Species and Taxonomy: AQA A Level Biology Exam Questions by Topic

18 questions · 27 marks · about 35 minutes. Answer in the spaces, then check the mark schemes at the end.

Question 1 · AS Paper 1 · June 2017 · Q09.1 · 2 marks

0 9 . 1 Define each of the following terms.

[2 marks]

Species _____

_____

Species richness _____

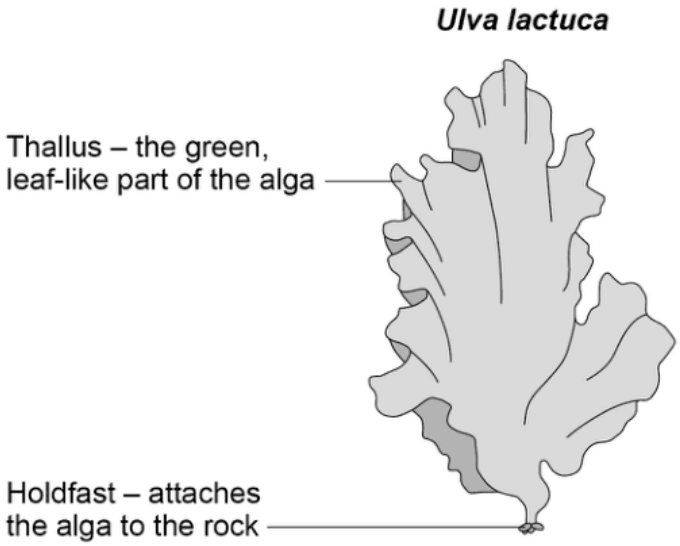
_____

Question 2 · information from earlier in the question

0 7 *Ulva lactuca* is an alga that lives on rocks on the seashore. It is regularly covered by seawater.

Figure 6 shows a diagram of one *Ulva lactuca* alga.

Figure 6

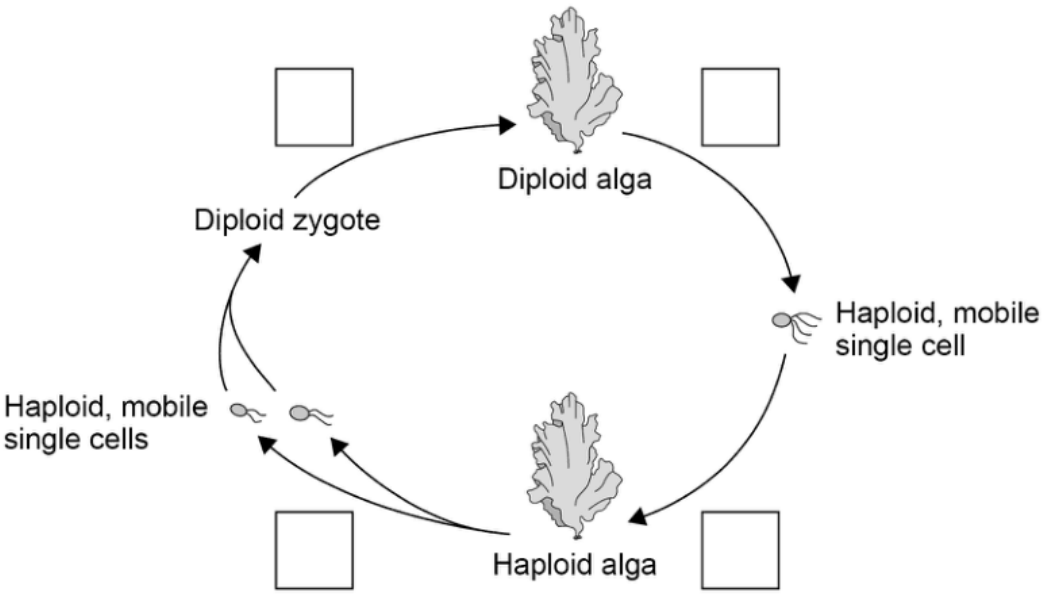


Questions, mark schemes and examiners' report extracts © AQA.

Ulva lactuca has a haploid and a diploid form.

Figure 7 shows the life cycle of *Ulva lactuca*.

Figure 7



Question 2 · A level Paper 1 · June 2019 · Q07.3 · 2 marks

0 7 . 3 *Ulva prolifera* also produces haploid, mobile single cells that can fuse to form a zygote.

Suggest and explain **one** reason why successful reproduction between *Ulva prolifera* and *Ulva lactuca* does **not** happen.

[2 marks]

Questions, mark schemes and examiners' report extracts © AQA.

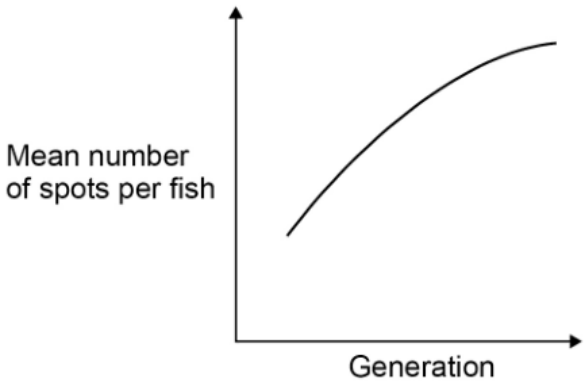
Question 3 · AS Paper 2 · June 2022 · Q08.1 · 1 mark

0 8 Guppies are small fish with brightly coloured spots on their body.
The number of spots on a guppy is controlled by genes.

A scientist investigated guppy breeding in a large population of guppies in a fish tank. The fish tank contained brightly coloured stones. After each generation of breeding, she counted the number of spots on every guppy.

Figure 9 shows her results.

Figure 9



0 8 . 1 The scientist concluded that the mean number of spots on the guppies changed in this fish tank because the brightly coloured stones had affected the behaviour of the guppies.

The guppies did **not** behave aggressively towards each other and their feeding behaviour did **not** change.

Suggest **one** type of guppy behaviour that could be affected by the presence of brightly coloured stones.

[1 mark]

Question 4 · information from earlier in the question

0 2 Dengue is a serious disease that is caused by a virus. The virus is carried from one person to another by a mosquito, *Aedes aegypti*. One method used to try to reduce transmission of this disease is the Sterile Insect Technique (SIT). This involves releasing large numbers of sterile (infertile) male *A. aegypti* into the habitat. These males have been made infertile by using radiation.

Questions, mark schemes and examiners' report extracts © AQA.

Question 4 · A level Paper 2 · June 2017 · Q02.3 · 1 mark

0 2 . 3 The release of radiation-sterilised *A. aegypti* has not been very successful in controlling the transmission of dengue.

Suggest **one** reason why.

[1 mark]

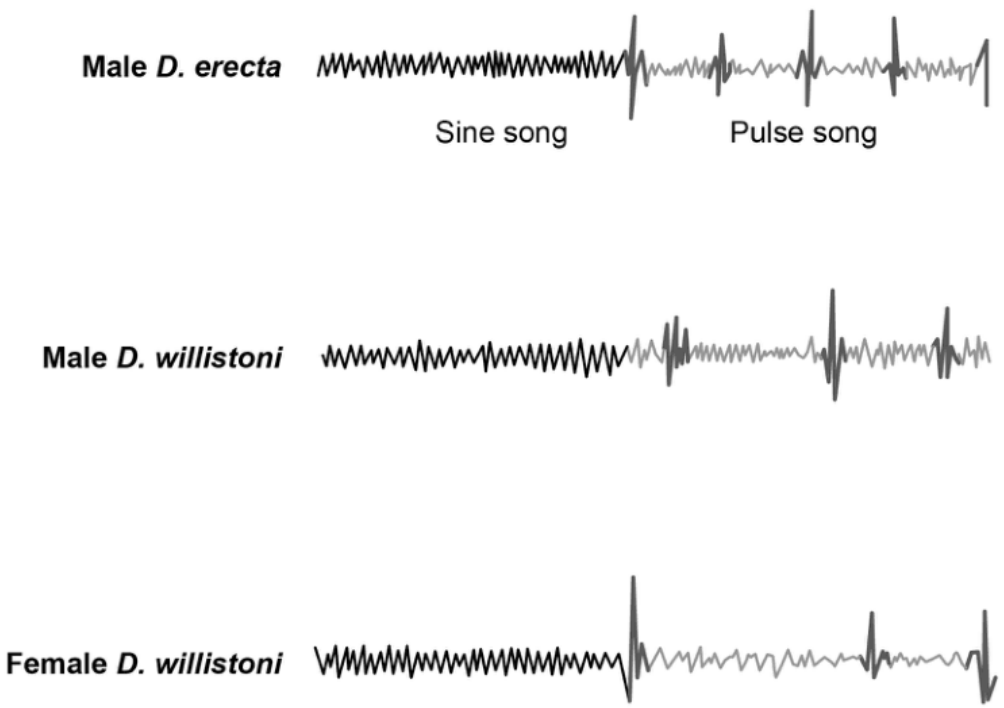
Questions, mark schemes and examiners' report extracts © AQA.

Drosophila fruit flies display courtship behaviour. One of the stages of courtship is singing by males. Normally a male will produce a 'sine song', in which continual noise is made, and a 'pulse song', in which there is continual noise with some louder peaks.

Scientists showed fruit flies a visual stimulus that made them sing. They made recordings of these songs.

Figure 6 shows the recordings of the songs of three flies over the same time period.

Figure 6



0 6 . 3 *D. erecta* and *D. willistoni* are closely related species **but** different species.

Describe evidence from **Figure 6** that supports this statement.

[2 marks]

Questions, mark schemes and examiners' report extracts © AQA.

Question 6 · AS Paper 1 · June 2018 · Q06.4 · 2 marks

0 6 . 4 The scientists repeated their experiments, using female fruit flies as the visual stimulus. When a male and female *D. willistoni* were together, their songs led to mating.

When two female *D.willistoni* were together, their songs did **not** lead to any attempt to mate.

Use information from **Figure 6** to suggest why the two females did not attempt to mate.

[2 marks]

Question 7 · AS Paper 2 · June 2022 · Q05.1 · 2 marks

0 5 . 1 Describe how organisms are grouped in a phylogenetic classification system.

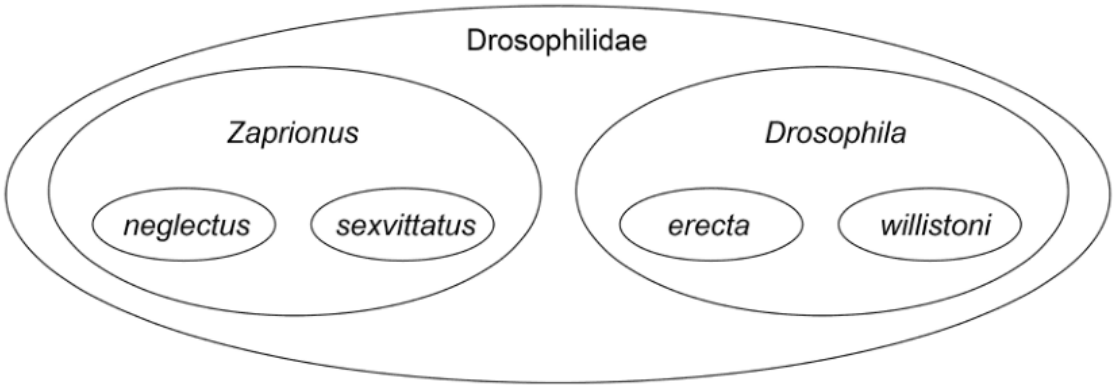
[2 marks]

Questions, mark schemes and examiners' report extracts © AQA.

Question 8 · AS Paper 1 · June 2018 · Q06.1 · 2 marks

0 6 **Figure 5** represents the phylogenetic classification of **four** different species of fruit fly.

Figure 5



0 6 . 1 **Figure 5** shows a hierarchy. Explain how.

[2 marks]

Question 9 · AS Paper 1 · June 2018 · Q06.2 · 1 mark

0 6 . 2 Name the taxon to which Drosophilidae belongs.

[1 mark]

Questions, mark schemes and examiners' report extracts © AQA.

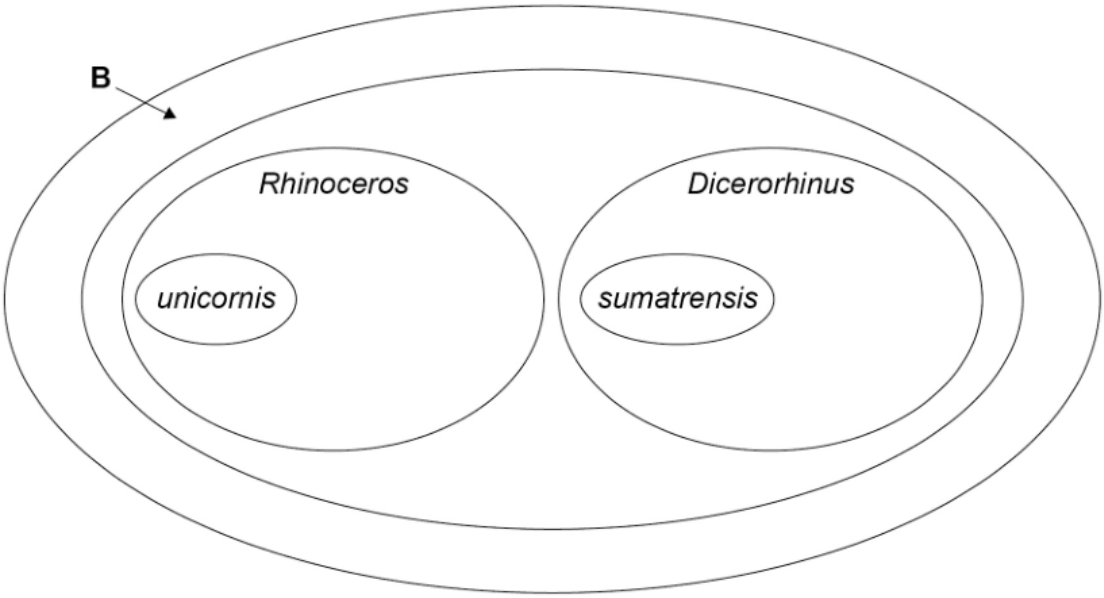
Table 1 shows some of the taxa in the phylogenetic classification of a rhinoceros species.

Table 1

Taxon name	Scientific name
Class	Mammalia
Order	Perissodactyla
Family	Rhinocerotidae
Genus	*Rhinoceros*
Species	*unicornis*

Figure 4 shows the relationship between the taxa in the classification of two rhinoceros species: *Rhinoceros unicornis* and *Dicerorhinus sumatrensis*.

Figure 4



0 5 . 2 Use information in **Table 1** to give the **scientific** name of the taxon labelled **B** in **Figure 4**.

[1 mark]

Questions, mark schemes and examiners' report extracts © AQA.

Question 11 · AS Paper 2 · June 2023 · Q09.4 · 2 marks

0 9 . 4 Complete **Table 6** to show the phylogenetic classification for these two species.

[2 marks]

Table 6

Taxon	***Opsanus tau***	***Trachurus trachurus***
		Animalia
	Chordata	
Class	Actinopterygii	Actinopterygii
	Batrachoidiformes	Carangiformes
Family	Batrachoididae	Carangidae
Genus		
Species	*tau*	*trachurus*

Question 12 · AS Paper 2 · November 2021 · Q03.1 · 1 mark

0 3 . 1 In taxonomy, an organism is identified by referring to the species name and the genus name.

What term is used to describe this method of naming organisms?

[1 mark]

_____

Question 13 · AS Paper 2 · November 2020 · Q01.3 · 1 mark

0 1 . 3 Name the taxon in the hierarchy of classification represented by:

[1 mark]

1 *Littorina* _____

2 *littorea* _____

Questions, mark schemes and examiners' report extracts © AQA.

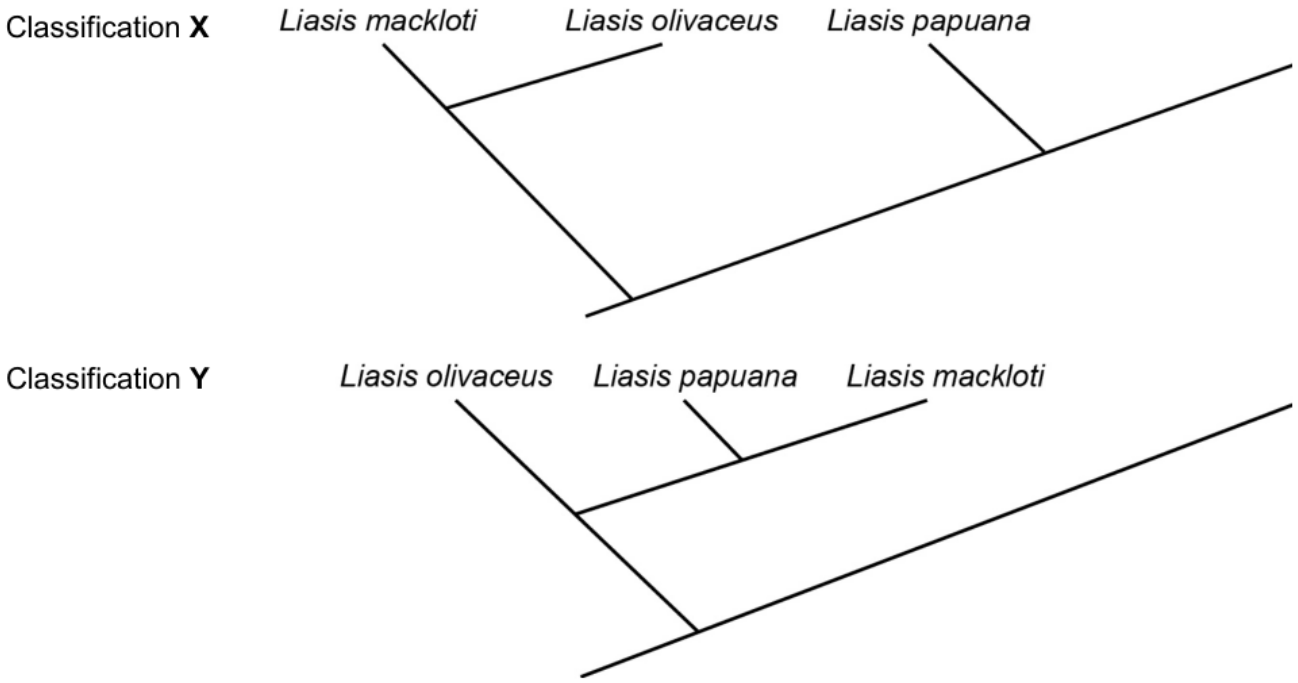
Question 14 · information from earlier in the question

0 8 **Figure 3** shows two different ways of classifying the same three species of snake.

- Classification **X** is based on the frequency of observable characteristics
- Classification **Y** is based on other comparisons of genetic characteristics.

All three species of snake belong to the Python family.

Figure 3



Question 14 · A level Paper 1 · June 2017 · Q08.3 · 1 mark

0 8 . 3 There is a debate about the name of one of these species of snake. Some scientists name it *Liasis papuana* and other scientists name it *Apodora papuana*.

Give the name of the taxon about which the scientists disagree.

[1 mark]

Questions, mark schemes and examiners' report extracts © AQA.

Question 15 · A level Paper 1 · June 2018 · Q03.5 · 2 marks

0 3 . 5 Three of the bee species collected in the farmland areas were *Peponapis pruinosa, Andrena chlorogaster* and *Andrena piperi*.

What do these names suggest about the evolutionary relationships between these bee species? Explain your answer.

[2 marks]

Questions, mark schemes and examiners' report extracts © AQA.

0 3 Tansy, *Tanacetum vulgare*, is a plant that grows in dense patches. The tansy beetle, *Chrysolina graminis*, feeds on, and completes its life cycle on *T. vulgare.*

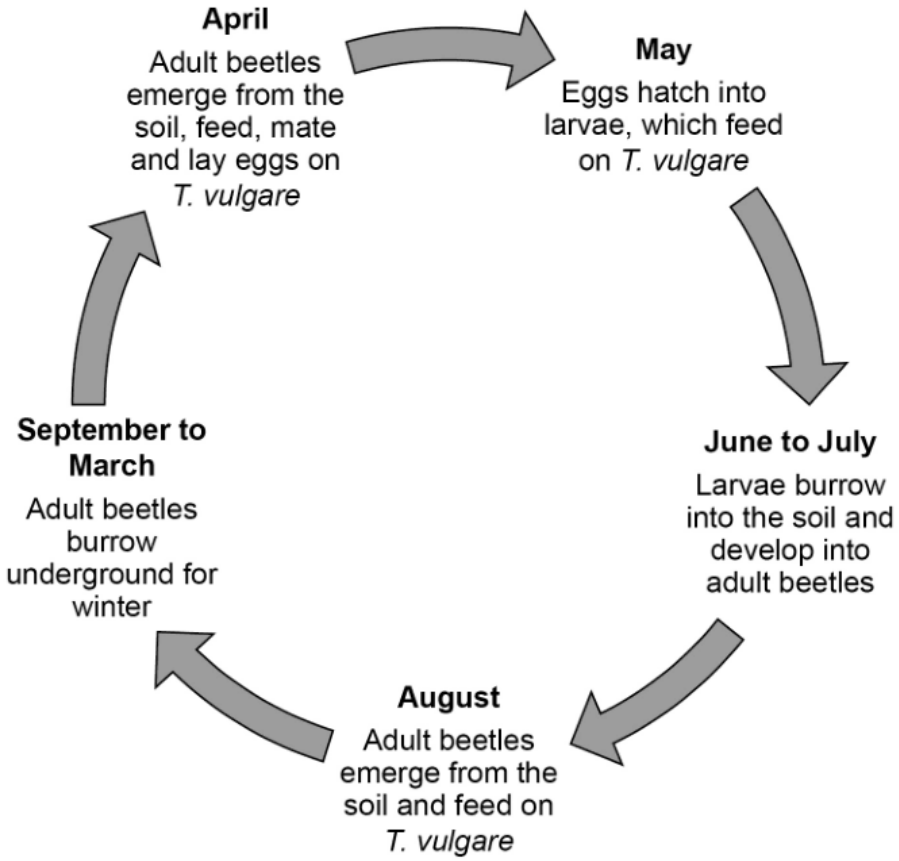
C. graminis is 8–10 mm long and green in colour.

Two other green beetles can also be found in the same habitat.

- The dock beetle, *Gastrophysa viridula,* which is 4–7 mm long.
- The mint leaf beetle, *Chrysolina herbacea,* which is 6–10 mm long.

Figure 2 shows the life cycle of *C. graminis*.

Figure 2



0 3 . 1 How many different genera of beetles are there in the information provided?

[1 mark]

Questions, mark schemes and examiners' report extracts © AQA.

Question 17 · AS Paper 2 · June 2024 · Q05.1 · 2 marks

0 5 . 1 Orchids form a large family of flowering plants. Scientists analysed genes coding for ribosomal RNA in orchids.

Explain how this analysis allowed the scientists to determine the phylogenetic relationships between species of orchids.

[2 marks]

Question 18 · information from earlier in the question

The classification system used in the early 20th century grouped different species of bacteria according to the position and shape of flagella on bacterial cells and by the number of flagella per cell. These were observed using an optical microscope.
Each species of bacterium has a characteristic cell shape and arrangement of flagella.
These characteristics may be shared with other species within a genus.
Flagella are fragile, difficult to stain and may extend from the cell at any angle.

Question 18 · A level Paper 1 · June 2023 · Q06.3 · 1 mark

0 6 . 3 Suggest why several bacterial species have been renamed in recent years.

[1 mark]

Questions, mark schemes and examiners' report extracts © AQA.

Mark schemes

Question 1 · AS Paper 1 · June 2017 · Q09.1 · 2 marks

09.1	1. Species = (A group of) organisms that are able to produce fertile offspring; 2. Species richness = the number of (different) species in a community;	2	2. Accept in a habitat / ecosystem / area 2. Reject in a population 2. Ignore 'types' unqualified

Questions, mark schemes and examiners' report extracts © AQA.

7.3 1. They are different species;

2. (So) if fused together they would not produce fertile offspring

OR

(So) they have named characteristics that means they are reproductively isolated;

2	2. For 'fuse' accept 'form a zygote'. 2. Accept • if they fused together meiosis could not occur • if they fused together (chromosomes) could not form homologous pairs • if they fused production of gametes could not occur. 2. Accept a description of characteristics that would lead to reproductive isolation eg • will not successfully fuse with one another • produce single cells at different times • description of geographical isolation.

Questions, mark schemes and examiners' report extracts © AQA.

Question 3 · AS Paper 2 · June 2022 · Q08.1 · 1 mark

08.1	Mating/courtship/sexual behaviour;	1 (AO2)	Ignore breeding/ reproduction

Question 4 · A level Paper 2 · June 2017 · Q02.3 · 1 mark

02.3	(Radiation) affects their 'attractiveness'/courtship /survival/ life span;	1	Accept: 'die/less likely to survive **due** to radiation'. Accept: 'disease can be transmitted by other means' (other than mosquitoes).

Question 5 · AS Paper 1 · June 2018 · Q06.3 · 2 marks

06.3	1. Sine song is (very) similar / same length (for both, so closely related). 2. (But) have different peaks / pulses (in pulse song);	2	2. Must give a difference, not just state they are different 2. Accept suitable differences eg number / length / amplitude / interval

Question 6 · AS Paper 1 · June 2018 · Q06.4 · 2 marks

06.4	1. (Three) peaks (in pulse song) occur at the same time (since both female) / songs identical / male peaks are different; 2. (Therefore) no male (song) to stimulate / cause mating; **OR** Nothing to stimulate / cause mating;	2	1. Accept suitable differences in male peaks eg number / length / amplitude / interval

Questions, mark schemes and examiners' report extracts © AQA.

Question 7 · AS Paper 2 · June 2022 · Q05.1 · 2 marks

05.1	1. Hierarchy (of groups) with no overlaps **OR** (smaller) groups within (larger) groups with no overlaps; 2. (Grouped) according to evolutionary origins/relationships/history;	2 (2 x AO1)	2. Accept 'common ancestry'

Question 8 · AS Paper 1 · June 2018 · Q06.1 · 2 marks

06.1	1. (It shows) smaller groups within larger groups / larger groups containing smaller groups; 2. With no overlap (between groups);	2	1. Accept groups within groups

Question 9 · AS Paper 1 · June 2018 · Q06.2 · 1 mark

06.2	Family;	1	Accept phonetic spellings

Question 10 · AS Paper 2 · June 2022 · Q05.2 · 1 mark

05.2	Perissodactyla;	1 (AO2)	Accept incorrect spellings provided the word looks close to Perissodactyla Ignore upper/lowercase letters Accept 'order'

Questions, mark schemes and examiners' report extracts © AQA.

Question 11 · AS Paper 2 · June 2023 · Q09.4 · 2 marks

09.4

1 mark for first column

1 mark for 2nd and 3rd column all correct

Kingdom	**Animalia**	Animalia
Phylum/Phyla	Chordata	**Chordata**
Class	Actinopterygii	Actinopterygii
Order	Batrachoidiformes	Carangiformes
Family	Batrachoididae	Carangidae
Genus	**Opsanus**	**Trachurus**
Species	*tau*	*trachurus*

2 (2 x AO2)

Question 12 · AS Paper 2 · November 2021 · Q03.1 · 1 mark

03.1	Binomial;	1

Question 13 · AS Paper 2 · November 2020 · Q01.3 · 1 mark

01.3	(*Littorina* -) genus **and** (*littorea* -) species;	1	Accept phonetic spelling Accept genera

Questions, mark schemes and examiners' report extracts © AQA.

Question 14 · A level Paper 1 · June 2017 · Q08.3 · 1 mark

8.3	Genus/genera; 1	If the response has two answers no mark is awarded.

Question 15 · A level Paper 1 · June 2018 · Q03.5 · 2 marks

03.5	1. *A. chlorogaster* and *A. piperi* are more closely related (to each other than to *P. pruinosa*); 2. Because they are in the same genus;	2	1. Must be a comparative statement. 1. Accept *A. chlorogaster* and *A. piperi* share a more recent/closer common ancestor (than they do with *P. pruinosa*); Ignore references to *A. chlorogaster* and *A. piperi* not being related to *P. pruinosa* or not having a common ancestor with *P. pruinosa*.

Question 16 · A level Paper 3 · June 2025 · Q03.1 · 1 mark

03.1	2/two; 1 (1 x AO2)	If no number is present, accept *Gastrophysa* **and** *Chrysolina* alone

Questions, mark schemes and examiners' report extracts © AQA.

05.1	1. Compare the <u>DNA</u> base/nucleotide sequence; 2. More closely related (species) the more similar the genes/DNA;	2 (2 x AO1)

2. Accept RNA (to prevent ecf)
2. Accept 'more recent common ancestor' for more closely related
2. Accept 'clear phylogenetic relationship' for more closely related

Questions, mark schemes and examiners' report extracts © AQA.

06.3	DNA/mRNA/RNA <u>base</u> sequencing **OR** Amino acid sequencing **OR** Use of electron microscopes with greater resolution **OR** Use of electron microscopes **and** improved staining/preparation;	1 (AO1)

Accept genome sequencing

Ignore detail OR magnification for resolution

Accept abbreviations TEM OR SEM in this instance

Questions, mark schemes and examiners' report extracts © AQA.