Name _____ Date _____

Natural Selection in Order: Why Some Inherited Traits Become More Common

Directions: Answer the questions on natural selection, which include two order sets and a group that uses a table of beak measurements from a finch population.

1. Which of these statements about how evolution by natural selection works is correct?

A. Individuals evolve during their lifetimes and then pass the new traits they gained on to their young.

B. Natural selection gives each organism the new traits it needs in order to survive where it lives.

C. A population evolves over generations, but an individual organism does not evolve during its lifetime.

D. Evolution moves every species step by step toward a perfect final form that it is aiming for.

2. In rock pocket mice, fur color is inherited, and on a dark lava flow some mice have dark fur while others have light fur. Put these events in order for one generation of mice on the lava flow, from the birth of the young to the next generation. Label each event First, Second, Third or Fourth.

Write the letter of the matching answer on each line.

1. _____ More of the dark-furred mice live long enough to mate and have young.
2. _____ More young mice are born than the lava flow has food and hiding places for.
3. _____ In the next generation, a larger share of the mice on the lava flow have dark fur.
4. _____ Owls catch light-furred mice on the dark rock more often than dark-furred mice.

A. First
B. Fourth
C. Second
D. Third

3. In a population of seed-eating finches on a small island, beak depth varies from bird to bird. Put these events in order, from the start of a long drought to the next generation of finches. Label each event First, Second, Third or Fourth.

Write the letter of the matching answer on each line.

1. _____ The surviving finches mate and raise chicks when the rains return.
2. _____ The grown chicks have deeper beaks, on average, than the finches alive before the drought.
3. _____ The drought cuts the seed supply, and the small, soft seeds are eaten up first.
4. _____ Finches with deeper beaks crack the large, hard seeds that remain and survive more often.

A. First
B. Second
C. Fourth
D. Third

4. In biology, fitness describes how well an organism survives and reproduces in its environment. On a dark lava flow, which of these rock pocket mice has the highest fitness?

A. A fast light-furred mouse that lives for a year and has 6 young that survive to adulthood

B. A dark-furred mouse that lives for two years but never has any young

C. A large, strong light-furred mouse that an owl catches before it ever mates

D. A dark-furred mouse that lives for a year and has 14 young that survive to adulthood

5. A light-furred rock pocket mouse on dark lava rolls in dark ash, which hides it from owls for a while, and it survives to have young. Will its young be more likely to have dark fur because of the ash?

A. No, because the ash changed only the outside of its fur, not the alleles it passes on.

B. Yes, because any change that helps an animal survive is passed on to its young.

C. Yes, because the mouse needed dark fur in order to survive on the dark lava flow.

D. No, because young mice never look like their parents in any of their traits at all.

6. Near the lava flow, other rock pocket mice live on light, sandy rock. There, which fur color is most likely favored by natural selection, and why?

A. Dark fur, because dark-furred mice are stronger than light-furred mice

B. Dark fur, because dark fur is the better trait in every kind of habitat

C. Neither color, because owls find mice only by sound and never by sight

D. Light fur, because owls spot dark mice more easily against light rock

7. Suppose every finch in an island population had exactly the same beak depth. During a long drought that left mostly large, hard seeds, what would most likely happen to the population's mean beak depth?

A. It would decrease, because only the birds with the smallest beaks would survive.

B. It would increase, because the drought would make each bird's beak grow deeper over time.

C. It would increase, because the finches would try harder to crack the large seeds.

D. It would stay the same, because natural selection needs variation among individuals.

Beak Depth Before and After a Drought

In a study, every adult finch on a small island was caught, banded and measured before a long drought. The survivors were measured again after the drought, and no adult's beak depth had changed. The chicks of the survivors were measured once they were fully grown.

Beak depth of the seed-eating finches on one small island, before and after a long drought

Group of finches	Number of finches	Mean beak depth (mm)
All adults before the drought	750	9.4
Adults that died during the drought	640	9.3
Adults that survived the drought	110	10.0
Chicks of the survivors, measured once grown	220	9.8

8. About what share of the adult finches survived the drought?

A. About 15 percent B. About 50 percent C. About 30 percent D. About 85 percent

9. Which comparison in the table best supports a link between beak depth and whether finches survived the drought?

A. The number of adults before the drought (750) compared with the number of grown chicks (220)

B. The chicks' mean beak depth (9.8 mm) compared with the survivors' mean beak depth (10.0 mm)

C. The survivors' mean beak depth (10.0 mm) compared with that of the finches that died (9.3 mm)

D. The number of finches that died (640) compared with the number that survived the drought (110)

10. Which conclusion about this finch population do the measurements support?

A. The population did not evolve, because no single finch's beak got any deeper at any point during the drought.

B. Each surviving finch's beak grew about 0.6 mm deeper during the drought, and its chicks inherited the change.

C. The population's mean beak depth rose in one generation, though no adult's beak changed, which fits evolution by natural selection.

D. The chicks' deeper beaks prove that the finches needed deeper beaks and so grew them to survive the drought.