

Selective Breeding Passage & Questions

Advances in Genetics

Name: _____ # _____

Date: _____ Per. _____

After reading the passage, **Selective Breeding**, answer the following questions.

1. What does the passage describe?
 - a. Experiments completed to analyzed the differences and similarities between animals bred for certain traits and animals not bred for certain traits.
 - b. The attitudes of different societies to selective breeding.
 - c. Different examples of animals that have evolved through adaptation to their surroundings.
 - d. Different examples of selective breeding and the impact of selective breeding on some animals.
2. Give an example of a positive effect of selective breeding. Why would it be considered positive?

3. Give an example of a negative effect of selective breeding. Why would it be considered negative?

Selective Breeding Passage:

Charles Darwin, a British naturalist who lived in the 19th century, is best known for his book *On the Origin of Species*. In it, Darwin established the idea of **evolution** that is widely accepted today. He proposed that all **species** alive have evolved through **adaptation** to their surroundings. **Natural selection**, the process by which varied **traits** that increase survival and enable reproduction are passed down from generation to generation, is probably the most famous principle from the book. Darwin’s book also addresses the perhaps less well-known concept of **artificial selection**. Today artificial selection is more often called “**selective breeding**.” Selective breeding involves breeding animals or plants for a specific, typically desirable trait. By doing so, the desired genes from the plant or animal will be passed on to its offspring.

Dog breeding is one of the most common examples of artificial selection. You need only to tune into a dog show on TV to see the power of selective breeding at work. Crossbreeds, for example, are dogs born from parents of two different breeds. Mixed breeds are born from parents of more than two breeds, and pure breeds are born from a single breed. All three varieties are featured in most dog shows. Many of these dogs were bred to achieve certain desirable physical or behavioral traits.

Beyond the context of dog shows, dogs are a particularly interesting example of selective breeding. After all, we call dogs “man’s best friend” for a reason. Dogs originally evolved from wolves. Eventually, humans were breeding different types of dogs to accomplish certain jobs. For example, some dogs were bred to hunt well. Others were bred with desired traits to herd cattle. But it was a trait known as “tamability,” or a dog’s ability to be tamed and live among people, that resulted in humans keeping dogs as pets. Now that many people live relatively quiet, domestic lives, how well a dog can herd sheep is not of huge importance. What matters most is whether a dog makes a good companion.

Charles Darwin may have been the first to describe the process of selective breeding, but the practice may be more than 2,000 years old. The Romans are said to have practiced selective breeding among their livestock, favoring cows that produced a lot of milk. But it wasn’t until the 18th century that farmers began practicing it on a large, industrial scale.

Today, farmers breed chickens to have extra-large breasts and to lay a lot of eggs. A wild fowl—a chicken that lives in the woods—lays between 20 and 30 eggs per year. In contrast, a chicken born out of selective breeding can lay as many as 300 eggs per year.

In the same way that chickens are selectively bred for having more meat and laying a greater amount of eggs compared to wild chickens, cattle are often selectively bred either for more meat or for more abundant milk production compared to cattle in the wild. Over the course of the 1700s, the size of bulls sold for slaughter increased dramatically—from around 300 pounds (about 140 kilograms) to nearly 800 pounds (about 360 kilograms)—as a result of selective breeding. Also as a result of selective breeding, the dairy cow, which does not display a lot of girth or muscle, can produce enough milk for 10 calves. One can identify a dairy cow by its udders, which can hold over 5 gallons (over 19 liters) of milk.

Even though people selectively breed to yield animals with desired traits, there are dangers to selective breeding. Temple Grandin, an animal welfare advocate, notes that breeding animals for size and strength interferes with natural animal processes. Breeding roosters for muscle, for example, can make them top-heavy and unsteady on their feet, interfering with their courtship dances. This, in turn, can alienate them from hens.

Speaking of hens, what about those that were bred to lay 300 eggs per year? Laying one egg a day makes a hen’s bones brittle, since the eggs soak up the bird’s calcium supply. And what about so-called broiler chickens—the ones that are bred for their large breasts? Often, their bodies grow so fast that their skinny legs can’t support them.

Cows required to produce enough milk for 10 calves tend to burn out quickly. Cows not subject to selective breeding can live up to 30 years without burning out. But prolific dairy cows tend to make it just four or five years before they are considered worthless, and then they are sent to be slaughtered.

Selective breeding comes with both benefits and drawbacks. Think of all the joy that dogs have offered humans in the form of companionship over the last 100 years. Selective breeding is to thank for man’s best friends. And yet, the pain and suffering that livestock endure makes us

think twice. It is important to keep in mind that, in some cases, the negative consequences of selective breeding may outweigh the positive.