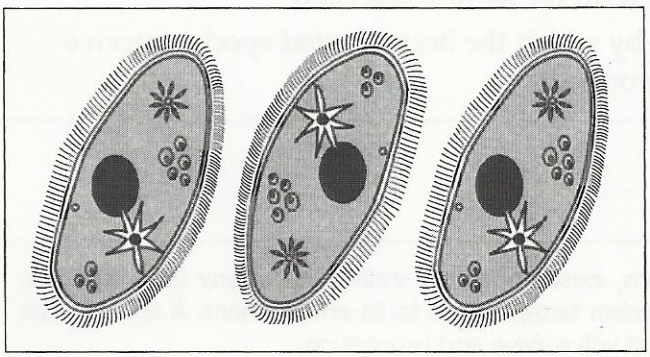
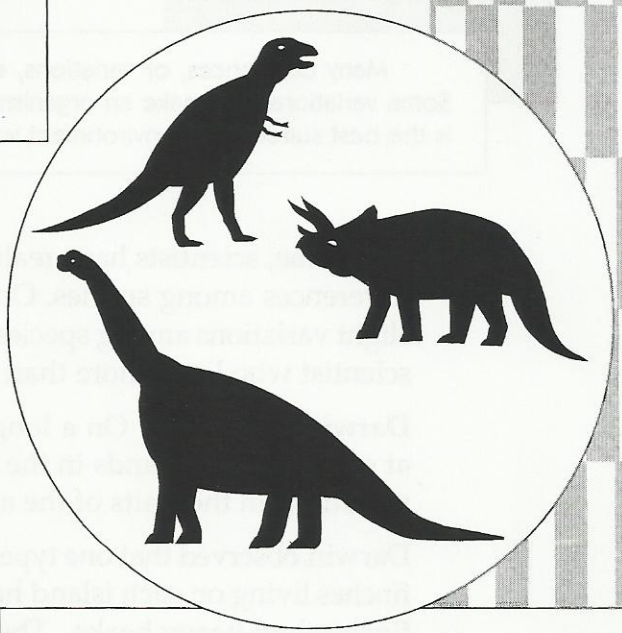
Evolution

UNIT 3

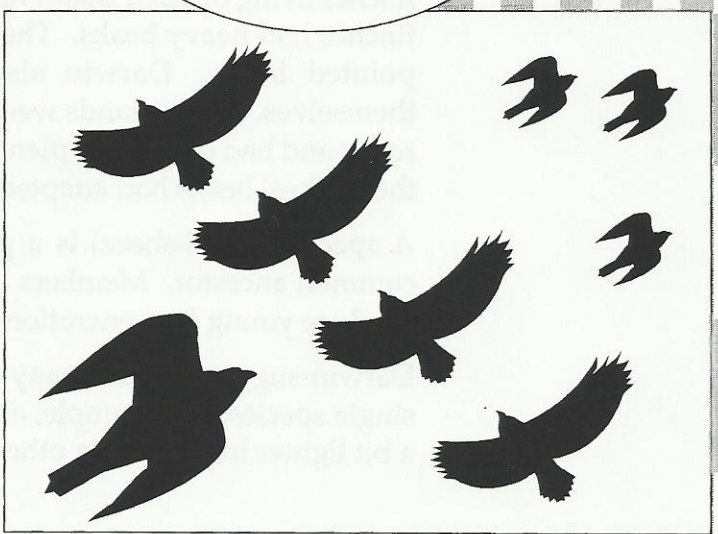




Many movies have been made about dinosaurs. A recent movie, Jurassic Park, *presents information about dinosaurs that seems very believable. Although some of the "science" of the movie is purely fictional, some of the ideas presented are based on scientific theories.*

By studying the bones of dinosaurs, scientists have made hypotheses about the physical appearance of dinosaurs. For example, whether a dinosaur is a meat-eater or a plant-eater can be determined by studying its teeth. The height and weight of these huge animals can also be estimated from their preserved bones.

Why did dinosaurs become extinct? Although many theories have been suggested, none have been proved. One popular theory is that a huge meteor from space struck the earth, creating thick clouds of dust that blocked out sunlight for months. This would have caused a major change in the climate which may have caused the dinosaurs to die off very rapidly.



Lesson 13 Natural Selection

Key Words

species: a group of closely related living things whose members can mate and produce young for generations.

adaptation: process by which a species becomes better suited to a change in its environment

survival of the fittest: another term for natural selection

natural selection: process by which the best adapted species survive and reproduce

KEY IDEAS

Many differences, or variations, exist among the individuals of any single species. Some variations may make an organism better suited to its environment. A species that is the best suited to its environment will survive and reproduce.

Over time, scientists have realized how much can be learned from studying differences among species. One of the first people to see the importance of slight variations among species was Charles Darwin. Darwin was an English scientist who lived more than 100 years ago.

Darwin's Studies. On a long voyage around the world, Darwin stopped at several small islands in the Pacific Ocean. While there, he noticed slight variations in the traits of the animals that lived on each island.

Darwin observed that one type of bird, a finch, lived on all the islands. But the finches living on each island had slightly different beaks. On one island, the finches had heavy beaks. The finches on another island had thinner, more pointed beaks. Darwin also noticed differences among the islands themselves. Some islands were covered with trees and bushes. Others were rocky and had only a few plants. After careful study, Darwin concluded that the finches' beaks had adapted to the type of food available on each island.

A **species** (SPEE-sheez) is a group of closely related living things with a common ancestor. Members of the group can mate with one another and produce young for generations.

Darwin suggested that many slight variations in traits existed within any single species. For example, an individual bird might be slightly smaller or a bit lighter in color than other birds of the same species.

Adaptation. Sometimes conditions in an environment change. The change may be sudden, such as that caused by a fire or a storm. Or the changes may be slow, such as the wearing down of mountains. If members of a species are not suited to the new, changed environment, the species may not survive. To survive, the species must either change or move away. But such changes occur slowly. They happen over long periods of time and over many generations.

Sometimes, an organism has a trait that allows it to survive. If this trait is passed on to its offspring, the offspring also have a better chance of survival. The process by which a species becomes better suited to a change in its environment is called **adaptation** (ad-uhp-TAY-shuhn).

1. **What is adaptation?** _____

_____

_____

Darwin wrote that the differences in the finches' beaks were variations. See Fig. 13-1. On an island that had many plants with large seeds, the finches had large, heavy beaks. This trait allowed them to crack open the seeds. Because these birds had plenty to eat, they would be healthy, and would be likely to find a mate and produce young.

In contrast, a finch with a smaller beak would have a hard time cracking open and eating the large seeds. This bird might not get enough to eat. As a result, it would not be as healthy as other well-fed finches. The hungry bird might not find a mate, and it might even die. Thus, it would not pass traits to a new generation of offspring.

Darwin suggested that only the better adapted finches would be healthy enough to survive and produce young. He called this process **survival of the fittest** (suhr-VY-vuhl uhv thuh FIHT-uhst). In this process, organisms that survived produced young that inherited the traits they needed to adapt to their environment. These helpful variations were passed from one generation to the next.

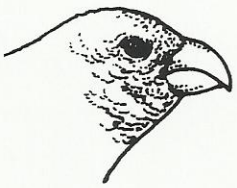
Natural Selection. Darwin realized that survival of the fittest also happened in species other than finches. He suggested that all species compete for survival. He also noted that species that are best adapted to their environment survive longer and reproduce more. Darwin called this process **natural selection** (NACH-uhr-uhl suh-LEHK-shuhn). The terms *survival of the fittest* and *natural selection* are both used to describe the process in which organisms with the best adaptations survive and reproduce.

2. **What is natural selection?** _____

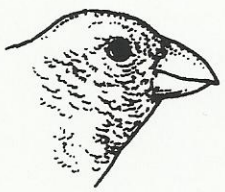
_____

_____

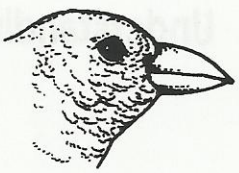
Fig. 13-1



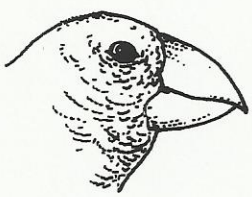
Small seed-eating finch



Insect-eating finch



Cactus-feeding finch



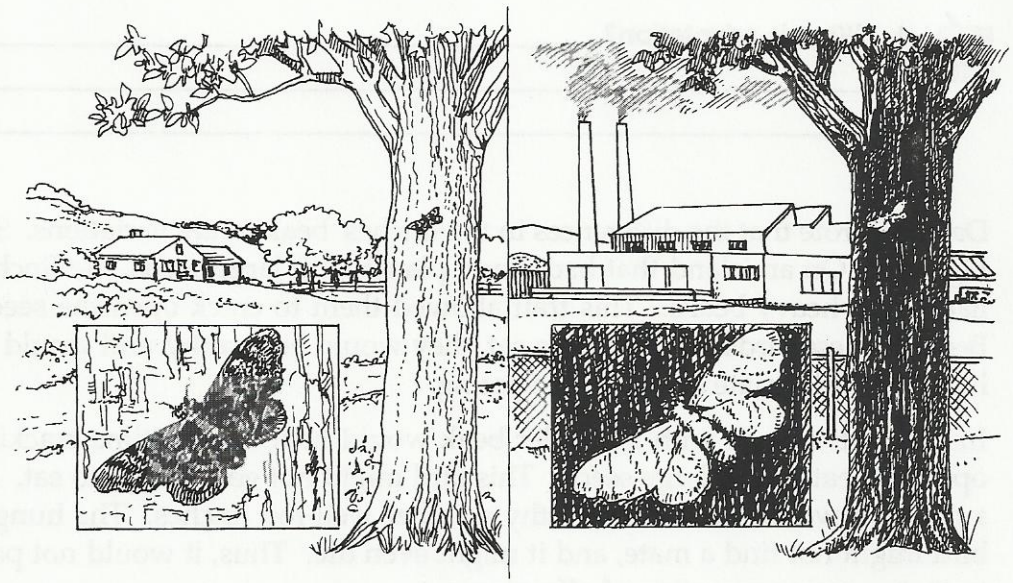
Large seed-eating finch

TAKE ANOTHER LOOK

Fig. 13-2 shows an example of natural selection in moths. Imagine two different traits for wing color in moths. One trait is for light-colored wings. The second trait is for dark-colored wings. Because dark-colored moths are easy to see on tree trunks, predators capture many of them. Most of the moths that remain have light-colored wings.

Then the environment changes. Pollution darkens most of the tree trunks. Now dark-colored moths have the advantage because they are hard to find. They become more common as predators capture more of the light-colored moths.

Fig. 13-2



Check Your Understanding

Write a sentence explaining the connection between each pair of words.

3. adaptation, trait _____

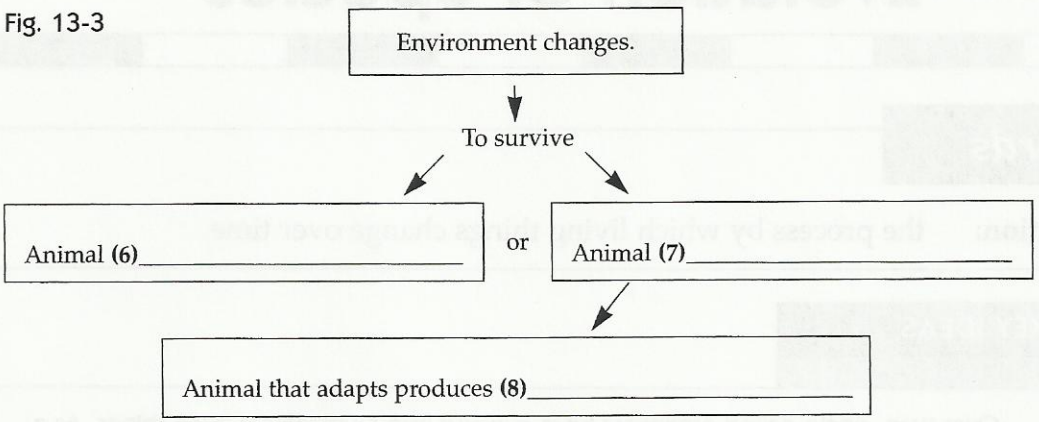
4. natural selection, survival _____

5. survival of the fittest, reproduce _____

Complete the concept map shown in Fig. 13-3. Use the following terms:

young *move away* *adapts*

Fig. 13-3



Fill in the blanks.

9. Another term for natural selection is _____.

10. Species that are best _____ to their environment survive longer and produce more young.

11. The process by which a species with the best adaptations survive and reproduce is called _____.

12. Within any group of species, there are variations of traits. How are these variations helpful to the group?_____

_____

_____

13. How did Darwin's finches adapt to the different environments of the islands? _____

_____

_____

14. Are all different types of traits the result of adaptation? Explain.

_____

_____

_____