# Butterflies Aflutter

Everyone adores butterflies!

During spring, depending on where you live, you may notice our much-loved pollinators flying about. On warmer days, we see bees pollinating our spring flowers and soon afterwards, we will delight in the colorful butterflies using the native flowers in our yards and fields, too!

Butterflies are fascinating and demand the attention of nature lovers of all ages. Did you know that the life cycle of a butterfly has four stages called metamorphosis? Each species turns from a caterpillar that crawls and eats plants, to a butterfly that flies and consumes liquid nectar from flowers.

Maybe you know some butterfly species. Which is your favorite?

In this butterfly learning packet, we'll unveil how butterflies grow and discover more about their body parts.

## Life Cycle of a Butterfly

Before a butterfly becomes a butterfly, it goes through multiple stages. This process is called *metamorphosis*. Each species goes through their own metamorphic process and remains in each stage for different lengths of time. Generally, the life cycle of a butterfly is composed of four stages.

The first stage is an egg. Usually a sphere or oval shape, they can be white, yellow, green, or orange depending on the species. Some butterflies lay their eggs one at a time, and some lay them in large groups.

Monarch Egg

Black Swallowtail Egg

Cabbage White Eggs

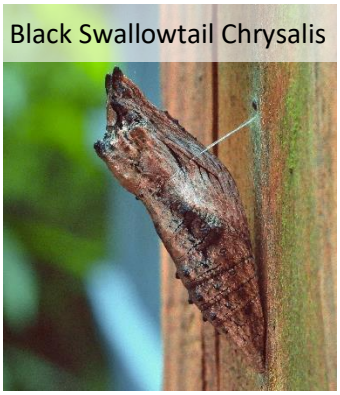
Then out of the egg comes a caterpillar, and within the caterpillar stage it will shed its skin multiple times, getting larger each time. These are called *instars*. Right when the caterpillar emerges, it is at its first instar. When it sheds the next time, it is at its second instar, and so on and so forth.

Monarch Caterpillar, 1st Instar

Monarch Caterpillar, 5th Instar

Next, when the caterpillar is large enough, it will form its skin into a hard shell called a *chrysalis*. This is where the most dramatic change takes place. Gradually inside the chrysalis the caterpillar will transform itself to a liquid where it gets all its parts in place, and then finally turns into a butterfly.

Monarch Chrysalis



Black Swallowtail Chrysalis

Cabbage White Chrysalis

Finally, the insect emerges from its chrysalis as a beautiful butterfly. Each species of butterfly has a specific lifespan. Not all butterflies have the same exact life cycle. For example, some butterflies have the ability to *overwinter*, which means if they form their chrysalis too late in the summer or fall, it will stay a chrysalis until it is warm enough for it to emerge next spring.

Monarch Butterfly

Black Swallowtail Butterfly

Cabbage White Butterfly

**Life Cycle Vocabulary**

Metamorphosis – the transformative process that allows an insect to change from immature to adult.

Instar – the term used to define which stage of molting a caterpillar is in.

Chrysalis – the pupa stage, in between immature and adult, when the caterpillar forms its last skin into a hard shell so that it can safely transform to a butterfly.

Overwinter – the ability to survive through the winter.

**Activity 1:** Watch this video and learn how a monarch caterpillar creates its chrysalis and how it eventually emerges as a butterfly. What are some things you notice in this video?

**Activity 2:** Life Cycle of a Butterfly


Label the Four Stages of the Butterfly's Life Cycle

1. _____
2. _____
3. _____
4. _____

**Bonus:** Can you remember which butterfly species this is from the information above in?

Answer: _____

**Anatomy of a Caterpillar**

Caterpillars have a head with tentacles that help the caterpillar feel. The thorax is after the head and has 3 segments, which is also where the 3 pairs of *true legs* are. After that is the abdomen which has 11 segments, which is where the 5 pairs of *prolegs* are.

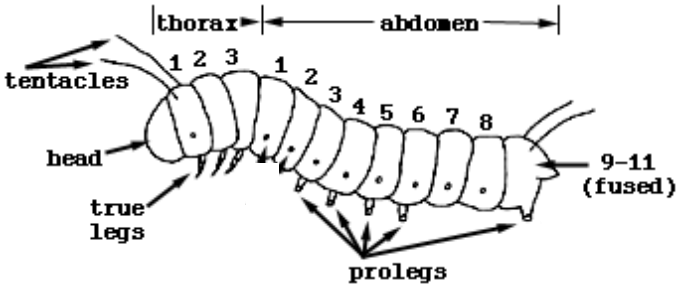



Photo credit:
https://www.monarchwatch.org/biology/

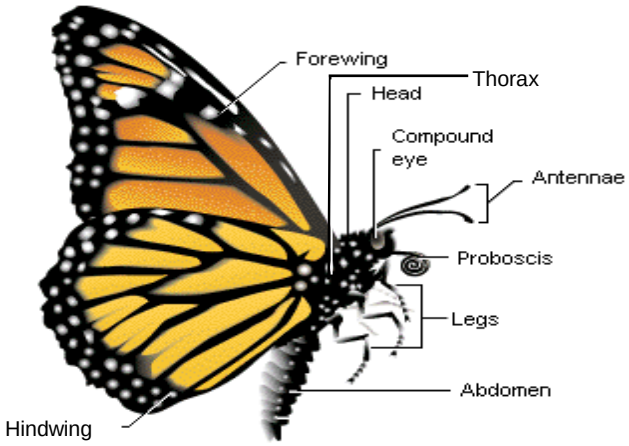
**Caterpillar Anatomy Vocabulary**

True legs – segmented legs, these also identify the front if the insect.

Prolegs – fleshy, unsegmented legs that help the insect climb without falling

**Anatomy of a Butterfly**

Butterflies, like all insects, have a head, a thorax, an abdomen, and 6 legs. They also have 4 wings altogether, 2 forewings and 2 hindwings. *Compound eyes*, which are made up of smaller parts that work together. A *proboscis,* which is their tongue that they use to stick in the part of the flowers that releases nectar so they can eat. Lastly, their antennae are their "feelers", which allows them to get a sense of touch.




**Butterfly Anatomy Vocabulary**

Compound eyes – eyes that are made up of many smaller parts that work together and allow insects to see.

Proboscis – a feeding tube that can extend from the head of the insect.

**Activity 3:** Match the Caterpillar to the Butterfly

Caterpillars and butterflies are so different! Metamorphosis allows them to start off as crawling insects and then transform into flying insects. They go from eating solid food like leaves as a caterpillar, to a liquid-only diet as a butterfly. Even their coloring is different from caterpillar to butterfly. Try to match the caterpillar to the butterfly it transforms into below!

**Activity 4:** Draw and Label the Parts of the Caterpillar

Be creative but be sure to draw all the parts of the caterpillar by using the word bank.

Word Bank

Head

Thorax

Abdomen

True legs

Prolegs

Additional Questions:

How many segments are generally in the thorax? _____

How many segments are generally in the abdomen? _____

How many true legs are there and where are they located? _____

How many prolegs are there and where are they located? _____

**Activity 5:** Draw and Label the Parts of the Butterfly

Be creative but be sure to draw all the parts of the butterfly by using the word bank.

| Word Bank | | |
|---|---|---|
| Head | Legs | Compound eyes |
| Thorax | Forewings | Proboscis |
| Abdomen | Hindwings | Antennae |

Additional Questions:

How many legs are there? _____

How many forewings are there? _____

How many hindwings are there? _____

What is the proboscis used for? _____

What are the antennae used for? _____

**Activity 6:** Draw Each Life Cycle Stage

Draw each stage to the best of your ability, keeping the anatomy of the insect in mind. Get creative by coloring them any way you'd like!

| **Egg(s)** | **Caterpillar** |
| --- | --- |
| **Chrysalis** | **Butterfly** |

**Butterflies vs. Moths**

Butterflies and moths belong to the same order called Lepidoptera, which means scaled wing. This is because the wings are covered with tiny scales like roof shingles which protect the wings from rain and bad weather. Since they are related, butterflies and moths have lots in common. However, there are some simple ways we can tell the difference between them.

**Butterflies**

**Moths**

| | |
|---|---|
| Butterflies are diurnal, meaning they fly and feed during the day | Moths are nocturnal which means they are usually active at night |
| Butterflies fold their wings together up over their backs like hands pressed together | Moths hold their wings out like a jet plane |
| Butterflies spend their pupal stages in hard smooth cases called chrysalises | Moths spend the pupal stage in cocoons wrapped in silk |
| Butterflies have long, thin antennae with club shaped tips | Moths have fuzzy antennae that look like feathers |
| Butterflies have thin smooth bodies | Moths usually have chunky fuzzy bodies |
| Butterflies tend to have vibrant colors | Moths often have more subdued colors |

**There are about 180,000 known species in Lepidoptera Order:**

**10% are butterflies**

**90% of them are moths!**

**Activity 7:** Butterfly or Moth?

Look at the photo pairs and guess which one is the butterfly, and which one is the moth:

**1a.**_____

**1b.**_____

**2 a.**_____

**2b.**_____

**3a.**_____

**3b.**_____

**Answer Key**

**Activity 1:** Video Observations

- 0:11 – Caterpillar is eating a leaf (solid food).
- 0:18 – Monarch caterpillar has 2 sets of antennae. This is because this is their defense mechanism. If predators were to approach, they would not be able to tell which is the front and which is the back of the caterpillar.
- 0:33 – Caterpillar is hanging in a "J" formation and shedding last skin as a caterpillar. It is hanging on by silk that it produced so the chrysalis can hang so that no side gets flattened. This allows the wings and rest of the body to fully form. The "J" formation is how you know a **monarch** caterpillar is starting to form a chrysalis. Different species use their silk in different ways, as well as look different and have a different texture.
- 1:16 – It wiggles around after the whole chrysalis forms. This ensures that the cremaster (the black piece of the pupa that the chrysalis is hanging from) is safely embedded in the woven silk.
- 1:38-1:49 – Chrysalis starts off soft and then hardens over time.
- 1:51 – Chrysalis turns clear. At this point you can see the butterfly through the chrysalis, and this means the butterfly is ready to emerge soon.
- 2:30 – Adult butterfly is feeding on nectar (liquid food)

**Activity 2:** Life Cycle of a Butterfly

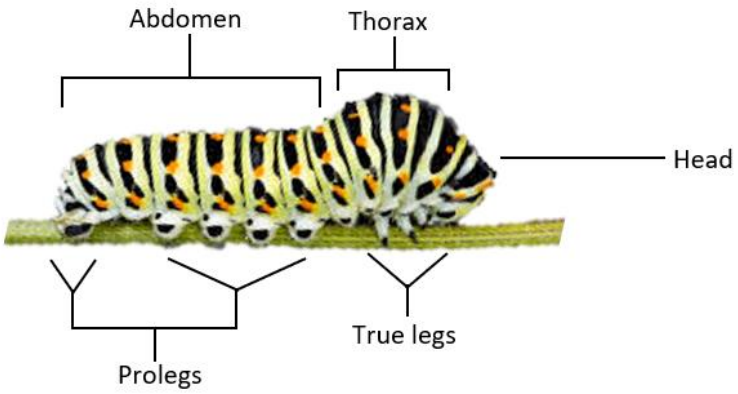
Label the Four Stages of the Butterfly's Life Cycle in Order

1. Egg
2. Caterpillar
3. Pupa or Chrysalis
4. Adult butterfly

**Bonus:** Monarch

**Activity 3:** Match the Caterpillar to the Butterfly

**Activity 4:** Draw and Label the Caterpillar




Additional Questions:

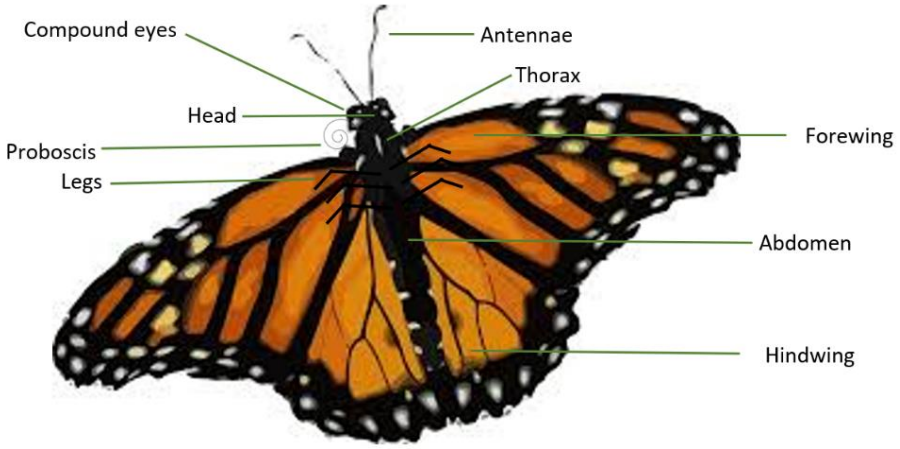
How many segments are generally in the thorax? 3 segments

How many segments are generally in the abdomen? 11 segments

How many true legs are there and where are they located? 3 pairs of true legs on the thorax

How many prolegs are there and where are they located? 5 pairs of prolegs on the abdomen

**Activity 5:** Draw and Label the Butterfly




Additional Questions:

How many legs are there? 6 legs

How many forewings are there? 2 forewings

How many hindwings are there? 2 hindwings

What is the proboscis used for? Eating nectar

What are the antennae used for? Feeling their surroundings

**Activity 6:**


**Activity 7:**

1a. Polyphemous Moth

1b. Monarch Butterfly

2a. Tiger Swallowtail

2b. Luna Moth

3a. Isabella Tiger Moth

3b. Black Swallowtail