species / type, of algae ;</p> <p>4 same volume / concentration, of hydrogencarbonate indicator ;</p> <p>5 same temperature ;</p> <p>6 same time / same end colour ;</p> <p>7 same initial colour of indicator at the start ;</p> <p><i>methodology: Max 3 from mp8-11</i></p> <p>8 detail of a quantitative method used to achieve different light intensities e.g. moving light source / use of bulbs with different light intensities / determining light intensity with a light meter ;</p> <p>9 method of achieving constant temperature e.g. heat shield / screen / low energy bulb / LED bulb ;</p> <p>10 use of a control tube with no algae ;</p> <p>11 time to equilibrate (to different light intensities) ;</p> <p>12 two or more repeats / replicates ;</p>	6	max 3 from mp3-7
(b)(ii)	Universal Indicator / litmus / AVP	1	

3 - (0610/63\_Summer\_2018\_Q2) - Characteristics And Classification Of Living Organisms, Organisms And Their Environment, Biological Molecules

(a)	<p>O (utline) single clear line no shading ;</p> <p>S (ize) use at least half available space ;</p> <p>D (etail) dots visible ;</p> <p>D (etail) 7 / 8 / 9 sections visible ;</p>	4	
(b)	<p><i>one similarity</i></p> <p>both have dots ;</p> <p>both have bars ;</p> <p>number of wings ;</p> <p>colours ;</p> <p>antennae / head ;</p> <p><i>two differences</i></p> <p>wing, shape / position ;</p> <p>pattern / viceroy, has a dark horizontal band in lower half of hindwing ;</p> <p>shape of dots ;</p> <p>number of dots ;</p> <p>monarch / monarch's wings, larger ; ora</p>	3	1 + 2
(c)(i)	<p>A(xes) – labels with units mass / g and length / mm ;</p> <p>S(cale) – suitable even scale and data occupies more than half the grid in at least one direction ;</p> <p>P(ot) – all points plotted accurately <math>\pm</math> half a small square ;</p> <p>L(ine) – suitable line drawn through points ;</p>	4	R line through zero
(c)(ii)	as body mass increases wing length increases / AW ;	1	
(c)(iii)	correct use of graph ; correct value ;	2	ecf