PE & Science Activity

Power Point Slides Transcripts

What is a caterpillar?

A caterpillar hatches from an egg laid by an adult moth or butterfly. Caterpillars are the second stage of the butterfly/moth life cycle. Each type of caterpillar will turn into a specific kind of adult butterfly or moth. Caterpillars like to eat, and they eat a lot! Caterpillars get energy and resources from their food, so that they can survive and reach the next stages of the life cycle – the pupa and then the adult stage. For more information see the optional additional handout – the butterfly life cycle.

Caterpillars have special skills to cope with their environment. These special skills are called adaptations. Adaptations can be physical changes to the caterpillar's body, behavioural changes in how a caterpillar does things, and changes in the way that the caterpillar moves around where it lives.

Many animals eat butterfly and moth caterpillars, for example other insects, spiders, frogs, toads, lizards, birds and small mammals like hedgehogs. These animals are called predators and caterpillars are their prey. This makes moth and butterfly caterpillars an important part of the food chain in the habitats in which they live.

Different types of caterpillars can have very different body shapes and sizes, and can look very different from each other. Some of these differences in the caterpillar's bodies are adaptations to try to stop the caterpillar from being eaten by predators. Some examples known to help protect caterpillars from bird predators are:

1. Camouflage – some caterpillars can be green in colour to match the leaf they are feeding on. This makes them harder to see and find.
2. Disguise – Some caterpillars go a step further and not only blend in colour-wise with the surroundings, but may have bodies that look like twigs or even bird droppings; things their predators are not fond of eating.
3. Warning colouration or patterns – Rather than remaining in the background, some caterpillars actually advertise themselves with particular colour patterns. These colour patterns warn predators that the caterpillar may not be very nice to eat; for example because their bodies contain nasty tasting substances. Other types of caterpillars have large patterns on their bodies that look like large eyes to frighten away predators
4. Decorations – some caterpillars have hairs, spines or spikes that make them more difficult to approach or eat

Some types of caterpillars have changed the way they behave to try to make it harder for predators to find and eat them. These are called behavioural adaptations. Some examples of behavioural adaptations seen in caterpillars are:

1. Hiding underneath leaves, or at the bottom of plant to make them harder to see and find
2. Feeding only at night time to make it harder for predators to see and find them
3. Escape behaviour – when threatened by a predator some types of caterpillars crawl backwards and deliberately fall off the leaf to escape. These types of caterpillars sometimes produce a silk thread and attach it to the leaf before they drop, so that they can use it to climb back up onto the leaf once the predator has gone away. Mother-of-pearl moth caterpillars jump into the air, form a round shape and roll away down a slope like a wheel.
4. Living in large groups and covering themselves with large silken webs to make it difficult for predators to reach the group
5. Living inside leaves on plant, eating the leaves from the inside and leaving tracks on the leaf called mines. Living inside the leaves makes it harder for the predators to get to them

Moving around

Moving around is dangerous for caterpillars. Predators can see them more easily and eat them. Caterpillars have soft bodies without skeletons to help them move. This means that it takes a lot of energy for them to move about, making it hard work to search for new plants to eat. There is also no guarantee that the caterpillar will be able to find new food before it runs out of energy or it is eaten by a predator.

Some types of caterpillars live in large family groups. Sometimes, when caterpillars live in big groups their food can run out more quickly, and these caterpillars need to move to find new plants to eat. To do this, these types of caterpillars use a behaviour called ballooning. The caterpillar moves to the end of a leaf or branch, drops down on a silk thread and dangles in the air to wait for a gust of wind to blow them far away.

How do caterpillars move?

A caterpillar has a lot of muscles in its body that help it to move. Close to their head, caterpillars have six legs with tiny claws that they use for gripping onto things like leaves. At the other end of their body, caterpillars have some structures that look like legs; called prolegs. These are not real legs, they have a more simple structure and lack claws, but the caterpillars can use them to grip tightly onto things. Caterpillars move around using their legs and prolegs. Different types of caterpillars move in different ways. Some types of caterpillars move using inching behaviour. This kind of moving is most common in small, slender caterpillars. When caterpillars move in this

way their body shape looks like a loop, like this: Ω. Larger types of caterpillars move using a crawling behaviour. When these caterpillars move, their bodies move in a wave-like motion, with the wave starting at their rear end, and travelling towards their head, moving the caterpillar forward.

Caterpillar have 12 eyes – 6 on each side of their head. But, even though caterpillars have lots of eyes they cannot actually see very well. Their eyes can only help them to tell the difference between light and dark, and they can only see very big movements that might suggest a predator is close by. When a caterpillar moves you might see that it lifts its head and moves it from side-to-side. This is called head waving, and caterpillars do this to help them to judge depth and distance.

The length of time that a caterpillar can survive without food can depend on how large it is. Larger caterpillars can survive for longer without food than smaller caterpillars. Larger caterpillars also tend to move faster than smaller caterpillars. This means that larger caterpillars can travel longer distances more quickly, and find a new food plant faster.

Rather than immediately kill the moth or butterfly, sometimes chemicals in the environment, like insecticides, can have unwanted side-effects such as affecting how well the caterpillar grows, or how well the caterpillar can move to find food, or a safe place to hide from predators. These unwanted side-effects can cause a drop in the number of caterpillars that survive to become adult moths or butterflies.

Adaptations in caterpillar movement behaviour

Scientists have found that caterpillar food searching behaviour changes depending on how the caterpillar's food plants are positioned in the habitat, how far the caterpillars need to travel to reach new plants, and how easy it is for the caterpillars to find these plants. This is a behavioural adaptation to help caterpillars to find new plants to eat, grow and survive to become adult butterflies or moths:

1. Caterpillar types that live in habitats where there are plenty of plants available for them to eat. The plants are easy to reach because they are not too far away for the caterpillar to move to. The plants are easy for the caterpillar to find quickly. These caterpillar types have a searching behaviour where they move slowly, turn to change direction often, and do lots of head waving. This type of slow careful moving helps the caterpillar to very carefully search a small area, and find a new plant that is close by.

   Some types of caterpillar also use this type of searching behaviour when they are not hungry and do not need to rush to find food.

2. Caterpillar types that live in habitats where there are not many plants available to eat that are close by. Plants are far away and take a long time to reach, they are not easy to find quickly. These types of caterpillars have a searching behaviour where they move quickly, turn and change direction less often, move in straighter lines, and they don't do head waving. This searching behaviour helps caterpillars to move faster, cover longer distances and quickly find a new food plant that is far away.

   Some types of caterpillar also use this type of searching behaviour when they are hungry and need to find a food quickly.