

# *Bunches of Butterflies*



## *Butterflies & Moths Vol. 2 Wonder Workbook*

CHICAGO  
ACADEMY OF  
SCIENCES

PEGGY NOTEBAERT  
NATURE  
MUSEUM

# *Fast Butterfly Facts*

- Butterflies and moths are insects! All insects have six legs, but if you glance at a butterfly you might only see four. The next time you look at a butterfly, look closely at its thorax, right under its head. You should be able to see two more legs tucked up against the front of its thorax. They're easy to miss if you're not looking for them!
- How many wings does a butterfly have? Butterflies and moths have four wings, two on either side. Their wings have hard veins that support the thin, delicate wing membrane. If the veins get damaged/cracked, especially the big one in front, the butterfly can't fly. But the butterfly is usually okay if the wing membrane gets tattered around the edges.
- Some patterns help butterflies and moths blend in with their environment. Having colors that match their background helps keep butterflies and moths from being seen or noticed. But camouflage only helps if you're on the right background!
- Some patterns help butterflies look scary. Some butterflies have patterns that look like part of a big, scary animal to scare enemies away, like owl butterflies that have eye spots. Some butterflies, like monarch butterflies, have bright, obvious colors that are like a sign saying "I'm poisonous!" Some butterflies have different colors on the inside and the outside. If they flash their bright colors quickly it can be really startling!
- The patterns on butterfly and moth wings can help them identify others in their species. Each species has a different pattern. There are some colors on butterfly wings that are ultraviolet and humans can't even see them, but butterflies can.
- A chrysalis, the pupa stage of the butterfly's life cycle, has a very important job: turning all of its insides, every last bit, from caterpillar to butterfly insides. Caterpillars and butterflies are super different—they eat differently, they move differently, they even have different eyes and antennae. So they don't just need to grow wings, they need a completely different body!
- Since a chrysalis doesn't move much or need to eat, it's the perfect stage to put in a box and send through the mail to get to us! We get boxes from South America, Australia, southeast Asia, and Africa! Our butterfly scientists hang them up in our lab and wait for them to finish their metamorphosis.



# Image Investigator

**Summary:** Students observe an image and create an accompanying story to construct an explanation as to what might be going on in the image.

**Grade Range** (suggested): K-5

**Materials:**

- An image or video
- Image Investigator worksheet



**ENGAGE**

1. Tell students that today we will be looking at an image/video to try to understand what might be happening in it, and uncover the story that it is telling.

**PREPARE TO EXPLORE**

2. Introduce the image/video you will be looking at. Ask students to look closely at the image for a minute or two or watch the video once or twice.

**EXPLORE**

3. Once students have had a minute to look at the image or watch the video, ask them “What is going on here?” The goal of this activity is to guide your student’s thinking and understanding as to what is going on in the image/video. Avoid inserting information--let students look closely and reason out their responses, rather than by discussing the facts.
4. Follow up the first question with, “What do you see that makes you say that?” to encourage students to back up their explanation with evidence from the image. This step can be repeated many times, having students build on their own ideas.
5. When a train of thought comes to an end, ask “What more can we find?” to pull out more evidence or to continue to build the explanation.

**REFLECT and SHARE**

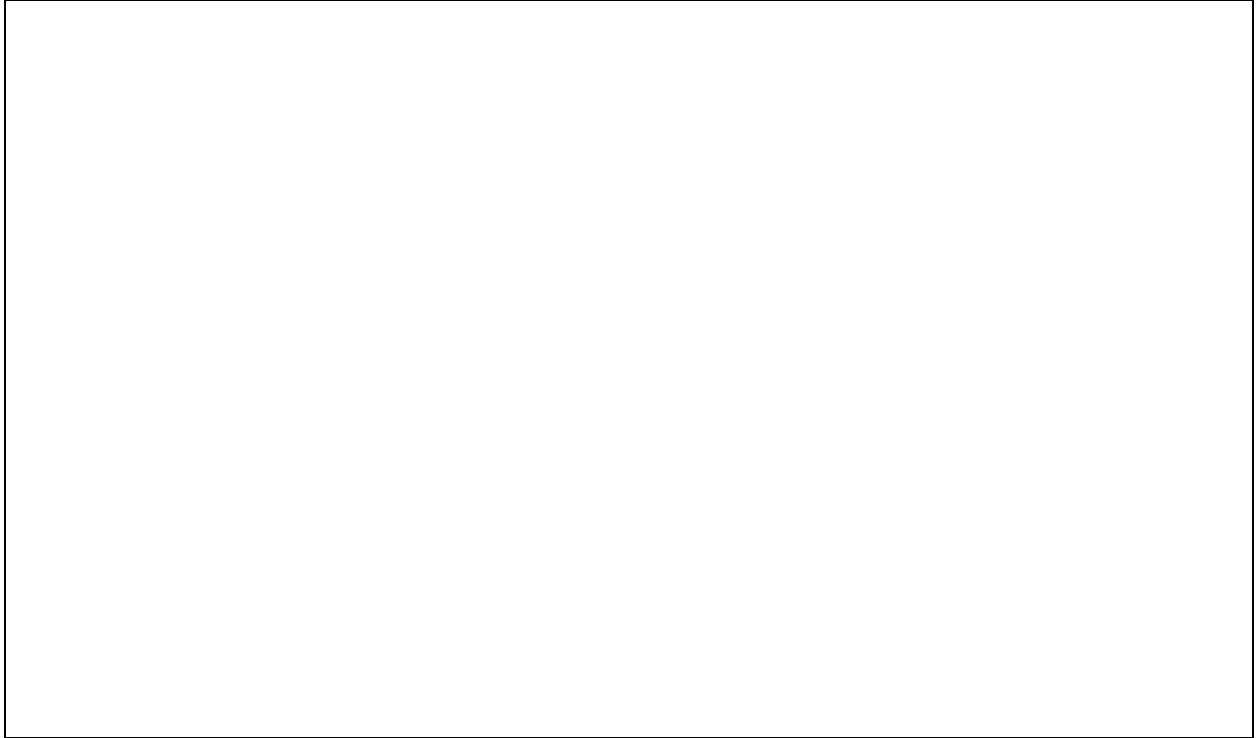
6. Now that your students have thought about the image/video and what might be going on, have them write a story that explains it using the worksheet. They can use words and/or pictures to tell their story.
7. Have students share their story with someone!

**Extensions and Variations:**

- Use the same graphic organizer, but look at a different image or video. It could be related to any content!
- Take all of the stories your class creates and put them together in a book to share!

## Image Investigator

Use words and/or pictures to tell a story about what you observed.



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# Investigador de imagen

Resumen: Los estudiantes observan una imagen y crean una historia que la acompaña para construir una explicación de lo que podría estar pasando en la imagen.

**Rango de grado escolar (sugerido): K-5**

**Materiales:**

- Una imagen o video
- Hoja de trabajo del Investigador de Imágenes



**Engranar:**

1. Diga a los estudiantes que hoy veremos una imagen / video para tratar de comprender lo que podría estar sucediendo en él y descubrir la historia que está contando.

**Preparar para explorar:**

2. Presente la imagen / video que estará viendo. Pida a los alumnos que observen detenidamente la imagen durante un minuto o dos o que vean el video una o dos veces.

**Explorar:**

3. Una vez que los estudiantes hayan tenido un minuto para mirar la imagen o ver el video, pregúnteles "¿Qué está pasando aquí?" El objetivo de esta actividad es guiar el pensamiento y la comprensión de su estudiante sobre lo que está sucediendo en la imagen / video. Evite insertar información: permita que los alumnos observen detenidamente y razonen sus respuestas, en lugar de discutir los hechos.
4. Siga la primera pregunta con: "¿Qué ves que te hace decir eso?" para alentar a los estudiantes a respaldar su explicación con evidencia de la imagen. Este paso puede repetirse muchas veces, haciendo que los estudiantes desarrollen sus propias ideas.
5. Cuando un tren de pensamiento llega a su fin, pregunte "¿Qué más podemos encontrar?" para sacar más evidencia o continuar construyendo la explicación.

**Reflexionar y Compartir:**

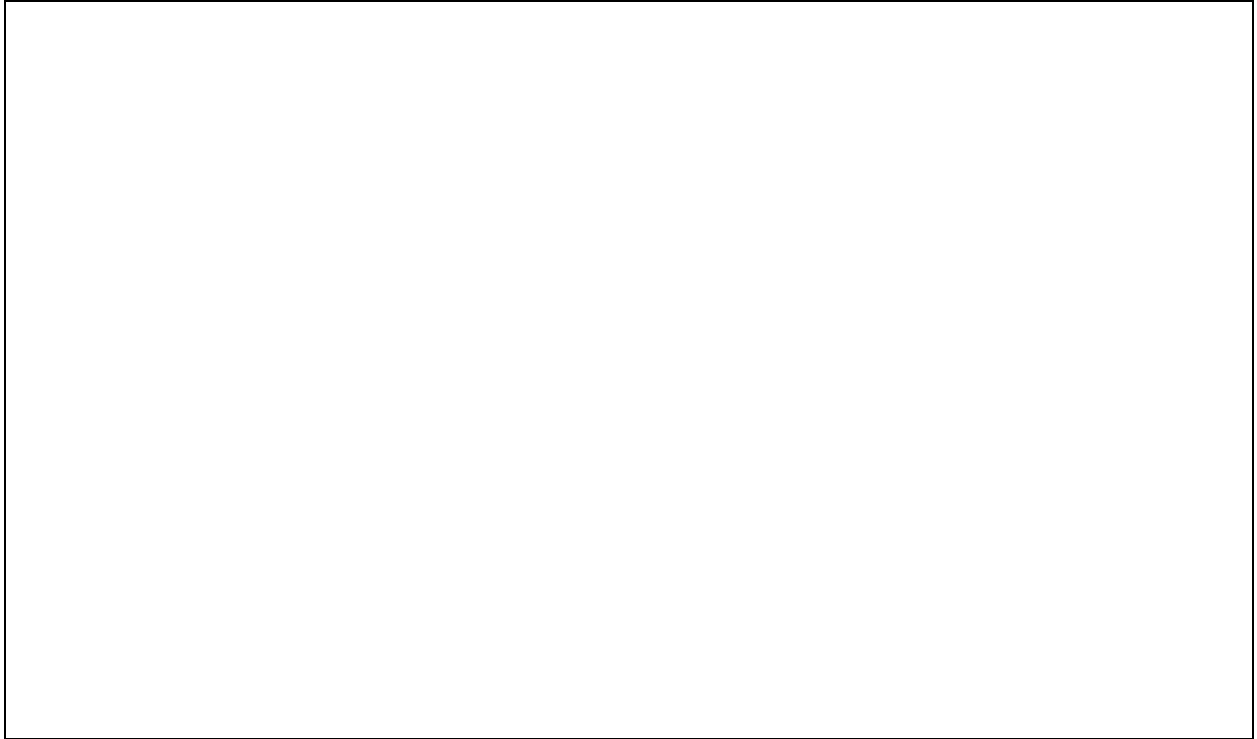
6. Ahora que sus alumnos han pensado en la imagen / video y lo que podría estar pasando, pídale que escriban una historia que lo explique usando la hoja de trabajo. Pueden usar palabras y / o imágenes para contar su historia.
7. ¡Haga que los estudiantes compartan su historia con alguien!

**Extensions and Variations:**

- Utiliza el mismo organizador gráfico, pero mira una imagen o video diferente. ¡Podría estar relacionado con cualquier contenido!
- ¡Tome todas las historias que crea su clase y compártalas en un libro para compartir!

## Investigador de imagen:

Use palabras y / o dibujos para contar una historia sobre lo que observó.



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# Drawing from the Museum's Collections



## Draw/Label:

Use pictures and words to show what you notice about **ONE** of the specimens on this page.

## Think:

What can you learn about this organism from observing the specimen?

What questions do you have about this specimen?



# *Dibuja de la Colección del Museo*



## **Dibuja/Etiqueta:**

Usa dibujos y palabras para mostrar lo que notas sobre **UN** espécimen en esta página.

## **Piensa:**

¿Qué puedes aprender sobre este organismo al observar la muestra?

**¿Cuáles preguntas tienes sobre este espécimen?**



# *Raising Caterpillars with Dr. Doug Taron*

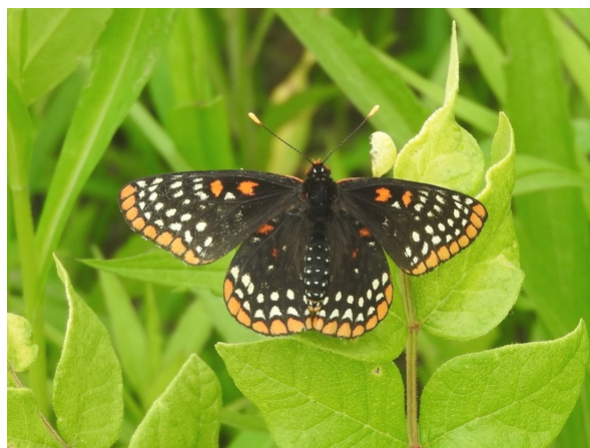


Dr. Doug Taron is our chief curator and oversees our Illinois Butterfly Monitoring Network community science program. But this summer, he's had a very special project. He's been taking care of Baltimore checkerspot caterpillars on his porch! We caught up with him to see how much work goes into caring for tiny caterpillars!

**Q: Why are you taking care of Baltimore checkerspot caterpillars?**

**A:** I'm rearing Baltimore checkerspot butterflies in the lab as part of an effort to release them and re-establish a population of this species at Bluff Spring Fen.

In June, I went just over the border in Wisconsin and, with permission of the land owner, collected five female Baltimore checkerspots. I set them up in cages, where three of them laid eggs. I'd usually do this in the Butterfly Conservation Lab at the Nature Museum. Because the Museum is closed, this summer I'm doing the work on my screened porch.



**Q: How many eggs and caterpillars have you been caring for?**

**A:** Baltimore checkerspots lay eggs in clusters of 50-300 eggs. The eggs start out yellow, and turn red as they get ready to hatch. After about a week and a half, the eggs hatch. The caterpillars are tiny – smaller than a sesame seed. Within a couple of days of hatching, I transfer them to caterpillar feeding cages. This year, I placed 457 caterpillars into feeding cages and each cage contains 10 caterpillars.



**Q: What are the feeding cages like?**

**A:** The feeding cages are paper cups with a hole pinched in the bottom. I cut a leaf of penstemon, one of the few plants that the caterpillars can eat, and thread the stem through the bottom of the cup. I place the cup into a second cup that has water in it, so that the stem sits in the water and the leaf stays fresh. I also stuff a small amount of cotton into the hole around the leaf stem so that the caterpillars can't fall into the bottom cup and drown. About once a week, I make new cages with fresh leaves and move the caterpillars into the new cages.



**Q: How long will you have to prepare food for the caterpillars?**

**A:** Sometime late this summer, the caterpillars will stop eating. They are getting ready for their winter hibernation. In October, I will move the caterpillars from their feeding cages into small, lidded plastic cups. The cups will be placed in an environmental chamber in the lab at the Nature Museum. This chamber mimics the changes of day length and temperature that the caterpillars would experience as they went into winter and on into spring.

**Q: When will you be able to release the caterpillars?**

**A:** Next April, I'll take the caterpillars out of the environmental chamber and put them into fresh feeding cages. They will spend most of the spring eating. In late May 2021, they will form their chrysalises for metamorphosis into adult butterflies. In June 2021, the adults will emerge and I'll release them at Bluff Spring Fen.

# What Do Butterflies Eat?

One of the most common questions we get at the Nature Museum is, “What do butterflies eat?” In order to better understand what they eat, we have to understand how they eat!

Butterflies have a long tongue, called a proboscis, which they can curl and uncurl to drink through like a straw. Because of their straw-like mouthparts, butterflies are mainly restricted to a liquid diet.

Butterflies use their proboscis to drink sweet nectar from flowers. Nectar sometimes resides deep within a flower and the proboscis allows the butterfly to reach this sugary treat. We fill the *Judy Istock Butterfly Haven* with an abundance of flowering plants that produce ample nectar for the butterflies, including: coral vine, firespike, jungle cucumber, *Ixora*, and *lantana*.

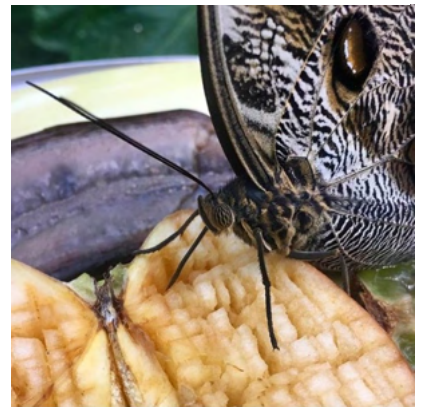
We also provide sponge pads soaked with simulated nectar for the butterflies. The simulated nectar is made by mixing honey and water.

Some butterflies also enjoy a different sugary treat, fruit. They especially enjoy fully ripened and rotting fruit. Why is that? As fruit starts to decompose it softens and becomes more liquid. Butterflies will eat a variety of fruit. We like to feed them bananas, apples, and pears. We poke each piece of fruit many times to make it nice and juicy and give space for butterflies to stick their proboscises.

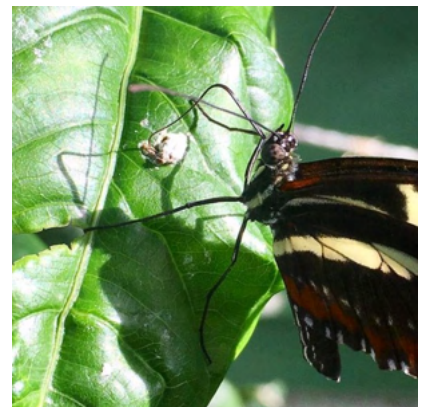
Butterflies do not always eat for their own nourishment. Many kinds of butterflies, usually male, will feed on other moist substances like puddles, wet gravel, sweat, scat, and even tears! What these butterflies are often doing is gathering salts and minerals to pass on to female butterflies which helps with egg development. Sometimes a large group of butterflies can be seen feeding in this way together, a puddle club!



*Butterfly sipping on a nectar pad*



*Butterfly sipping on juices from a rotting fruit*



*Butterfly sipping minerals from bird poop*



# *Let's Take a Butterfly Walk*

Hi everyone, I'm Allen and today we're going to go outside and look at some common butterflies around the Museum.

On our grounds, we have a lot of plants that are both good nectar sources for adult butterflies and is interspersed with host plants that the caterpillars need to feed on.

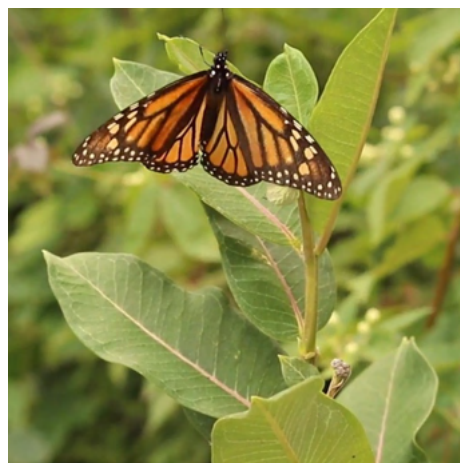
As I'm looking for butterflies, I like to scan along the tops of vegetation, paying close attention to flowers, because they'll often sit to drink nectar and that's when they're easiest to observe. As they're flying, they can be really shy and be easily startled away.

Monarchs are one of the most widely encountered butterflies across the state. Monarchs really stick out because of their orange and black colors. Monarch butterflies are able to store poisonous chemicals from their host plants, milkweed, in their bodies and then they have these bright colors to warn predators, "Hey, I'm toxic. You shouldn't eat me or you're going to get sick."

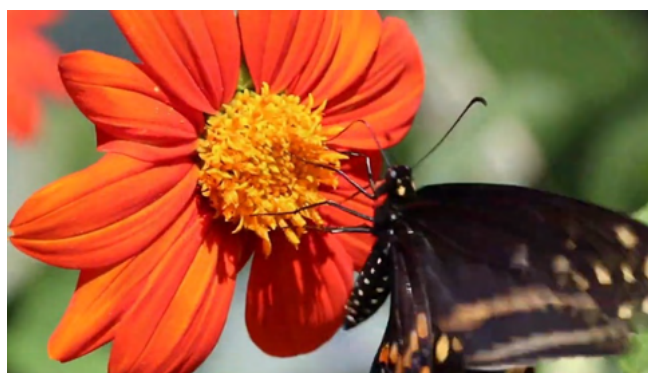
Monarchs will migrate to Mexico in the fall, towards the end of summer. They fly all the way down to Mexico, to Michoacán, where they overwinter, just on a few mountain tops that are covered with fir trees that they need to sit on. And then in the spring, they'll fly back a little bit north, towards the southern end of Texas, that's about as far as they make it. There, they'll mate, lay eggs, then when those caterpillars hatch and eventually become butterflies, then they'll fly up and reach Illinois, potentially making it to Chicago or maybe even their kids will be making it to Chicago. And then while they're here, they're going to be going through several life cycles until it's fall again, when they have to migrate back down to Mexico. So it's only the great grandkids of those that were in Mexico last year that go back down to Mexico and somehow they know exactly where to go! During the summer, an adult monarch will probably live a couple weeks, up to a month. Those that overwinter have a lot more fat in their bodies. They're built to survive longer and they have to survive the entire winter, so they'll live for about three months or so.



These are common milkweeds that are host plants for monarch butterflies. They're really great nectar sources when they're in bloom, but for the rest of the season, when they're no longer in bloom, they're still really important to have here in the garden because this will get monarch butterflies not just to come visit the garden to drink, but to stay. It's somewhere for them to lay their eggs and it's somewhere for their caterpillars to develop. Butterfly caterpillars usually can only eat a specific kind of plant or a group of closely related types of plants, so it's really important to have the right host plants available for the butterflies you want to be in your garden.



Mexican sunflowers are great nectar sources for butterflies because they produce ample nectar and they have an appropriate shape for butterflies. They need the nectar stored in kind of a long tube so that butterflies can fit their long, coiled proboscis down into it and they also need a landing pad, somewhere where they can hang on to, so that they can feed. A proboscis is just what we call the mouth parts of a butterfly. It's a long, coiled up tube that they can extend and suck fluids through. The butterfly's proboscis is coiling and uncoiling to eat. The uncoiling of a butterfly's proboscis occurs when a butterfly touches something tasty with its feet. They have taste buds on their feet and they detect there's something sweet, they uncurl their proboscis and take a drink.



Here is a black swallowtail butterfly. They are really common in our prairies. Black swallowtails, interestingly enough, are one of the few butterflies that perhaps have increased in abundance and in their distribution of range as human civilizations expanded, because some of their most common host plants are weeds that grow along roadsides, like wild carrot, wild parsnip, and poison hemlock, and as our roads have expanded, proliferation of these weeds have expanded, which creates more habitat for these black swallowtail butterflies. They feed on a number of common herbs that you might have in your kitchen, including dill, parsley, and fennel.



As you're looking at butterflies, you may notice that some look a little worn or tattered. This can show the age of a butterfly or it can show that some predators tried to get a hold of it and it got away. Large portions of a butterfly's wings tend to be expendable, so if a bird were to grab a bite of the tail end of a butterfly's wing, the butterfly can get away. A chip of the wing might fall off, but it's essentially unharmed. It always amazes me how butterflies can be both quite fragile yet quite robust.

Let's look at some skippers. Skippers are a group of butterflies that are rather stout bodied, and they have these antennae that have little hooks on the end of them. Silver spotted skippers are probably one of the most recognized skippers, because they're very large and easy to identify. A lot of skippers are small and brown and hard to tell what it is, but silver spotted skippers have this big white-yellow patch on the underside that makes them really obvious.

Another skipper is the fiery skipper and they're really interesting because we're on the northern edge of the range. They can't survive the winter here. They have to migrate up north every year, and as the years go on, we're potentially seeing more and more every year. By tracking their populations we can maybe track the effects of climate change.

Not only can butterflies be seen all around the entire Nature Museum building, they can also be seen in your neighborhoods, in your gardens, and in parks. Just keep your eyes open!

**What do you notice about these butterflies?**

**What butterfly questions would you ask Allen?**



*Silver spotted skipper*



*Fiery skipper*



# Upcycled Butterfly Craft

Local artist Katherine Lampert is showing us how to make our own symmetrical butterfly by using recyclable objects!

## SUPPLIES

- Acrylic or tempera paint (we like the washable variety)
- Any kind of paper
- Paintbrush
- Scissors
- Pencil or crayon
- Upcycled toilet paper roll insert
- An adhesive: glue, paste or tape will all work
- A smock or apron when painting is always a good idea!

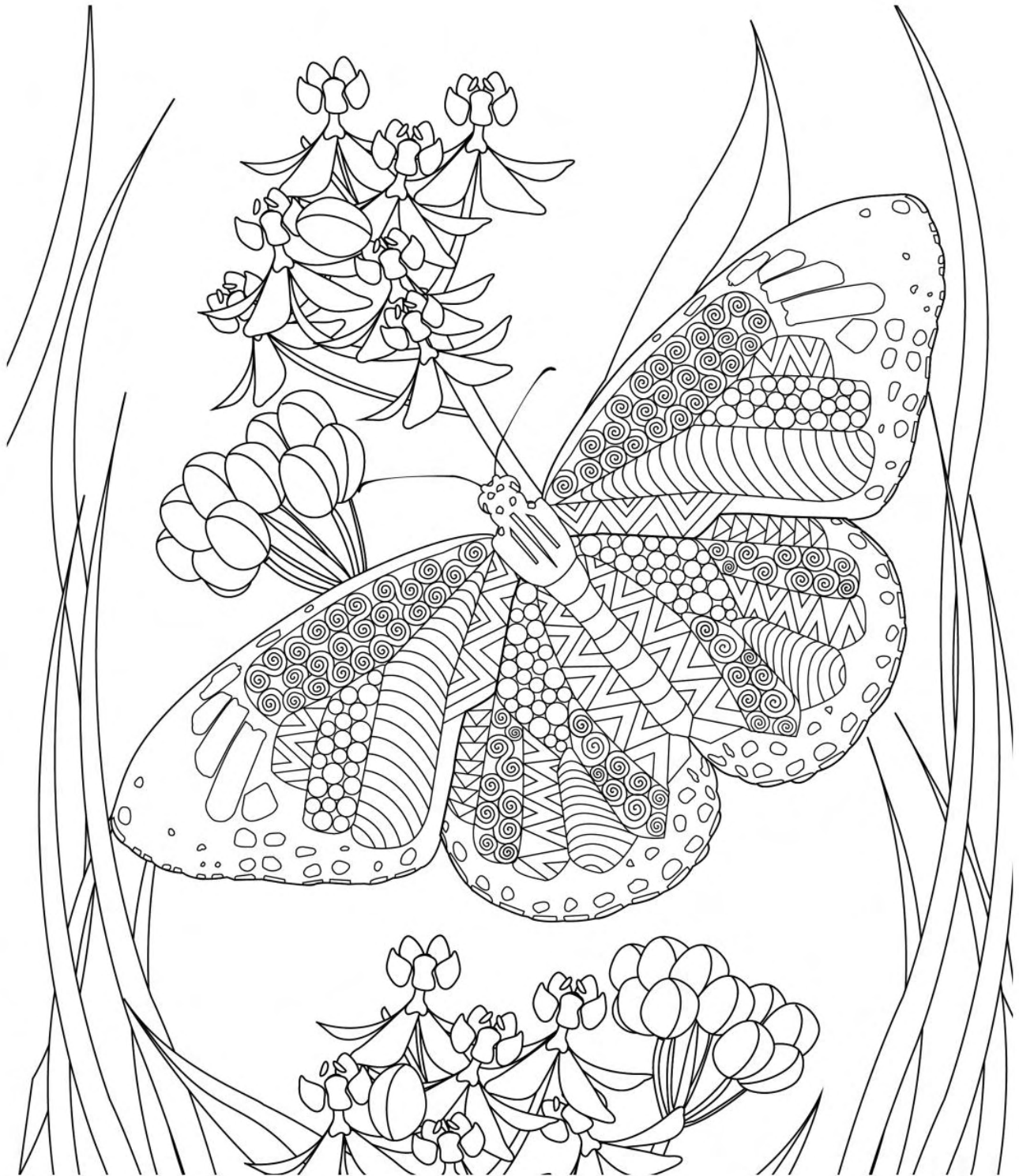
## DIRECTIONS

Start by folding a piece of paper in half. Sketch out half of a butterfly using your pencil, then cut out both halves at the same time, so that you have two matching sides with a fold in the center.

Open up your butterfly wings. Apply paint thickly, creating a design on one side only. Before your paint dries, fold your wings together, pressing down so that the design from one wing prints onto the other. Open up your wings to see your symmetrical design! Allow to dry.

In the meantime, use an upcycled toilet paper roll to create the butterfly's body. Decorate the body, paint a silly face, make antennae, and allow to dry. Once dried, glue or tape the wings onto the back!





**Monarch Butterfly (*Danaus plexippus*)**

The monarch butterfly ventures through Chicago Wilderness on its multi-generation migration between Mexico and Canada and depends on milkweed plants in backyards, parks, roadsides, and other open spaces for food.

Featured Plants: Common Milkweed (*Asclepias syriaca*) and Butterfly Milkweed (*Asclepias tuberosa*).

© Chicago Wilderness 2016. Illustration by Ember Seven.

# *Neighborhood Species*

**Species name:**

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**Description (color, size, etc.):**

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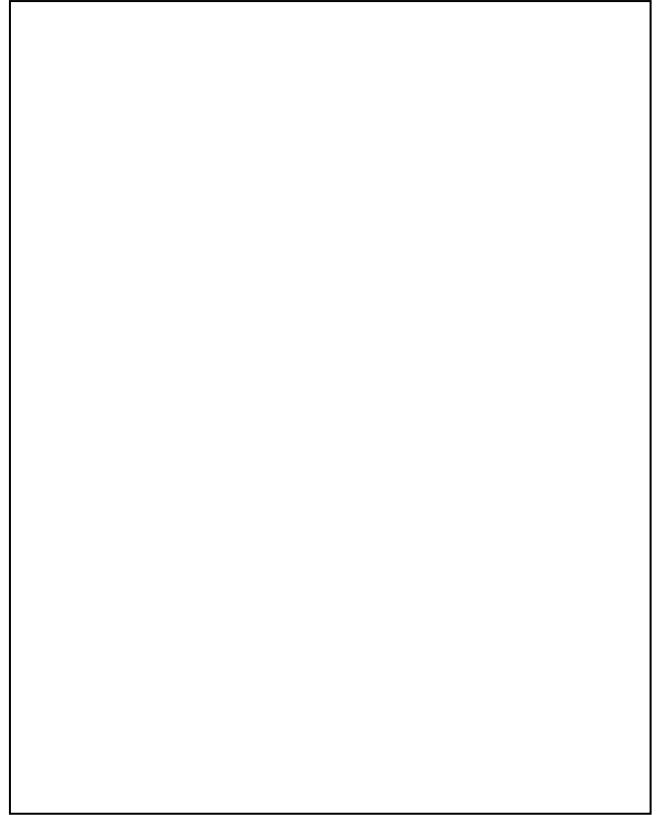
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**Diet:**

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**Habitat (where did you see it?):**

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**Behaviors (what was it doing?):**

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**Drawing and research done by:** \_\_\_\_\_

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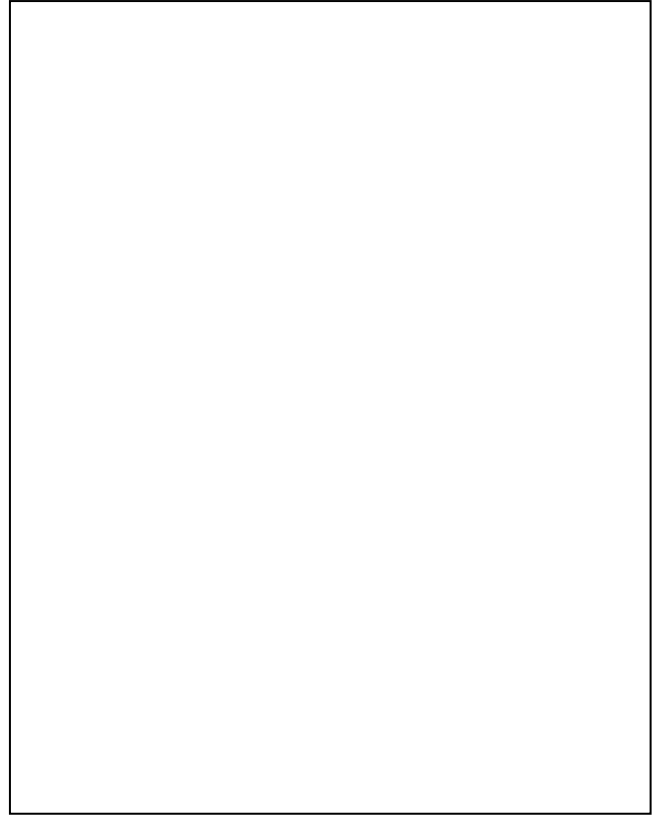
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**Habitat (where did you see it?):**

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# *My Observations*

I'm observing\_\_\_\_\_.

**I notice:**

(use words and drawings to describe what you're observing)

**I wonder:**

(write all the questions you have about what you're observing)

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# Story Time Graphic Organizer

Story Time Book Title: \_\_\_\_\_

Use words and pictures to share about  
a main idea in the story you read.

Describe some adventure or exploration that happened.

How is nature involved in the story?

As you were reading the story, how did you feel?

Does the story give you any ideas in your own life?

After reading the story, what do you wonder?

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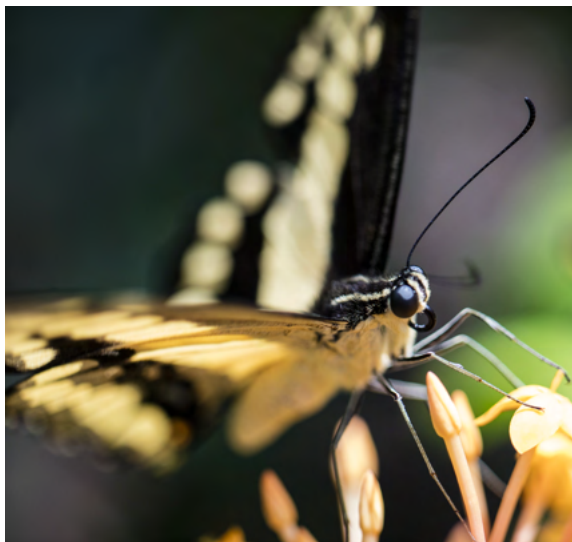
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# Exploring Butterfly Patterns

Let's explore butterfly patterns together! By using our material list, images, and template alongside the guiding questions this Exploring Butterfly Patterns project can be a fun and colorful way to think about the wings of butterflies.

## Butterfly Body Part Images



### Materials:

- Butterfly template (below; this template can be printed out or can be a guide for drawing your own)
- Butterfly images (above and below)
- Additional craft items for pattern making:
  - Scrap paper (any colorful paper - construction paper tissue paper)
  - Glue and scissors
  - Colored pencils, markers, or crayons

### Guiding Questions:

Help focus your scientist's attention and create a meaningful exploration by considering these guiding questions.

For more information check out our "More on Butterflies" section

- When have you seen a butterfly before? What did it look like?
- What do you notice about the close-up picture of butterfly wings?
- Why do you think the wings look like that? (*they are made up of tiny pieces - scales*)
- When you create your own realistic butterfly wings what will you use to create the pattern? Why do you want to use that supply or material?
- Why might different butterflies have different colors and patterns on their wings?

### More on Butterflies:

The Illinois Department of Natural Resources lists 150 species of butterflies in Illinois.

Butterflies have three main body parts (head, thorax, abdomen), three pairs of legs, and a pair of antennae.

**Most have two pairs of symmetrical wings, which are covered with tiny scales. The scales and their arrangement provide the diversity of color patterns seen in different species.**

Want a deeper dive on color? Continue reading to learn even more and then share with your scientist, as you think is age and interest appropriate. Animals and plants **use color** for many purposes: including **to attract** something or **to repel** something. Colors in biological organisms are produced in three primary ways: as a biological pigment, from structural color, or through bioluminescence. All have to do with the interaction of light.

**Structural color** is color produced by microscopic physical features that function like tiny prisms, reflecting or refracting light. These often appear iridescent because light catches them at certain angles, so the visible color changes. Lots of insects use structural color.

Blue, purple, green and white are structural in butterflies. In fact, the color blue is often a structural color for animals, and there are very few natural blue pigment colors on living things.

**Biological pigment** is color produced by the absorption of light, and the pigments reside in specialized cells of the organism. The color of our eyes, hair and skin is biological pigment.

The orange, yellow, brown, and black are pigment colors in butterflies.

**Bioluminescence** is color produced through a chemical reaction. Some marine animals use bioluminescence. The color and light a firefly uses is also bioluminescence!

#### References:

<http://www.webexhibits.org/causesofcolor/>

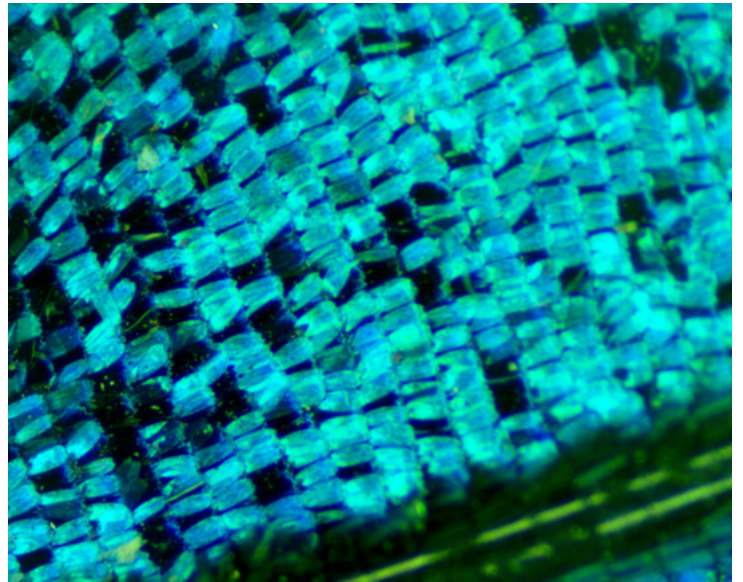
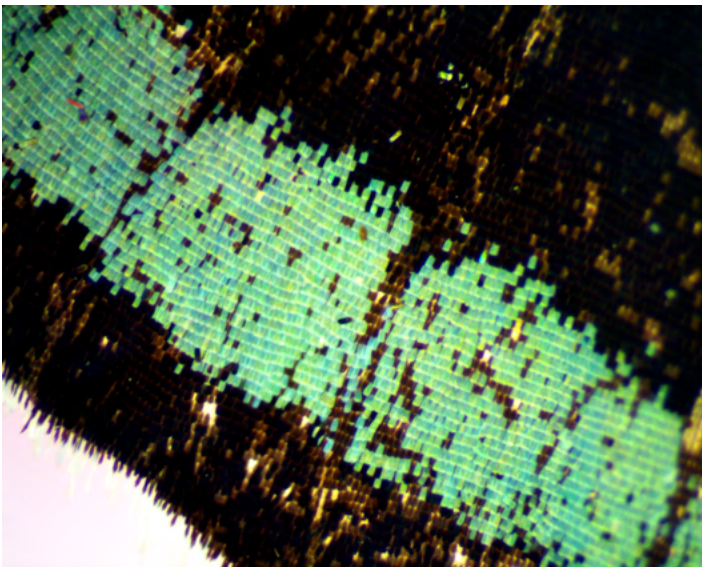
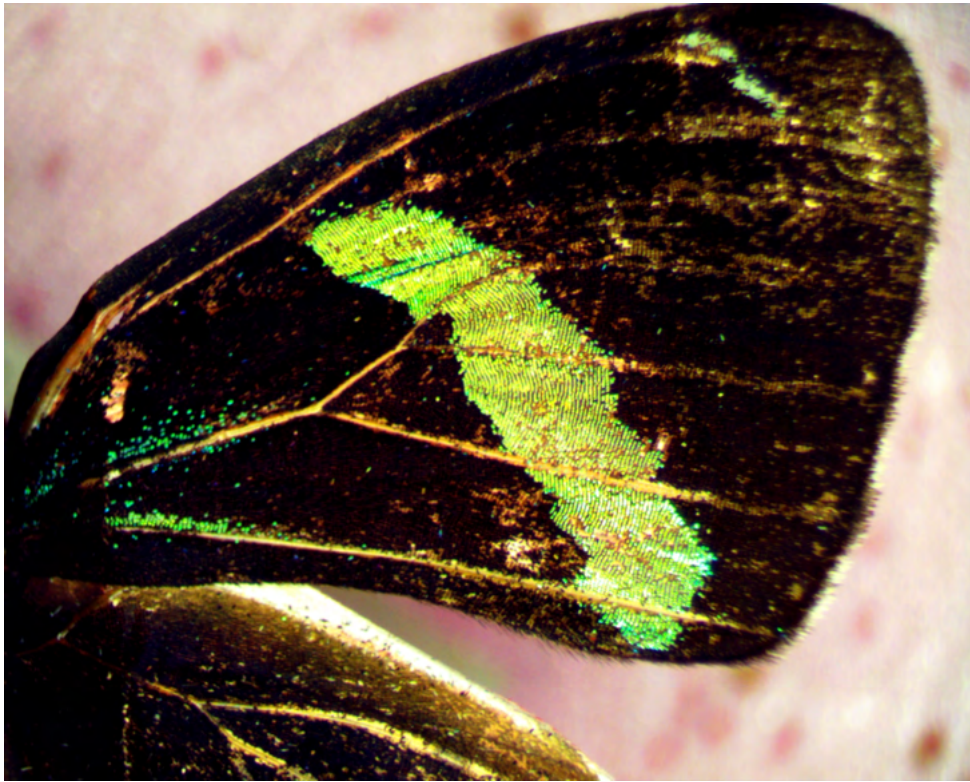
<https://www2.illinois.gov/dnr/education/Pages/WAMothButterfly.aspx>

#### Butterfly Body Part Images





## Close up Butterfly Wing Images



## Butterfly Body Template

