

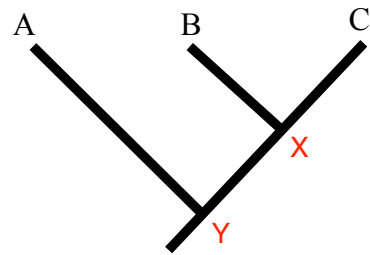
**Label all internal nodes**

Tree thinking pretest

This quiz is in three sections. Questions 1-10 assess your basic understanding of phylogenetic trees. Questions 11-15 assess whether you are equipped to accurately extract information from the kinds of trees you are likely to encounter in biology textbooks. Questions 16-20 use some examples from drawn from the phylogenetic research literature, generally involving applied biological phenomena, to see how readily you can make sense of such studies.

1) Which of the following is a correct interpretation of the tree shown? (Select all that apply)

- a) C is descended from B, which is descended from A
- b) C is the most advanced species
- c) A is the most ancient species
- d) B is an intermediate between A and C
- e) None of the above

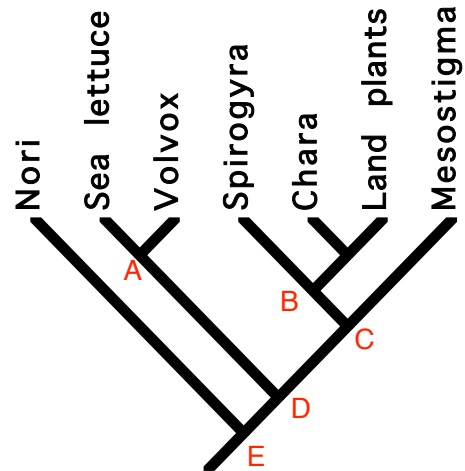


2) Referring to the same tree, which statements about common ancestry hold? (Select all that apply)

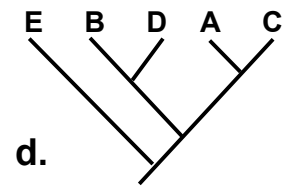
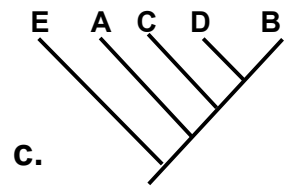
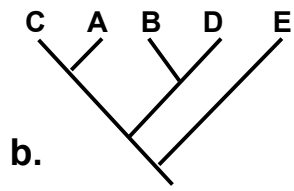
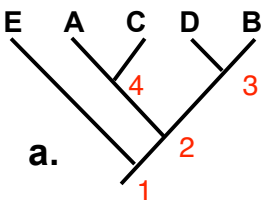
- a) A is the common ancestor of B and C
- b) The common ancestor of A and B lived after the common ancestor of A and C
- c) B and C share a more recent common ancestor than B and A
- d) Any common ancestor of A and B is also an ancestor of C
- e) None of the above

3) Consider the tree to the right. Viridiplantae may be defined to include all the descendants of the last common ancestor of volvox and land plants. Which taxon or set of taxa are not in Viridiplanta?

- a) Nori
- b) Mesostigma
- c) Nori, mesostigma
- d) Nori, mesostigma, volvox
- e) Nori, mesostigma, volvox, spirogyra, chara

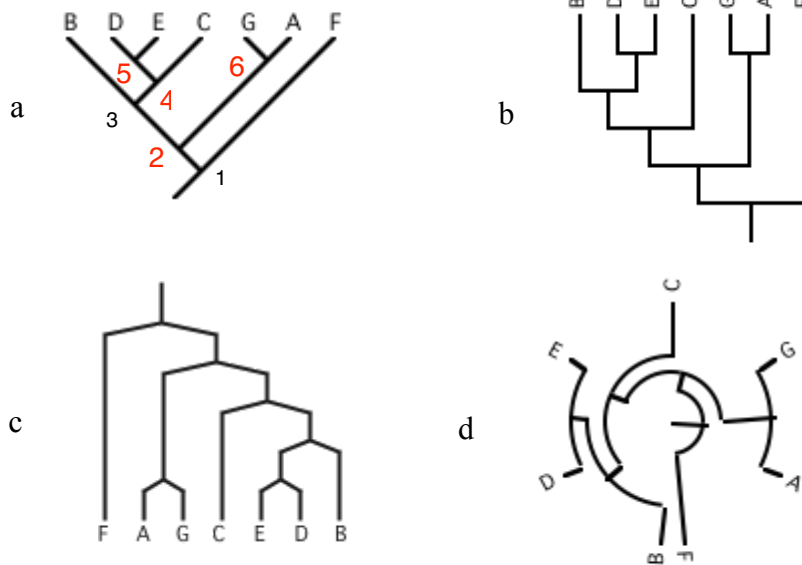


4) Which of the four trees below depicts a different pattern of relationships than the others?



**Identify an internal/ancestor node that is not present in all other trees**

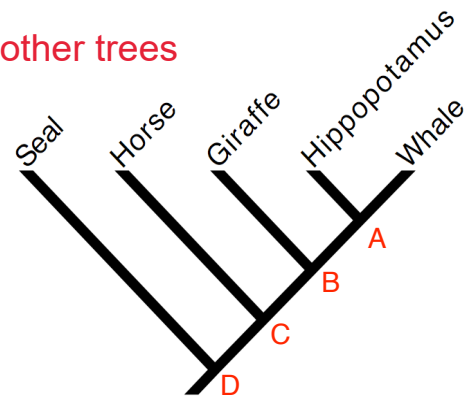
5) Which of the four trees below depicts a different pattern of relationships than the others?



Identify an internal node that is not present in all other trees

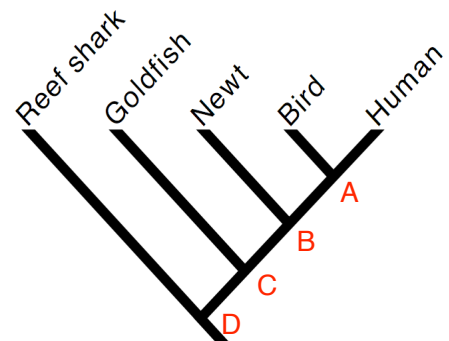
6) By reference to the tree to the right, which of the following is an accurate statement of relationships?

- a) A seal is more closely related to a horse than to a whale
- b) A seal is more closely related to a whale than to a horse
- c) A seal is equally related to a horse and a whale
- d) A seal is related to a whale, but is not related to a horse



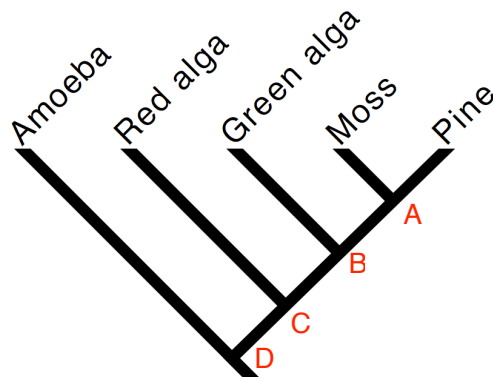
7) Assume that the tree to the right is correct. Which of the following is true?

- a) Reef sharks are older than newts
- b) Reef sharks gave rise to newts
- c) The common ancestor of goldfish and humans lived before the common ancestor of birds and humans
- d) Reef sharks and goldfish have no common ancestor
- e) Birds came before humans



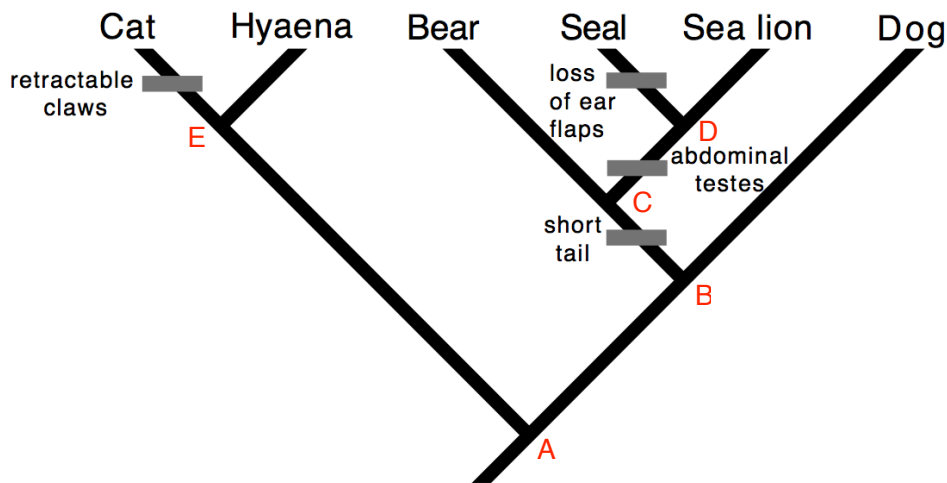
8) By reference to the tree to the right, which of the following is an accurate statement of relationships?

- a) A green alga is more closely related to a red alga than to a pine
- b) A green alga is more closely related to a pine than to a red alga
- c) A green alga is equally related to a red alga and a moss
- d) A green alga is related to a red alga, but is not related to a moss



9) Looking at the same tree as question #8, three students have different interpretations. Student A says that pine is the most advanced species because it is the most recent. Student B says that the pine is the least advanced species because all the other branch off it. Student C says that all the species are equally advanced because that have all evolved the same amount of time from their common ancestor. Which student is correct?

- a) Student a
- b) Student b
- c) Student c
- d) None of the students



10) In the above tree, assume that the ancestor had a long tail, ear flaps, external testes, and fixed claws. Based on the tree and assuming that all evolutionary changes in these traits are shown, what traits does a seal have?

- a) long tail, ear flaps, external testes, and fixed claws
- b) short tail, no ear flaps, external testes, and fixed claws
- c) short tail, no ear flaps, abdominal testes, and fixed claws
- d) short tail, ear flaps, abdominal testes, and fixed claws
- e) long tail, ear flaps, abdominal testes, and retractable claws