How much do you already know about evolution??

This survey will not be graded. It will only be used to help find out what you already know and what you don't already know.

This survey is anonymous. We will go over the performance of the class as a whole, but you will not be individually assessed.

QUESTIONS 1 – 6. Each question contains two parts. For the first part, select the option (1 or 2) that best completes the phrase. For the second part, select the *best reason* (A, B, or C) for the choice you made in the first part.

1. Modern-day sharks can swim at speeds up to 30 knots. Suppose their ancestors swam at a much slower speed. The ability to swim fast probably:

    1. developed for all the sharks in a few generations,
    2. involved an increase in the percentage of sharks that can swim faster,

    BECAUSE:

    A. there was first a random genetic change in a few individuals.
    B. the more the sharks used their muscles, the faster they became.
    C. the need to catch prey caused them to swim faster.

2. Butterflies with a long proboscis (feeding tube) can reach the nectar at the base of flowers better than can butterflies with shorter proboscis. Some flowers have shallow tubes with nectar at the bottom while other flowers have much deeper and narrower tubes. If a large population of butterflies with short proboscises were transported to a desert oasis covered entirely with plants whose flowers had very long tubes:

    1. some butterflies would live and some would die,
    2. the butterflies would gradually develop longer proboscises,

    BECAUSE:

    A. the few butterflies starting out with longer proboscises would survive to reproduce.
    B. the proboscis of every butterfly would change in the same way because they are all related.
    C. all of the butterflies' proboscises would slowly change so they would be better for reaching the nectar.

3. Seals that live in Alaska have a thick layer of fat. Their ancestors may not have had fat as thick as it is today. Over the centuries, changes in the seals have occurred because:

    1. the need to keep warm caused the fat of every seal to get thicker,
    2. more seals each generation have had thicker fat,

    BECAUSE:

    A. the seals wanted to adapt to their surroundings.
    B. the offspring inherited a thicker layer of fat than their parents had.
    C. the individuals that had the thickest fat layers lived to produce the most offspring.

4. In the past, penicillin was used to fight infections of the bacteria that causes tuberculosis (TB). More recently, penicillin has not been as effective at killing the TB bacteria. The reason for this change in the bacteria is that:

    1. over the years, all of the bacteria gradually became less affected by penicillin,
    2. a greater proportion of bacteria are unaffected by penicillin each generation,

    BECAUSE:

    A. the need to survive caused the bacteria to change.
    B. the use of penicillin led to a mutation of the DNA in the bacteria.
    C. every generation, the individual bacteria that survived penicillin reproduced.

5. A population of evergreens exists in an area that has had several years of very hot and dry summers. If the summers continue to be severe in the future, we would expect that

    1. many of the evergreens will live but some will die because of the dryness,
    2. most of the evergreens will be able to live through the summer,

    BECAUSE:

    A. the need to survive the summers will cause the evergreens to develop better ways to avoid drying out.
    B. some individual evergreens have, by chance, better ways of conserving water.
    C. the plants will learn to tolerate the hot and dry weather.

6. A population of beetles contains individuals that are either solid green or green-striped. The habitat where the beetles live used to have plants with both solid green and green-striped leaves. Recently, a disease has wiped out all of the plants with green-striped leaves, leaving only the grass with the solid green leaves. The effect on the lizards would be that every generation:

    1. the green-striped beetles would develop slightly less striped bodies,
    2. there would be a greater proportion of individuals with solid green bodies,

    BECAUSE:

    A. only those beetles with solid green bodies would escape predators and live to reproduce.
    B. the beetles would adjust to the change in the environment.
    C. the need to survive would cause beetles to change their body color.

QUESTIONS 7 – 9. Several options (A – F) follow each statement or question. There may be more than one correct option. Circle *all* that apply.

7. Evolutionary change can be caused by:

    A. natural selection and no other processes
    B. random differences in survival
    C. learning
    D. mutations occurring as fast as natural selection gets rid of them
    E. changes in allele frequencies within a population
    F. physiological adjustment

8. Which of the following can evolve by natural selection?

   A. a gene that creates many copies of itself within the genome and sometimes harms the individual that has this gene
   B. a virus that replicates rapidly and kills its host
   C. a song that birds learn from their parents
   D. a behavior that causes individuals to sacrifice themselves for the good of the species
   E. a gene that causes individuals to risk their life for their children
   F. a trait that shortens an individual's life but allows it to produce more offspring

9. Evolutionary change:

   A. requires the accumulation of many small changes
   B. can respond to changes in the environment
   C. can lead to new traits
   D. is a random process
   E. happens at a constant rate
   F. must lead to increased complexity

Questions 10 & 11. These questions are to let the instructor know about your interests and concerns.

10. What are your biggest questions about evolution?

11. What are your concerns about this class?