



## A Bit about Butterflies

*Almost everyone loves butterflies, Tom the small child enraptured by the brilliant colors to the biologist intrigued by their variety and magical life cycle. Almost every science curriculum (district, state and national) includes animal life cycles. Butterflies are perfect specimens to observe and ideal for comparing and contrasting to the human life cycle.*

### Background:

BUTTERFLIES ARE INSECTS! They have six legs, three body parts and two antennae. They are a member of the **Order Lepidoptera**, of the Class Insecta, in the Phylum Arthropoda, in the Kingdom Animalia. Like other members of the Phylum Arthropoda, they have an exoskeleton, jointed legs, and are cold-blooded.

Insects of this Order are characterized by having overlapping scales on the wings. (Greek: **lepis = scales, pteron = wings**) There are approximately 170,000 known species of Lepidoptera, of which only about 10% are butterflies.

If a butterfly or moth is touched on the wings, the fine "dust" that is rubbed off is actually tiny **scales**. Additionally, the brilliant colors and patterns common to many butterflies may be caused by pigment or by light refracting off of the scales. The brilliant iridescent blue of the beautiful Common Morpho butterfly is an example of coloration due to refraction. If you watch one fly through our conservatory you will notice their color change from bright cobalt blue to an aqua marine depending on how the light hits the wing.

Identifying scale color and pattern is only one of the ways butterflies find a mate. Many male Lepidoptera have special scales called androconia that scatter their scent over the female during courtship. Scales also cover other parts of the body. What appears to be hairs atop the head of the butterfly are actually scales standing erect.

Another characteristic feature of adult Lepidopterans is the sucking **proboscis** or "straw-like mouthpart." When the insect is at rest, the proboscis is often rolled up underneath the head. To feed, they extend it so that the organ acts like a flexible straw. The usual food for most lepidopterans is nectar, though some, like the owls & morphos, will sip juices from rotting fruit. Others, like the longwings, are adapted to be able to digest pollen as well. Some moths have NO proboscis and the adults do not feed at all!

**Kingdom:** Animalia

**Phylum:** Arthropoda  
"jointed legs"

**Class:** Insecta  
3 body parts,  
6 legs

**Order:** Lepidoptera  
Butterflies & Moths  
"Scaly Wings"

**Butterfly Families:**

Papilionidae (swallowtails)  
Pieridae (sulphurs & whites)  
Danaiidae (milkweed)  
Ithomiidae (glassywing)  
Nymphalidae (brush-footed)  
Heliconiidae (longwings)  
Brassolidae (owl)  
Morphidae (morphos)

People often ask, "**What the difference between moths and butterflies?**"

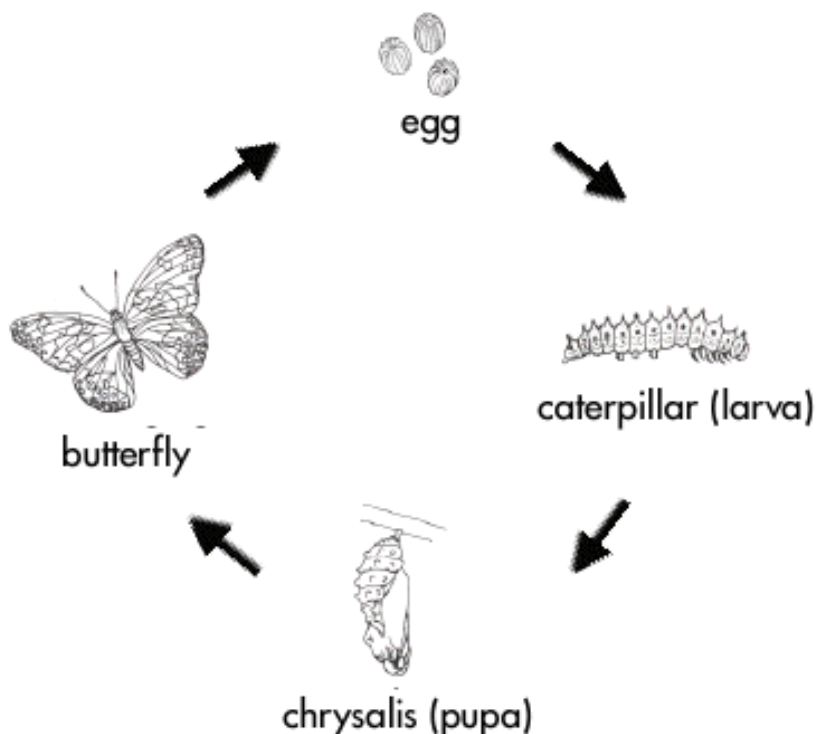
A Lepidopterist (an entomologist that specializes in Lepidoptera) might adamantly reply, "The division is purely artificial. In fact some moths are more closely related to butterflies than to other moths." In America we group Lepidoptera by some basic physical and behavioral attributes. However, it is important to note there are many exceptions to each "rule." **YOU CAN NEVER SAY "ALWAYS" WHEN IT COMES TO SCIENCE!**

Characteristics	Butterflies	Moths
Color	Bright	Dull
When active?	Day	Night
Body shape	Thin, sleek	Heavy, furry
Resting wing position	Together over back	Folded flat over back
Pupae	Chrysalids	Silk cocoons or "naked"
Antennae	Thin, end in knob	Feathery or straight ending in a point

### Life Cycle:

Lepidopterans are members of what scientists refer to as advanced insects. These more evolved insects (others include: beetles, bees, ants and wasps) grow through the process of **complete metamorphosis**. Metamorphosis means a change of form; complete metamorphosis refers to those animals that have four (4) distinct changes of form in their lifetime: egg, larvae (caterpillar), pupa (chrysalis or cocoon), and adult.

Butterflies and moths begin their life as an **egg**. Eggs are often laid on the underside of leaves, better to hide them from predators. Some are laid in bunches, others singly. From the egg hatches a caterpillar. These creatures, with their chewing mouthparts, have one job -- to eat! Most **larvae** (caterpillars) have both true legs and pro-legs (false legs). The three pairs of true legs are found on the thorax, while the pro-legs are present on the abdomen. They eat and molt, and eat and molt, until they are big enough to support the long and complicated life change. Once they are "ready," silk is secreted from glands in the mouth. The caterpillar hooks on to this silk with it's hind pro-legs and molts a final time. This time it's exoskeleton hardens and forms a **pupa**, or chrysalis. In the case of some moths, a cocoon of silk is wrapped around the pupa. In the pupa, the chewing, wingless larva undergoes a magical transformation into a magnificent winged **adult** which will emerge only when mature.



## Frequently Asked Questions:

### HOW LONG DO THEY LIVE?

These are *average* life expectancies for each developmental stage of tropical butterflies.

egg: 10 days

caterpillar: 4 - 8 weeks

chrysalis: 10 days

adult: 14 days in captivity, usually somewhat shorter in the wild.



*Julia or Fambou, Longwing Butterfly*

### WHY ARE THERE NO CATERPILLARS IN THE BUTTERFLY PAVILION?

Fortunately caterpillars are very picky eaters and "mama" butterflies have adapted to provide for the young they will never see. This is why butterflies will lay their eggs only on a "host plant," a plant their caterpillars will eat. To avoid having caterpillars, we don't plant any of the caterpillar "host plants" such as passion vine or citrus. Butterflies can still mate and may lay eggs on non-host plants. Butterfly Pavilion staff removes these eggs daily during a spray down of the plants in the conservatory. The Butterfly Pavilion is permitted to raise the caterpillars of a few types of butterflies under controlled conditions. These butterfly species include owl butterflies (host plant is palm or pink ginger) and monarch butterflies (host plant is milkweed).

### WHY DO CHRYSALIDS WIGGLE?

Chrysalids will wiggle when they are upset or disturbed. This does not mean they're hatching. It is like being stuck in a sleeping bag. If you get upset what can you do? Wiggling is often accompanied by a squeaking noise and may scare *off* potential predators.

### HOW LONG DOES IT TAKE FOR A CHRYSALID TO HATCH?

When the butterflies are hatching, it takes about 5 minutes to pull themselves from the chrysalis shell and about 10 minutes to inflate their wings with fluid from the abdomen. After the wings are inflated they need two to six hours (depending on the species) for the wings to harden enough to fly.

### WHY DOES A CHRYSALIS APPEAR TO CHANGE COLOR WHEN THE BUTTERFLY IS CLOSE TO EMERGING?

Chrysalids come in many shapes, sizes and colors, all specific to a butterfly species. The last thing a butterfly does before it hatches is to put pigment in the wings. At this stage, the chrysalis becomes more see through and appears to have changed colors. The colors you are actually looking at is the color of the butterfly's wings. Once the chrysalis becomes clearer and the wing designs are visible, hatching will generally occur within 24 hours. Most hatching occurs between 7:00 a.m. and 12 noon. If they hatch after noon there is a good chance they will have to wait until the next day to fly.

### WHY ARE SOME CHRYSALIDS SO ODDLY SHAPED? WHY ARE OTHER CHRYSALIDS BRIGHTLY COLORED?

Some may look extremely twisted or disfigured. However, when they are placed with their native host plant, they may match perfectly to the dried leaves or tendrils (camouflage or cryptic coloration). Many other chrysalids are reflective or have shiny gold and silver spots. The word chrysalis in Greek actually means "gold". These beautiful gold and silver spots can help the chrysalis hide by mimicking water or dew droplets. The shiny and bright colors can serve as warning colors, telling other animals the chrysalis is poisonous and should not be eaten.

