THINK About It: Change and Survival

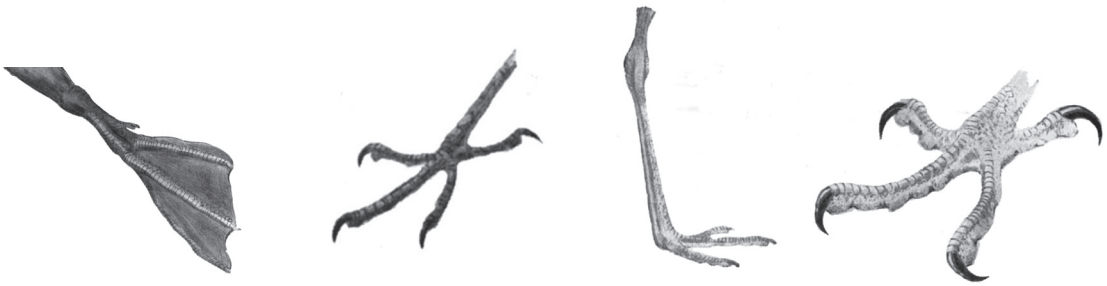
VSC G6.3.D.1.a, b, c, e; G6.3.F.1.a, c G8.3.D.1.a, b

Every organism lives in an **environment**—the physical surroundings of an organism, which includes living parts (like plants and animals) and nonliving parts (like soil and sunlight). All environments have a limited amount of **resources**, such as food, space, water, air, and shelter. Organisms with similar needs often compete for the resources they need to live. This competition might be between different **species** (groups of living things that can successfully reproduce among themselves) or between individual organisms in the same **population** (a group of organisms of the same species that live in the same area at the same time). The growth and survival of organisms, populations, and species depends on how well they can compete in the physical conditions of their environments.

Particular **traits**, or characteristics passed from parents to offspring, make certain species better suited than others to their environment. Sometimes, a specific variation will make one organism in a population more competitive in its environment. This individual would be more likely to survive and produce offspring that could inherit and spread the beneficial trait through more of the population. When a characteristic improves a population's chance of survival and reproduction, it is called an **adaptation**.

There are different types of adaptations. A **structural adaptation** involves a specific part of an organism's body. For example, a cactus has spines on it that help protect it from organisms that try to eat it. Many hummingbirds have beaks of a particular shape that allow them to feed from the most abundant flowers in their environments.

8 **The pictures below show four claws, each from a different bird.**



Webbed Branch-grasping Elongated Fish-grasping

Which bird's foot is <u>best</u> adapted to swimming in a wet environment?

- ○ **A** webbed
- ○ **B** elongated
- ○ **C** branch-grasping
- ○ **D** fish-grasping

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A **behavioral adaptation** involves an animal's behavior—it can be learned or it might be something an animal is born doing. For example, every species of bird has its own birdcall. These patterns of sound help birds find appropriate mates and protect their territory. Other animals use their behavior to evade predators. For example, the possum often plays dead when a predator is nearby because many predators will not eat animals that are already dead.

A **physiological adaptation** involves the overall functions, systems, or processes of an organism. For example, certain types of bacteria have become resistant to antibiotics, which means they adapted to survive the treatments that people use to kill them.

Many of these adaptations amount to only small differences between parents and offspring. But these differences can accumulate with each generation, so that later descendants are very different from their ancestors. For example, almost all early life originated in water. Then, some variations occurred in the fins of certain fish, which allowed them to move over land for short periods of time. Eventually, other land adaptations appeared, like lungs for breathing air, which resulted in the first land animals. When certain adaptations occur as a result of natural variation and this slowly transforms species over many generations, **evolution** is occurring.

Evolutionary change in species also occurs as a result of environmental changes. Environments are constantly changing, often slowly, but sometimes very rapidly. Gradual change (like climate change) and sudden changes (like floods or fires) transform the conditions that affect the survival of individual organisms and populations. Changing conditions could mean that water and certain kinds of food are more difficult to find. So, those organisms that were best adapted to the previous conditions may not remain the best suited to the changing environment. Species that are better adapted to cope with change may ultimately survive best.

For example, climatic change has caused prolonged drought conditions in the African grasslands. Certain grazing animals have suffered greater losses than others. Better-adapted species can range far from water, and can live on more drought-resistant shrubs and trees. Animals that must be near water at all times and that feed on drought-susceptible grasses have a smaller chance at survival and reproduction.

9 **A forest fire sweeps through a wooded area.**

Which organism might be affected <u>most</u> positively?

- ○ **A** bears that can climb trees
- ○ **B** deer that can run from the fire
- ○ **C** plants that need heat to reproduce
- ○ **D** trees that have fire-resistant bark

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