Beautiful Butterflies

Objective:

1. Students will demonstrate knowledge of the basic anatomy and function of the butterfly.
2. Students will demonstrate knowledge of the habitat of butterflies and moths.
3. Students will be able to label and explain the life cycle of the butterfly.

Grades: 1- 2

Key Vocabulary:

- **Proboscis**
- **Spiracles**
- **Thorax**

Related Literature:

Butterflies
Seymour Simon

The Butterfly
Patricia Polacco

From Caterpillar to Butterfly
Deborah Heiligman

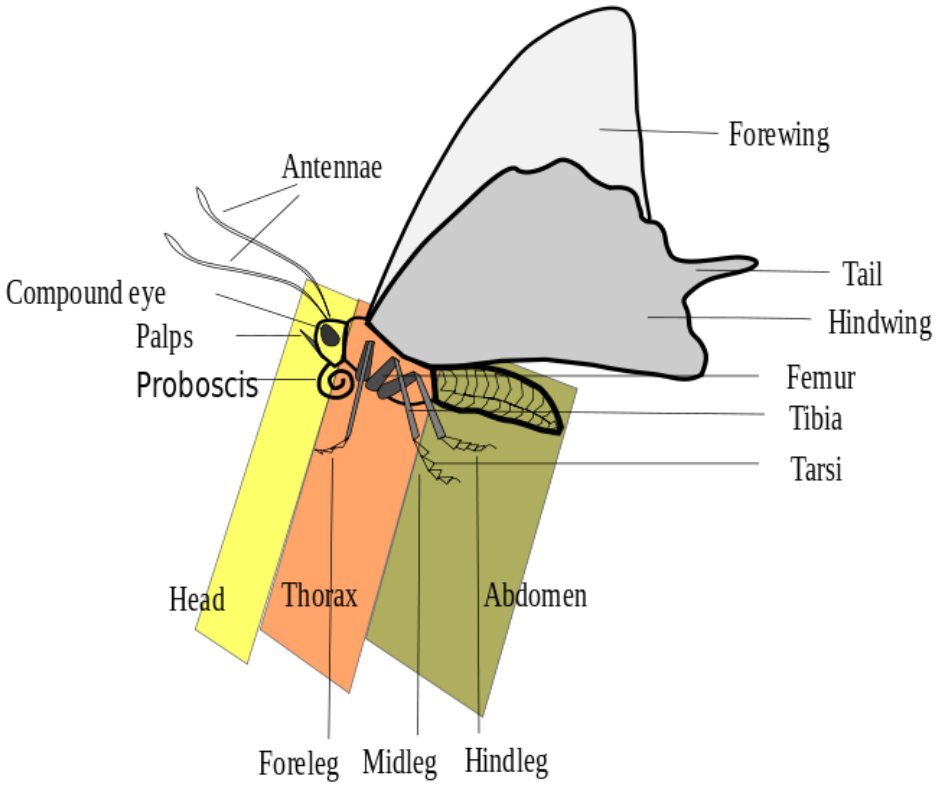
Performance Objectives:

Grade 1: Strand 4: Concept 1 – PO 1- 3
Concept 2 – PO 1-2, Concept 3 – PO 3
Grade 2: Strand 4: Concept 1 – PO 1-2
Concept 2 – PO 1
NGSS: 1-LS 3. B; 2-LS 2. A
CCSS: 1. W. 3; 1. W. 5; 2. W. 2, 2. W. 8

Background Information:

Butterflies seem to be everywhere around us. We see [illegible] in the school yard and in the forest. Butterflies are beautifully colored and appear to float on the air. Butterflies are a part of the insect world and have been on Earth for a very long time. According to NABA (North American Butterfly Association), there are about 725 different species of butterflies in North America. That is a lot of color flying around.

As a part of the insect world, butterflies share many of the same characteristics as other insects. They have three main body parts: the head, the **thorax** and the abdomen. Butterflies and moths also have six legs, two antennae, four wings, and a **proboscis**. The proboscis is a tubular mouthpart that stays coiled up until the butterfly is ready to sip nectar. Then the proboscis acts like a straw drawing the liquid nectar up so the butterfly can drink.



The butterfly antennae are used for balance in flight and as a way to sense the things around them. Butterflies and moths have compound eyes that are large and made up of thousands of tiny sensors. The sensors allow the butterfly to see in all directions at once. Butterflies and moths are sensitive to movement and they can tell when it is day and when it is night. (Diagram by L. Shyamal)

Butterflies and moths have many similarities. They are both insects and both are in the insect order, Lepidoptera. That means they both have scales on their body and wings, antennae, compound eyes and two sets of wings. Most butterflies fly during the day and most moths fly at night. The butterfly antennae are thin with a club at the end. A moth has either a plain or feather-like antennae. Note the feather-like antennae on the Atlas Moth. (Photo by Linda Hoyer)

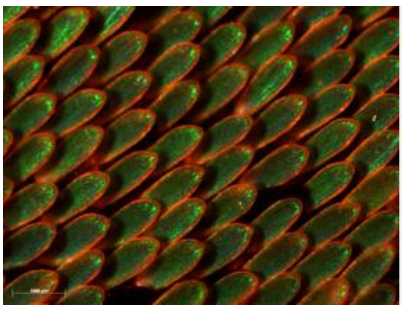
Many moths have a thick, furry body, whereas butterflies tend to have a slimmer body with no hair.

Butterfly antennae with the club or thickened end. Butterflies tend to be more brightly colored than moths.

(Photos by Linda Hoyer at Butterfly Wonderland.)

The thorax, middle of the body, is where the legs and wings are attached. The digestive, respiration, circulatory and reproductive systems are in the thorax. Butterflies and moths breathe through tiny openings along the side of the abdomen. The openings are called **spiracles**.

Both butterflies and moths have wings that are made of thousands of tiny scales. Each scale is one color, but put together the wings of the beautiful butterfly and moth often reflect the brilliance of deep color. Butterflies generally fold their wings up over their back when at rest. Moths rest with their wings open or folded downward over their body.



Notice the wing scales on this Amazonian Butterfly and the color pattern. The wings are so delicate that once the scales are rubbed off they cannot grow back. That is why it is very important not to handle the butterfly or moth.
(Photo by Richard Prum.)

The **life cycle** of the butterfly involves 4 stages: egg, larva, pupa and adult. Like many other insects, the butterfly goes through a complete metamorphosis as it becomes an adult. Moths, bees, wasps and ants are a few other insects that go through a complete metamorphosis.

Depending on the species, butterflies can lay many hundreds of eggs during their life. Generally, the female butterfly lays her eggs on the underside of leaves or even twigs. If the outside temperature is right, the eggs will hatch in about one to three weeks and the newly emerged caterpillar will begin the second stage of the life cycle. The tiny caterpillars start their life with a huge appetite and begin to consume the egg shell around them. The little eating machine moves on to the leaves of plants chewing its way toward the next stage in life.

(Public domain photo)

A caterpillar may shed its skin four or more times as it eats and continues to grow. A caterpillar can travel a great deal eating and growing until it has reached the ideal size and has located just the right place to pupate. This stage is critical to the formation of the adult. Many biological changes take place during the pupal stage, which may last from a few weeks to several weeks. The species of butterfly and the outdoor climate impact the time in which the pupal stage is completed.

The magic that takes place inside the chrysalis is as remarkable as the beauty of the emerging butterfly. The outside of the chrysalis may appear to blend in with the foliage around it and remains still and protective of the mystery inside. The transformation that takes place completes the metamorphosis. The organs, tissues and limbs of the caterpillar are changed into the delicate wings and body of the elegant butterfly waiting to emerge. From the confines of the chrysalis the butterfly emerges with soft, wet wings folded against its body. In a few hours the butterfly will have a body and wings that are ready to fly and begin the life of an adult.

The unique environment at **Butterfly Wonderland** provides a perfect way in which to view the magic of the chrysalis. Numerous species of butterfly and moth chrysalis are located in the controlled atmosphere of the emergent gallery. The chrysalis viewing area is maintained under USDA regulations and is set up for observing the miracle of the emerging butterfly.

Notice the variety of colors, shapes and sizes of the different species represented in the emergent gallery.

(Photos by Linda Hoyer at Butterfly Wonderland.)

The adult stage of the butterfly and moth is one filled with beauty and challenge. Just after the butterfly emerges from the chrysalis, it must have resting time to inflate the wings with a blood supply. The wings must also be given time to dry. In the wild, the butterfly is vulnerable during this resting period. Some species of butterflies and moths have colors and patterns that help disguise them from predators. For example, the owl butterfly has large eye spots that may appear to be the eyes of a bird to some predators. As an adult, the butterfly is focused on finding food, mating and continuing the life cycle. The newly emerged Altas Moth is brilliantly colored and carries a distinctive pattern on the wings. Notice the outer areas of the wings and how easily they might distract predators with their shape and coloration. (Photos by Linda Hoyer at Butterfly Wonderland.)

Butterfly behavior is more than fluttering in the air. Butterflies must stay warm by absorbing the heat from the sun. It is common to see butterflies "basking" in the sun while stretching their wings and sitting atop a rock or stone path in the garden. Butterflies will bask for a few seconds to several minutes depending on their need for warmth.

Butterflies spend much of their time in search of food. While they live mainly on nectar, butterflies and moths will also take in liquids from tree sap, rotting fruit, dissolved minerals in wet dirt, bird droppings and the dew on leaves.

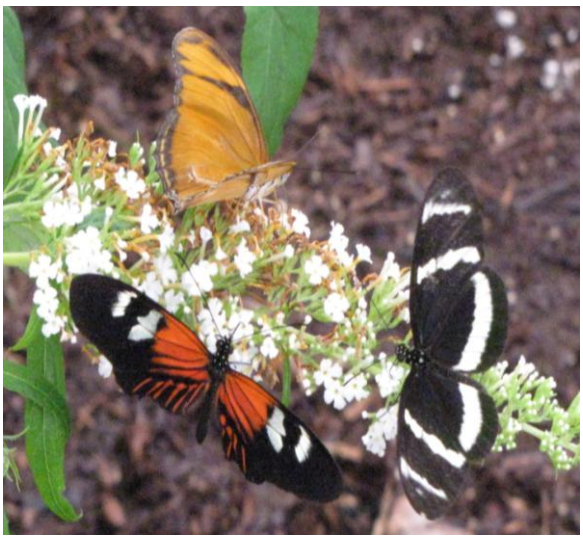
Butterfly Wonderland provides generous resources for the butterflies and moths to locate nourishment. This plate of fruit is a favorite.

(Photo by Linda Hoyer)

Butterflies are considered to be pollinators; however, they are not as efficient as bees. Butterflies like big, colorful flowers with petals that can be used like a landing strip to sit on as they sip up the nectar.

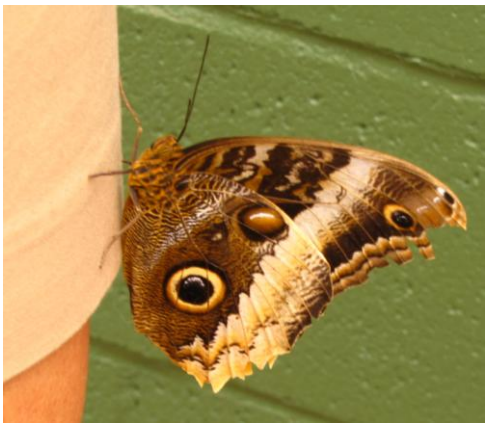
In the environment, butterflies are good indicators of the health of an ecosystem. Butterflies and moths are sensitive to changes in the environment and are impacted by climate changes. The decline in a population of butterflies or moths would be an indicator of concern in the region. Because butterflies are a part of the food chain and food web, a decline in butterflies and moths would disrupt the food chain and potentially have a detrimental impact on other species of insects and animals in the region.

The atrium at **Butterfly Wonderland** is designed to provide the optimum living conditions for the 50-plus species inside. The rainforest-like atmosphere includes a collection of plants that will serve as replacements for the natural "host" plants of the butterfly and moth species. The UV lighting and filtered, natural light is a perfectly managed system for butterflies and moths. In addition, the lighting allows visitors to observe and photograph the hundreds of fluttering butterflies. Misting systems maintain the appropriate level of humidity inside the atrium. The butterflies and moths are not native to Arizona and must have an environment much like their place of origin. The butterflies and moths have modified their behavior to continue their life in the safety of the atrium.



The glass-enclosed atrium at **Butterfly Wonderland** is home to thousands of beautiful plants, trees, butterflies and moths. Visitors can enjoy the environment by strolling through or pausing to rest in seating areas. Butterflies and moths surround the visitors and display their characteristic behaviors as they flutter about to the music in the background.

Do not be surprised if a butterfly decides to land on you and hitch a ride on your visit through the atrium.



(Photo by Linda Hoyer)

Procedures and Pre-Activities:

1. State the learning objective.

2. Read related literature and discuss the anatomy and life cycle of butterflies and moths.

3. Ask open-ended questions about observations of butterflies and moths in the area.

4. Present the background information. Ask and answer questions and show photos as needed.

5. Hand out the Life Cycle sheet and review the term complete metamorphosis as it relates to the butterfly.

Activity: Students can color and name their own butterfly. (See attached coloring pages.)

6. Review the basic anatomy of the butterfly. Using the "Label the Butterfly" handout, students complete the sheet as an assignment or quiz.

Reflection and Assessment:

After visiting Butterfly Wonderland, discuss the experience in each of the exhibits. Discuss the butterfly emergent gallery and adult butterflies in the atrium.

Activity: Life Cycle of the Butterfly. Students complete and label the Life Cycle handout. This can be used as an activity or quiz.

Activity: Students write a thank you letter to Butterfly Wonderland and include what they liked the most on their visit.

Activity: Students write an original poem about a butterfly. (See attached samples.) They can include an illustration.

Activity: Students write a short story about a caterpillar and butterfly. (See short story map attached.)

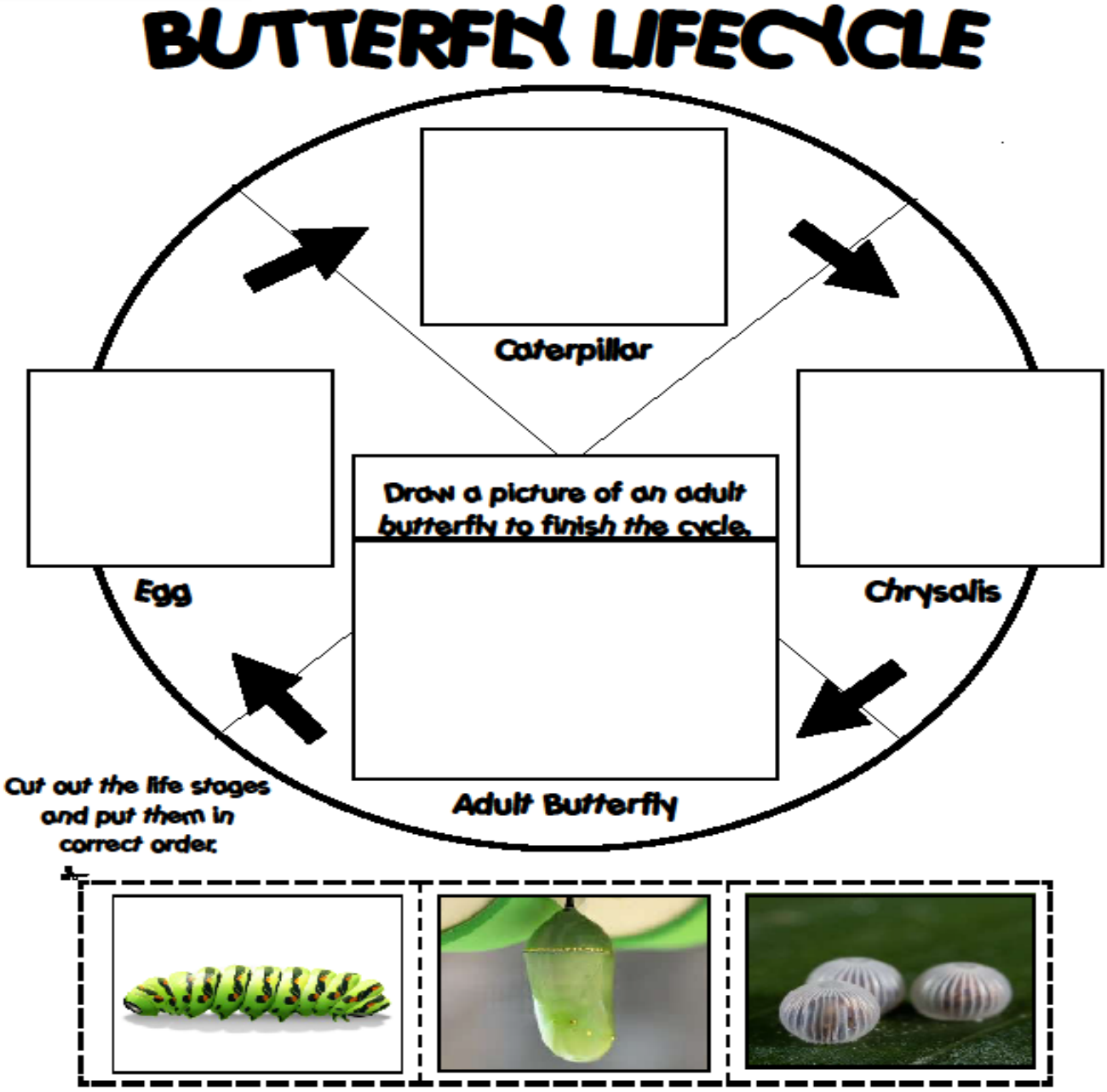
Assessment: Participation, completion and points on activities are per teacher preference.

Sources: North American Butterfly Association (NABA); Butterfly Wonderland; Science Kids; Wikipedia; National Wildlife Federation; University of Michigan; University of Tennessee.

(Photo by Linda Hoyer – Taken at Butterfly Wonderland.)

THE LIFECYCLE OF THE BUTTERFLY

BUTTERFLY WONDERLAND



Egg: Butterfly eggs are laid on plants called Host Plants. They are super small and placed on a leaf by female butterfly. The egg stage usually lasts several weeks before caterpillars come out from the eggs.

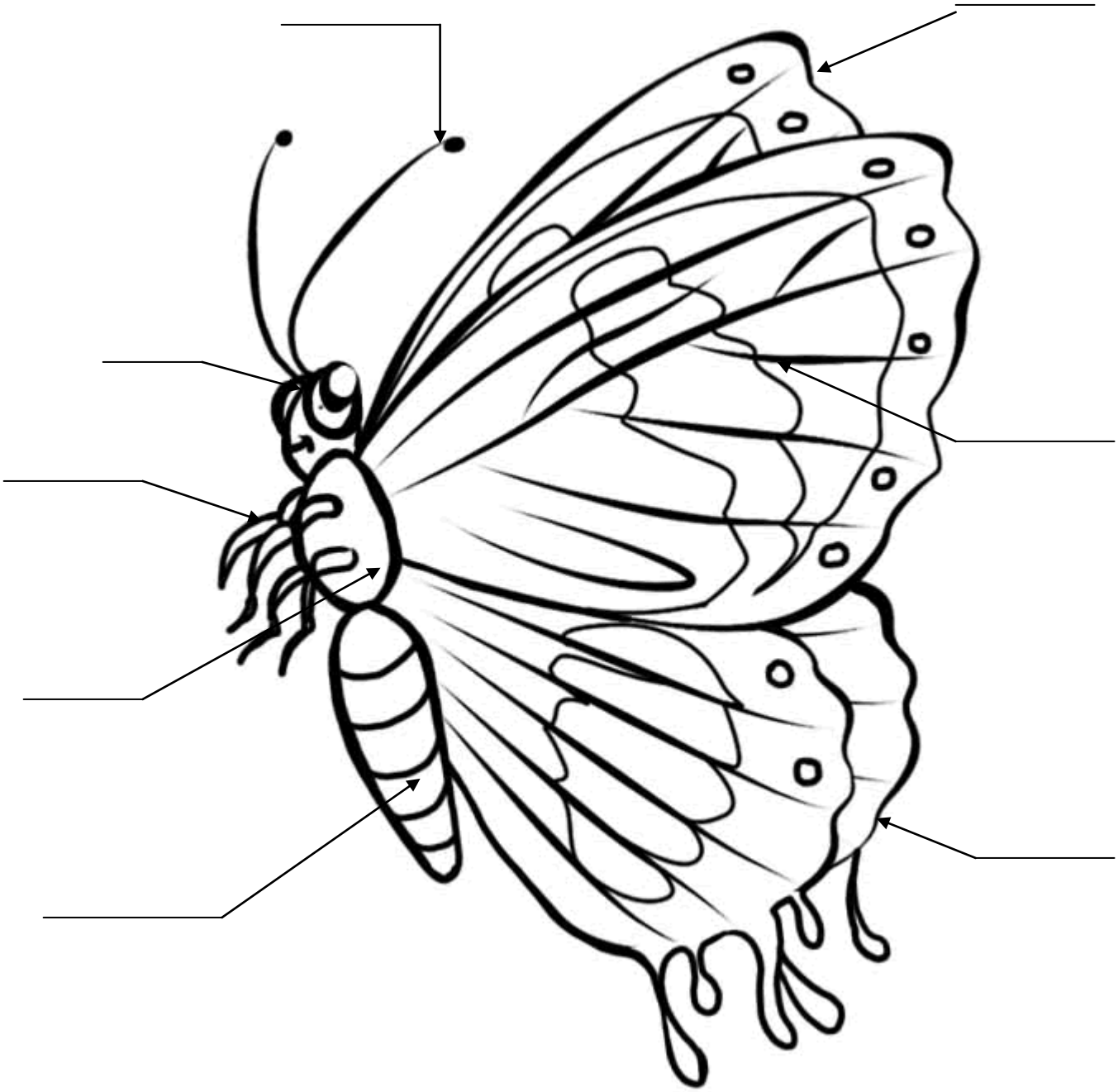
Caterpillar: They are also called butterfly larvae. The job of the caterpillar is to eat. They grow 2,000 times their birth weight. Caterpillars have different shapes and will go through a series of stages called instars.

Pupa: Caterpillars transform into pupas. At this stage, unlike a caterpillar, a pupa stops eating and goes through transformation into a butterfly. This process is called metamorphosis. During the this process, the pupa body goes through drastic changes. Butterfly wings start to grow out for flight.

Butterfly: After the pupal stage, the adult butterfly has 4 wings and 6 legs. It may take up to 3 hours for the butterfly's wings to dry and then the butterfly can fly, look for nectar and a mate. Then the process starts over again.

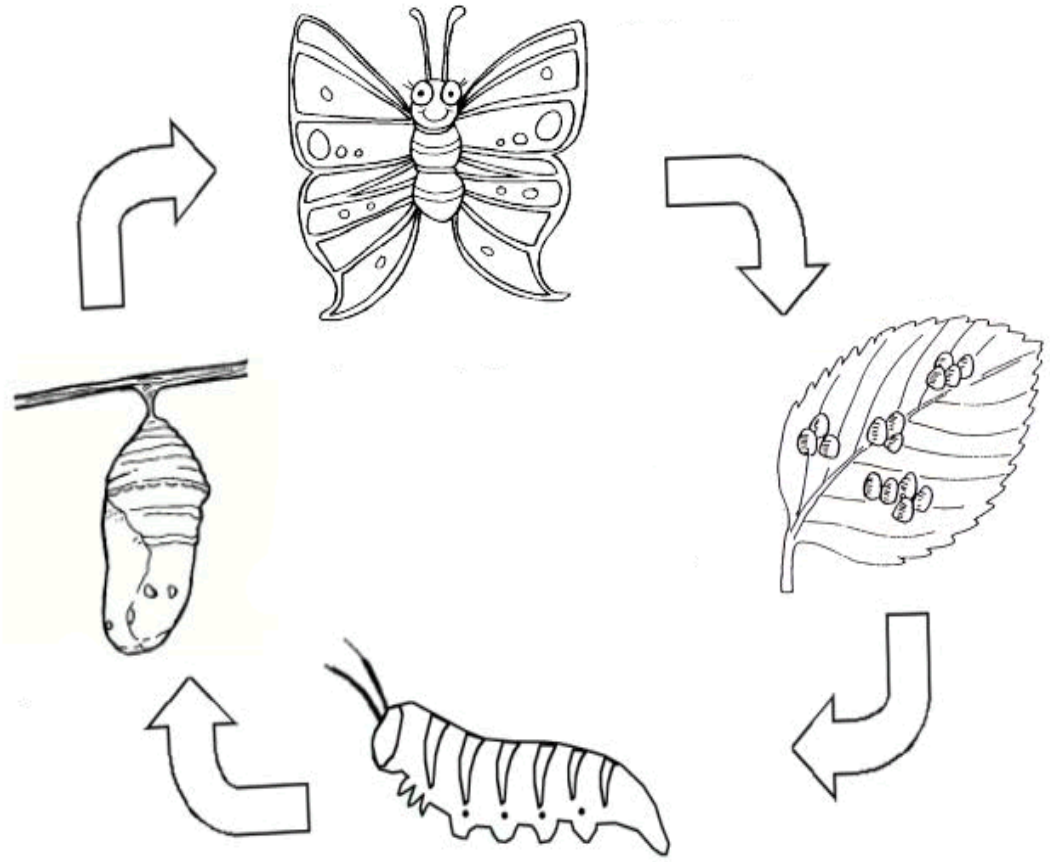
(Designed by Adriane Grimaldi/photos public domain)

LABEL THE BUTTERFLY



Antennae
Eye
Legs
Front wing
Wing vein
Abdomen
Thorax
Hind wing

Life Cycle of the Butterfly



Label the picture above and explain the stages of the life cycle:

1. _____

_____

2. _____

_____

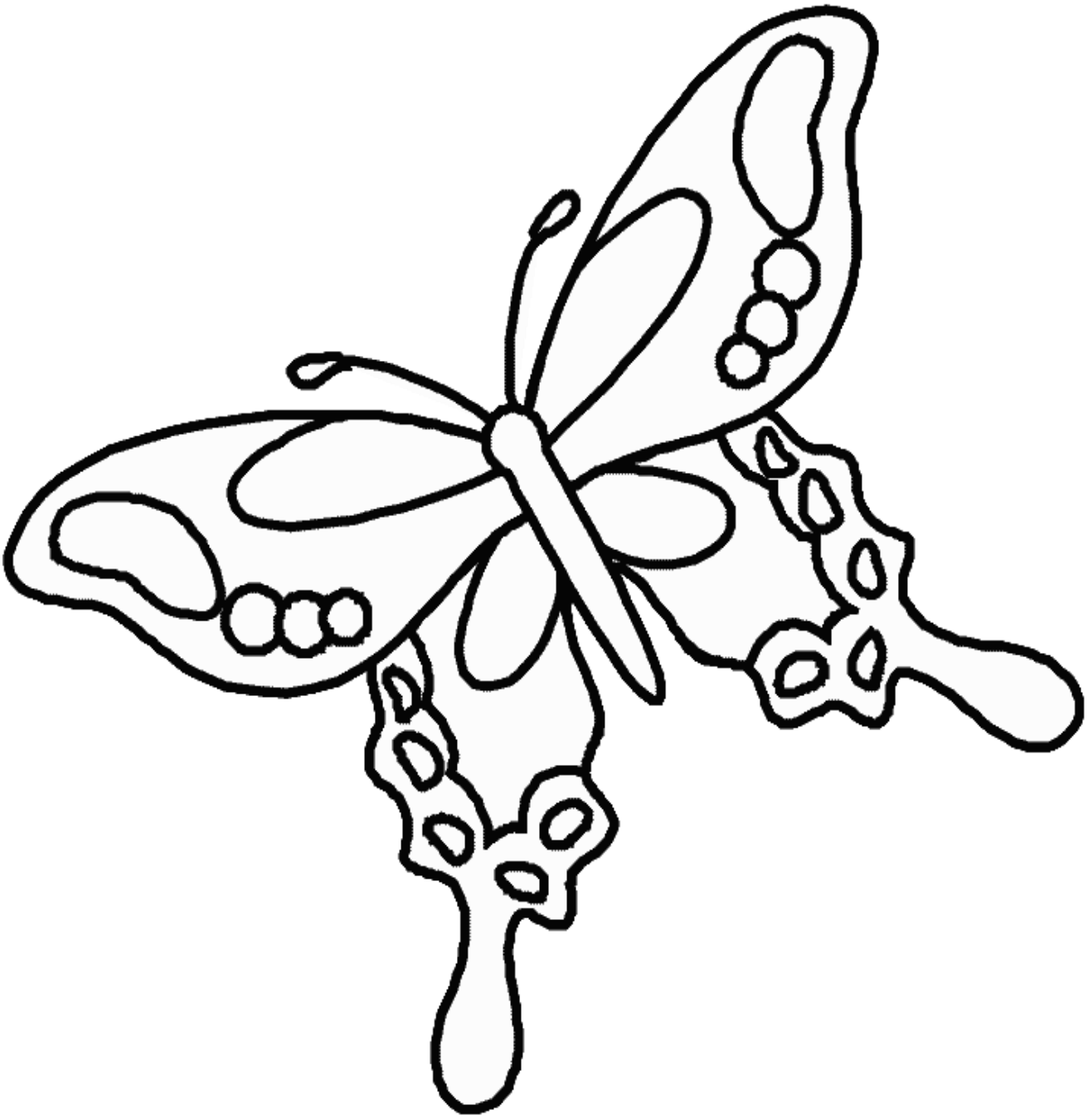
3. _____

_____

4._____

_____

Color the Butterfly



Main Idea

Problem of the story

A story event

A story event

How the problem is solved

The ending

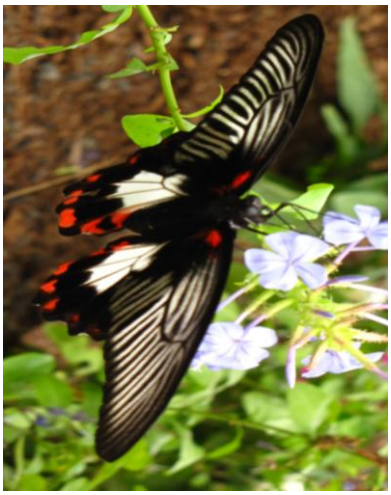
Butterfly

If I was a butterfly

Which one would I be?

I'd wrap in my blanket

And hang from a tree.



If I was a butterfly

I'd flutter around

And sit on the flowers

That grow on the ground.

Flight

Butterfly, butterfly in the sky

Can you tell me how to fly?

Butterfly, butterfly wild and free

Butterfly come and talk to me.

Tell me what you like to eat

Is it things that are very sweet?

(Photos and poetry by Linda Hoyer)