

Chapter 5-9: Natural Selection

Darwin and Wallace recognized that members of a population of organisms have unequal chances for survival and reproduction. They must compete for food and mates, safety from predators, safety from disease, and numerous other factors. In these struggles for existence, some individuals in a population will be more successful than others because of variations in their physiology, body structure, or behavior. The reproduction of fitter organisms is the basis for natural selection.

Both Darwin and Wallace believed that natural selection is the primary mechanism in the evolution of new species. Contemporary biologists attribute evolution to other phenomena such as gene flow and genetic drift, but natural selection remains an important factor.

In this plate, we examine the process of natural selection, and we show how a population changes as a result of it. We will see how fitness is a measure of an individual's ability to survive and reproduce and how some members of a population are more fit than others.

Look over the plate and color as you read the paragraphs below. There are four parts to be colored in this plate: an isolated island on which natural selection occurs; two types of animals from the population of the island; and a predator. You will only need four colors. We will follow the story of the island through five diagrams, beginning at the top of the page.

Historically, biologists wondered how animals and plants adapted, uniquely fitting to their environments, but they now know that variation and natural selection are responsible. Variations give certain individuals advantages over others, and they survive and reproduce as noted above. Natural selection encourages survival of the better-adapted individuals and acts on variations present in individuals within the population, rather than on the population as a whole.

Take a look at the first diagram. Two different animals exist on the isolated island (I). The first animal (A) lives solely on the ground, has a pointed snout, and digs holes in the ground. The second animal (B) has a blunt snout and cannot dig holes, but can climb trees to obtain food. The first animal is unable to climb trees. Thus, we see a variation in both the physical characteristics and lifestyles of the two animals.

Contrasting colors should be used for the first animal (A) and the second animal (B). We have established a population of mixed animals in a geographically isolated environment. We will now see how natural selection causes a change in the gene pool of the population. Focus on the second diagram and use the same colors that you've been using.

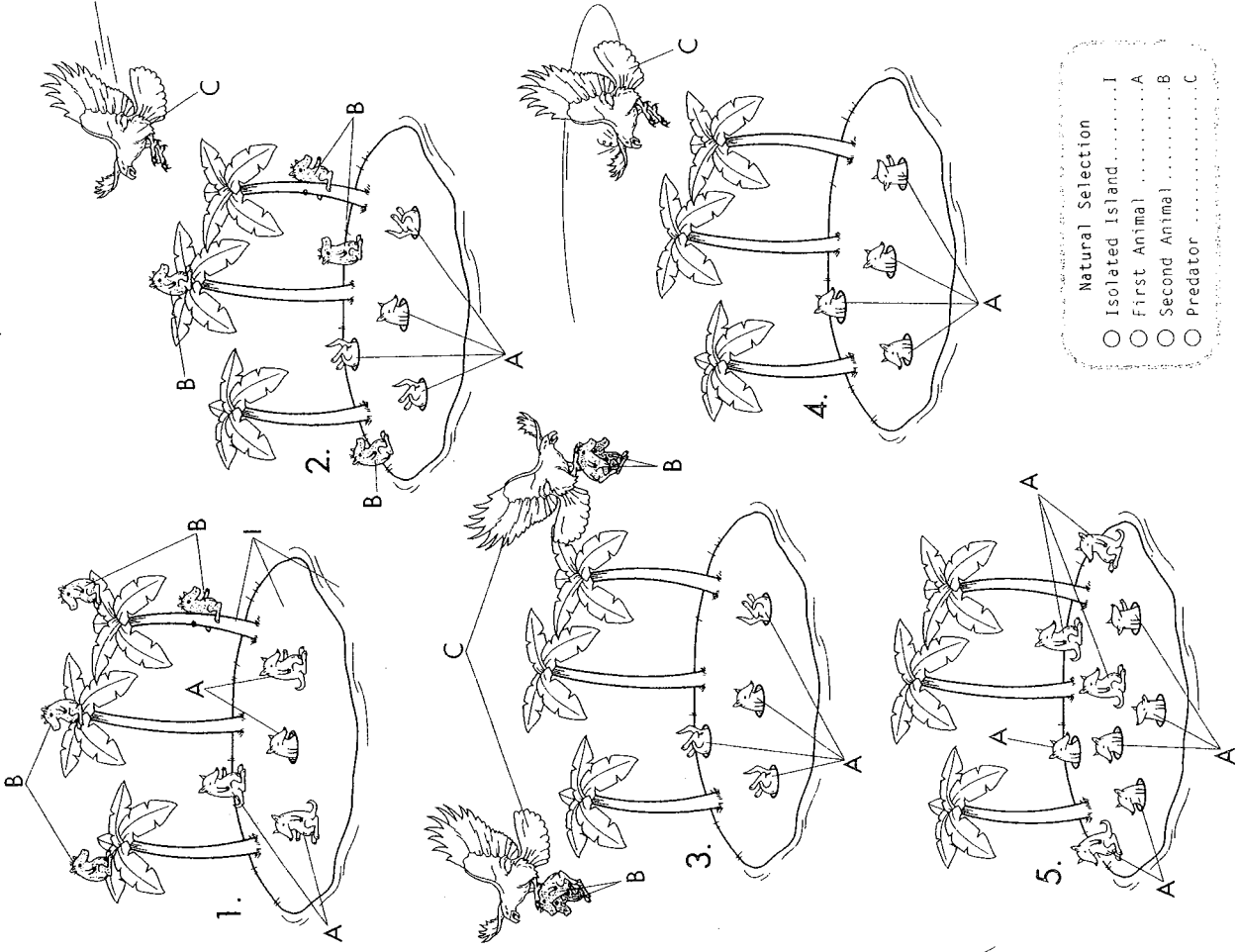
As we see in the second diagram, a **predatory bird (C)** now enters the environment. The first animals, which have pointed snouts (A), quickly dive into their holes in order to escape from the bird. The second animals (B), however, have blunt snouts and cannot dig holes into which they can escape.

In diagram three, we see that the birds (C) are carrying off the less fit animals (B), while the burrowing animals (A) are in their holes. Natural selection is now taking place; animals that are less fit for that environment are removed from the population and the more fit ones survive. It is a chance event based on the anatomical advantage of one of the animals.

In diagram four, we see the close of the episode of predation. The bird (C) cannot get at the animals that have pointed snouts (A). They have survived because they are suited to the environment and can use their qualities to their advantage. Soon, the birds will no longer hunt on this island since they will have exhausted the supply of tree-climbing animals that can be easily reached.

We close our story by looking at the last diagram in the plate. Some years have passed and we see the effect of the predatory event. Continue to use the colors you used before.

After time passes, the only animals present on the island will be those that have pointed snouts. These animals have reproduced and passed their characteristics to their offspring.



Natural Selection	
☐	Isolated Island I
☐	First Animal A
☐	Second Animal B
☐	Predator C

5.9 Natural Selection

- Do organisms of a population have equal chances for survival & reproduction?
- What did Darwin & Wallace believe was the primary mechanisms in the evolution of a new species?
- These give individuals certain advantages over others:
- Not only do these individuals survive, but they _____ as well.
- What two types of variations are noted between the two animals on the island?
- What happened to the animals that could not dive into holes?
- What happened to the animals that survived?