

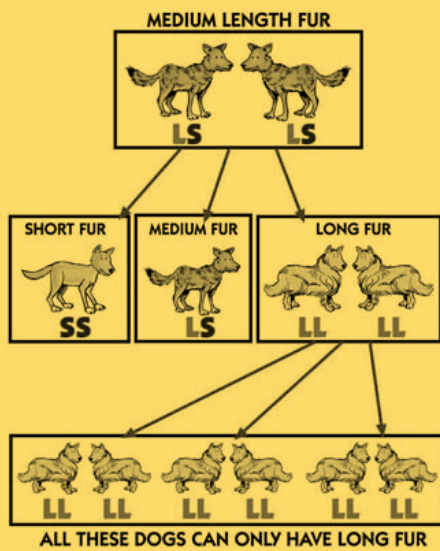


10 Examples of Natural Selection



Unit 6: Evolution

Article written by Diana Bocco



Defined:

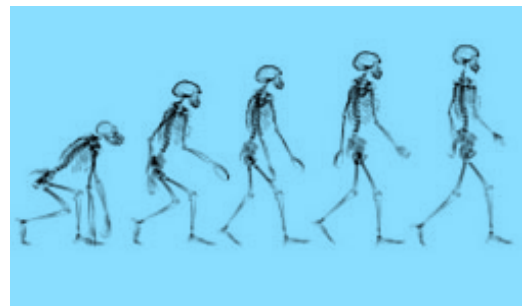
Natural Selection:

a natural process that results in the survival and reproductive success of individuals or groups best adjusted to their environment and that leads to the perpetuation of genetic qualities best suited to that particular environment

An Introduction to Evolution

When we think of evolution, we usually think of complex organisms developing from more simple ones, and of the evolutionary changes that were made over thousands and thousands of years. But the truth is evolution is at work all the time. Sometimes the changes are small and appear insignificant at first glance, but they all play a part in natural selection and the survival of the species.

But natural selection doesn't always lead to the development of a new species. In most cases, the process simply allows a species to better adapt to its environment by changing the genetic make up from one generation to the next. And the process is actually quite predictable. If a species lacks a certain trait that will allow it to survive, there are two options: Either the species dies out over time or it develops the missing trait through several generations.



Most people think of biologist and naturalist Charles Darwin as the father of the theory of evolution, but the truth is that the concept of evolution is much older. Anaximander, a philosopher who lived in Ancient Greece, believed that man naturally evolved from an early animal species [source: All About Science]. And in 1809, biologist Jean-Baptiste Lamarck talked about the transformation of one species into another. But it was Darwin who introduced the concept of natural selection in the 1850s and forever changed the concept of evolution. Read on to see 10 prime examples of this theory and how each species puts its own spin on it.

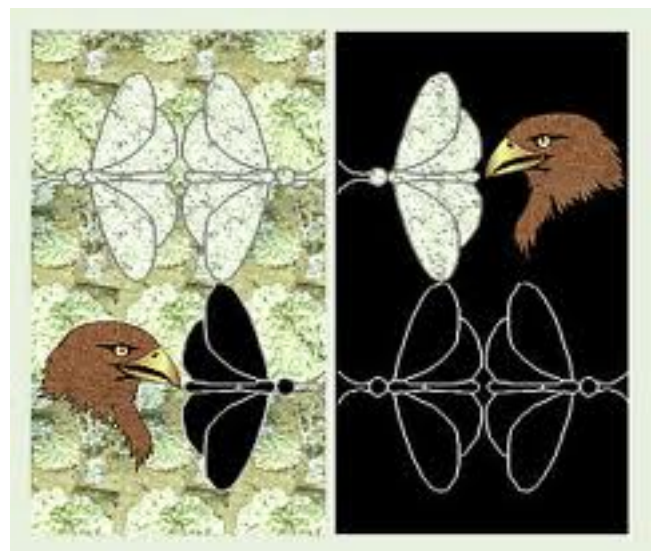


Peppered Moth

Example #10

Many times a species is forced to make changes as a direct result of human progress. Such is the case with the peppered moth (*Biston betularia*). Up until the Industrial Revolution, these moths were typically whitish in color with black spots, although they were found in a variety of shades. As the Industrial Revolution reached its peak, the air in London became full of soot, and the once-white trees and buildings that moths used for camouflage became stained black. The birds began to eat more of the lighter-colored moths because they were more easily spotted than the darker ones. Over the course of a few months, dark moths started appearing in the area and lighter moths became scarce. Once the Industrial

Revolution peak passed, lighter moths made a comeback.



Rat Snake

Example #9

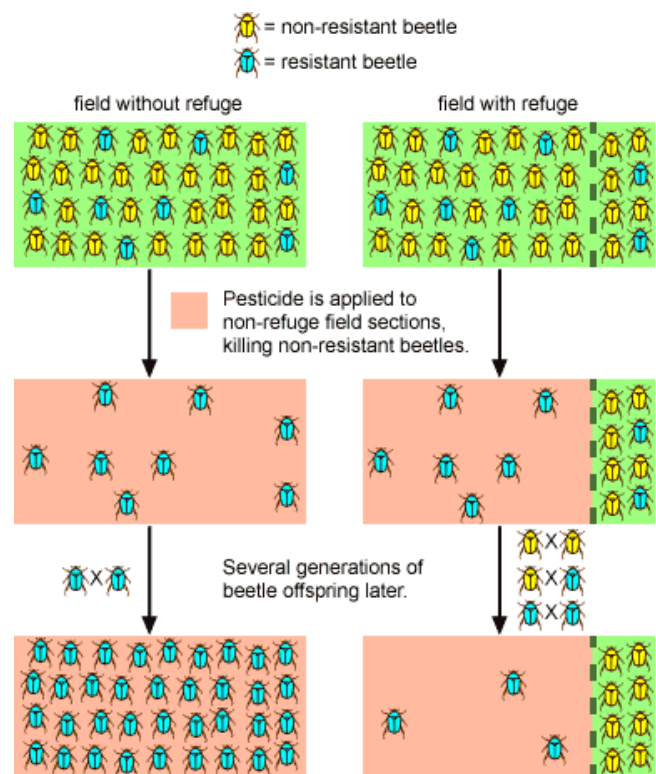


All rat snakes have similar diets, are excellent climbers and kill by constriction. They all have the same reaction when startled (they remain motionless) and will avoid confrontation whenever possible. Some will bite if threatened, although they are non-venomous. However, rat snakes come in a wide variety of colors, from yellow striped to black to orange to greenish. This is because rat snakes are found all over the Eastern and Midwestern states, and are subjected to all types of weather and terrain. Rat snakes are common in urban areas, but they can also be found in wooded areas, mountains or coastal regions. As a result, rat snakes have had to adapt to their local environments in an effort to avoid detection and hunt more effectively.

Pesticide- Resistant Insects

Example #8

The more a pesticide is used, the greater the chance that the insects targeted will develop immunity to the chemical. Pesticide resistance is not only very common, but it also usually happens rather quickly. Sometimes all it takes is a single generation. Imagine that a group of insects survives the pesticide and is able to reproduce. More likely than not, the offspring will be resistant to the pesticide from birth. Those that are not immune will die, while the strongest will survive. Since many insects reproduce quickly, several generations can be born within months or even weeks. By the time a few generations have passed, all insects are likely to be resistant to the pesticide.

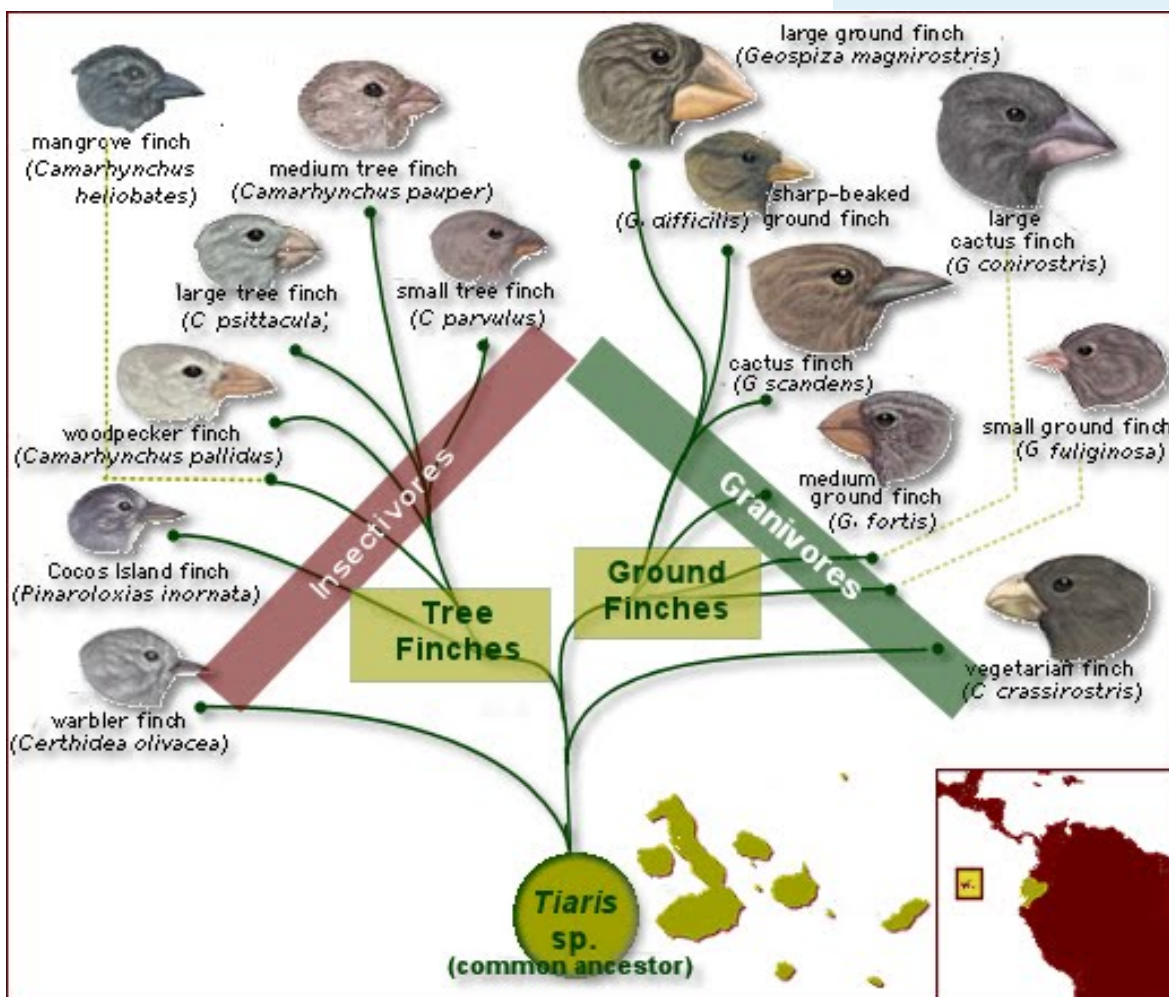


There are 13 types of Galapagos finches, also known as Darwin's Finches, and they share the same habits and characteristics except for one: All 13 have different beaks. The differences in their beaks might be the most important aspect of their survival. Two documented examples of that survival occurred in the late 1970s and mid 1980s. First, when a large drought affected the island in 1977, seeds became scarce. Finches with the largest, toughest beaks were able to eat larger seeds that weren't typically part of their diet. As a result, they survived. Finches with smaller beaks were unable to crack the tough seeds and many died. Through the process of natural selection, the birds that were able to adapt reproduced and thrived, while the others dwindled in number. However, adaptation can go both ways, as was seen during rainy weather in 1984 and 1985. The heavy rains created more of the small, soft seeds and few of the large ones. This time, more birds with the smaller beaks survived and produced more offspring.



Galapagos Finches

Example #7



The more impressive the tail of a male peacock, the higher its chances of finding a mate. Female peacocks choose mates based on the color of the feathers and the overall physical prowess of the animal. According to experts, the brightness of the plumage might signal to females that the animal has high-quality genes. This would make him ideal for reproduction and to ensure the

Peacocks

Example #6



survival of the offspring, so they're chosen first when it's time to mate [source: [The Great Debate](#)]. In reality, not all males have bright, large tails, and this was especially true a few thousand years ago. And because females kept choosing the brightest males as partners, the ones without the impressive tails were less likely to mate and reproduce. As a result, their numbers diminished from one generation to the next, making them

Warrior Ants

Example #5

The warrior ants in Africa are probably one of the most impressive examples of adaptation. Within any single colony, ants emit a chemical signal that lets the others know they all belong to the same compound. Or, put more simply, a signal that says "Don't attack me, we're all family." However, warrior ants have learned how to imitate the signal from a different colony. So if a group of warrior ants attacks a colony, they will be able to imitate that colony's signal. As a result, the workers in the colony will continue on, now under the direction of new masters, without ever realizing an invasion has taken place.



Deer Mouse

Example #4

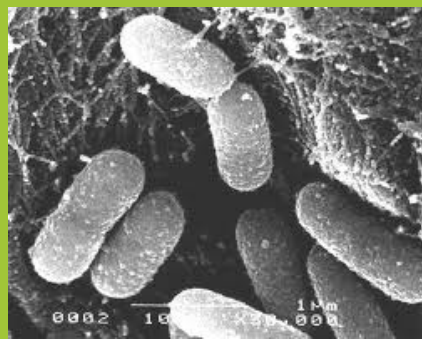
Nebraska's Sand Hills is home to a deer mouse that's one of the quickest-evolving examples of natural selection in animals. The deer mouse is normally dark brown, which is a good color for mice living in the woods and surrounding areas, since it allows them to hide better and avoid predators. The deer mouse that lives in the Sand Hills, however, has evolved into a much lighter, sand-like color. Without this change, the deer mouse would be easily spotted by predators against the area's light terrain. Just one single gene had to change for the mouse's coat to become lighter. What's even more impressive? The change took only about 8,000 years, which is the equivalent to seconds in the evolutionary scale.



Since nylon wasn't invented until the 1940s, bacteria that can eat nylon can be nothing but new. The bacterium *Pseudomonas* is able to metabolize nylon thanks to certain enzymes it has. However, a surprising thing happens when you take a non-nylon eating variety of this bacterium and place it in an environment where the only type of food available is nylon.

Nylon-Eating Bacteria

Example #3



Every single time the experiment was tried, the bacteria would evolve until it was able to consume nylon [source: [Michigan State University](#)]. This is a very simple example of natural selection, where the most basic forms of life can adapt to whatever food the environment offers.



Lizards

Example #2

A number of studies have been done on lizards to determine natural selection. One experiment temporarily eliminated the lizards' natural predators from a particular area, and then scientists observed what impact that had on the lizards. The surprising find was that it's not so much the predators that influence the death or survival of certain lizards. Instead, the smaller lizards were more likely to die off anyway despite the lack of natural predators, because the larger, stronger lizards in the area still had better access to food. The lizards with the longest legs were able to climb better, escape the ground when floods or storms came, and reach food that wasn't available down below.

Humans

Are humans still evolving? The simple answer is yes, even if the changes are not obvious. Experts believe that about 9 percent of our genes are undergoing rapid evolution as we speak [source: [Science Daily](#)]. The genes most affected by natural selection are those involving the immune system, sexual reproduction and sensory perception.

Lactose intolerance is one example of natural selection. We are the only species that doesn't become lactose intolerant as we grow up. According to experts, this seemed to have happened when cattle became domesticated in Europe centuries ago. Another example is the sickle hemoglobin gene, which occurs in people who live in certain regions of Africa and other areas where malaria is endemic. This gene mutation makes people who have it more resistant to malaria. While they can still contract the disease, they are less likely to die from it. The mutation probably happened over hundreds of generations as a result of the constant exposure to malaria and people contracting and surviving it.



Example #1

Written by Diana Bocco

Reading Questions:

10 Examples of Natural Selection



1. How would YOU describe natural selection after reading this article?
2. Describe one instance where human activity has caused natural selection toward a certain phenotype.
3. Describe how non-random selection of mates can cause natural selection. In which instance did we see this?
4. Describe how camouflage leads to natural selection.
5. Fennec foxes have evolved to have very large ears. They live in hot, dry climates and hunt at night. How are these ears adaptation to their environment and lifestyle?
6. Describe which of the above scenarios is your favorite example of evolution and WHY. If you know of an additional example of natural selection not discussed here, please explain!

