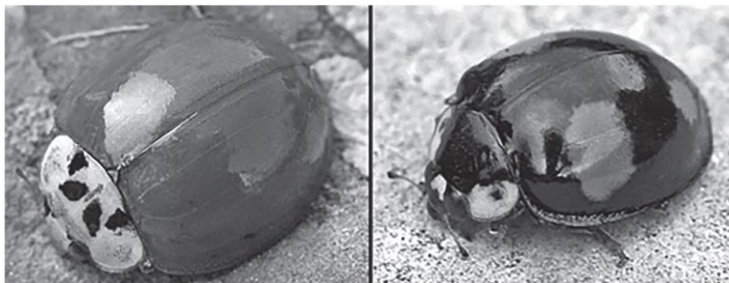


## Classification and Evolution

1. The harlequin ladybird, *Harmonia axyridis*, has many different distinct forms, two of which can be seen below.



Which of the terms, **A** to **D**, best describes this type of variation?

- A** interspecific continuous
- B** interspecific discontinuous
- C** intraspecific continuous
- D** intraspecific discontinuous

Your answer

[1]

2. The table below shows features of the five kingdoms.

Kingdom	Nerves present	Hormones present
Prokaryotae	x	x
Protocista	x	x
Fungi	x	✓
Plantae	x	✓
Animalia	✓	✓

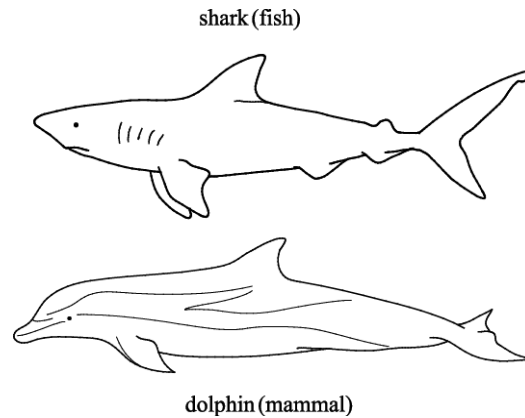
Which of the statements, **A** to **D**, is correct?

- A** only autotrophic organisms require hormones
- B** only heterotrophic organisms need to interact with their environment
- C** only multicellular organisms require hormones
- D** only unicellular organisms require nervous systems

Your answer

[1]

3. These two organisms show very similar anatomical adaptations but are classified in different taxonomic groups.



What is this an example of?

- A. convergent evolution
- B. divergent evolution
- C. disruptive selection
- D. stabilising selection

Your answer

[1]

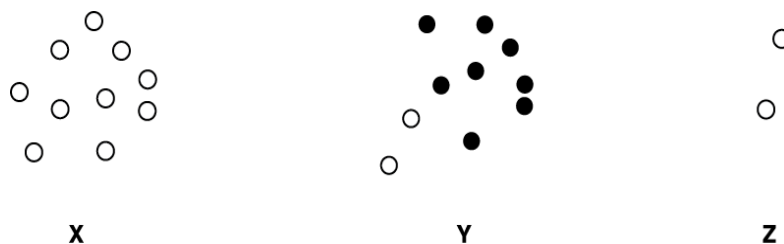
4. Which statement, **A** to **D**, best describes the relationship between classification and phylogeny?

- A. classification and phylogeny are the same thing
- B. modern classification reflects phylogeny
- C. phylogeny is the science used in classification
- D. phylogeny is naming the phyla used in classification

Your answer

[1]

5. Diagrams **X**, **Y** and **Z** represent populations of microorganisms.



Which of the sequences, **A** to **D**, demonstrates the changes caused by addition of a drug to which some individuals are resistant?

- A** Y, X, Z
- B** Z, Y, X
- C** Z, X, Y
- D** Y, Z, X

Your answer

[1]

6. Which of the statements, **A** to **D**, does **not** provide evidence for natural selection?

- A** Clover plant populations produce higher hydrogen cyanide toxin levels in areas where snails are common.
- B** Fossils of animals identical to species living today can be found in shallow rocks.
- C** Insects can rapidly develop resistance to insecticides such as DDT.
- D** Resistant forms of *Staphylococcus aureus* were not known before 1961.

Your answer

[1]

7. The image below shows a European badger, *Meles meles*, which is a member of the family Mustelidae.



The American badger belongs to a different genus within the same family.

Which of the options, **A to D** , is the correct binomial name for the American badger?

- A *Meles leucurus*
- B *mellivora capensis*
- C *mustelidus Everetti*
- D *Taxidea taxus*

Your answer

[1]

8. Which of the following statements about antibiotic resistance is correct?

- A All antibiotics cause mutations in bacterial DNA.
- B Antibiotic resistance in bacteria is evidence to support Darwin's theory of evolution by natural selection.
- C The development of antibiotic resistance in bacteria is an example of genetic drift.
- D The development of antibiotic resistance in bacteria is an example of stabilising selection.

Your answer

[1]

9. Accurate analysis of an ecosystem's biodiversity requires a detailed classification of organisms.

The spruce pine plant is given the binomial name *Pinus glabra*.

i. Place a tick (✓) in the box next to the species most closely related to *Pinus glabra*.

*Diplodia pinea*

*Ilex glabra*

*Pinus resinosa*

*Annona glabra*

[1]

ii. Explain why *Pinus glabra* and humans, *Homo sapiens*, are classified in the same domain but in different kingdoms.

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[2]

10. The giant water lily, *Victoria amazonica*, grows in the shallow waters of the Amazon river basin.

Which of the following adaptations, **A** to **D**, enables **Victoria amazonica** to survive in its watery environment?

- A** thick waxy cuticle
- B** leaves with stomata on upper surface only
- C** leaves with sunken stomata
- D** extensive shallow root system

Your answer

[1]

11. Some of the taxonomic groups for the beach sunflower, *Helianthus debilis*, are shown in the table below.

Kingdom	Plantae
Phylum	Magnoliophyta
<b>W</b>	Magnoliopsida
Order	Asterales
<b>X</b>	Asteraceae
<b>Y</b>	Helianthus

Which of the following rows, **A** to **D**, correctly identifies the missing taxonomic groups from the classification of *Helianthus debilis*?

	<b>W</b>	<b>X</b>	<b>Y</b>
<b>A</b>	class	genus	species
<b>B</b>	class	family	genus
<b>C</b>	family	genus	species
<b>D</b>	family	class	genus

Your answer

[1]

12. Antifreeze proteins are a group of globular proteins that prevent ice crystal formation in living cells. These proteins are found in four different kingdoms and have evolved independently of each other.

Which of the following phrases explains why this convergent evolution has occurred?

- A** adaptation to fill a similar niche
- B** continuous variation of these species
- C** interspecific variation
- D** the same gene occurs in these species

Your answer

[1]

13. There are four different human blood groups: A, B, AB and O.

This is because there are three different alleles coding for different proteins in red blood cells.

Which of the letters, **A** to **D**, describes this form of variation?

- A** continuous and intraspecific
- B** continuous and interspecific
- C** discontinuous and intraspecific
- D** discontinuous and interspecific

Your answer

[1]

14. *Brassica rapa* is a plant that occurs in wild-type and dwarf varieties.

A student investigated the growth of *B. rapa*.

Seeds of both varieties were planted and the heights of stems were measured 20 days after planting.

The results are shown below.

Variety	Height after 20 days (cm)						
	Individual plants						Mean
	1	2	3	4	5	6	
<b>Wild-type</b>	90.7	94.5	87.4	82.7	92.0	91.5	89.8
<b>Dwarf</b>	6.5	8.0	7.4	7.8	8.3	7.8	7.8

Which of the following correctly explains the student's results?

- A** variation in height between varieties is continuous and polygenic
- B** variation in height between varieties is discontinuous and controlled by one or two genes
- C** variation in height within varieties is continuous and controlled only by one or two genes
- D** variation in height within varieties is discontinuous and polygenic

Your answer

[1]

15. Gene sequencing has a number of uses.

Which of the following is **not** a use of gene sequencing?

- A determining the amino acid sequence of a polypeptide
- B the classification of newly-discovered organisms
- C the polymerase chain reaction
- D the selection of the correct vaccine in a disease outbreak

Your answer

[1]

16. Polar bears, *Ursus maritimus*, and giant pandas, *Ailuropoda melanoleuca*, both belong to the family Ursidae.

Which of the following, **A** to **D**, is **not** true about the classification of polar bears and giant pandas?

- A They each belong to a different class.
- B They each belong to a different species.
- C They each belong to the same order, carnivora.
- D They each belong to the same phylum, chordata.

Your answer

[1]

17. Which of the following, **A** to **D**, is **not** an adaptation to reduce water loss in plants?

- A an extensive root system that extends far from the plant
- B leaves that are reduced to spines that prevent damage from animals
- C the ability to store carbon dioxide so stomata only need to open at night
- D the surface covered in reflective hairs

Your answer

[1]



18. Biologists use both phylogeny and classification to understand how different species are related.

Which of the options, **A to D**, is a statement about phylogeny?

- A There are 21 species of ladybird in the UK that belong to the sub-family Coccinellinae.
- B *Homo sapiens* and *Pan bonobo* share a common ancestor.
- C The lily family, Liliaceae, consists of fifteen genera.
- D The great white shark, *Carcharodon carcharias*, is a member of the class Chondrichthyes.

Your answer

[1]

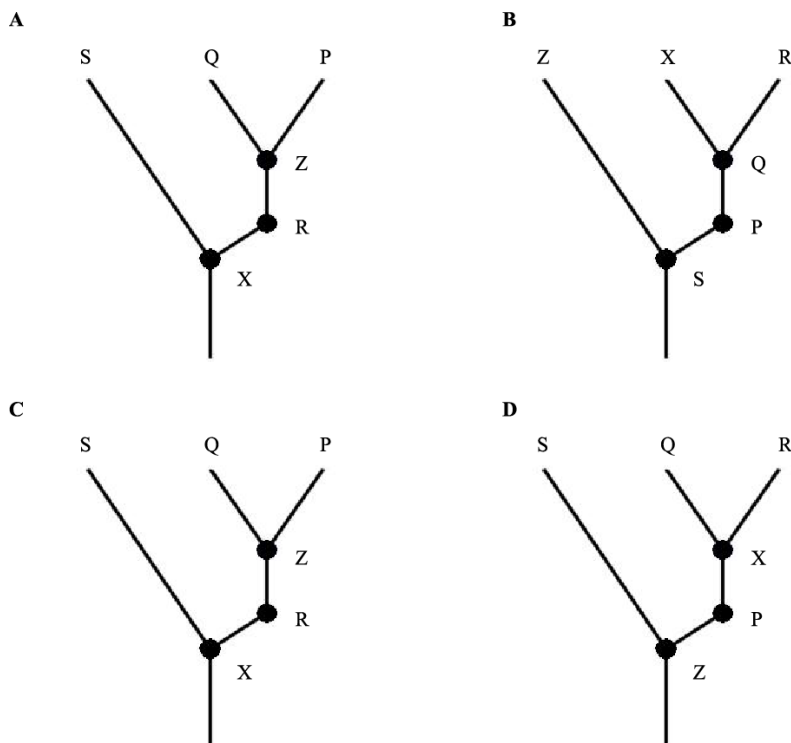
19. Q, P, R and S are related species of organisms.

Species X is an extinct recent common ancestor of species Q and R.

X, Q and R all evolved from species P.

Species S is the least related to the others, with extinct species Z being its most recent phylogenetic link to the other species.

Which of the following phylogenetic trees correctly represents the relationships described above?



Your answer

[1]