



# Insect Lore

Growing  
Butterflies  
Since 1969

Welcome  
to the  
Miracle of  
Metamorphosis!



**Caterpillars to Butterflies**  
**Instruction Guide**

# Caterpillars to Butterflies - Right Before Your Very Eyes!

At Insect Lore, we have always believed that adding just a bit of nature to our lives enhances feelings of contentment and belonging.

Placing a sense of wonder and excitement into a child's life and holding that intense interest for a period of weeks is not an insignificant thing. We believe that the development and use of our Butterfly Garden provides just that.

In our nearly 50 years of existence, we have never failed to see the importance Nature plays in the lives of young and old alike.

Your little caterpillars will grow to ten times their original size, change into jewel-like chrysalides, and finally, emerge as gorgeous Painted Lady Butterflies!



## 1. Insect Lore Butterfly Activities and Crafts Online

Visit us at [InsectLore.co.uk](http://InsectLore.co.uk) to find helpful instructional videos, our Caterpillar Quick Guide, and answers to common questions.

See our Pinterest Boards at [pinterest.com/insectlore](http://pinterest.com/insectlore) to find butterfly games, lessons, crafts, FAQs, and more!



**These instructions are for all Insect Lore Butterfly Kits.**

***If you have purchased a butterfly kit with a Voucher,  
Steps 2 and 3 are for you.***

***If you have purchased a butterfly kit with live caterpillars,  
please skip ahead to Step 4.***

## 2. Plan Your Butterfly Metamorphosis Timeline

Before redeeming the voucher for your Cup of Caterpillars, be sure you are ready to take care of them. You'll need to watch over your caterpillars, care for them responsibly, and observe their exciting changes on a daily basis! That's why planning is important.

- *Plan for any school breaks, holidays or extended weekends that might interrupt your project.*
- *Keep in mind you will release your butterflies within 3 to 5 weeks after you receive your Cup of Caterpillars. Your caterpillars will develop more quickly in warmer environments.*



## 3. Visit [InsectLore.co.uk](https://www.insectlore.co.uk) to Redeem Your Voucher

When you are ready to order your Cup of Caterpillars, it is best to redeem your voucher online. See your voucher for details.



- Order your Cup of Caterpillars when it is warm enough in your area. As we send to all EU countries, we are unable to determine the weather conditions in your area. Caterpillars are available in the EU from March to Mid-September. This ensures an available food source for the butterflies to thrive when released. Temperature should be at least 12°C when releasing your butterflies.
- Keep your Voucher Code in a safe place so you can refer to it if you contact Insect Lore about your shipment.
- Once your order is received, it takes about 1 to 2 business days to process, and then about 3 to 7 business days in transit.
- We guarantee three out of five caterpillars to become perfect Painted Lady butterflies. Retain your Caterpillar Guarantee (sent with each set of caterpillars). If your order does not fulfil this guarantee, please contact Insect Lore within 30 days of receipt of your caterpillars.

## 4. Your Caterpillars Have Arrived!

Your caterpillars come with all the nutritious food and moisture they need to grow into Painted Lady butterflies. You'll notice that the lid of the cup has tiny air holes to ensure that your caterpillars get all the fresh air they need.

- Always handle your Cup of Caterpillars gently and be sure to keep the caterpillars sealed in the cup in which they arrive. Your caterpillars are hardy, but try not to disturb them too much by tapping or shaking the cup. This cup will be their cosy home for the next 7 to 14 days.

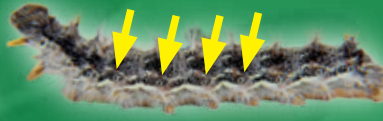


- Keep the cup upright, indoors and away from direct sunlight or drafts. Direct sunlight will cause the interior of the cup to heat up and may cause excess moisture to form inside, which could cause the caterpillars to sicken and die.
- While they are caterpillars, it is important to leave the lid on the cup at all times and do not place anything inside the cup. Adding any foreign substance may introduce harmful bacteria to their food. They have all the food they need.
- Temperature plays a very important role in the development of your caterpillars. At a constant temperature of around 24°C, the caterpillars will take three weeks to develop into butterflies. As Europe has fluctuating temperatures year round, this life cycle will take longer when it is cooler. A good estimate is 3-5 weeks.
- Helpful hints for cooler weather or for teachers whose classrooms are not heated on weekends/evenings: In order to maintain a constant temperature, we recommend wrapping the cup in a blanket, placing it on a high shelf and/or placing it in a cardboard box with a closed lid at night. Don't forget to take them out in the morning! (Teachers: the caterpillars will be fine in these conditions during the weekends.)
- Don't worry if your caterpillars are inactive when they first arrive; sometimes they need to rest after their journey to you, so give them a day or so to get used to their new surroundings. Your caterpillars will become more and more active as they eat the food at the bottom of the cup. Eating and growing is what caterpillars do best!

## Webbing is a good sign!

It is common to see webbing in your cup when you first receive it, and your caterpillars will continue to spin as they grow. In nature, the webbing protects the caterpillars from many dangers. Caterpillars use webbing to stick to their host plants, as the wind can easily blow them off the leaves; caterpillars also use the silk to pull leaves around themselves to hide from predators that might like to eat them!

The caterpillar breathes through holes in its sides called spiracles. These are located on both sides of each segment.



## 5. Watch Them Grow and Become Chrysalides

Your caterpillars will eat, spin silk and grow for approximately 7 to 10 days before changing into chrysalides. If your environment is hot and humid, your caterpillars will develop more quickly.

During this incredible period of growth, they will shed their exoskeletons 4 times and grow more than 10 times their original size!

When they have finished growing, the caterpillars will climb to the top of the cup. Once there, they will hang from the paper disk in a “j” shape under the lid.

They will shed their exoskeletons one last time (5 times in total!) before they pupate (become chrysalides)



- Do not disturb the caterpillars for at least 2 days (3 days are recommended) in order to allow them to safely harden into chrysalides. This is a very delicate time, so keep the cup nice and quiet during this final moult.
- Make sure you have your Insect Lore hatching habitat ready to receive its new tenants!

## What's an "exoskeleton"?



While we humans have skeletons inside our bodies, with tissue and skin on the outside, caterpillars' bodies are just the opposite! Their tissues are inside their bodies and the skeleton is the outside covering. That's why their skeleton is called an "exoskeleton". When caterpillars grow, the exoskeleton gets tighter and tighter. Since the exoskeleton will not stretch, caterpillars must shed their exoskeleton (moult) in order to continue growing. Your caterpillars will moult five times in total before becoming chrysalides and that's why you might see little black balls at the bottom of the cup - they're actually little balls of cast-off caterpillar exoskeleton! Sometimes you may even see the remains of the moulted exoskeleton hanging from the tip of the chrysalis.



## Wiggle, Wiggle, Shake!

You may find that your chrysalides will wiggle or shake dramatically when you move them to the butterfly habitat - or even if you disturb them just a little.

Understandably, you might think that the butterflies are about to emerge when you see this behaviour. This unusual wiggling is a perfectly normal response in the chrysalis community. In fact, this behaviour is actually a natural defence mechanism! Chrysalides wiggle and shake when they are disturbed in an effort to frighten potential predators.

So next time you see your chrysalides wiggling, you'll know they are just telling predators to stay away! Chrysalides need calm and quiet surroundings so they can metamorphose into beautiful butterflies!

## 6. Move Your Chrysalides into the Butterfly Habitat

After two to three days, your chrysalides should be fully formed. It's a good idea to wait until the last caterpillar that has formed into a chrysalis has hardened for at least two days before moving all of the chrysalides from their cosy cup to their airy new home.



- Gently open the cup and remove the paper disk with the chrysalides attached.
- Remove any silk strands and frass from the paper disk and the chrysalides. This is a very important step! If the silk and frass is not removed, the butterflies may become entangled in the silk when they emerge, causing their wings to not form correctly.
- Using a safety pin attach the paper disk with the chrysalides attached to the lower inside of the butterfly habitat, about 2cm from the bottom. Do not pin the disk to the inside roof of the habitat. When emerging, the butterfly is heavy and is grasping for a secure hold. Falling from the very top of the habitat could cause damage to the newly emerged butterfly.
- Place a cloth or a paper towel under your habitat prior to moving your chrysalides, to prevent any drops of meconium from potentially staining your table top or valued furniture. Keep your butterfly habitat in a safe place.

### If a chrysalis falls, what do I do?

Sometimes a chrysalis falls to the bottom of the Cup of Caterpillars before it has fully hardened. Not to worry! Leave that chrysalis there to harden for the required time. Then, take a plastic spoon, scoop the fallen chrysalis and remove any silk and frass that may be surrounding it. Place the chrysalis on a paper towel on the floor of the habitat, close to an inside wall. When the butterfly emerges, it will instinctively climb up the wall of the habitat, and then hang there to stretch and pump fluid into its wings to straighten them.





## More on the removal of silk and frass

It is very important to remove the silk and frass surrounding your chrysalides just before moving them into your Insect Lore Habitat. This step will ensure that your butterflies will emerge from the chrysalides successfully.

You have probably noticed that your healthy caterpillars spin silk and deposit “frass” or caterpillar waste, in the cup while they are eating and growing.

This silk and frass remains in the cup during the entire process and sometimes can surround the caterpillars while they are transforming into chrysalides.

Allow your chrysalides to fully harden for three days and then open the lid of your cup and remove the paper disk with the chrysalides attached.

Before pinning your chrysalides inside your Butterfly Garden Habitat, you must remove any silk or frass that encircles them. If you skip this step, your butterflies may become entangled when they emerge from the chrysalides. Entanglement could result in wing deformity or even the death of a butterfly.

Using a cotton swab, carefully remove all of the silk and frass surrounding your chrysalides.

Once all of this material is removed, you can move the chrysalides to the habitat and wait for your butterflies to emerge safely!

## 7. The Magical Moment of Emergence

For 7 to 14 days, the chrysalides may look like they are resting peacefully, but an amazing transformation is taking place inside! The caterpillar parts inside each chrysalis are liquefying and re-arranging to become the cells, tissues and organs of a beautiful butterfly. As the days pass, be sure to keep a close eye on the chrysalides.

Are your chrysalides beginning to darken? This is a big clue that your butterflies are preparing to emerge. You'll be able to see the outlines of their wings and bodies inside the chrysalides.

The magical birth of a butterfly happens surprisingly quickly. When a butterfly is ready to emerge, it takes in air through tiny spiracles (tiny holes) in the chrysalis. This added intake of air pressure helps the butterfly split the chrysalis open.



The butterfly will climb out of the split chrysalis with soft, crumpled wings and then position itself, head upward, in a vertical position. Once your butterflies have emerged, do not disturb them while they are expanding and drying their wings. Your butterflies need some time to rest and recover after their prolonged and complex transformation.



You'll see that when the butterfly first emerges, its wings are tiny and shrivelled. The butterfly will sway from side to side, forcing haemolymph (insect blood) into the veins of its wings in order to expand them to their full size. Do not touch or disturb the butterfly during this process. You may see the butterfly expel a small amount of red meconium during this wing expansion. Evidence of meconium means that your butterfly is healthy!



When a butterfly emerges, its tongue (or proboscis) begins as two long strands or halves that must be fused together. You will see the butterfly coiling and uncoiling the two halves during wing expansion. The two halves eventually join to form a tube-like tongue. The butterfly will use this tube to sip nectar.

Once its wings are fully expanded and the proboscis is fused, your butterfly is ready for flight and food!





## Meconium can be a little messy

You might wonder about the small red spots you see on the sides or on the floor of your habitat after your butterflies have emerged from their chrysalides.

This red liquid is called meconium and is a normal part of the process.

When the butterfly emerges from the chrysalis, it hangs from the sides of the habitat and pumps haemolymph, or insect blood, into its wings to stretch, strengthen and harden them. In fact, real insect blood is actually a greenish or yellowish colour!

While the butterfly is stretching and hardening its wings, it expels drops of red meconium from its abdomen. It is often mistaken for blood, but it isn't blood at all. Instead, it is the leftover waste material stored in the butterfly's abdomen not needed to complete metamorphosis. This is red due to the colouring of the butterfly. By contrast, the meconium is ivory for a white silkworm.

## 8. Feed and Observe Your Butterflies

One to two hours after emergence, your butterflies will be fully formed and ready to fly! You may feed your butterflies nectar (sugar-water), fruit, or nectar-bearing flowers.

**Fruit:** Among other fruit, butterflies like fresh cut oranges, apples and old bananas. Score the fruit surfaces to create puddles of juice - making it easier for the butterflies to sip!

**Nectar:** Mix one teaspoon (5 ml) of sugar into a 100ml cup of water and stir. Using the pipette provided, sprinkle the nectar mixture directly onto any fresh flowers you have placed in the habitat. An alternative is to place a tissue saturated with the nectar onto a small plastic plate and place it in the Hatching Habitat. Do not leave an open container of sugar water in the habitat, your butterflies may fall in and drown.

**Flowers:** If you're unsure if your flowers are nectar-bearing, sprinkle some of the sugar-water nectar onto them daily using the pipette. The butterfly's mouth, or proboscis, functions like a straw to sip these nutritious liquids. When not unfurled to drink, the proboscis stays curled up beneath the butterfly's head.

## Butterfly feeding habits in Nature

Butterflies enjoy an all-liquid diet. While they mainly feed on nectar from flowers, butterflies also occasionally sip from mud puddles rich in minerals and salts. This behaviour is called puddling. Male butterflies tend to puddle more than females; it is thought that the beneficial salts they acquire during this behaviour are transferred to the female during mating, resulting in increased egg production.



### 9. Set Them Free!

Release your butterflies two to four days after they have emerged from their chrysalides.

- Make sure that daytime temperatures are above 12°C and try to choose a day that is dry and not too windy. On cooler days, butterflies must warm their flight muscles in a sunny spot before they can fly. If a butterfly has to sit still for too long, it may be vulnerable to predators. Your butterflies will need warmth in order to fly, feed and mate.



- Simply unzip the habitat and patiently wait for the butterflies to fly away. Or, carefully and quietly allow the butterflies to crawl on your hand and fly up and away! Releasing them near flowers may encourage them to remain in your area. Your butterflies will often land on little hands and faces before saying goodbye. It's an experience your family and friends will never forget!
- *Do not shake the habitat.*

Your butterflies will be safe and happy in their habitat as long as you feed them as recommended. Please be sure to release your butterflies within a few days, before mating and egg laying begins. It would be a very big job to care for all of the caterpillars that hatch from the eggs! When you release your butterflies outdoors, your little friends will be free to continue the amazing life cycle all over again. Remember, butterflies are important and helpful members of our environment!

## A word about Painted Lady butterflies

Painted Lady butterflies are the most widely distributed butterfly species in the world, making their home on every continent except Australia and Antarctica.

They are also extremely resourceful butterflies, able to live in a variety of environments, like marshes, mountains, fields and forests.

If you live in a suburban or urban area, don't worry - the Painted Lady is a migrating butterfly and can fly thousands of miles to find food.

Once released, your butterflies can often be seen for several days in the vicinity, especially if you have butterfly-attracting blooms in your garden.



## 10. Wash Your Habitat

Your butterfly habitat is easy to clean and store away until your next project. Simply place a drop of mild soap into a basin of water and swish your habitat in the soapy water. Rinse thoroughly. hang your habitat to dry and it will be ready for more butterfly friends!

## 11. Be a Social Butterfly!

Your butterfly experience is important to us!

Please share your stories, reviews and images with us on Facebook, Pinterest, Twitter, YouTube and Instagram, or at [InsectLore.co.uk](http://InsectLore.co.uk)!



## Frequently Asked Questions

[My caterpillars have arrived dead!](#)

Your caterpillars are probably just fine. They do not move much in the first few days as they are preparing their bodies to moult their skin. You will see a lot of growth in the next few days. A good indication that they are fine is the presence of little balls of waste near them and silk webbing.

### My caterpillars seem to be running out of food. What should I do?

Your caterpillars are sent with more than enough food to develop into healthy adults. If the food appears to be running low, it's a sign that your caterpillars are close to pupating.

### Can I remove the lid of the cup and touch my caterpillars?

No. Removing the lid could introduce bacteria and mould into the caterpillar environment. Oils and salts from your hands could harm your caterpillars. Do not open the cup until your chrysalides have formed and it is time to move them to your butterfly habitat.

### What are the little brown balls appearing in my cup of caterpillars?

Those little balls are “frass”, or caterpillar waste. It means your caterpillars are eating and growing!



### Why are my caterpillars spinning silky webbing?

It is a good sign if you see webbing in your caterpillar cup. The webbing has many uses. Caterpillars use the silk to pull leaves around themselves to hide from predators that might like to eat them. Caterpillars also use the webbing to stick to their host plants, as the wind might otherwise easily blow them off leaves. Additionally, their six true legs have hooks on the ends and they use the webbing to walk like you would climb a ladder.

### What is a “chrysalis”?

A chrysalis is a pupa. When a caterpillar changes into a chrysalis, it is “pupating”. Chrysalides are always bare. A cocoon does not surround them. A butterfly emerges from a chrysalis; a moth emerges from a cocoon.

### All of my caterpillars have formed chrysalides except for one slowpoke! What do I do?

Sometimes a caterpillar may pupate more slowly than the others. If your other chrysalides are ready to be moved to the Hatching Habitat, do so according to our instructions on page 6. Place a coffee filter or paper towel on top of the cup and replace the lid. Then cut away the extra coffee filter paper that might be sticking out under the lid. This will give your remaining caterpillar something to attach to when it is ready to transform into a chrysalis. If the remaining caterpillar is extremely smaller than the others, then we suggest releasing it onto nettle. It may not be eating the food as normal.

### A chrysalis fell to the bottom of the culture cup. What should I do?

Gently scoop your chrysalis with a spoon, remove any silk webbing and lay it on a piece of paper towel at the bottom of your butterfly habitat. It will emerge there safely.

### How can I tell whether a butterfly is male or female?

Because of their egg mass, females have a larger, more rounded abdomen than males. Look at your butterflies from above. The male butterfly's abdomen has straight sides, while the female's abdomen is curved.

### How long will my butterflies live?

Adult Painted Lady butterflies typically live for 2-5 weeks. During that time they will feed, mate, lay eggs, and begin the amazing butterfly life cycle (metamorphosis) all over again!

### Is a butterfly an insect? I only see four legs!

Like all insects, a butterfly has three body parts: head, thorax and abdomen, three pairs of jointed legs, one pair of antennae and an exoskeleton. It may look like your Painted Lady butterflies have only four legs, but they do indeed have six. The two front legs are furry and tucked up high on the thorax and are very easily overlooked. You will see the butterfly bring these out to taste.

### Are Painted Lady butterflies native to my country?

Painted Lady butterflies are found almost everywhere! They are native to Canada, the United States, Europe, Asia, Africa and even Iceland!

### Can I reuse my butterfly habitat?

**Yes! Simply wash the habitat with soap and water and visit us at [InsectLore.co.uk](http://InsectLore.co.uk) to order another Cup of Caterpillars!**



## Notes from our founder, Carlos White, aka Dr. Entomology!

### Moths & Butterflies



Butterflies and moths belong to the order Lepidoptera. One of the basic ways moths are different from butterflies is that they can fold their wings over their bodies while at rest. Butterflies cannot do this. In this respect, butterflies are actually more primitive in their development than moths. The primitive condition of wings in insects is a simple extension from the body. This can be seen in much more primitive insects such as dragonflies.



### Wings



Butterflies use their wings not only to fly, but also as lures to other butterflies of their own species for mating purposes. Hence, the great variety of colours and forms has evolved for this need.

The wings can also act as camouflage in mimicking the background and environment where the butterfly rests. Note the much different colour of the undersides of the wings of the Painted lady butterfly. The colours on the underside, normally the resting position, are much more muted and neutral.



Another function of the wings is to frighten would be predators. (This can be seen in moths more so than butterflies.) Note the huge eyespots on the wings of Peacock. This makes them appear to be a much larger and more dangerous animal.



The membrane of the wings of butterflies is overlain with thousands of rows of scales. These can be seen very easily through a microscope. The colouration of the wings is the result of the variety of colours placed upon these scales during the butterfly's formation within the pupa. Another method of colouration of the wings is the result not of pigmentation but by the placement of scales at various angles along the surface of the wing. The angles of placement combined with the smooth reflective surface of the scales catches and reflects only certain parts of the photo spectrum. The varieties of colour are due to the angle of light being reflected from the wings. Since this is not a true colour, these butterflies may appear black or very muted when the light is withdrawn.

When the butterfly first emerges from its puparium the wings, of course, are miniscule. Within the membranes of the wings, however, are open veins through which the butterfly forces blood (haemolymph in the case of insects) into them under pressure. She does this through rhythmic contractions of her body to force this liquid into them under considerable pressure. The wings, being damp and flexible at the time, rapidly expand under this hydrostatic pressure.

## Our Butterflies in Space!

To assure the wings will be normal, the effect of gravity must be accounted for by the butterfly. The gravity effect, if the butterfly were not at right angles to its effect, would be to deform the wet wings as they form. In 1999, NASA sent a variety of the stages of our butterflies into orbital space to examine the effect of the absence of gravity on the wing development of our butterflies. Photo footage of the emerging butterflies showed that butterflies could emerge and inflate their wings in any position they happened to be upon emergence. Therefore, the butterfly senses the pull of gravity and responds by climbing away from its effects. This is called negative geotropism. Geotropism is an orientation toward the pull of gravity.



## Dating and Mating

While butterflies use their wings to attract would-be mates, moths, being nocturnal, have found another method. In the case of moths, scents are used by the female along with receptors on the male. The females scent glands are located at the tail end, while in the male, the receptors are on the antennae. Notice the bushy, comb-like antennae on the moths you see around your porch light some night. Each species manufactures a different kind of scent (pheromone) and the male of that species has perfect receptors for that particular chemical on his antennae. Males can detect the powerful scents females emit at distances up to a mile should wind conditions be just right.

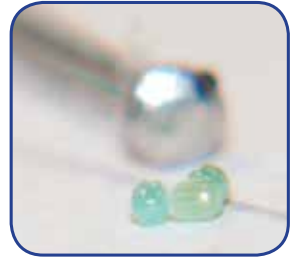


The preferred time for butterflies to attract each other is in the early to late afternoons. You may notice a butterfly resting on the ground during this time with her or his wings spread open and at almost perfect right angles to the sun's rays. Butterflies, having excellent eyesight, can readily see the pattern and colouration and this triggers a response to approach. Unlike moths, both males and females will perform this procedure. They mutually attract each other as opposed to the more one-sided approach moths take.

## Eggs

Since butterflies operate strictly during the daylight, they first use their vision to sort through the many types of plants they see to get an approximation of what they seek. This being done, they alight on the plant to verify their suspicions. First tasting the plant leaf surface for correctness, they then dip their antennae onto the surface of the leaf to determine the correctness there.

Once established that the right leaf has been found, they then deposit an egg. Each egg is attached to the leaf by way of a very quick-drying glue that is added to the egg as it is being laid. Firmly attached in this way, the egg is secure from being washed or blown away from the leaf during stormy weather. A Painted Lady butterfly can lay up to 500 eggs. They are smaller than the head of a pin.



Moths, on the other hand, must use methods other than light to find the proper hosts on which to lay their eggs. They do this by using the radiation emitted by the plant itself. The radiation is in the infrared range of the light spectrum. Each plant emits its own radiation signals and the moth is attuned to this particular radiation signal emitted by the plant it seeks. It has been speculated that moths lay fewer eggs during clear moonlit nights due to the interference of the reflected light from the moon. The final verification of the accuracy of its assessment is made by touching the leaf with its antennae for the proper scent.

## Blood

Most of us have noted the sight of the premature end to insects on the windshields of our cars. It's interesting to observe that a squashed butterfly (or other insect) is mostly yellow. Since insects do not have blood in the same sense as animals of a higher order, their remains signify the colour of their substitute for blood. This is called haemolymph. The red in blood of higher animals is the result of the oxygen carrying haemoglobin in our blood. This 'blood' or haemolymph is yellow because it does not need the iron rich haemoglobin of our own blood.



## Polination

It would be hard to over-emphasize the importance insects play in the pollination of flowers and to our benefit. Without this essential help, much of the food we eat would not exist. Imagine life without fruits such as apples, peaches, pears, plums, cherries, or raspberries; no snacks such as walnuts or almonds; no vegetables such as beets, broccoli, cabbage, cucumbers, carrots, or tomatoes, no morning coffee or hot chocolate (cocoa)! Unthinkable! All of the above are fertilised through the pollination efforts of insects, including butterflies.

**Visit [InsectLore.co.uk](http://InsectLore.co.uk) for more Butterfly fun!**



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