TOPIC: MISCONCEPTIONS ABOUT EVOLUTION

Common Misconceptions

"Evolution is just a theory"

- In science, "theory" _____ well-supported.
- Evolution is one of the most widely accepted & supported theories.

"Survival of the fittest means the biggest and strongest survive"

- Fitness ≠ big, strong, fast. Fitness = who _____ the most.
- Within a species, which organism best "fits" its _____.

"Adaptations help the *species* survive"

- In NS, competition is _____ the species.
- Natural selection selects individuals not _____.

"The organism will evolve and adapt to its new environment"

- Individuals can _____, but acquired traits are not inherited.
- Individuals only survive and _____ (or don't); populations evolve.

"This organism is the product of millions of years of evolution"

- Organisms from past were _____ working to become the organisms we see today.
- Populations will be different in the future

"Natural Selection makes organisms perfectly suited for their environment"

- Can't be good at everything – life requires _____.
- Selection only works on _____ variation.

PRACTICE

Which of the following statements applies evolutionary thinking correctly and does not propagate a common misconception?

a) The ancestors of birds evolved feathers so that birds could fly.

b) To help the species survive, vervet monkeys use alarm calls to warn other monkeys about predators.

c) To best establish an organism's fitness, you must know how likely it is to reproduce successfully.

d) Birds that migrate in winter must evolve and adapt to a new environment every year.

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PRACTICE

"Lekking" is a common mating behavior seen in organisms ranging from insects to birds. The males in a population gather in one area to display; this group is known as the "lek". The females then evaluate the males and choose with which males they will mate. Which statement below best explains this behavior in terms of natural selection?

a) Lekking evolved to ensure that the population retains high fitness because only the strongest males will be chosen as mates.
b) When females choose mates from a lek, they are choosing males that have adapted to have high fitness.
c) Lekking gathers the entire group in one place so that all members of the group can find mates efficiently.
d) Males that join the lek will, on average, have more offspring than males that do not join the lek.

PRACTICE

"Invasive species" are species that, when introduced to a new environment, immediately spread rapidly, outcompeting many native species. Which of the following statements describes why a particular introduced species might be so successful in a new environment?

a) The introduced species evolved traits in its previous environment that happen to make it extremely well fit for the new environment.
b) A new environment will introduce new mutations, allowing the species to adapt rapidly.
c) Invasive species likely evolved diverse traits in advance so that if they are introduced to new environments, they have a better chance of surviving.
d) The individuals introduced to the new environment were likely the biggest and strongest from the previous population.

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PRACTICE

Bt Delta endotoxin is a protein produced by bacteria that kills caterpillars. Scientists have engineered crops that produce this toxin in their leaves, meaning they do not need to spray their fields because the insecticide is being produced by the plant at all times. Over time, however, many species of insects are now showing resistance to these Bt-producing plants. Why do you think this is?

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a) When exposed to Bt Delta endotoxin, a caterpillar or other insect is likely to develop resistance and pass it on to its offspring.

b) The presence of Bt Delta endotoxin in the environment is likely to induce genetic changes to genes that provide Bt resistance.

c) Because the Bt Delta endotoxin is now produced by the plant and the plant is the insect's food, they have no choice but to adapt to be more resistant.

d) Individuals that have some resistance to Bt Delta endotoxin are more likely to reproduce. As this continues over many generations, resistance will become more common.