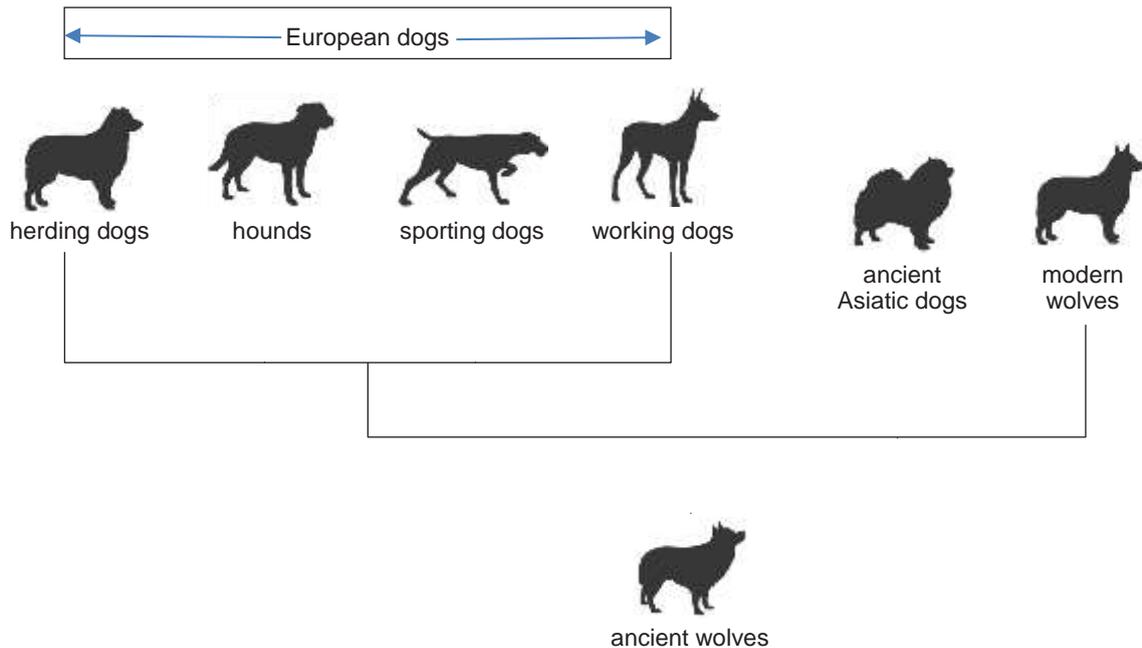


Stage 2 Biology

The following examination-style questions are suitable for assessing evidence of learning in **Topic 4**. They do not constitute a complete test.

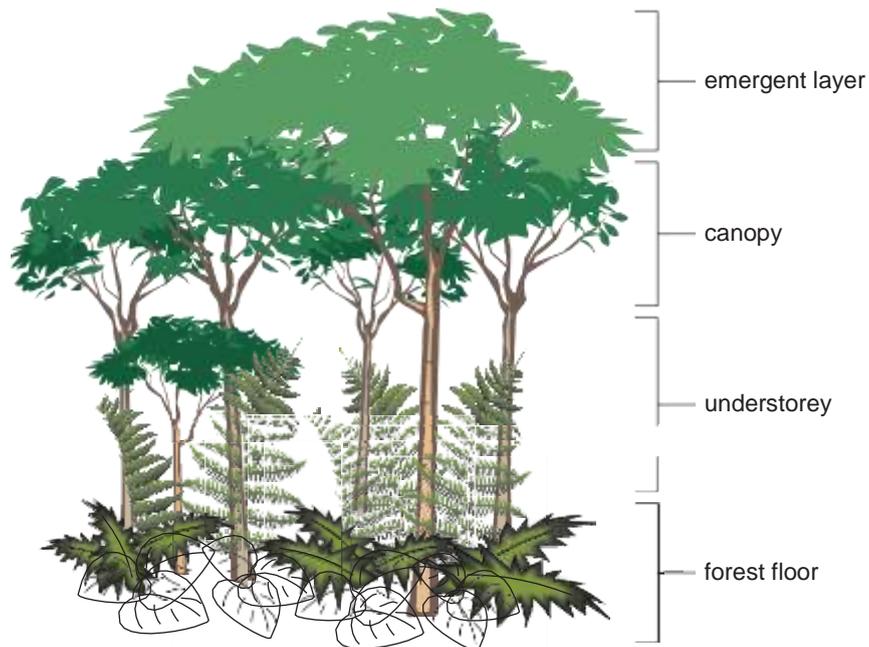
1. Refer to the phylogenetic tree below, which shows the relationship between ancient wolves and ancient Asiatic dogs, modern wolves, and some European dogs:



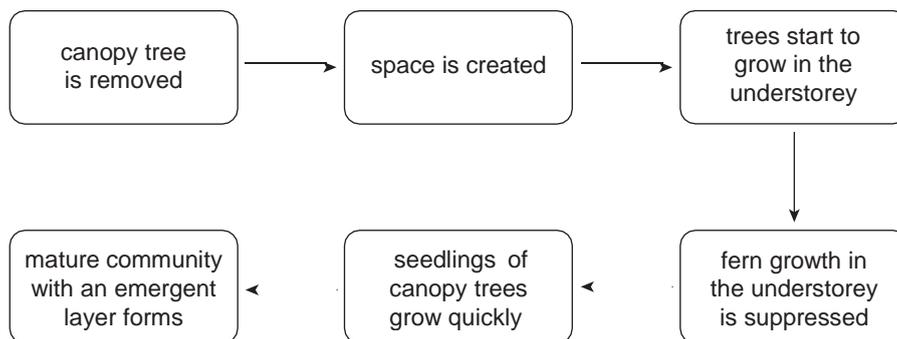
Source: Adapted from © Hywit Dimyadi | Dreamstime.com

- Which one of the following statements is correct?
- J. Working dogs are more closely related to modern wolves than to ancient wolves.
 - K. Herding dogs and hounds have a common ancestor that is different from that of sporting dogs and working dogs.
 - L. Modern wolves are more closely related to ancient Asiatic dogs than to sporting dogs.
 - M. European dogs share a common ancestor with ancient wolves but not with modern wolves.
2. Which one of the following pieces of evidence does **not** support the theory that the ancestry of eukaryotic cells probably involved endosymbiotic events?
- J. Chloroplasts contain a single circular chromosome.
 - K. Ribosomes are found in prokaryotic cells and eukaryotic cells.
 - L. The inner membrane of mitochondria contains proteins similar to those found in the membranes of prokaryotic cells.
 - M. Eukaryotic cells contain organelles that have a double membrane.

3. The following diagram shows the different layers of a mature community in a tropical rainforest.



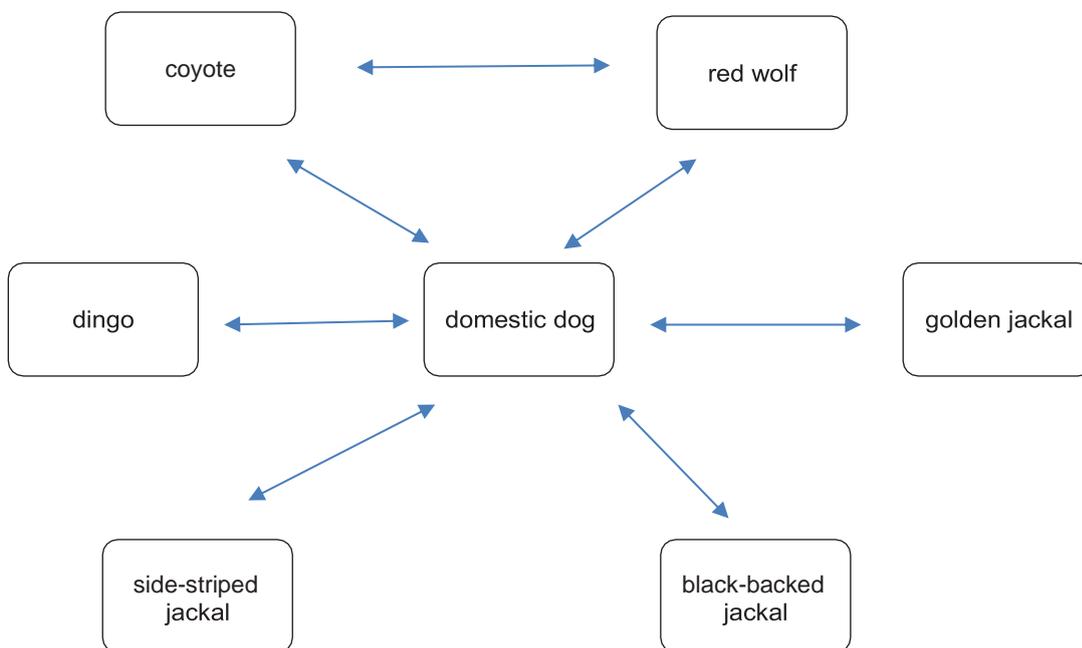
Refer to the following flow chart, which describes the steps that occur when a large tree is removed from the canopy of a tropical rainforest:



The information in the flow chart indicates that

- J. in a mature community only the canopy will contain trees.
- K. the suppression of fern growth results in trees starting to grow in the understory.
- L. an alteration to the environment suppresses fern growth.
- M. the mature community will be the same as the original community.

4. If modern parrots are descended from Norwegian blue parrots, but not from African parrots, the DNA sequences of
- J. Norwegian blue parrots will be more similar to those of African parrots than to those of modern parrots.
 - K. Norwegian blue parrots will show little similarity to those of African parrots or modern parrots.
 - L. modern parrots will be more similar to those of Norwegian blue parrots than they are to those of African parrots.
 - M. African parrots will be more similar to those of modern parrots than they are to those of Norwegian blue parrots.
5. (a) Refer to the following diagram, which shows interbreeding between canines. The arrows link canines that are able to interbreed and produce fertile offspring:



- (i) Explain why a biologist might consider that all of these canines belong to the same species.

(2 marks)

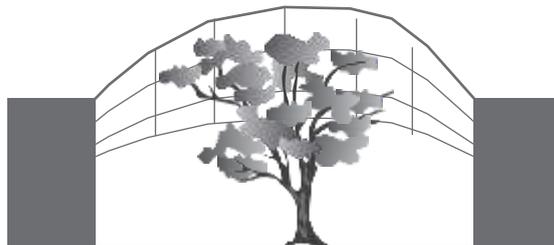
- (ii) Describe one process by which the coyote and the red wolf could become separate species.

(3 marks)

- (b) Explain why humans have an obligation to preserve the habitat of the coyote.

(3 marks)

6. In a redevelopment and expansion of a shopping centre, an attempt was made to preserve a very tall, old tree in the middle of the shopping centre. The tree was enclosed by a glass roof.



Within months the tree looked stressed. Efforts to save the tree included injecting it with a nutrient solution containing phosphate. However, 2 years after the redevelopment was completed the tree was dying, and it was cut down.

Explain why an organism that is isolated in this way is less likely to survive than an organism in its natural environment.

(6 marks)

7. Plants synthesise amino acids in a metabolic process that involves several consecutive steps. Glyphosate is a widely used weedkiller that prevents an enzyme from functioning properly in one of these steps, and this results in the death of the plant. There is growing concern that some species of plants have developed resistance to glyphosate. Describe how a species may, over time, develop resistance to a chemical that was previously lethal to that species.

(6 marks)