



Stratford-Upon-Avon Butterfly Farm
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Teachers Pack

- A short Introduction to animal classification with particular focus on butterfly life cycle and anatomy.
- A description of both minibeasts and the rainforest.
- Examples of how a tour at Stratford Butterfly Farm can help your class learn more about butterflies, lifecycles, minibeasts and the rainforest.
- Extra 'Lesson Plan' ideas to continue learning in your classroom.



Written by Harriet Nelson

Education Officer

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A book especially written for the Butterfly Farm by John Eames & illustrated by Nicola Dennis	

Something to Note!

As a third of our butterflies come from Belize, Stratford Butterfly Farm recently redeveloped the farm to add a Maya theme. Whilst walking through the farm you will see statues and information all around about how the Maya lived. We also offer Maya based school group tours. To learn more about these tours please visit our website and download our 'Maya Education Pack'

Butterfly Life Cycle

A butterfly's life cycle has more stages than that of a mammal. It is highly complex and very interesting. The offspring of a mammal is essentially a smaller version of its adult form. When a butterfly grows, it transforms from egg to larva to pupa and eventually an adult butterfly. This transformation is called complete metamorphosis. Some insects, such as stick insects, simply hatch from an egg to a nymph, forego the pupa stage and eventually shed their last nymph skin to become an adult form. This is known as incomplete metamorphosis.

The butterfly's life cycle is described in more detail below.

1. The butterfly starts life as an egg, laid by a female butterfly. The egg is usually laid on the underside of a leaf, specifically the food plant of the larva.



Idea leuconoe

Tree Nymph Butterfly

Egg

2. The larval form is more commonly known as a caterpillar. The caterpillar looks very different to the adult form. The caterpillar eats from its specific food plant until it is ready to pupate. During this time, the caterpillar will go through various instars (stages of growth) and will shed its skin at each stage.



Idea leuconoe

Tree Nymph Butterfly

Caterpillar

3. The caterpillar will then attach itself to a surface using a small pad of silk and sheds its skin to form a pupa. Butterfly and moth pupa are often known as chrysalis. Certain species of moths, known as silk moths, can form an extra layer of protection called a cocoon. The word cocoon should never be referred to when discussing butterflies, as butterflies do not have a cocoon.



Idea leuconoe

Tree Nymph Butterfly

Pupa

4. Inside the pupa, dramatic changes take place. The body of the caterpillar breaks down into a thick and usually green liquid. The clusters of cells regroup and reform into the adult form of a butterfly. This is metamorphosis.
5. When the butterfly is ready to emerge, it breaks free from its pupa. A newly hatched butterfly will be wet and small in comparison to its finished state. The butterfly uses a liquid that forms in the abdomen to pump up the wings, it will then hang until the wings are dry.
6. Once the butterfly is dry they are ready to fly. The primary aim for a butterfly is to mate and therefore produce offspring. Once the female has been mated she will then lay her eggs and the process begins all over again!



Idea leuconoe

Tree Nymph Butterfly

Butterfly

Butterfly Farm

During the tour, your guide will take you into the 'Discovery Zone'. Your class will be able to see every stage of a butterfly life cycle. In particular, our guides will show you the differences between a cocoon and a chrysalis. They will also show you in detail our 'Emerging Case' and the chrysalis/pupae that are hanging. You may even be lucky enough to see a butterfly hatch. Our 'Discovery Zone' also boasts an interactive display area, where staff members are usually packing chrysalis, or gluing them onto rods to go into our 'Emerging Case'

Lesson Plan Idea

Ask the children to draw and describe in detail the life cycle of a butterfly. There is a well-known children's book describing a caterpillar's journey. If you use this in class be sure to point out that a butterfly does not come from a cocoon!

'Butterfly' Behaviour

Most insects have a very high protein content and are therefore a staple diet item for many animals. During each life stage the butterfly can adapt and defend themselves in many ways.

Egg

The female butterfly makes many choices, with the aim to improve the chances of her offspring surviving to the adult stage. Firstly, the female butterfly will lay many eggs. The life of a butterfly is a difficult one and the percentages of butterflies who reach the adult stage is commonly around 3% In the wild. Therefore, the more eggs a female lays, the higher the chance of survival. Some butterflies lay an individual egg on one leaf. This can be beneficial in two ways, mainly if a butterfly laid all her eggs on one leaf and that leaf became damaged, she would then lose all her offspring. If, however she distributes her eggs, it is more likely some will survive. It also means that each caterpillar has their own leaf to eat. The female can also choose to lay her eggs on the underside of a leaf in order to hide the egg from any predators and protect them from adverse weather.



Caligo memnon
Owl Butterfly
Egg and Caterpillar

Larva / Caterpillar

The caterpillar can defend itself in many ways:

- **Camouflage** - Many animals use camouflage to hide in their surroundings in the hope that a predator will not spot them! Some even camouflage to look like bird poo during their early instars (see below).



Greta oto
Glass wing
Butterfly
Caterpillar



Papilio demodocus
Christmas
Butterfly
Caterpillar
(Left 3rd instar
Right 4th instar)

- **Smell** - Some caterpillars smell horrible enough to put off even the hungriest of birds. The blue morpho caterpillar lets off a nasty odour when disturbed. Swallowtail caterpillars have a special forked organ (osmeterium), that comes out of the back of their necks when they are disturbed. The osmeterium smells terrible and can also has the appearance of a snakes tongue.



Papilio demodocus

Christmas Butterfly

Caterpillar

- **Spines** - Some caterpillars have sharp spines all over their bodies so that birds and other predators will not try to eat them. These spines can also act as an irritant, designed to distract predators.



Heliconius charitonius

Zebra Long Wing Butterfly

Caterpillar

- **Bright colours** - Most bright colours in nature are a warning of something quite nasty. In the case of caterpillars, bright colours often advertise bad taste or even poison.



Morpho peleides

Blue Morpho Butterfly

Caterpillar

- **Anatomy** – Some caterpillars will also try to make their back end look the same as their front end. A predator will always try and attack the head of an animal. If the predator accidentally gave a caterpillar a nip on the wrong end, it may very well survive.



Idea leuconoe

Tree Nymph Butterfly

Caterpillar

- **Mimicry** - To mimic something means to copy it. There are lots of caterpillars and butterflies that are not poisonous, spiky, bad tasting or smelling but copy the colour markings and shape of others that are. They are then safe from predators because they are thought to be bad to eat. Mimicry is a strategy that lots of animals and even plants use to avoid predation. There are some caterpillars that even mimic snakes to try and defend themselves from predators!



Hermeroplanes triptolemus

Hawk Moth

Caterpillar

Pupa

- **Camouflage** - Caterpillars will also ensure their pupa can hide in their surroundings, as a pupa has no form of defence. Some caterpillars can choose what colour their pupa will be in order to truly camouflage themselves.



Morpho peleides

Blue Morpho Butterfly

Pupa



Papilio Lowi

Great Yellow Mormon

Pupa

Brown pupa formed on a twig

Green pupa formed under a leaf

- **Bright colours** - Caterpillars will also advertise their bad taste or poison in their pupa stage.



Idea leuconoe

Tree Nymph Butterfly

Pupa



Tithorea harmonia

Harmonia Tiger Wing Butterfly

Pupa

Butterfly

- **Camouflage** – Butterflies will also camouflage in order to hide from their predators. The Indian Leaf butterfly disguises itself as a dried leaf!



Kallima paralekta

Indian Leaf Butterfly

Butterfly

- **Mimicry** – Butterflies themselves can also use mimicry to hide from predators. Some butterflies mimic other animals. The owl butterflies wing mimic the head of an anole which is a type of lizard.



Caligo memnon

Owl Butterfly

Butterfly



Butterfly Farm

During the tour, your class will be asked to look out for caterpillars. They will be asked to decide whether the caterpillars they see are poisonous or not. In order to spot our well camouflaged butterflies you will have to look very closely.

Lesson Plan Idea

Ask each child to 'design' a caterpillar and pupa. This can link to an art project, suggest the children use a collage and think about the textures and colours they are using. As a group discuss each one;

Does it look poisonous?

Is it trying to hide?

Does it have any defence mechanisms? Etc

Butterfly and Caterpillar Anatomy

Butterfly Anatomy

Insects are invertebrates which have some identifiable features. They have three parts to their body and three pairs of legs. This is an easy way of deciding if an animal is an insect.

The head holds most of the sensory organs and the mouth parts. Different insects have different mouthparts depending on what type of food they eat. Butterflies use their proboscis to drink nectar from flowers or the juice from rotting fruits. They use their antennae to smell their food and they taste through their feet.

The thorax is the part of the body which is connected to the wings and legs. The wings are used for flight and the legs used for walking. Remember a butterfly is an insect, so it will have six legs. Although in flight butterflies appear to have two wings (one on each side) they actually have four wings. The upper side and the underside of the wings can often be very different. Many butterflies tend to have a well camouflaged underside, so when they sit and their wings are closed they can hide into their surroundings. The bright colours are usually seen on the upper side.

The abdomen holds the stomach and reproductive organs. They also have spiracles, tiny openings along the sides. These spiracles are linked to air tubes that allow oxygen to be carried throughout the insects' body. The abdomen is around two thirds of their length, a butterfly's abdomen is usually very long and thin. When they have just hatched however, it is full of a liquid which they use to pump up the wings.

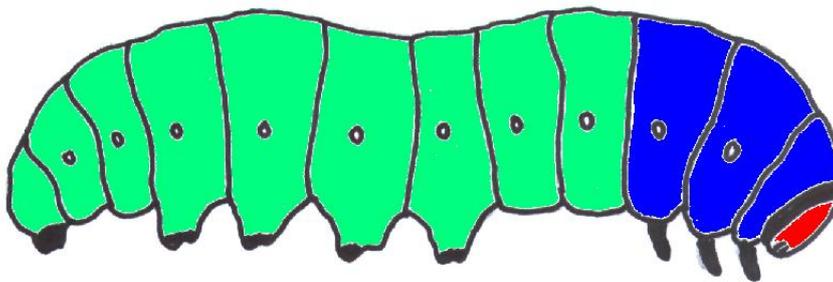


Caterpillar Anatomy

The head has ocelli (basic eyes which can sense light and dark) and mouth parts to eat leaves.

The thorax is full of muscles and has six true legs.

The abdomen is the largest part of the body, there are four pairs of prolegs which help the caterpillar when travelling. Spiracles (tiny openings) can be found along the body which help the caterpillar to breathe. A pair of claspers (at the end of the body) are used to help the caterpillar hold on when climbing and pupating.



Butterfly Farm

The first stop of the tour is our feeding table, the class will have the chance to get a closer look at the butterflies and their anatomy. You will also be able to see the butterflies use their proboscis to drink the juices from various fruits laid out on the table.

Lesson Plan Idea

Day 1: Pick five invertebrates and ask the children to draw them from memory, e.g. bee, butterfly, caterpillar, millipede and a ladybird.

Day 2: Without referring to the previous day, describe the same five invertebrates in detail without mentioning what the animal is. Ask the children to draw the animal as you are describing. Once you have finished ask the class which animal you were describing. Once you have guessed each animal correctly, compare the previous drawings. Discuss whether there is more detail to the second drawing and why they are more anatomically correct.

Rainforest

Rainforests are home to just over 50% of the species in the world. Rainforests are split into four different layers. Each of these layers is a very different environment. Each different environment creates a specific habitat for a large variety of plants and animals.

The differences in the layers include

Climate

Temperature

Amount of sunlight

Humidity

Flora and Fauna

Below is a breakdown of each layer of the rainforest.

Emergent Layer

The trees are taller than any other trees in the rainforest and can reach 60m. The emergent layer gets most of the sunlight and can be quite windy sometimes. Emergent trees are very top heavy and have almost no side branches below the canopy. Many birds, some monkeys and insects such as tropical butterflies live in the emergent layer.

Canopy Layer

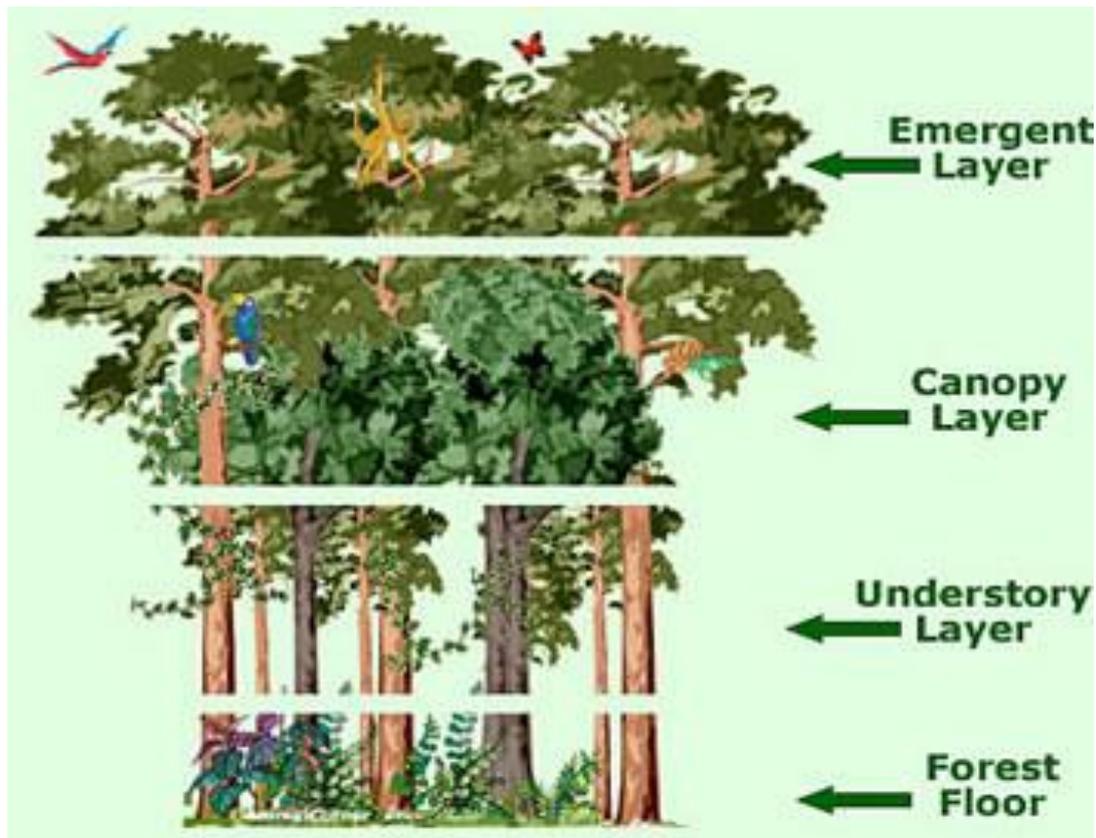
The trees in the canopy interweave and are covered by vines and creepers to make a very thick cover which is generally 18 – 40m above the ground. The thick branches and leaves block sunlight and rainfall to the lower levels. Most birds, insects, arachnids, reptiles and mammals live in this leafy environment. More than half the animals living in the rainforest live in this canopy layer.

Understory Layer

A dark cool environment that gets little sunlight and therefore has limited plant life. There are usually short, green, leafy shrubs, mostly non-flowering, small trees, ferns and vines. Animals that like the wet and the shade like insects and amphibians live in the understory layer.

Forest Floor

This level has the highest humidity level of the Rainforest. There is no grass here and the soil is hidden by a thin layer of rapidly rotting leaves, twigs and dead flowers. The work of decomposing this litter layer is carried out by plants, fungi and animals such as ants, millipedes, and cockroaches; all of which can be seen in our 'Minibeast Metropolis' area.



Butterfly Farm

As we only house tropical butterflies, our green houses have been specifically designed to mimic the natural habitats of our butterflies. The ideal temperature of our farm is 26 degrees and around 80% humidity. This tropical temperature will inspire the children to immerse themselves fully into their surroundings. They will feel like they are actually in a tropical rainforest; feel the heat, hear bird calls and see beautiful butterflies as well as free roaming green iguanas.

Lesson Plan Idea

Pick a variety of animals that would be found in the various layers of the rainforest. Give the children a description of the animals behaviour, social system, diet and habitat and ask the children to decide which layer that animal would live in. Note: Some animals can live in more than one layer, discuss with the class why the animals may choose to move through the layers.

Minibeasts

Invertebrates

Invertebrates are animals without backbones such as snails, millipedes, insects and crustaceans. Arthropods are the largest group of invertebrates. They have a hard skeleton on the outside of their bodies, like plates of armour, called an exoskeleton. The word 'exo' means outside. This strong armour is made of chitin which is a similar material to your fingernails and hair. The largest group of arthropods are the insects and there are more kinds of insects than all other types of animals put together.

Reptiles

A reptile is a cold-blooded vertebrate, this class of animals includes; snakes, lizards, crocodiles, alligators, tortoises and turtles. They are usually distinguishable by having dry scaled skin and typically lay soft-shelled eggs on land. A cold-blooded animal cannot control their own body temperature. Meaning that a reptile can only be the temperature of the air around them. Reptiles are known for using less energy than other types of animals and commonly catch prey by a 'wait and strike' method rather than a 'chase' method often seen in a mammal hunt. Most reptiles are carnivorous although many lizards are omnivores and all tortoises are herbivores.

Amphibians

Amphibians are also a type of vertebrate, they commonly live in or around water. Within this group there are; frogs, toads, salamanders and newts. Although amphibians are similar to reptiles in many ways, they are a few main differences between the two groups. Amphibians go through a larval stage, for example the frog starts life from an egg – tadpole – froglet – frog. The word amphibian means two lives; one in the water the other on land. This refers to the metamorphosis that it undertakes. During their larval stage amphibians have gills which aid them to breathe under water. Later, their bodies change, growing legs and lungs enabling them to live on the land. Amphibians are also cold-blooded animals; however, they tend to have thin and moist skin rather than scales. This skin type helps them to take in more oxygen.

Fish

All fish are gill bearing aquatic vertebrates, there are many different types of fish that live in a variety of bodies of water. All fish lack limbs and digits but propel themselves through the water with fins. Fish are mainly scaled cold blooded animals.

Butterfly Farm

Within 'Minibeast Metropolis' we have a vast range of invertebrates, some of which will be involved in your handling session. You will also see; reptiles, amphibians and fish.

Why does Stratford Butterfly Farm exist?

Stratford Butterfly Farm is not only a beautiful place filled with colour and delight. It also has several important purposes.

Education

By visiting Stratford Butterfly Farm both as a school group or a member of the public you will learn about many different animals, their behaviours and their habitats. By stepping through our doors, you can be transported to a beautiful rainforest, experience the climate, humidity and dense plant life. You will also be transported to Central America and experience living as a Maya 1500 years ago.

Research

Stratford Butterfly Farm both encourages and helps to fund many different research projects. This ranges from; allowing a student to collect data for their dissertation projects at the farm, or staff members researching our native butterflies as well as helping to fund research in the decline of tropical butterflies worldwide.

Conservation

Stratford Butterfly Farm both owns and has connections with butterfly farms across the world. In order to import pupae, we help to conserve areas of land which increase butterfly breeding. Although our focus is on butterfly breeding, by conserving that area of land we are conserving an entire ecosystem for all other animals living in that area.

Employment

As well as the employees at Stratford Butterfly Farm, we also employ local people in Asia, Africa, and Central and South America. This wage creates a sustainable income for families in deprived parts of the world. We also have a volunteer and work experience programme to help encourage all ages to get involved.

Rainforests

Rainforests are very special places. There are 3 major rainforest regions in the world. Rainforests cover 31% of the land area on our planet and are thought to hold just over 50% of the total world species. Around 1.6 billion people rely on the benefits rainforests offer, including food, fresh water, clothing, traditional medicine and shelter. Unfortunately, 46-58 thousand square miles of forest are lost each year due to deforestation—equivalent to 48 football fields every minute. It is therefore vital that we help to conserve what we have left of our rainforests.

Enjoyment

Lastly, thousands of people come through our doors each year, simply to enjoy themselves. Appreciate the variety of sizes and colours and experience watching tropical butterflies fly without having to travel the world in a day! Many spend hours watching our leafcutter ants make the delicate journey over ropes to get to their fresh leaves, meticulously cut a piece and wander back to their home, eagerly awaiting delicious fungus to eat. The most patient of visitors can watch a caterpillar change into a pupa, readying itself for a beautiful and fascinating journey. Stand in awe as they see a freshly hatched butterfly take flight for the first time. Soak in the beautiful heat and get away from everyday life!

Tour

Tours can be booked between 10:00AM and 3:00PM – either on the hour or half hour depending on the size of the group.

Arrive at least 15 minutes prior to the start of your tour so that you are ready to start your tour on time.

Allow plenty of time to use the toilets, and to place children's coats, bags, jumpers, cardigans etc. in the drawers and cupboards provided. The children will then be ready to be greeted by their tour guide.

Guided tours last approximately 1 hour and 15 minutes.

If your numbers are too large to take around in one group, we will split them into smaller groups, each with their own guide. You do not need to book more than one time for this, and you will be informed of this when booking. Your guides will allow around a 5-minute gap in between each group to prevent the farm becoming over crowded.

Please be aware that our farm is also open to the public. During the tour, guides will try to make sure members of public can still move around the farm easily. We will also expect the groups to keep noise levels to a minimum whilst in the farm, this will allow guides to be heard and allow other visitors to enjoy their experience.



Pricing and Availability

Opening Times: Open every day except Christmas Day
Summer: 10.00am – 6.00pm
Winter: 10.00am – dusk
Last admission 30 minutes before closing

2019 Admission Rates **Group Rates** (10 people or more)

Children & Teachers **£5.25 (1 teacher free with every 10 children)**

Group Visits: must be booked in advance by telephone or email. The guided tour is very popular, especially in the summer months, so early booking is advised. Tours can be booked on the hour from 10:00AM – 3:00PM. We do however suggest that if you are travelling a distance to book after the 10:00AM slot. If your tour is running late and we have other tours booked, you're your guide may not be available to accompany you on your tour

Toilets: There are onsite toilets and we do request that all children have been to the toilets before the start of the tour.

Cloakroom: In the Education Area, there are large draws and cupboards to store children's coats, bags and lunches whilst they are on their tour. We do not have onsite eating facilities, however there is a large gazebo in the wildflower garden and plenty of picnic tables that you may use. If the weather is bad on the day of your tour, we will do the best we can to provide a more suitable area. We do however, suggest planning alternative areas for your lunch before you arrive.

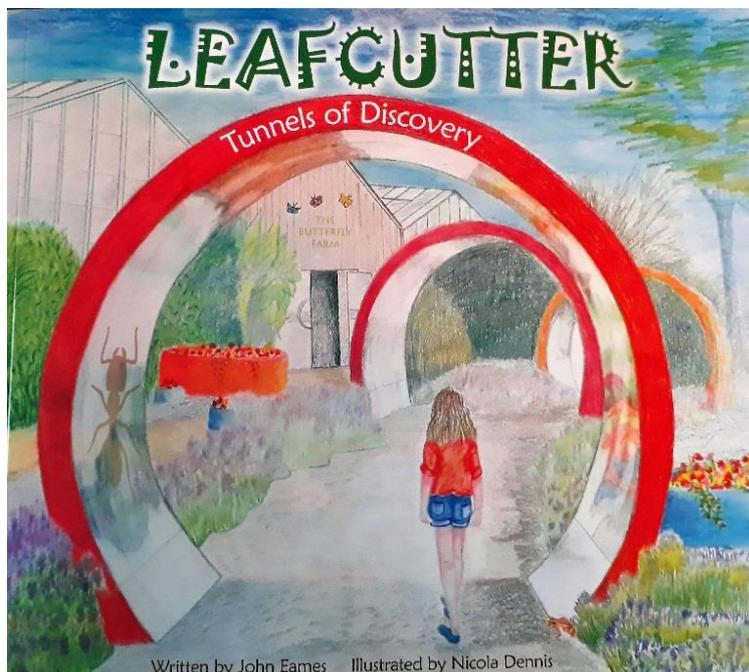
Disabled Access: All displays are fully accessible with carers having complimentary admission. We regret that we are unable to allow Guide Dogs in to the farm as they cause distress to our animals. In addition, the climate inside the farm is distressing to the dogs themselves. Please read our access statement for more information:

<https://www.butterflyfarm.co.uk/attraction/access-statement>

How to find us: We are a five minutes' walk from the town centre, just over the River Avon footbridge, opposite the Royal Shakespeare Theatre. Our signs will take you from the footbridge to our entrance. Coaches may load and unload passengers outside our entrance. Coach Parking is available in the Coach Park behind the Leisure Centre. For car drivers, there is a large public car park outside our entrance. On-site parking facilities are for blue badge holders only.

Nature Inspired Gift Shop: offers a range of gifts, books, drinks, confectionary and ice-cream.

Leafcutter-Tunnels of Discovery, an exciting new book written especially for Stratford-upon-Avon Butterfly Farm by John Eames and illustrated by Nicola Dennis



To compliment your school visit to the Butterfly Farm '**Leafcutter-Tunnels of Discovery**' is available in the gift shop either individually at £5.99 or £5.00 each if bought as a school class set. Written especially for the Butterfly Farm as a fun and informative exploration of the amazing world of the Leafcutter Ants. It includes 3 double spread pullouts to make a '**Tapestry of Ant Life**' perfect for classroom walls.

Follow the link to see how your school can receive a **complimentary workshop** by the author, John Eames, upon purchase of a class set of the book title.

<https://www.nicoladennisart.com/workshops-for-schools-and-teacher-p>