

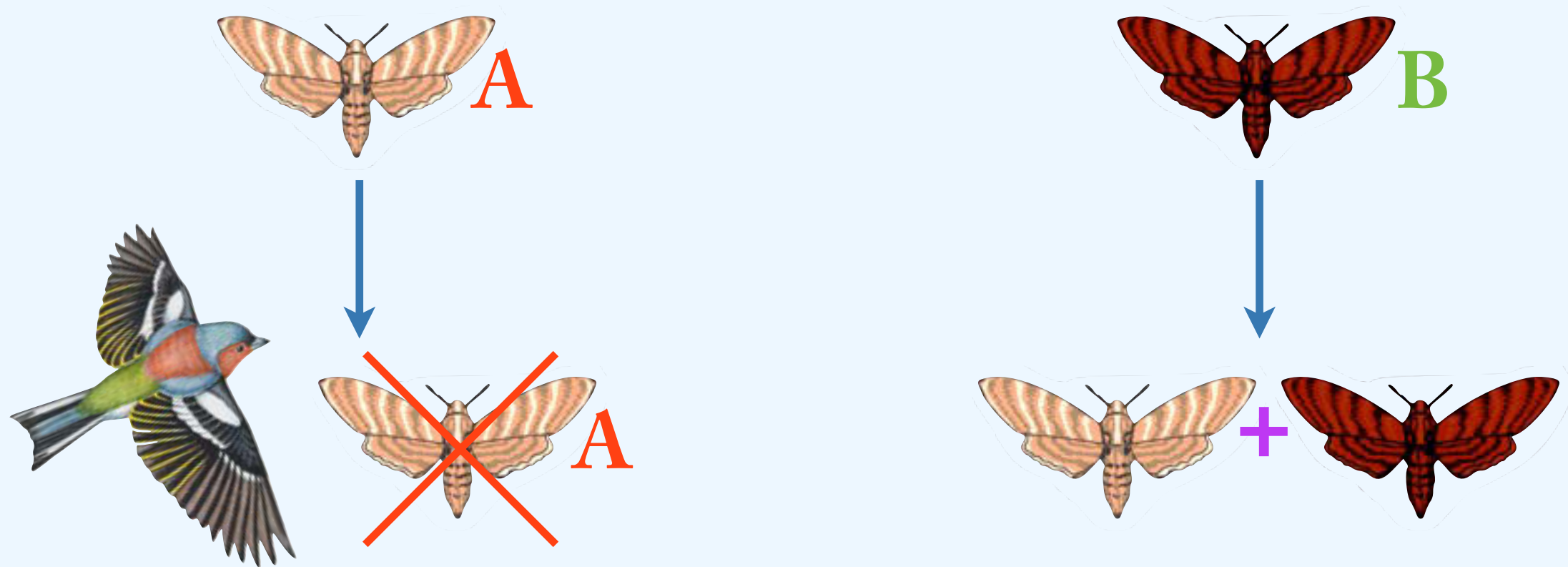
Evolution and Inheritance

Learning Objective:

To understand that adaptation of plants and animals to suit their environment may lead to evolution.



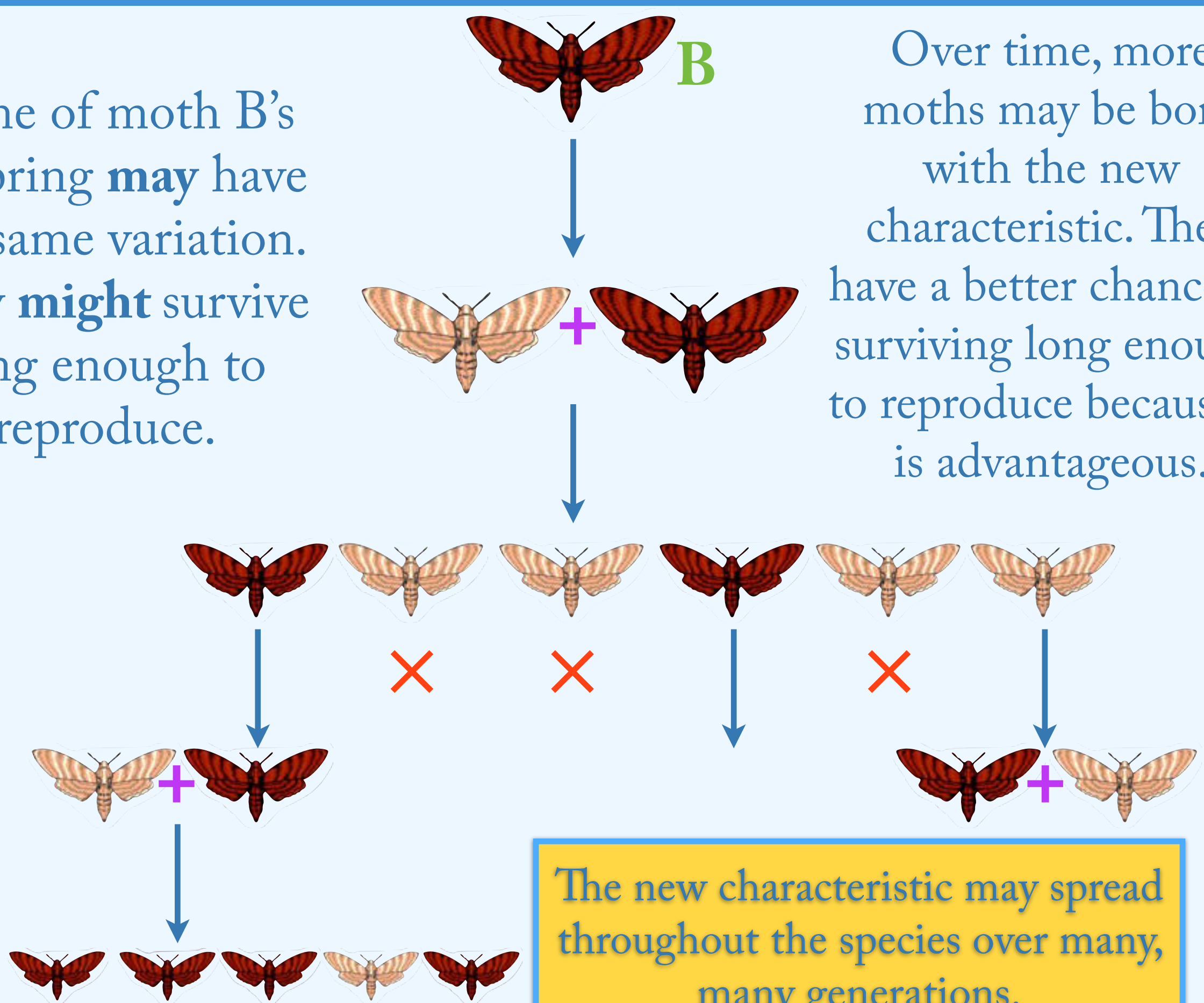
These two moths are different because moth B was born with an unusual characteristic. This *variation* may occur from one generation to the next. Moth B's darker colour is *advantageous* because it allows it to blend into its surroundings and hide from predators more effectively.



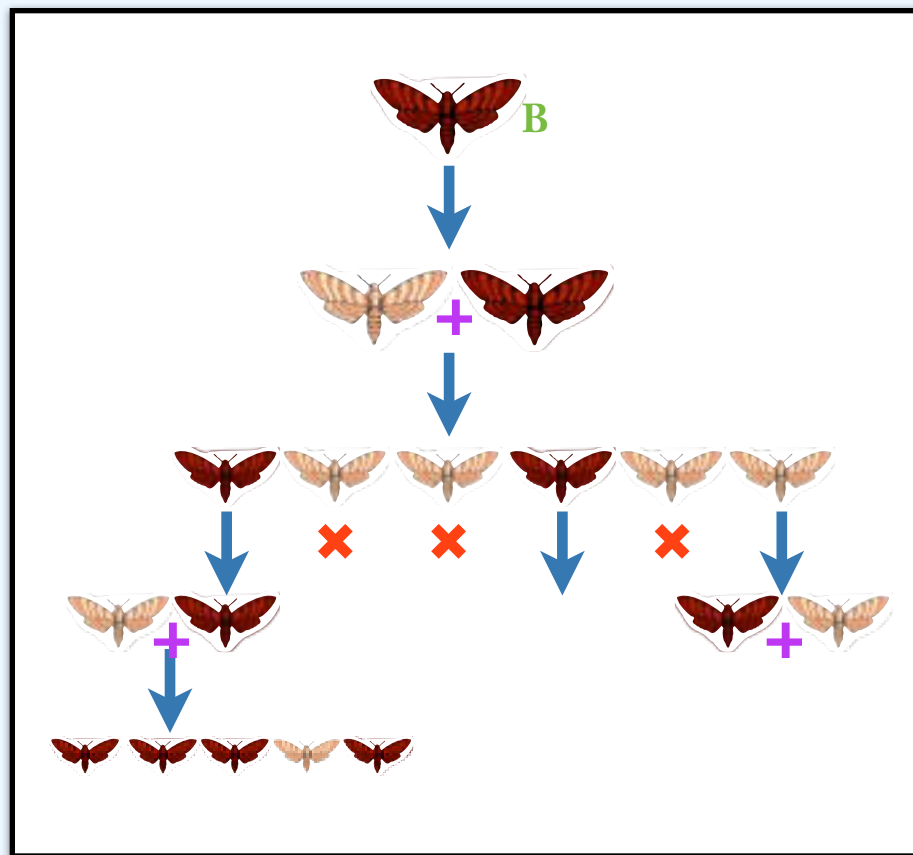
Because of its lighter colour, moth A is more easily seen by birds. It is eaten by a finch before it can find a mate and reproduce. Moth B survives long enough to find a mate and reproduce.

Some of moth B's offspring **may** have the same variation. They **might** survive long enough to reproduce.

Over time, more moths may be born with the new characteristic. They have a better chance of surviving long enough to reproduce because it is advantageous.



This process is part of a bigger life process called evolution. Evolution explains how all life on Earth has adapted and changed to suit its environments over time.



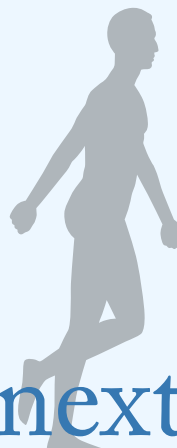
Let's find out more...

There is evidence to show that ancient Greek philosophers tried to understand and explain how living things have descended from one another. Over time, many scientists and other great thinkers have added to these ideas with their own theories.

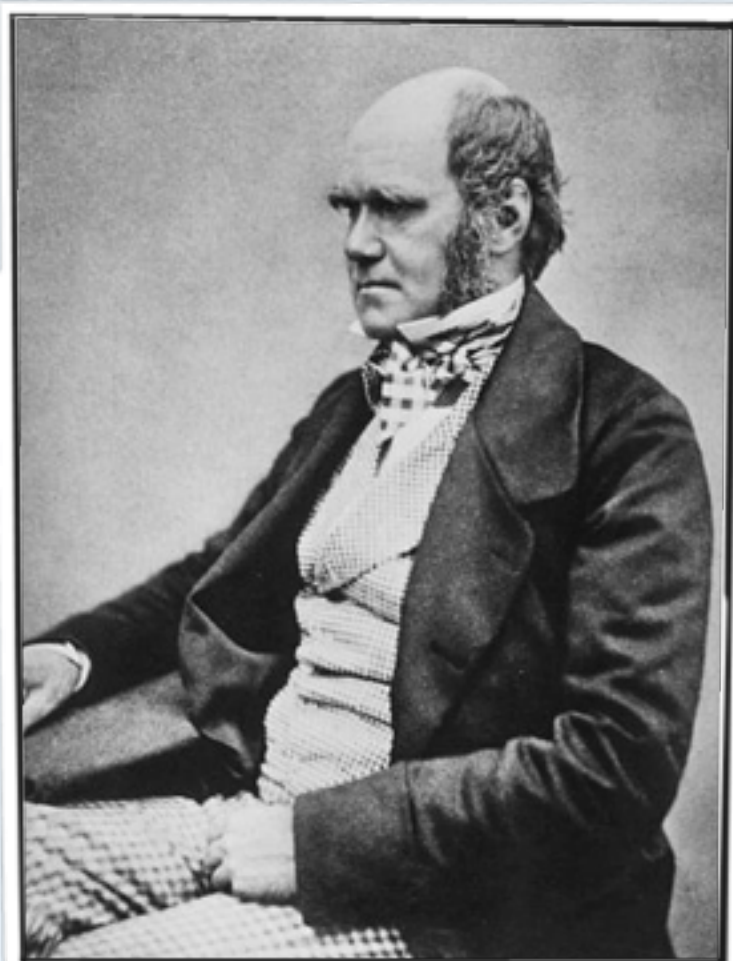
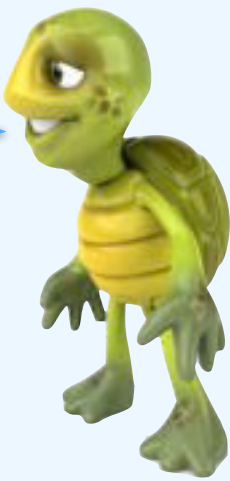


Carl Linnaeus
1707-1778

In the 17th and 18th centuries, scientists such as Carl Linnaeus were developing systems for classifying living things and developing theories which explained how living things were affected and changed over time by the conditions of their environment.



During the 19th century, the work of many scientists helped define a modern understanding of evolution. Their ideas, along with the evidence they discovered through looking at fossils, have shaped our understanding of the world today.



Charles Darwin dedicated his life to the study of plants and animals. In 1859 he published a book called *On The Origin Of Species*. In it, he explained the evolutionary process of **natural selection**.

Let's find out more about natural selection...

"Charles Darwin seated crop" by Charles_Darwin_seated.jpg; Henry Maull (1829–1914) and John Fox (1832–1907) (Maull & Fox) [1]derivative work: Beao - Charles_Darwin_seated.jpg. Licensed under Public domain via Wikimedia Commons - http://commons.wikimedia.org/wiki/File:Charles_Darwin_seated_crop.jpg#mediaviewer/File:Charles_Darwin_seated_crop.jpg

Charles Darwin
1809–1882



Natural Selection

On The Origin Of Species explained in great detail what Darwin had observed in nature to support his explanation of natural selection, which is that:

Living things reproduce and become more numerous

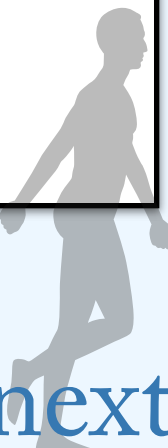
Offspring differ from their parents (variation)

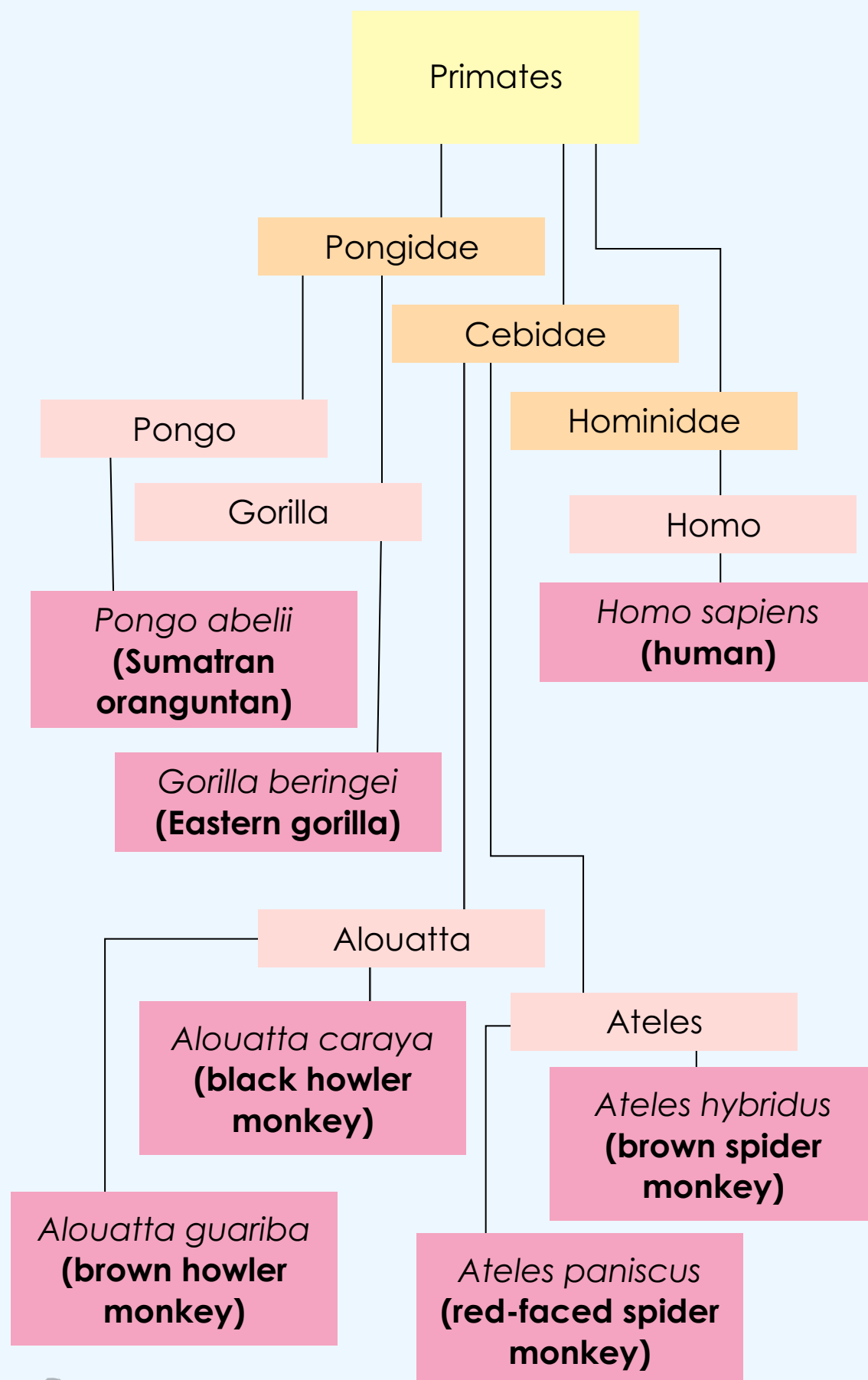
Some of those differences are advantageous, giving the offspring a greater chance of surviving and reproducing

More offspring will be born with that variation

That variation may spread through a population and change it

Sometimes, part of a population will develop different variations, eventually forming a new species



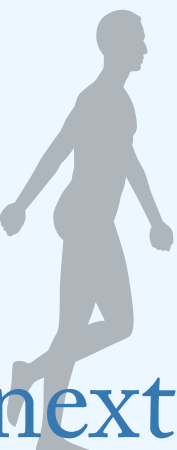


Scientists today continue to build on the work of earlier scientists and develop our understanding of evolution. This modern classification tree is based on the classification system developed by Carl Linnaeus. It shows just a tiny part of the order of primates. We now understand that humans and other species of monkeys and apes are parts of the same order that have evolved differently over time due to natural selection.

Let's take a closer look
at some of the ways in which
different species in the order of
primates have evolved, developing
different characteristics...



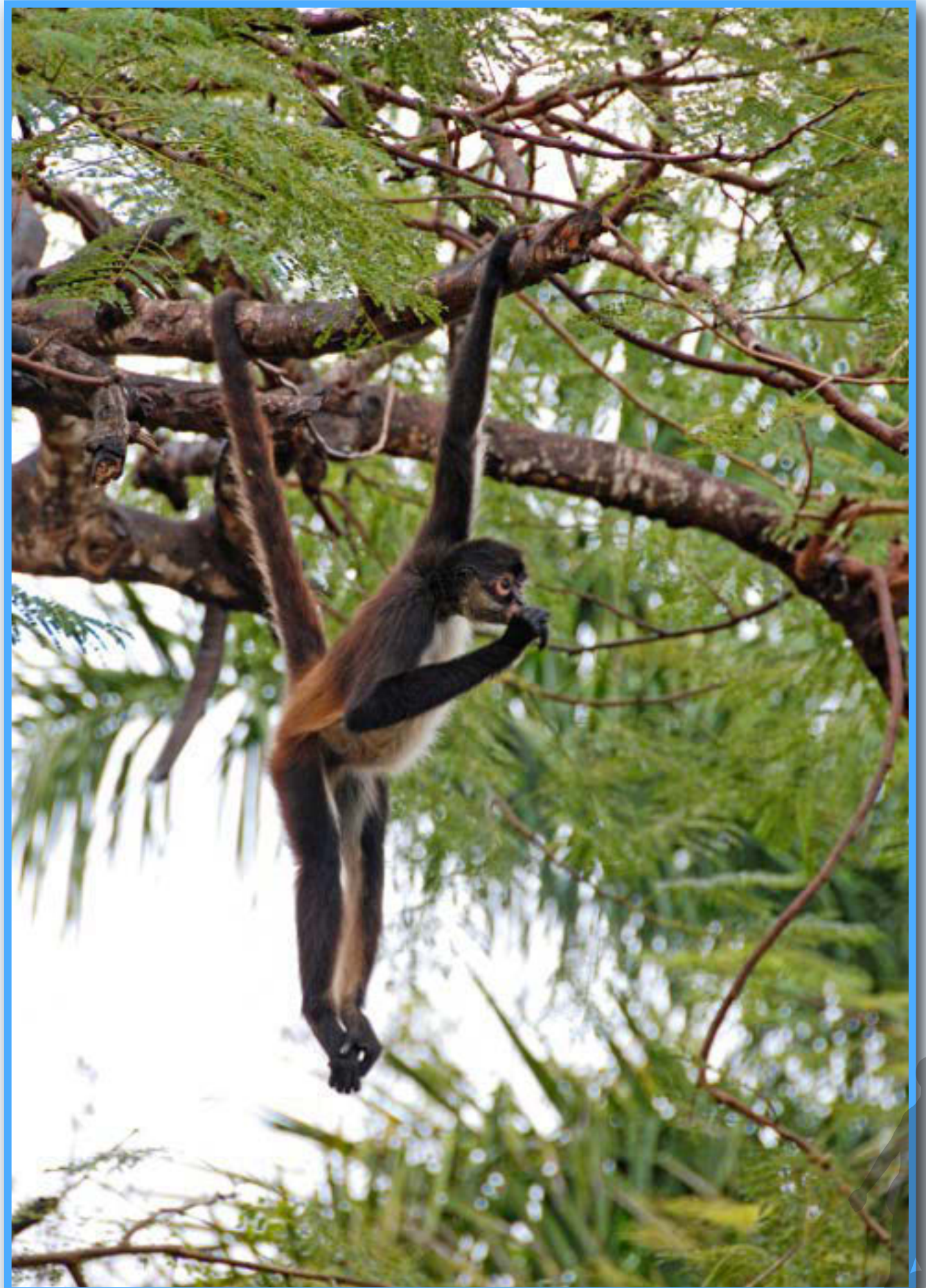
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Spider monkeys spend most of their lives living in the tree canopies of rainforests in central America, where they forage for fruit and seeds.

Look closely: can you see some ways in which this species of primate has adapted and evolved to suit its environment?



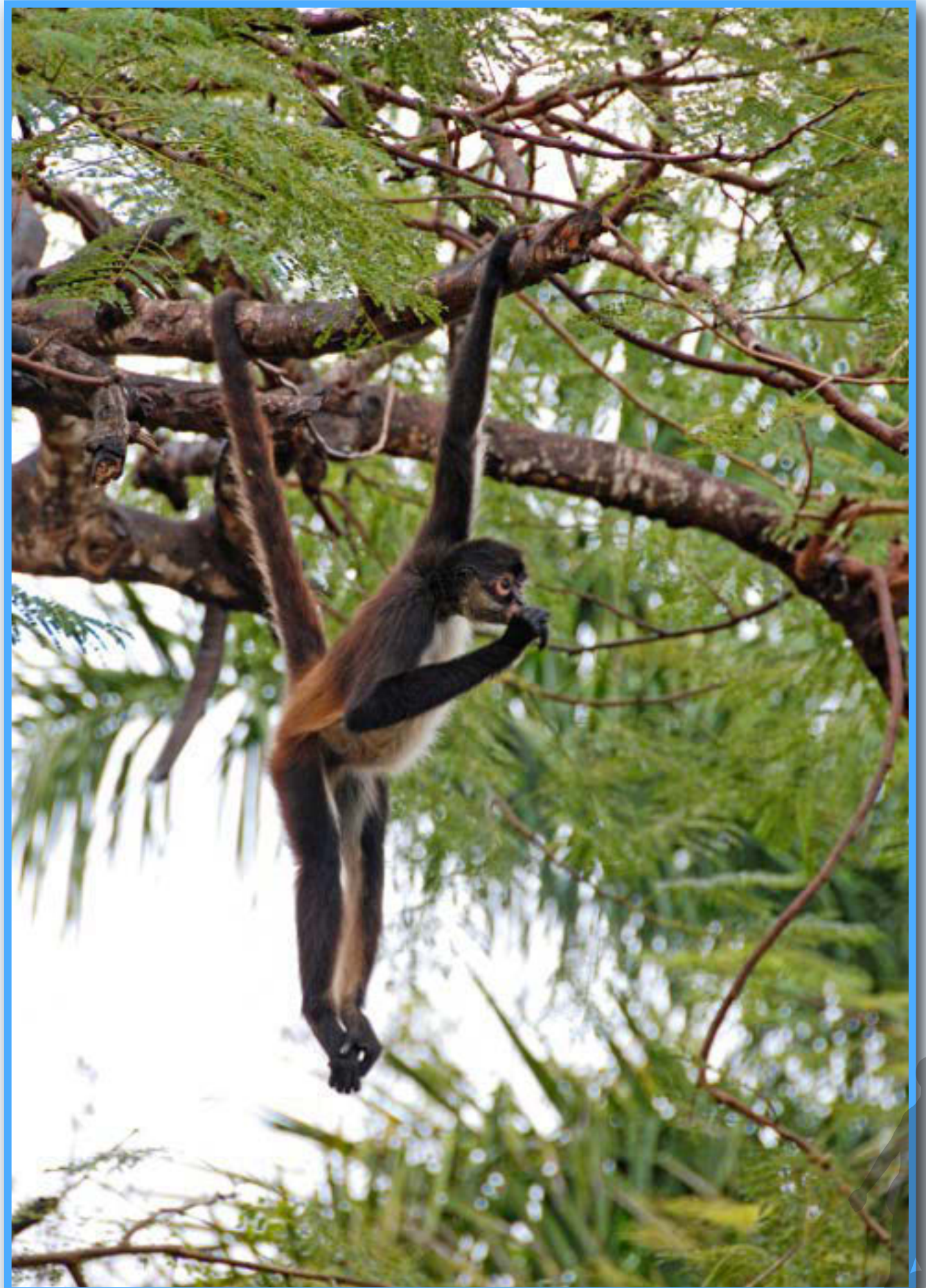
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Spider monkeys have long, strong arms and legs with long toes and fingers; they can grip vines and branches with their hands or feet.

They also have a long, *prehensile* tail which they can use like an extra limb to help them climb and swing through the rainforest canopy.



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Eastern lowland gorillas live in large, social groups, led by one male gorilla. They use hand gestures and facial expressions to communicate with each other. They have been seen making and using simple tools to help forage for food.



Look closely: can you see some ways in which this species of primate has adapted and evolved to suit its environment?



Gorillas have adapted and evolved to have very expressive faces, and hands that are very much like ours. They can express themselves and communicate within the group using these.

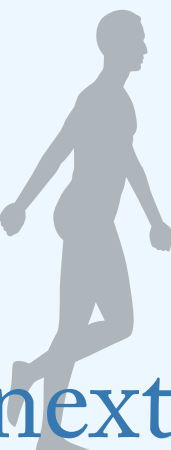
Their hands are adapted to do complex things, such as pick branches and strip the leaves off them to make tools to 'fish' for insects.



Their big, strong bodies help to protect themselves and others in their troop from other gorillas and, occasionally, from being attacked by leopards.



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Plants have adapted and evolved to suit their environment too! Over millions of years, this saguaro cactus has adapted to the hot, dry climate of the Sonora desert in Arizona, North America.

Do you know some ways cactuses are adapted to suit hot, dry environments?





Cactuses such as this saguaro have adapted to store water inside them. They can often expand to take in lots of water when it rains. Their spines prevent many animals from getting to the stored water. Many cactuses have deep roots to take in as much water as possible. They grow very slowly; this means they can survive a long time without water and minerals.

Today we
will be learning more about how plants
and animals have adapted and evolved over
time to suit their environment.



Plenary

This photograph shows an arctic environment in Norway. Freezing cold wind blows across the region, and snow and ice cover the landscape for most of the year. The soil is frozen for most of the year. It is very dark, too; the Sun does not rise above the horizon for roughly two months of the year!



Can you describe some of the characteristics a plant might need to survive in this environment?

**Think, pair,
share your ideas.**



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