

# Learning Question:

**How have some animals and plants evolved over time?**

**Knowledge objective:** identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

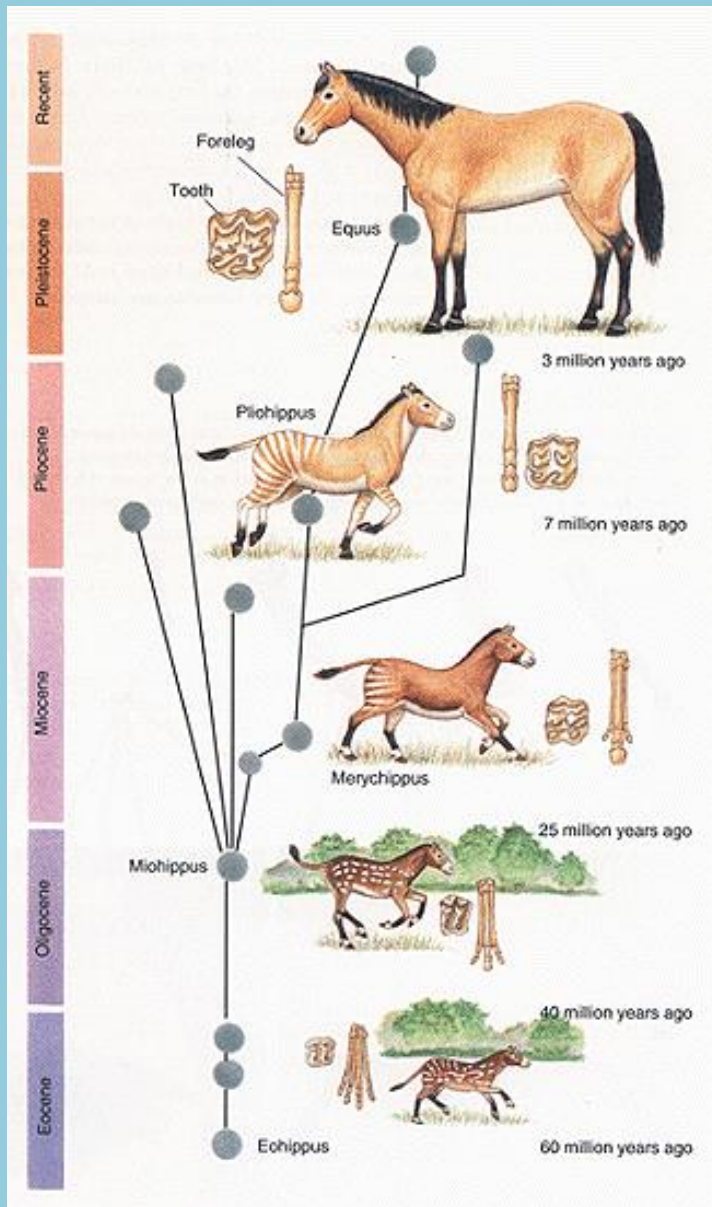
**Working scientifically objective:** Reporting findings from enquiries; identifying scientific evidence that has been used to support or refute ideas or arguments.

Today, we will be looking at whether ALL adaptations are advantageous.

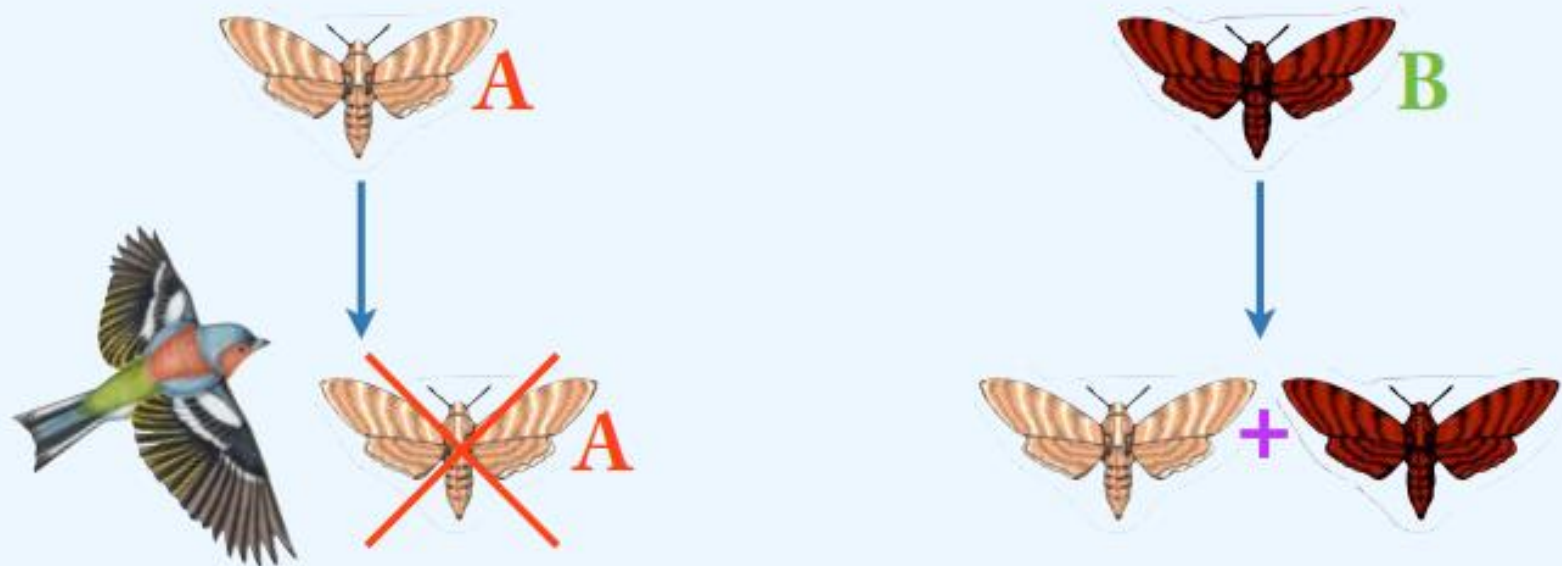
**Evolution** is the way animals change over time.

**Variation** is the differences between living things in a species.

We will now look at how evolution takes place over time...



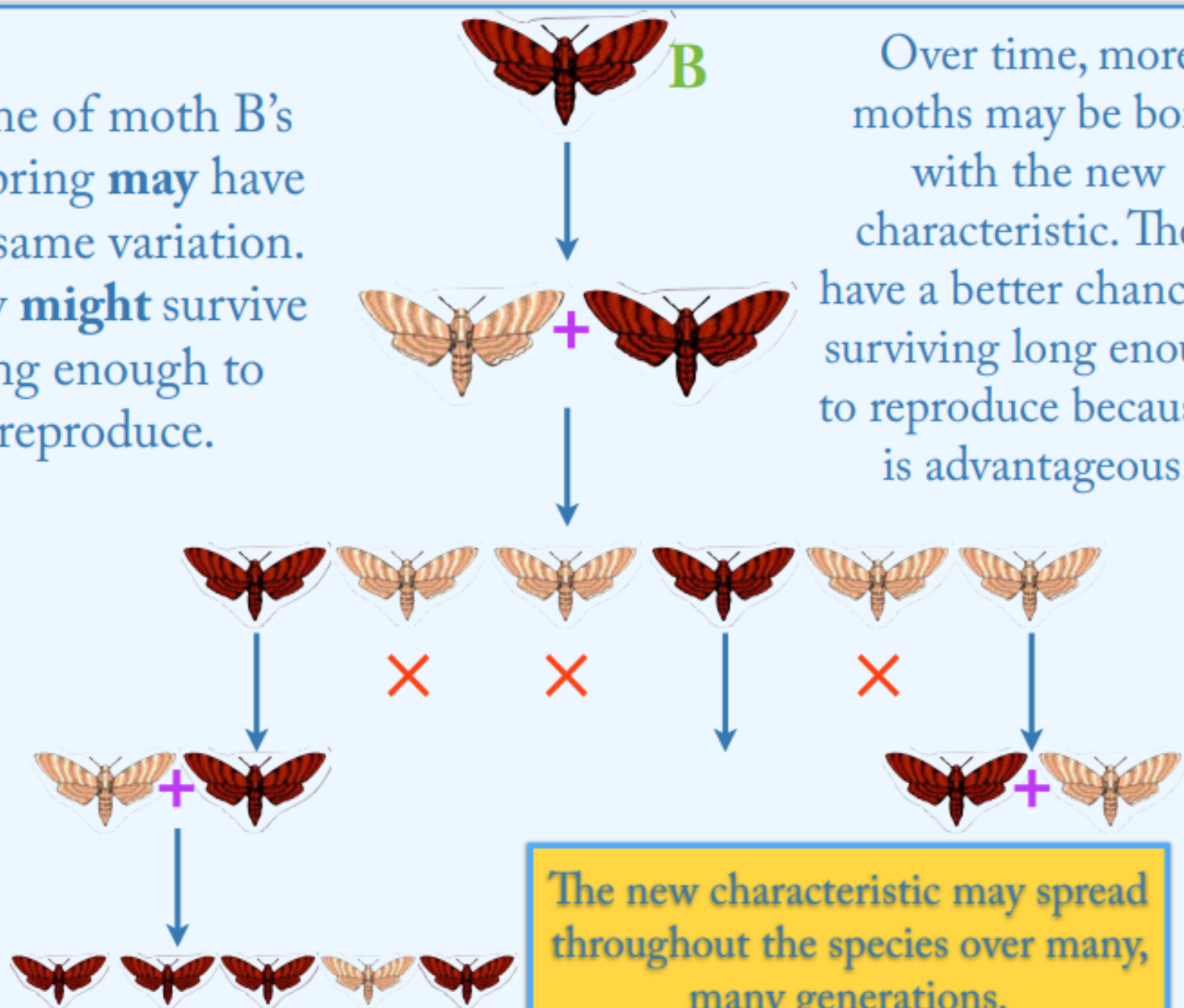
These two moths are different because moth B was born with an unusual characteristic. This *variation* may occur from one generation to the next. Moth B's darker colour is *advantageous* because it allows it to blend into its surroundings and hide from predators more effectively.



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.

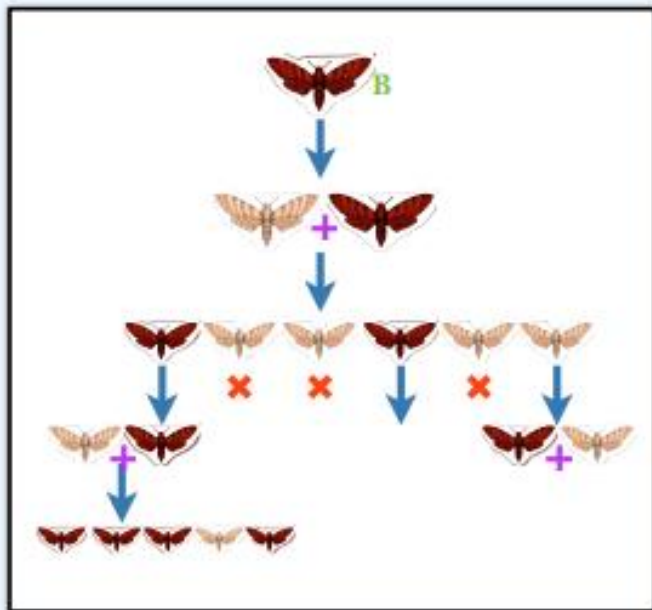


The new characteristic may spread throughout the species over many, many generations.





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...

Not all inherited characteristics are **advantageous**.

This means that not all the characteristics an offspring (child) inherits help them.

Sometimes they inherit characteristics that do not help them (this would be a disadvantageous characteristic).

Not all inherited characteristics are **advantageous**. Sometimes, offspring will inherit characteristics from their parents which make it harder for them to survive.

**big, webbed feet**

**long neck**

**short neck**

**short beak**

**short, strong legs**

This means: Which of these would help a duck?

Which of these characteristics would be advantageous for a duck?





Did you choose these? They are all advantageous characteristics for a duck to inherit from its parents.

**big, webbed feet**

**long neck**

**short, strong legs**



Would  
the same  
characteristics be  
advantageous for  
this bird?





**Task 1:** Read the descriptions of the two animals. In your books, answer these questions **in full sentences**:

1. Describe a unique characteristic of a zebra. Explain why this characteristic is advantageous. (How does it help the zebra).
2. Describe a unique characteristic of a cheetah. Explain why this characteristic is advantageous. (How does it help the cheetah).
3. Describe a similar characteristic for both the zebra and cheetah.



The **plains zebra** is a *herbivore* found across the plains of southern and eastern Africa. It has large, flat teeth for chewing and breaking down leaves and grasses. It needs lots of fresh water, so often stays in herds near water sources. Its head is the highest part of its body; this allows it to see predators. The zebra's ears are on top of its head, allowing it to listen carefully for predators. Its stripy fur confuses predators, who cannot easily see where one zebra ends and another begins!



The **cheetah** is a *carnivore* found across the plains of southern and eastern Africa. It has large canine teeth for attacking its prey and tearing flesh. The cheetah will attack and eat all kinds of mammal - even one's that are bigger than itself! Its body is low to the ground; this allows it to hide in long grass and sneak up to its prey. Its spotty, sandy-coloured fur helps it blend into its surroundings. The cheetah has forward-facing eyes. This allows it to focus on its prey when hunting.

The next few slides will explain what happens when one bird inherits an advantageous characteristic and the other inherits a disadvantageous characteristic.

Let's look at how this works in nature; in this example, two unrelated spotted redshanks are born with different characteristics.



**Disadvantageous** characteristics are less likely to be inherited than **advantageous** characteristics.



Redshank A was born with a slightly longer than average beak. Why might this be **advantageous**?

Redshank B was born with a slightly shorter than average beak. Why might this be **disadvantageous**?





The spotted redshank is a wading bird. Its long legs help it wade through shallow water. It catches small invertebrates living in the mud under the water with its long beak.

Big, webbed feet are good for swimming, however, they would be disadvantageous for wading birds that walk through shallow water.





Over time, redshanks and other wading birds eat lots of the invertebrates in the mud under the shallow water.



Redshank A's slightly longer beak allows it to go into slightly deeper water than most other birds to find food.



Redshank B's slightly shorter beak means that it can only hunt for food in shallower water, where food is scarcer due to more birds being able to feed there.



Redshank A can find plenty of food thanks to its slightly longer beak. It is fit and healthy enough to mate with another redshank and produce offspring.



Redshank B cannot find as much food, and does not grow to be as healthy. Its offspring are smaller and less healthy too. Some of them may not survive.







Redshank A's offspring inherit the characteristic of a slightly longer than average beak. They too are able to feed in slightly deeper water, and therefore have a good chance of surviving, breeding successfully and producing offspring with slightly longer than average beaks.

Eventually, over many, many generations, this advantageous characteristic may spread across the entire species of spotted redshanks. All redshanks may evolve to be better adapted in this way.



Task 2: Complete the sheet on the next slide which looks like this. If you do not have a printer, set up a page in your Science like this.

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graph TD; A[Name of animal/plant] --> B[How is the animal/plant adapted?]; B --> C1[ ]; B --> C2[ ]; B --> C3[ ]; B --> C4[ ]; C1 --> D[What would happen if this was missing?]; C2 --> D; C3 --> D; C4 --> D; D --> E[ ]; D --> F[ ]
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**Instructions:**

Choose a living thing from the list below:

*giraffe, polar bear, penguin, cactus,  
elephant, zebra.*

Find out 4 different ways it has adapted to its environment.

Then, think about what would happen if that characteristic was missing.

The sheet is available to print on the next slide. There is an example of a completed sheet on slide 17.



Name of animal/plant

How is the animal/plant adapted?

What would happen if this was missing?

# Example:

