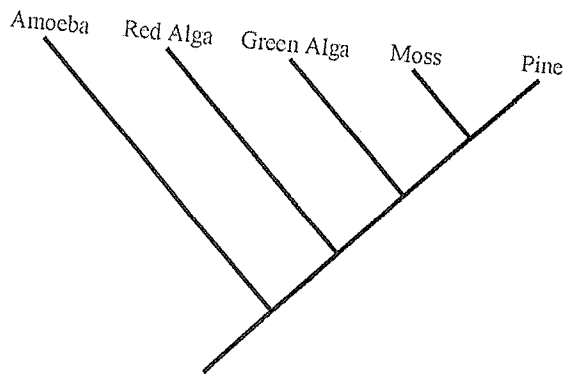


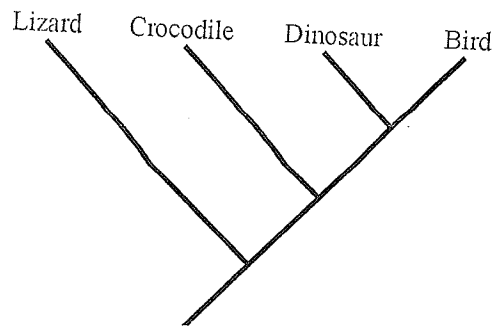
Basic Tree Thinking Assessment
David A. Baum, Stacey DeWitt Smith, Samuel S. Donovan

This quiz includes a number of multiple-choice questions you can use to test yourself on your ability to accurately interpret evolutionary trees. Insofar as real biological examples have been used they are accurate based on current knowledge.



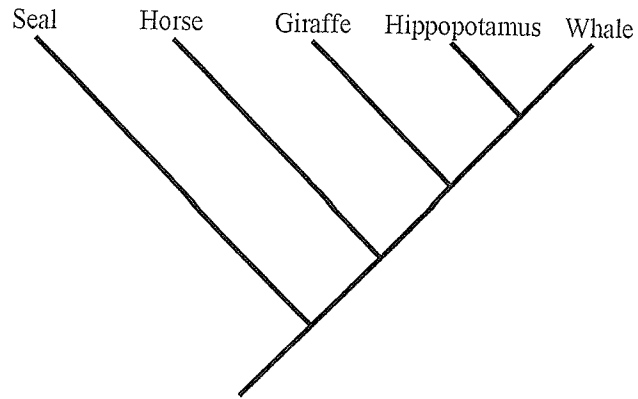
1) By reference to the tree above, which of the following is an accurate statement of relationships?

- a) A green alga is more closely related to a red alga than to a moss
- b) A green alga is more closely related to a moss 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



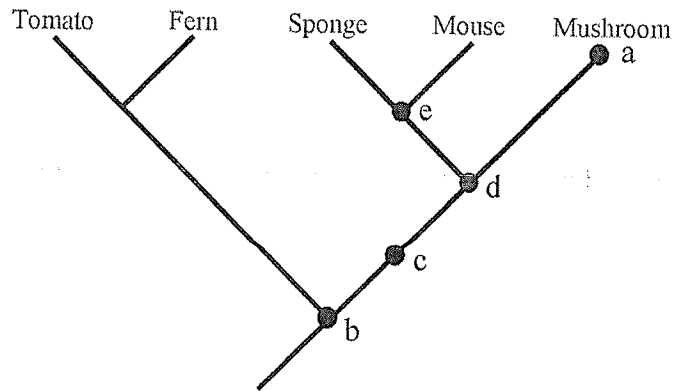
2) By reference to the tree above, which of the following is an accurate statement of relationships?

- a) A crocodile is more closely related to a lizard than to a bird
- b) A crocodile is more closely related to a bird than to a lizard
- c) A crocodile is equally related to a lizard and a bird
- d) A crocodile is related to a lizard, but is not related to a bird

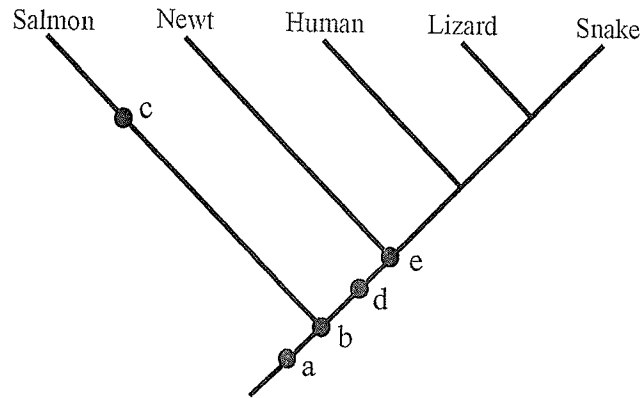


3) By reference to the tree above, which of the following is an accurate statement of relationships?

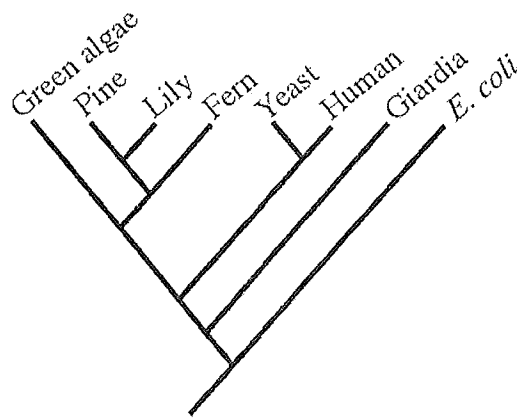
- a) A seal is more closely related to a horse than to a whale
- b) A seal is more closely related to a whale than to a horse
- c) A seal is equally related to a horse and a whale
- d) A seal is related to a whale, but is not related to a horse



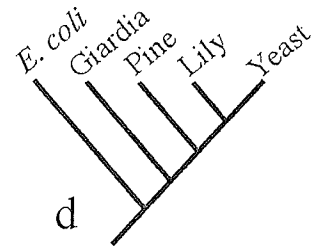
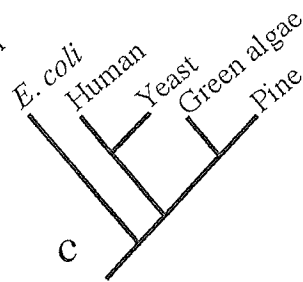
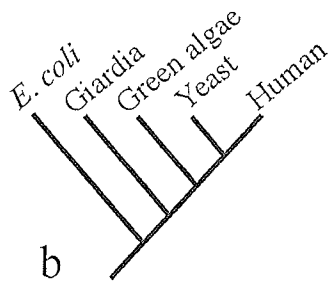
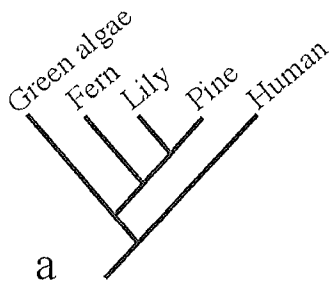
4) Which of the five marks in the tree above corresponds to the most recent common ancestor of a mushroom and a sponge?

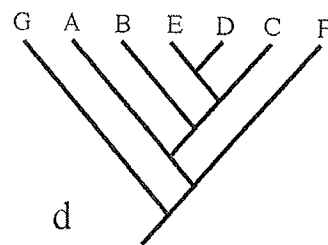
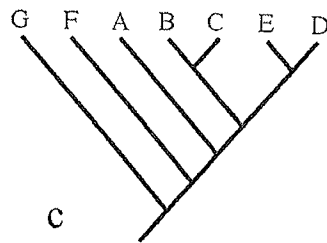
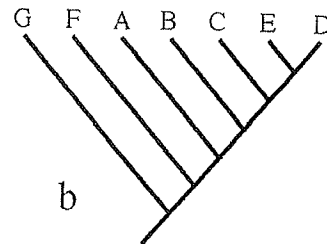
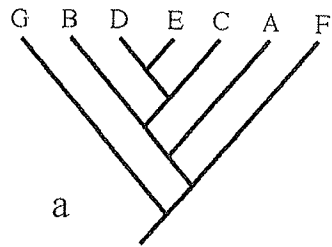


5) If you were to add a trout to the phylogeny shown above, where would its lineage attach to the rest of the tree?

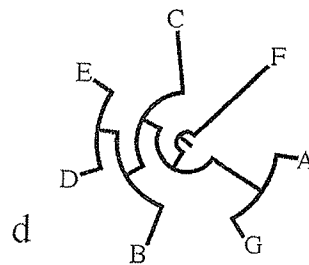
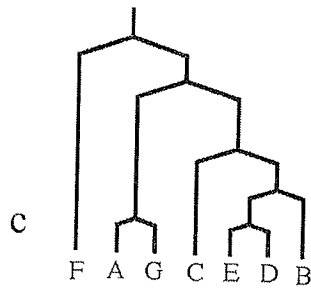
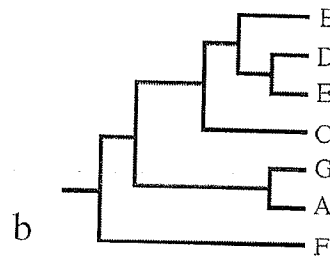
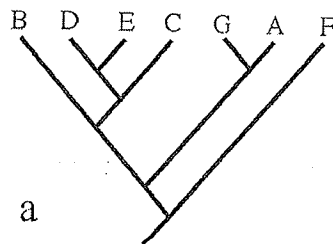


6) Which of trees below is false given the larger phylogeny above?

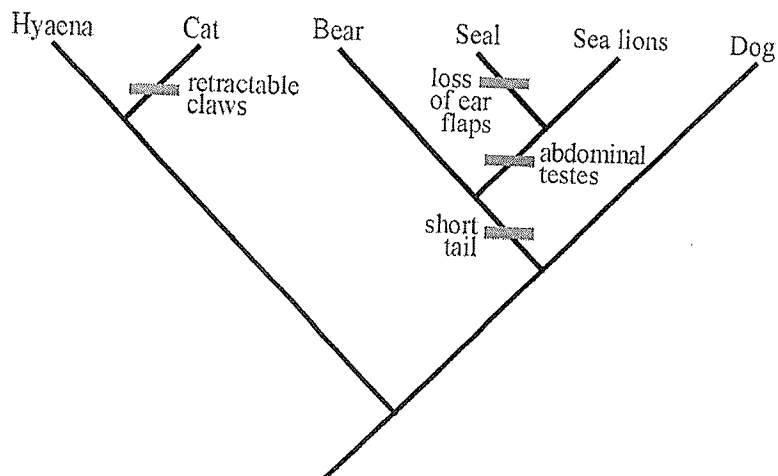




7) Which of the four trees above depicts a different pattern of relationships than the others?

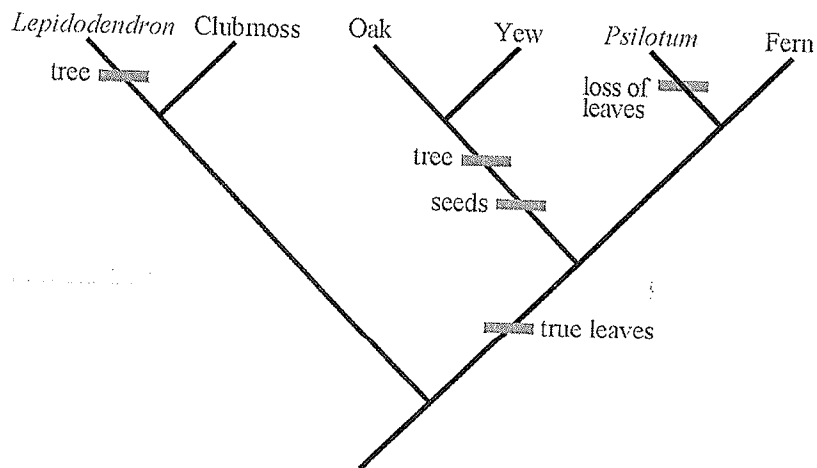


8) Which of the four trees above depicts a different pattern of relationships than the others?



9) 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 sea lion 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



10) In the above tree, assume that the ancestor was a herb (not a tree) without leaves or seeds. Based on the tree and assuming that all evolutionary changes in these traits are shown, which of the tips has a tree habit and lacks true leaves?

- a) *Lepidodendron*
- b) Clubmoss
- c) Oak
- d) *Psilotum*
- e) Fern

Predator Prey Relationships

(1) Predator-prey relations refer to the interactions between two species where one species is the hunted food source for the other. (2) The organism that feeds is called the predator and the organism that is fed upon is the prey.

(3) There are literally hundreds of examples of predator-prey relations. (4) A few of them are the lion-zebra, bear-salmon, and fox-rabbit. (5) A plant can also be prey. (6) Bears, for example, feed on berries, a rabbit feeds on lettuce, and a grasshopper feeds on leaves.

(7) Predators and prey exist among even the simplest life forms on Earth, single-celled organisms called bacteria. (8) The bacteria *Bdellovibrio* feed on other bacteria that are bioluminescent (they produce internal light due to a chemical reaction). (9) Indeed, the study of *Bdellovibrio* predation has revealed a great deal of the mechanics of predation and how the predator and prey populations fluctuate in number over time in a related fashion.

(10) Predator and prey populations respond dynamically to one another. (11) When the numbers of a prey such as rabbits explode, the abundance at this level of the food chain supports higher numbers of predator populations such as foxes. (12) If the rabbit population is over-exploited or drops due to disease or some other calamity, the predator population will soon decline. (13) Over time, the two populations cycle up and down in number.

(14) In many higher organisms, the prey can be killed by the predator prior to feeding. (15) For example, a cheetah will stalk, run down, and kill its prey (examples include the gazelle, wildebeest, springbok, impala, and zebra). (16) In contrast, fish and seals that are the prey of some species of shark are examples of prey that is fed on while still alive. (17) The key aspect of a predator-prey relationship is the direct effect that the predation has on numbers of their prey.

Historical Background and Scientific Foundations

(18) Predators and prey have evolved together, and their relationship is ancient. (19) For example, fossils dating back nearly 400 million years have revealed evidence that extinct animals known as *Hederellids* were the prey of an unknown creature that killed them by drilling holes through their tubular shells.

(20) As species developed and flourished, other species exploited them as their food. (21) A species that has become a successful predator and has survived has developed strategies to acquire their prey. (22) The predator may use speed; stealth (the ability to approach unnoticed by being quiet and deliberate in its movements, or by approaching from upwind); camouflage; a highly developed sense of smell, sight, or hearing; tolerance to poison produced by the prey; production of its own prey-killing poison; or an anatomy that permits the prey to be eaten or digested. Likewise, the prey has strategies to help it avoid being killed by a predator. (23) A prey species can also use the aforementioned attributes listed for the predator to avoid being caught and killed.

(24) The fitness of the prey population—the number of individuals in the population, chance of being able to reproduce, and chance of survival—is controlled by the predator population.

Name: _____ Date: _____ Per: _____

Comp A-1: Finding Supporting Evidence ____/8

Write the number(s) of the sentence that best supports the claim given.

1. _____ An organism can be both predator and prey.
2. _____ Plants can be “prey” for multiple organisms.
3. _____ Though bacteria are microscopic, they can still be predators.
4. _____ Wolves on Isle Royale have no competition and are therefore apex predators.
5. _____ Moose eating grass and tree leaves on Isle Royale is not considered a classic predator-prey relationship.
6. _____ Predators have existed for millions of years.
7. _____ A cheetah’s speed makes it a very efficient predator in African Savanas.
8. _____ If the population of predators were to drastically increase, the population of their prey would decrease.

Comp D-2: Understanding Words in Context ____/8

Use context clues to find the meaning of the words.

1. The word “pinnacle” in sentence #34 means _____.
2. The word “fluctuate” in sentence #9 means _____.
3. In sentence #12, “calamity” means _____.
4. What does “deliberate” as used in sentence #22 mean? _____.
5. The word “graze” in sentence #29 means _____.
6. In sentence #9, the word “mechanics” is used. What does it mean? _____

7. What does the word “aforementioned” in sentence #23 mean? _____.
8. Re-read the last paragraph (sentences #30-38). What is a ONE WORD synonym for “apex”? _____.