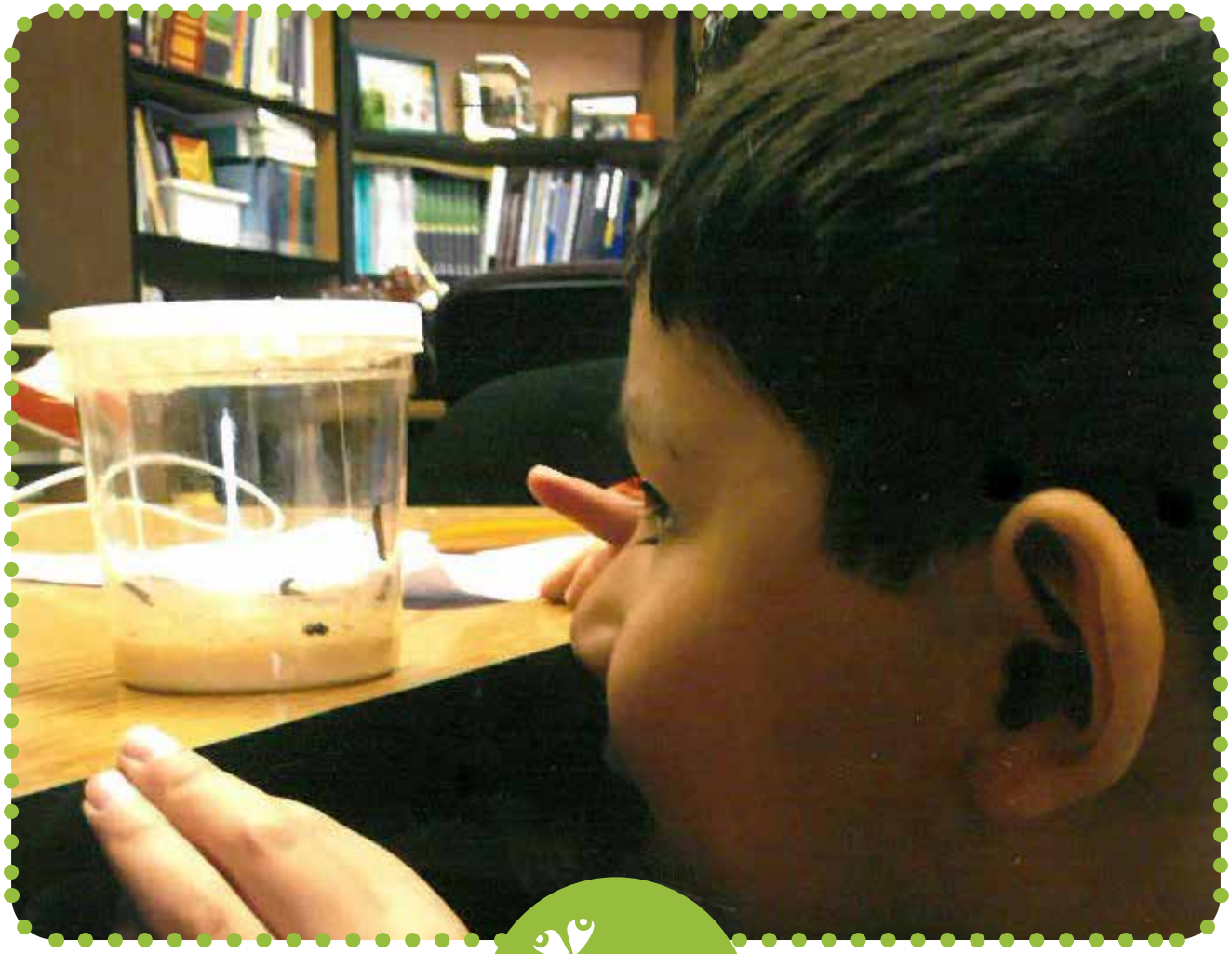
BUTTERFLY LAB

WHAT DO BUTTERFLIES NEED TO SURVIVE & THRIVE?

Kindergarten Science :: Teacher's Guide



CELEBRATE PLANET EARTH

CelebratePlanetEarth.org 1 800 698 4438 2024

BUTTERFLY LAB Kindergarten

Table of Contents

What Do Butterflies Need to Survive & Thrive?

BUTTERFLY LAB Kindergarten

Table of Contents

Find additional curriculum materials at: CelebratePlanetEarth.org/Learning
Lessons about sprouting sunflowers, scientific illustration, a word wall, counting mats and much more.

Acknowledgements

Celebrate Planet Earth is grateful for the insights and recommendations of **Judy Chaddick**, science teacher emeritus of the Espanola Valley Public Schools, who helped make all of the Butterfly Labs easy, educational and fun.

Deanne Velasquez, a seasoned kindergarten teacher with the Santa Fe Public Schools, brings years of experience with young students learning hands-on science. Her deep knowledge of children's education plays a vital role in the success of the Butterfly Lab.

Celebrate Planet Earth grows children who love & protect the Earth, our home.

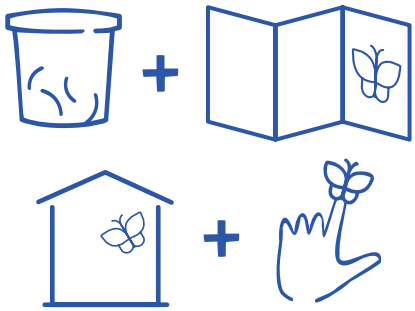
Since 1989, more than 15 million children have delighted in raising butterflies, growing sunflowers, learning about the natural world & supporting conservation. Our work empowers students to initiate environmentally responsible actions in school & at home.

BRING YOUR CLASSROOM TO LIFE!

BASIC BUTTERFLY KIT *Current Prices Are Online*

EVERYTHING YOU NEED!

- 3-5 Painted Lady Butterfly caterpillars in a clear cup with food & a ventilated lid
- Easy cardboard house for your butterflies
- Colorful poster about life cycles & care info
- Shipped March through October



CATERPILLAR CUP *Current Prices Are Online*

- 3-5 Painted Lady Butterfly caterpillars in a clear cup with plenty of food, a paper cover for forming chrysalises & a ventilated lid
- Care instructions included
- Shipped March through October

BUTTERFLIES & SUNFLOWERS KIT

BASIC BUTTERFLY KIT & SUNFLOWER ALL STAR KIT

An unforgettable, hands-on learning experience. Children nurture tiny caterpillars and sprout seeds. They care for beautiful butterflies and grow pretty sunflowers.

CELEBRATE PLANET EARTH

Order online at www.CelebratePlanetEarth.org

For questions, email orders@CelebratePlanetEarth.org

BUTTERFLY LAB Kindergarten

Butterfly Care

Getting Started

Hooray! You've received a cup of Painted Lady caterpillars!
The caterpillars will be 1/4 to 1/2 inch long. They will become active and start growing in 2-3 days.

Remember to **BE GENTLE** when you handle the cup of caterpillars. Do not remove the plastic lid. It has air-holes. As caterpillars, they only need air and the food in the bottom of the cup.

Place your cup of caterpillars in a warm spot, out of direct sunlight.

> **ON THE FIRST DAY:**
> **Using a marker or pen, draw one caterpillar's length on the outside of your plastic cup. When your caterpillars are full-grown, you'll be amazed to see how small they once were!**

Make a Butterfly House *or use the Butterfly House in the Basic Butterfly Kit*

Your chrysalises will need protection while they change into butterflies. Make a butterfly house using a cardboard or plastic box. After the chrysalises are in the house, cover the top with plastic wrap. See instructions at CelebratePlanetEarth.org/learning

Chrysalis to Butterfly

When the caterpillars are fully grown, they crawl to the top of the cup. They hang upside down & change into chrysalises.

Once they've all changed, wait two days & then transfer them to the butterfly house. Remove the plastic lid from the cup. Peel back the paper layer & lift it off the cup. Your chrysalises should stay attached to the paper & hang down. If one drops off of the paper, place it on the floor of your house, next to a wall.

Using a piece of tape, hang the paper layer on a wall inside the butterfly house.

Butterflies will emerge from chrysalises in 7 to 10 days. It will take them an hour or two to dry their wings. You may keep your butterflies in their house for 1-2 days. Once they begin to fly around their house, they are ready to go free.

It's time to release your butterflies outside! Let them go on a warm, sunny day. The butterflies need to find flower nectar for energy. They will help pollinate trees, flowers & vegetables. They will create a new generation of butterflies.

Questions? Contact us at kids@CelebratePlanetEarth.org

BUTTERFLY LAB Kindergarten

Observing the Caterpillar Cup

The caterpillar cup is a clear, 10-ounce, plastic cup. It is covered with a white plastic lid with tiny holes for ventilation. Under the lid is a cloth or paper cover that the caterpillars attach themselves to when they pupate.

DO NOT OPEN THE CUP!
The food will dry out quickly and become inedible. When all of the caterpillars form chrysalises, you can take off the lid and gently remove the cloth with all of the chrysalises attached. Tape the cloth inside the butterfly house.

At the bottom of the cup is a mixture of ground-up malva leaves, a caterpillar favorite, for the larvae to eat. There is enough food for the caterpillars to grow until they pupate.

There are 4-6 tiny Painted Lady caterpillars inside the cup, 1/4-1/2 inch long. They get more active and start eating in 1-2 days.

Caterpillars need 4 things to survive:

- **AIR** through the ventilation holes in the lid
- **FOOD and WATER** from the leaf mixture at the bottom
- **SUNLIGHT** through the clear cup

Caring for Caterpillars, Caring for the Earth

Young children understand what it means to be a good friend. Talk with them about being a good friend. Write their suggestions on the board. How do you treat good friends? Can caterpillars and other animals be our friends? Look at how much the Earth gives us. Can the Earth be our friend? How would the Earth like to be treated? What can we do to help them?

Caring for living things in the classroom is a wonderful opportunity to learn that:

- **all living things have needs**
- **children can understand the needs of other living things**
- **children can take action & help with the needs of others**

1 - All living things have needs.
Every child understands their own need for food, shelter and care. And every living thing also has needs. We are all connected.

2 - Students can understand the needs of other living things.
Caring for living things teaches your students that we all have unique needs. Not everyone's needs are the same. What is good for a child might not be good for a plant. The care of a seedling is different than the care of an insect.

3 - They can take action & help with the needs of others.
Students want to interact and be involved with the living things around them. Checking to see if plants need water or if the caterpillars are becoming chrysalises builds a child's confidence and understanding. They learn about responding to what is needed and offering to help.

Teaching Students How to Care for Caterpillars
Observing caterpillars in your classroom is a great way to teach children about the pollinators that we depend on for food. Day by day, they observe how the caterpillars grow and change. They can see them eating their food. It is practical experience in understanding the needs of others and learning how to help.

Sending *My Butterfly Journal* home at the end of the school year gives the children an opportunity to share what they learned with their families. Being responsible to care for plants and pollinators is a good 'job' even for young children.

Butterfly Lab Storyline

Choose the activities that are best for your classroom. Or adapt an activity in a way that works for your students. Whatever activities you choose, delight in the wonder of nature with your students!

If your students have not experienced the wonder of caterpillars changing into butterflies, you may want to wait on some of these activities to keep it a surprise.

Before the Caterpillars Arrive

- Read through the background information and this packet.
- Make copies of all the handouts.
- *Read Aloud* a storybook with your students.
- Start learning about butterflies with songs and an imaginative dance. The songs are simple, using familiar tunes with a call and response structure.
- You can also introduce the unit with *"Is A Butterfly An Insect?"* Mini-Book to learn about insect body parts.
- Introduce the needs of animals through the *Animals & Food Cards.*
- The cup of live caterpillars will arrive on a Thursday. Read the *Care Instructions*.
- Find your Caterpillar Cup a warm spot, out of direct sunlight.

The Caterpillars Are Here

- Start with *"Looking Closely, Asking Questions"* and *"What Is It Today?"* Graph
- These activities introduce your students to thinking & acting like scientists– looking closely, recording information and learning from results.
- Continue *Read Alouds.*
- Continue observing the caterpillars each day, recording what you see on the *"What Is It Today?" Graph.*
- Sing songs to have fun and get the wiggles out as often as you like.
- Follow the EXPLAIN section to introduce the life cycle, migration paths, and...
- When the caterpillars have grown a little bit, take the *"Is It a Caterpillar? Or Not a Caterpillar?" Quiz.*
- When they all become chrysalises, transfer them into a butterfly house.

Butterfly Lab Storyline *continued*

Butterflies Emerge

- When the butterflies emerge from the chrysalises, the students can observe them for a few days and continue with the *"What Is It Today?" Graph.*
- Your class can study *"What Are the Parts of a Butterfly?"*
- Do some creative integration with *Butterfly Symmetry Painting.*
- Have students apply their knowledge with the *Butterfly Lab*.

Notes

- To sustain the butterflies while you are observing them, feed them with a sugar water wick or with cut fruit like oranges and melons. More information is in the *Care Instructions.*

- If a butterfly emerges incompletely or is deformed, there is—sadly—nothing you can do to help. Explain to the children that this happens sometimes. Place it in a bush to be eaten by another animal. **Remember:** caterpillars and butterflies are important parts of your local food web.

Release and Celebrate

- Plan a day of celebration when you release the butterflies!
- **Take the Planet Earth Pledge.**
- Sing songs and say goodbye.
- Outside temperature should reach at least 55°F during the day.
- Open your butterfly house and allow a butterfly to crawl onto a hand.
- The butterfly will borrow heat from your body to warm itself up to 68°F, so that it can fly away.
- Discuss with the children what it means to care for the Earth and all her creatures.
- Brainstorm as a class the **Call-to-Action** or give students ideas as to how to continue nurturing butterflies and our local environment.

Inquiry-based Science, Language Arts & Math

Your students are already little scientists! By building off their natural curiosity, questions and observational skills, you'll help them engage deeper in the learning process by helping them connect, understand and apply necessary background knowledge, and make a change with a Call-to-Action to help butterflies and caterpillars thrive throughout the year.

The **Engage, Explore & Explain** section includes 5 inquiry-based cross-curricular activities designed to prepare students for deep learning. The goal is to connect broad science concepts with the daily observation and study of caterpillars and butterflies.

The 5 activities address three disciplines:

- Science: *Animals & Food Cards* and *Looking Closely, Asking Questions*
- Language Arts: *My Butterfly Journal* and *Read Alouds*
- Math: *Measure and Graph Caterpillars* and *What Is It Today?*

The 5 activities are guided by the Inquiry Process:

- Based in experience and observation
- Guided by questions
- Driven by the students

Depending on your class and structures, here are additional ideas to support the inquiry process:

- Write down students' questions throughout the unit. Choose 1-2 each week to research and share with the class.
- Have students observe other natural elements in your close outdoor environment like flowers and plants.
- Brainstorm and select a Call-to-Action you want to do as a class after this unit. Involve the larger school community or caregivers.
- Ask students what other animals they see and want to learn more about!

Animals & Food Cards

Science Question
What do animals need to survive and thrive?

Time: 30 mins

Materials for Classroom

- 2-3 sets of Animals & Food Cards

Objectives

- Students learn about a variety of animals and what they eat by making diagrams with the cards
- Students work individually and together to review a core idea

Overview

All animals need food and water in order to live and grow. They get their food from plants and/or from other animals. This is a core life science idea for the students to learn and understand.

Step One: Make Animals & Foods Cards

1. Make copies of the Animals & Foods Cards. 2-3 sets would be useful. There are 3 types of cards - 12 animal cards, 9 food cards and 8 task cards.
2. Copy on card stock or glue onto tag board, index cards or old file folders. Separate them into sets of animal cards, food cards and task cards.

Step Two: What Do the Students Already Know?

Review all of the animals and foods with the class. What do your students know about these animals? Is everyone familiar with them? Do they know what they eat? Do all animals need to eat to survive? Do all animals need to drink water to survive?

Step Three: Pre & Post Assessment

Working with a group of 10-12 students, use the animal cards to ask what each animal eats.

1. Spread out the food cards where your students can clearly see them.
2. Show the children one animal card and ask a student to point to a food that this animal eats.
3. Work through the animal cards one at a time, asking a different student each time.

Animals & Food Cards *continued*

Step Four: Make a Diagram

1. Show your students how to make a diagram of what an animal eats.
2. Place an animal card on the table.
3. Below the animal place every food that the animal eats. Remind the children that most animals eat many types of food.
4. Explain that organizing the cards like this makes a diagram, a visual model that explains what the animal eats.
5. Repeat with different animals and have your students add the food cards below the animal.

Step Five: What Are the Patterns?

What patterns do your students observe about the animals on the cards?

A pattern is something that happens or appears in a regular and repeated way. Patterns can be found in the needs and behaviors of living things. For example, all animals eat food. All animals need to drink water. Some animals only eat plants. Other animals eat both plants and other animals.

Why do animals need food and water?

Animals & Food Cards *continued*

Step Six: Play a Game

Tasks

1. Organize a group of 4-8 students with a set of Animal & Food Cards.
2. Place the task cards face down between the students. The animal and food cards are in separate stacks on the table.
3. Student A draws the top task card and gives it to Student B on the right who reads the task out loud and then completes the task.
4. When the task is finished, the teacher reviews the diagram of cards and shows a thumbs-up or thumbs-down. Put the diagram of cards back into the stacks.
5. Then Student B draws a task card and gives it to Student C on the right. Continue playing until all of the task cards are used.

Diagrams

1. A student places one food card on the table.
2. The other student has all of the animal cards and places every animal that eats the food below the card.
3. Trade roles and repeat.

Speed Match

1. One student has several animal cards in their hand and the other has several food cards in their hand.
2. Place an animal card on the table and as quickly as possible match a food card that the animal eats beside it.
3. Repeat until all of the cards are matched.

KEY: Animals & Food Cards *continued*

Plant Eaters: caterpillar - cow - rabbit

Animal Eaters: cat - dog - hawk - ladybug beetle

Plant & Animal Eaters: chicken - duck - human - mouse - pig

Cat
animal eater - meats, fish

Caterpillar
plant eater - leaves

Chicken
plant & animal eater - grasses, grains, seeds, vegetables, fruits, insects

Cow
plant eater - grasses, grains

Dog
animal eater - meats, fish

Duck
plant & animal eater - grasses, grains, seeds, vegetables, fruits, insects

Hawk
animal eater - meats, fish

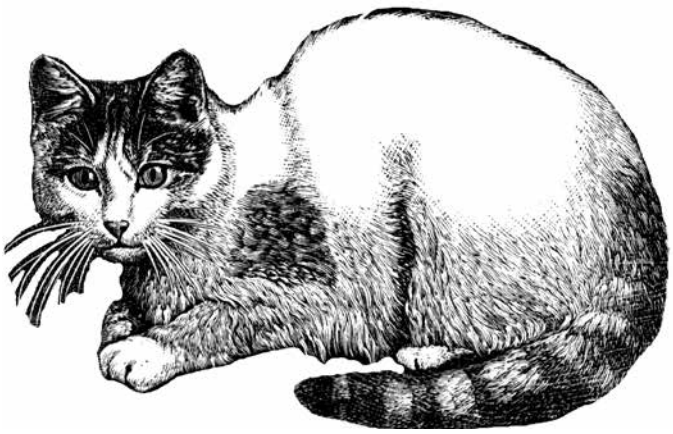
Human
plant & animal eater - grains, seeds, vegetables, fruits, meats, fish

Ladybug Beetle
animal eater - insects

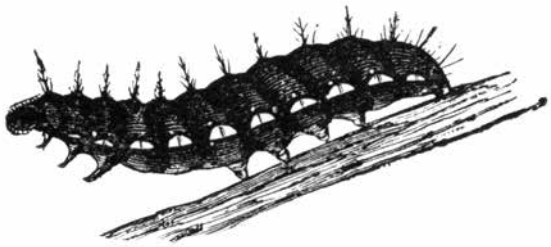
Mouse
plant & animal eater - grasses, grains, seeds, vegetables, fruits, insects, meats, fish

Pig
plant & animal eater - grasses, grains, seeds, carrots, lettuce, apples, berries, insects, plants, meat, fish

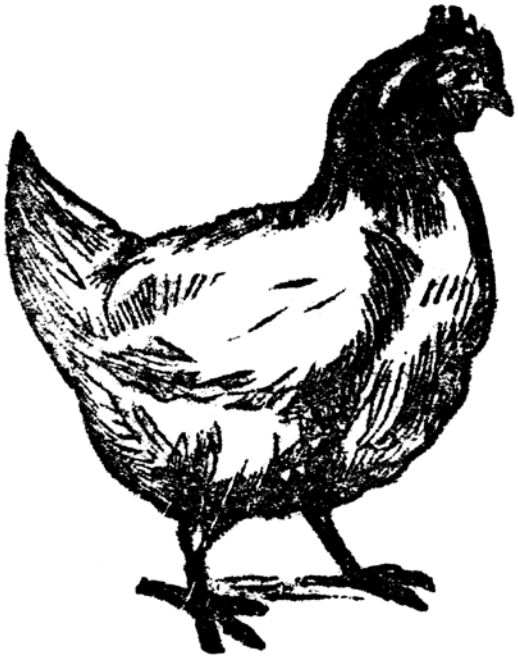
Rabbit
plant eater - grasses, grains, vegetables, fruits



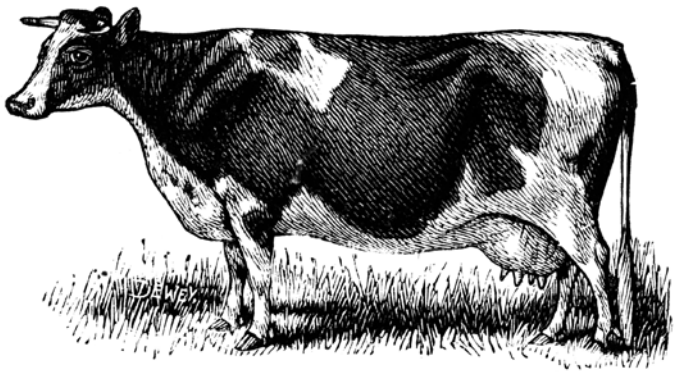
cat
gato



caterpillar
oruga

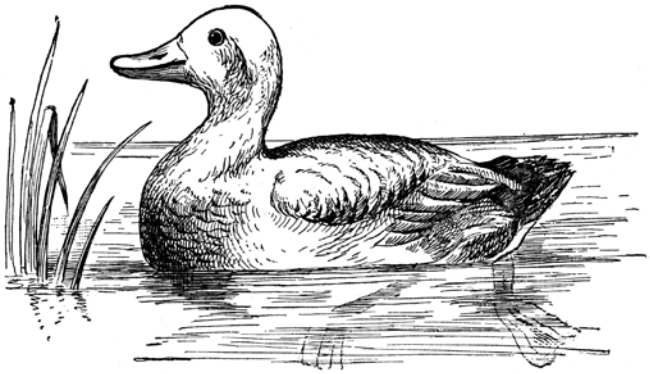


chicken



cow

dog
perro

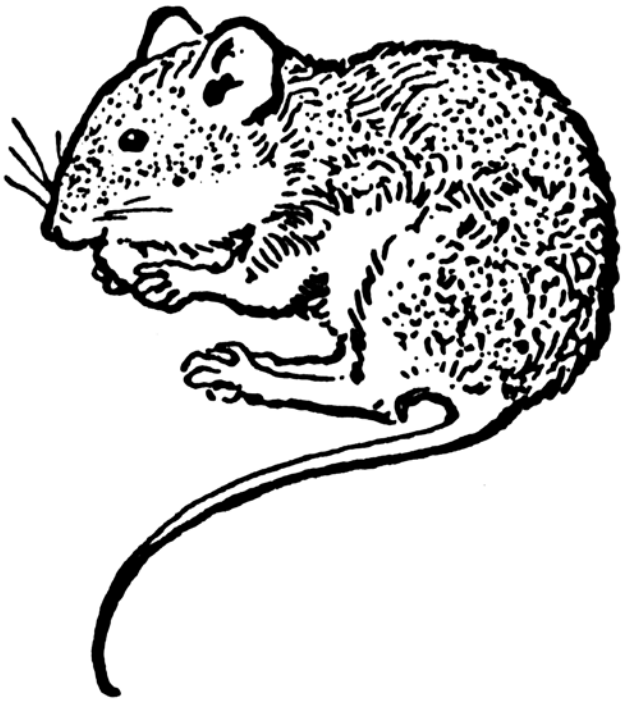


duck
pato

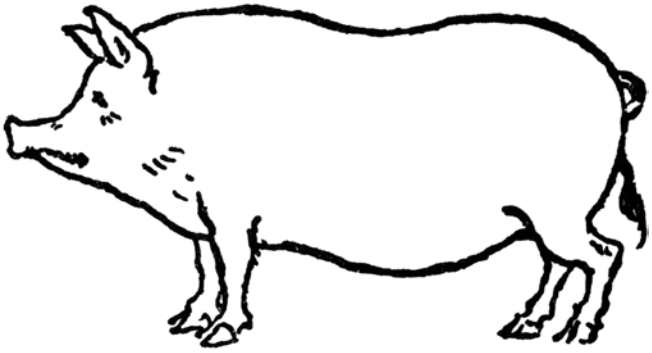
hawk

human

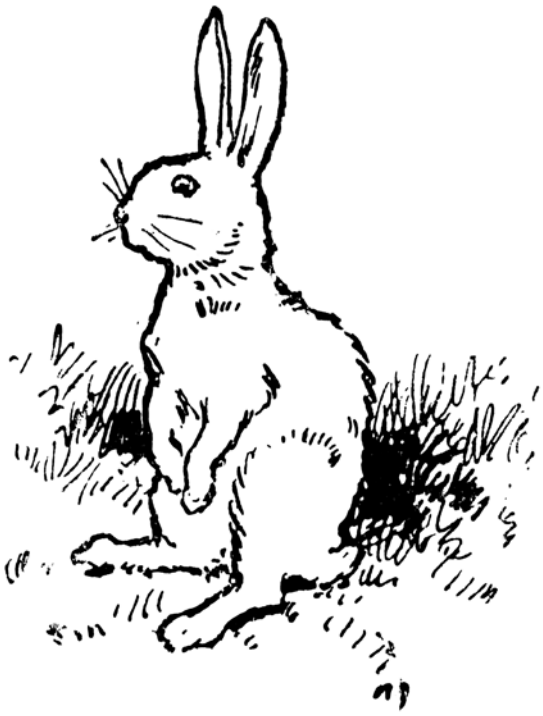
ladybug



mouse



pig



rabbit

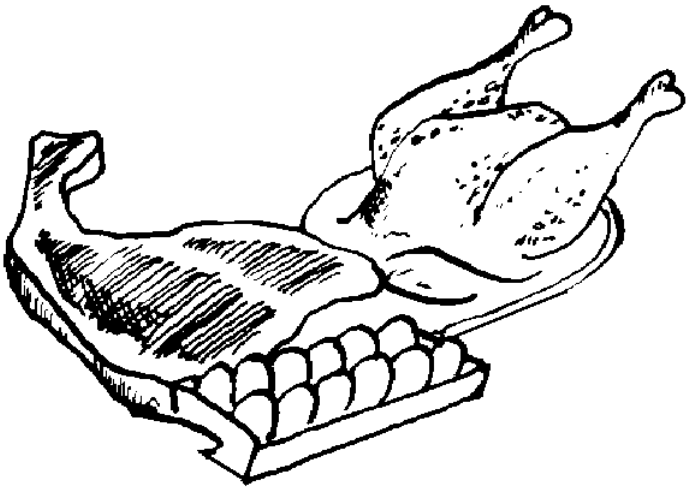
vegetables

fruits & berries

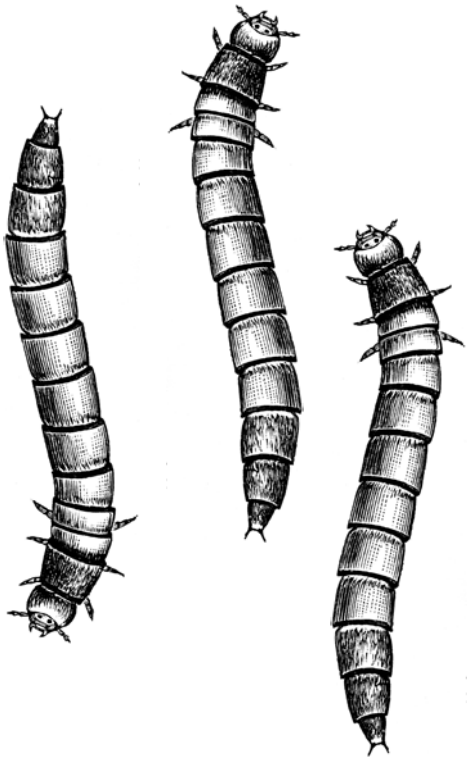
grasses & grains

leaves

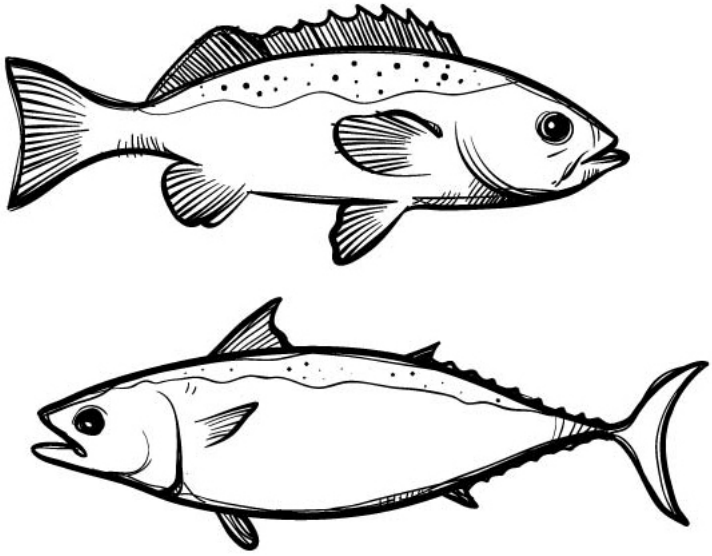
seeds



meats



insects



fish

TASK

Make a row of animals that eat other animals.

TASK

Make a row of animals that eat plants.

TASK

Make a row of animals that need water.

TASK

Make a row of animals that eat plants & animals.

TASK

Put down a food card. Add 1 animal that eats it.

TASK

Put down a food card. Add 2 animals that eat it.

TASK

Put down a food card. Add 3 animals that eat it.

TASK

Make a row of foods that humans eat.

Looking Closely, Asking Questions

Build your students' ability to look closely, make observations, ask questions and record what they see.

DO NOT TELL THE STUDENTS WHAT IS IN THE CUP.
DO NOT TAKE THE LID OFF THE CUP.

Science Question
What do the caterpillars need to survive and thrive?

Time: 15-20 mins every 3-4 days
Arrange sessions & steps in a way that is best for your classroom.

Materials for Classroom
- cup of Painted Lady caterpillars
- K-W-L chart on a bulletin board, white board or newsprint
- markers

Inquiry Process

Use the inquiry process for your entire butterfly science unit:

Engage	**look closely** at a cup of caterpillars **ask questions** about what you see, hear, smell and feel
Explore	**make observations** and share prior experiences **record** questions and observations
Explain	**find answers** - processes, patterns and interactions
Elaborate	**share creativity -** drawings, models, graphs and charts
Re-Engage	**take action** to love and protect the butterflies

Looking Closely *continued*

THE BIG QUESTION

Science Question – What Do Butterflies Need to Survive & Thrive?
Guide the students' questions towards this BIG science question. Every question about caterpillars and butterflies can lead to a stronger understanding of their needs, survival and ways that children can protect them.

Butterflies need 4 things to survive: **AIR** to breath, **FOOD** to eat, **WATER** to drink, and **SUNLIGHT** for warmth and energy. ***Are these 4 things in the caterpillar cup?***

Good Questions

Question One – Can We Look Closely at the Whole Cup?
The teacher models looking closely, pointing out details, asking questions, prompting observations and questions from the students. Be curious. Look again. Ask more questions.

What do you see? What is the cup made of? What is covering it?
What's at the bottom? Is there something moving inside? What could they be?

Question Two – Are They Alive? Are They Not Alive?
The teacher facilitates the students looking closely and asking - ***Are they alive? Or not alive?***
How can you tell? What do you see? Are they moving? Are they growing?

Question Three – What Kind of Animals Are They?
Does anyone know a name for these animals?
What kind of living animals are they? Has anyone seen them before?
Can we describe them? How big are they? What color are they? How can we identify them?

Question Four – What Questions Are Most Important to your Students?
Review the questions recorded on the **K-W-L Chart.**
How can they find answers to these questions?

Looking Closely *continued*

Steps

Step One – Looking Closely

With your students, start by looking closely at the entire cup of Painted Lady caterpillars.

Step Two – Questions and Observations

The teacher models looking closely, pointing out details, asking questions, prompting observations and questions from the students. Be curious. Look again. Ask more questions.

Step Three – Draw the Experience

Using **My Butterfly Journal**, ask your students to draw the whole cup or the caterpillars with lots of details. Remind them of a few details that you observed together. Use words for shapes, colors, lines and textures. Use vocabulary from the **Word Wall**.

Step Four – Record your Questions & Observations on a K-W-L Chart

Select a location for a classroom **Know-Wonder-Learn Chart** - a whiteboard or bulletin board. See the sample **K-W-L Chart**.

Prepare 3 sections with headings on the chart:

- **KNOW, What do we know?** (prior experience)
- **WONDER, What do we want to know?** (asking questions)
- **LEARN, What did we learn?** (recording patterns & discovery)

As a class, discuss what the students observed and what they wondered about. Ask the students to tell you - one at a time - what they know about the cup and its contents.
Record their observations under KNOW and their questions under WONDER on the chart.
Record their discoveries and observed patterns under LEARN.

Step Five – Do You Observe Any Patterns?

What patterns do the students observe in the caterpillars? A pattern is something that happens or appears in a regular and repeated way. Patterns can be found in the needs and behaviors of living things, as well as the shapes and parts of their bodies. For example, all caterpillars need to eat. The caterpillars in the cup have the same shape. They crawl around the cup in the same way. Record the patterns you observe under **LEARN**.

K-W-L Chart: LOOKING CLOSELY, ASKING QUESTIONS

KNOW What do we know?	WONDER What do we want to know?	LEARN What did we learn?

HOW
How can you find answers?

My Butterfly Journal

Science Question
Can we describe and draw
the caterpillars and butterflies?

Time: 20-30 mins every 3-4 days

Materials for Classroom

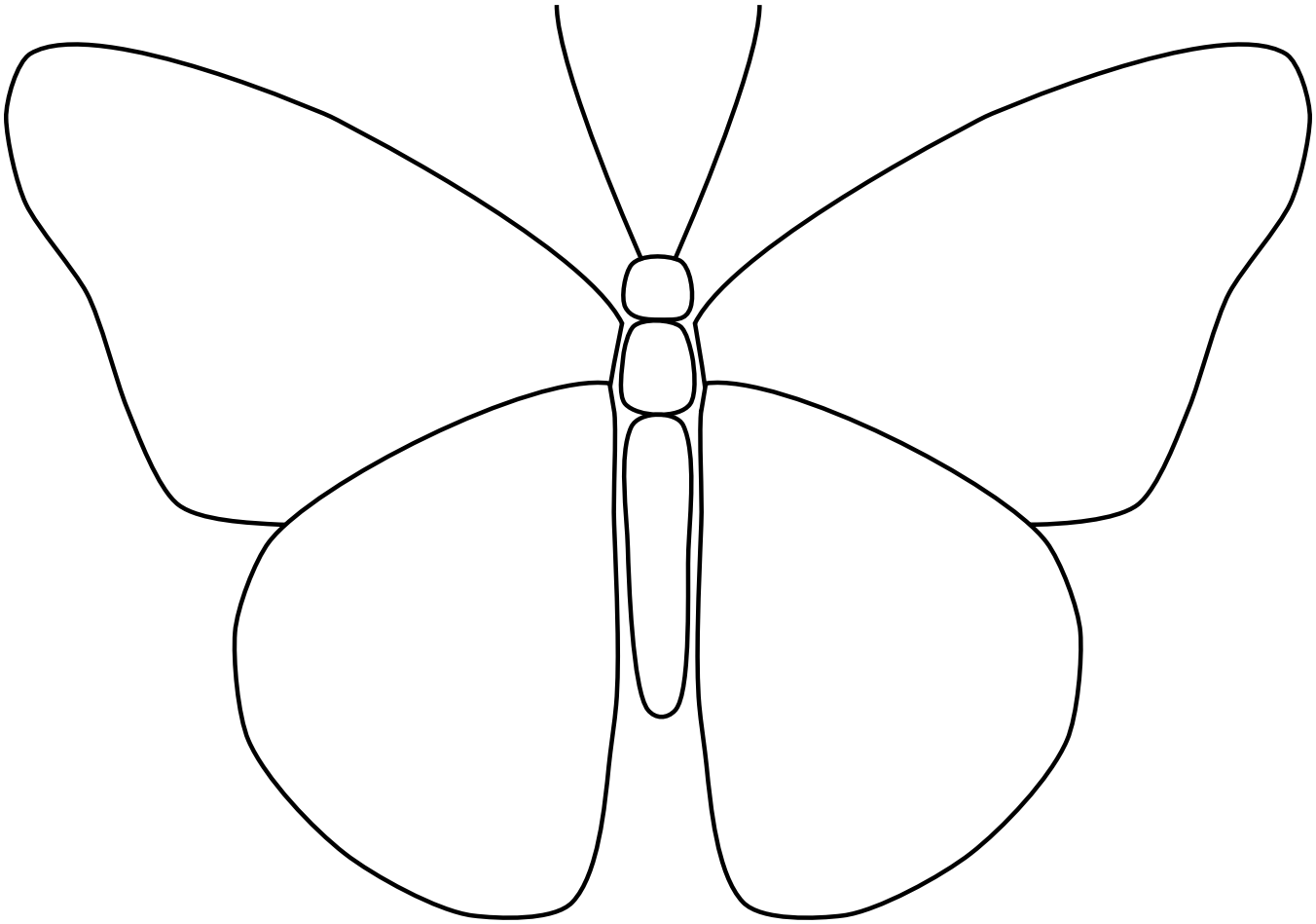
- pencils and markers
- copies of the My Butterfly Journal cover, the drawing & describing handout, and the circle words handout.

Cover of My Butterfly Journal
Make a journal folder for each student on 11" x 17" paper. The cover will be on the right side of the sheet. Ask them to color their journals using markers.

Drawing & Describing Handout
Make copies for each student when you have a session of **Looking Closely, Asking Questions.**

Circling Words Handout
This handout is a template for you to customize with words that your students are learning and using. Some of the words will describe a caterpillar or butterfly; other words do not apply. The words might describe insect body parts, appearance, or behavior. Make copies of your customized handout for each student.

MY BUTTERFLY JOURNAL



CELEBRATE PLANET EARTH

Name _____

My Butterfly Journal

Name _____ Day _____

The _____ looks like this.

This is what I see.

My Butterfly Journal

Name _____ Day _____

Circle words that describe a _____.

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Measure & Graph Caterpillars

Science Question
How much are the caterpillars growing? Can we measure them to show their growth?

Time: 10-15 mins every 3-4 days

Materials for Classroom

- permanent marker
- paper punch dots or small adhesive dots
- Measure & Graph Caterpillars - Classroom Graph
- cup of caterpillars with marks

Steps

This activity can integrate with **Looking Closely, Asking Questions** or be a separate activity. The class will need to identify the animals in the cup as caterpillars before doing this activity. Mark a caterpillar's length and record the length on the **Measure & Graph Caterpillars - Classroom Graph.**

Step One — Measure the Length of the Caterpillars

Using a permanent marker, on the first or second day, draw the length of one caterpillar on the outside of the plastic cup. Above the mark, on edge of the white lid, write Day 1 or the date.

Use paper dots to "measure" the length of the caterpillar mark. Place or hold a paper dot below or beside the first mark.
Is the length of the mark one dot or two dots?
Tip: Make dots from the adhesive strip of a post-it note, so they will stick to the cup while you "measure." Or use small adhesive dots.

Step Two — Record the Length of the Caterpillars on the Graph

Demonstrate using the **Measure & Graph Caterpillars - Classroom Chart.** Explain that the class is using the **Graph** to learn about how caterpillars change and record their growth.

Point out day 1, day 2, etc. *How many days have you had the cup of caterpillars?* Decide together if this is day 1 or day 2. Point out the rectangle that you will record the measurement in.

Measure & Graph Caterpillars *continued*

Step Two - *continued*
Demonstrate placing 1-2 dots on the line in the rectangle.

Together, your students have recorded 1) the day that you made a measurement and 2) the length of the caterpillar.

Step Three — Measure & Record the Length Another Day
Repeat every 3-4 days until all of the caterpillars have become chrysalises.

Fill in the in-between days with the previous measurement so your students can see the progression of the caterpillar's growth.

Step Four — Interpret the Graph, Look for Patterns
Interpret the graph with your students when the caterpillars become chrysalises.

Look at the first measurement. Count the dots of the first measurement and compare to the number of dots of the final measurement. Count each measurement and compare the number of dots. Did the number of dots increase in a consistent PATTERN? Did the caterpillars grow at a consistent rate? What made the caterpillars grow?

The Larva or Caterpillar (7-10 days)

The hungry caterpillar eats constantly and grows quickly.
As it eats, the caterpillar's skin gets tighter.
Soon it sheds this tight skin, emerging with new skin underneath.
Each caterpillar changes skin four times before it's fully grown.

BUTTERFLY LAB

Measure & Graph Caterpillars - Classroom Graph

After measuring a caterpillar in the cup, paste the same number of paper punch dots in the chart.

What Is It Today?

Science Question
Can we make a graph of the butterfly life cycle?

Time: 10-15 mins every 3-4 days

Materials for Students
- What Is It Today? Graph
- What Is It Today? Cut-outs
- cup of caterpillars
- scissors
- gluesticks

Steps

Observing the butterfly life cycle is an excellent opportunity to learn about graphing and build science literacy skills like looking closely and recording data. This activity can integrate with **Looking Closely, Asking Questions** or be a separate activity.

Step One — Observe the Caterpillars & Ask, *What Is It Today?*

Explain that the class is using the "What Is It Today?" Graph to record the stages of the butterfly life cycle. With the students, observe the caterpillars in the cup and ask the students, *What is it today?*

Look at the cut-out illustrations and have the students choose a picture that looks the most like the insect today. Cut it out and paste it on Day 1 of the What Is It Today? Graph.

Step Two — Observe & Ask Again

Every 3-4 days, take a few minutes to observe the insects, select a picture and paste it on the Graph. The students can cut-out pictures to fill in the in-between days with the previous stage so your students can see the progression of the caterpillar's growth.

What Is It Today? *continued*

Step Three — Interpret the Graph, Look for Patterns

When the class is ready to release the butterflies, interpret the graph together. Count and compare the number of days the insect was in each stage.

Count the number of days in each stage. Write the number below each column. Compare the height of each column like a bar graph.

Which stage was longest? Which was shortest? How many total days did the class observe the butterflies? How is the life cycle of a butterfly a pattern?

The Painted Lady Butterfly Life Cycle

Egg (3-5 days)

Adult female butterflies lay their eggs on plants that Painted Lady caterpillars like to eat, like thistle or hollyhock. The eggs are the size of a pin head, each one containing a caterpillar beginning to grow.

Larva or Caterpillar (7-10 days)

The hungry caterpillar eats constantly and grows quickly. As it eats, the caterpillar's skin gets tighter. Soon it sheds this tight skin, emerging with new skin underneath. Each caterpillar changes skin four times before it's fully grown.

Chrysalis (7-10 days)

With a silk thread that comes out of a hole just below its mouth (spinneret), the caterpillar spins a silk pad to attach to. The caterpillar hangs from this pad. Soon, the caterpillars' skin splits open, from head to abdomen, revealing a dull, brownish case underneath—the chrysalis or pupa.

Butterfly (10-14 days)

When the butterfly first emerges from the chrysalis, its wings are soft and crumpled. The tired butterfly rests, and then slowly unfolds its wings to dry. After a few hours, the butterfly will be ready to fly. The Painted Lady Butterfly has a 10-14 day life span. During that time, its main goal is to reproduce and lay eggs so the cycle can begin again!

BUTTERFLY LAB

Name _____

"What Is It Today?" Graph

Date _____

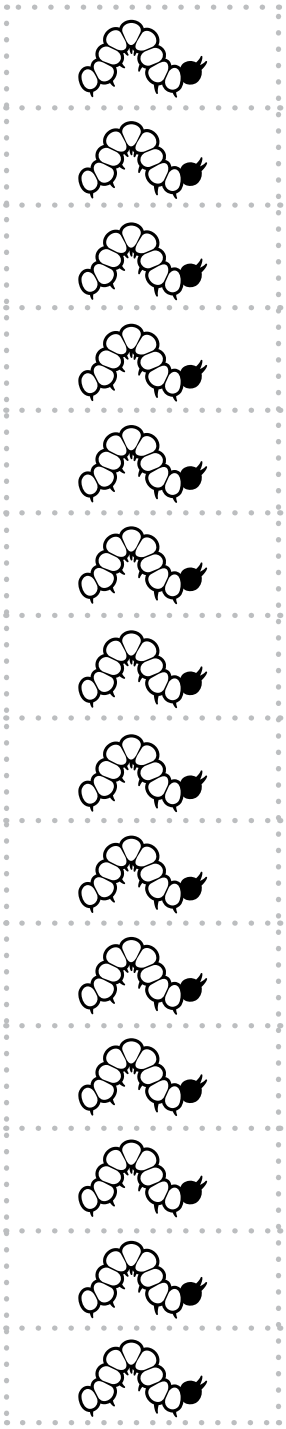
Did you observe a caterpillar, chrysalis or butterfly today? Paste a cut-out every day on the bar graph. On the day that you release your butterflies, write the word FLY in the rectangle.

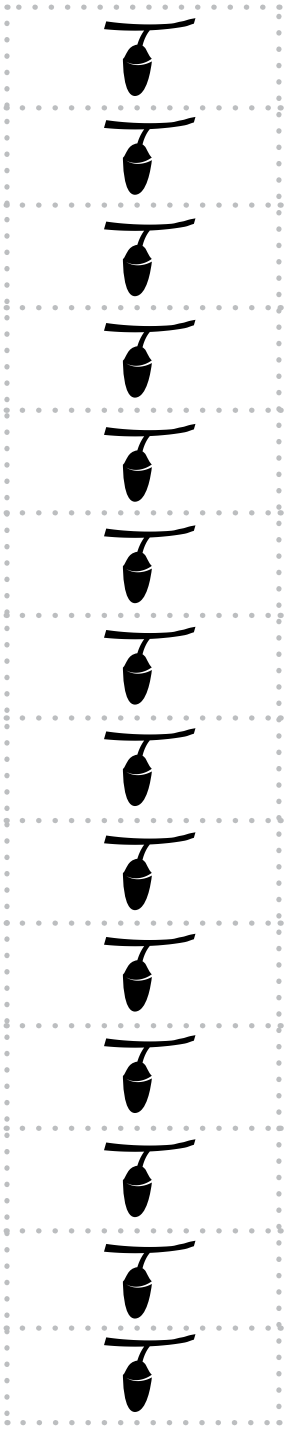
day 14					day 14
day 13					day 13
day 12					day 12
day 11					day 11
day 10					day 10
day 9					day 9
day 8					day 8
day 7					day 7
day 6					day 6
day 5					day 5
day 4					day 4
day 3					day 3
day 2					day 2
day 1					day 1

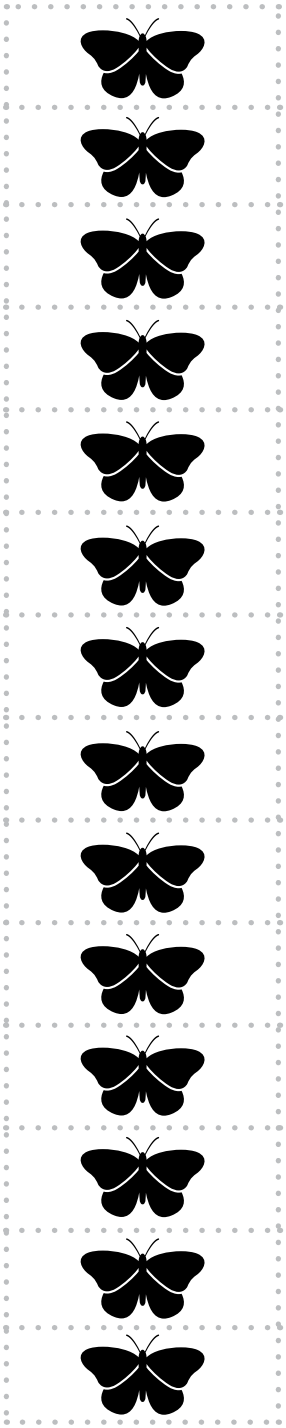
Egg 4 Caterpillar ___ Chrysalis ____ Butterfly ____

BUTTERFLY LAB

“What Is It Today?” Cut-outs







EXPLAIN: For Teachers

Teaching Resources for Learning about Butterflies

As you embark on this journey with butterflies, we know your students will have lots of questions! This section aims to provide basic background information about Painted Lady Butterflies so that you can help your students learn about these incredible creatures that will become a big part of your classroom.

There are different ways to use the contextual information included here. You know your routines and students best, but here are some ideas:

- Introduce a "fact" a day (page 44) based on the stage of the caterpillar.
- Introduce them to the life cycle of the butterfly (pages 50-51) so they can learn about and be ready for the next stage.
- At each stage (caterpillar, pupa, butterfly), print out 1 large copy of their body parts to show to students. *Which body parts are like ours? Which are not? What has changed since the last stage?*
- Sing songs about the body parts (pages 72 and 73)
- Many students love maps! Show them both where Painted Lady Butterflies thrive and migrate (pages 52-53). *Look outside—what season is it? Are the butterflies migrating north or south?*
- Butterflies and flowers have a special, important relationship. Students can observe or collect flowers in your school garden, or around their home to discuss what flowers butterflies like and what they like about flowers! (Pages 54-57). *What do flowers need from butterflies? What do butterflies get from flowers?*
- Learning about our environment is important to understand how we can help plants and animals thrive around us. Collect ideas from students: *How can we help butterflies in our neighborhood?* There are some additional ideas on page 59 - choose one and help your class take action together!
- Read alouds are a great way to build literacy and dig deeper into the world of our butterfly friends. Look in your classroom or school library for books that will engage them further (page 70 has a few ideas).

EXPLAIN: For Teachers

Fun Facts about Painted Lady Butterflies

The Painted Lady Butterfly or *Vanessa cardui* is one of the most common butterfly species in the world. They are found on every continent except Antarctica and South America. They thrive throughout the United States, Canada, and Mexico.

Order: **Lepidoptera**

Family: **Nymphalidae**

Genus: ***Vanessa***

Species: ***Vanessa cardui*** (binomial name)

Impress your students! Share one fun fact a day as you progress through the unit.

Caterpillars

- The little balls that appear all over the cup are caterpillar poop. They are called frass.
- A caterpillar grows so fast, its cuticle or skin becomes too tight. So it sheds the cuticle. This is called molting. Molting of the cuticle usually happens about 4-5 times. You may see small black balls in the cup.
- Caterpillar webbing is sticky and dense. It helps caterpillars hang onto leaves.
- A caterpillar may have as many as 4,000 muscles in its body. The caterpillar's head has 248 individual muscles, and about 70 muscles control each body segment.
- A caterpillar will increase its body mass a 1,000 times or more before pupating.
- A caterpillar's first meal is usually its protein rich eggshell.

Chrysalises

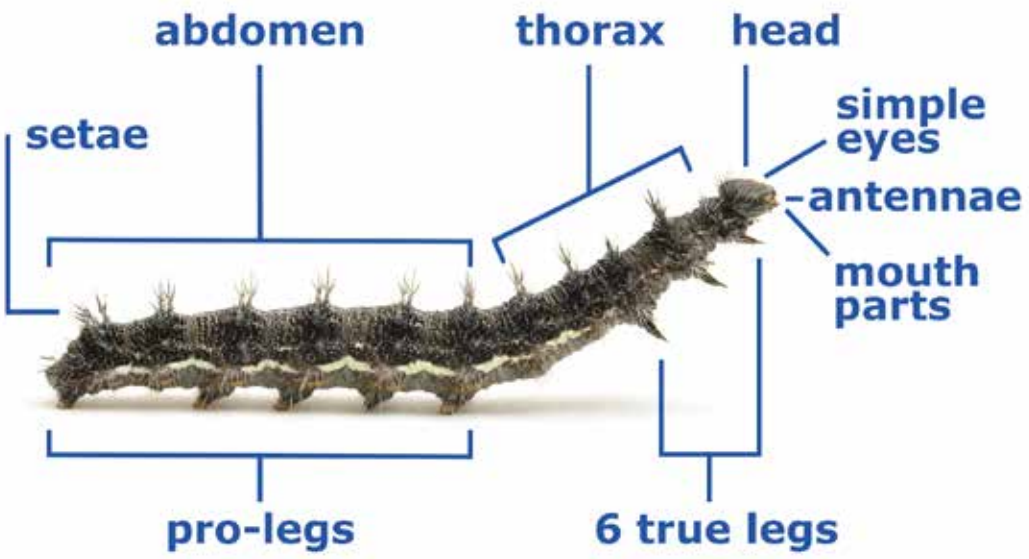
- Some butterflies overwinter inside the chrysalis and then emerge in the spring.
- The hard shell of the chrysalis is an exoskeleton.
- The exoskeleton is made of chitin, a hard substance similar to fingernails.

Butterflies

- Meconium is a reddish, waste liquid that drips after a butterfly emerges. It is not blood.
- After emerging, its wings are soft and wrinkled. A butterfly straightens its wings by pumping hemolymph (a fluid similar to blood) into its veins.
- A butterfly must assemble the 2 parts of its proboscis as soon as it emerges.
- A butterfly uses its forewings to lift it into flight and its hindwings for speed and quick turning to evade predators.
- Butterflies often have brightly coloured wings with unique patterns made up of tiny scales.
- Butterfly wings are actually transparent. The colors and patterns we see are made by the reflection of the tiny scales covering them.
- Males drink from mud puddles to extract minerals that aren't available in flowers. This behavior is known as puddling.
- Female butterflies lay many eggs to insure that even a few of these eggs will survive.
- There are about 24,000 species of butterflies. The moths are even more numerous: about 140,000 species of them were counted all over the world.

EXPLAIN: For Teachers

Caterpillar Body Parts



caterpillar or larva

Larva–the second stage of metamorphosis, another term for caterpillar

Head–the head includes a brain, a mouth, 2 antenna and 12 eyes called ocelli

Thorax–the thorax is the midsection where the legs are attached

Abdomen–the abdomen contains the heart, digestive system and other organs

True Legs–all insects have 6 true legs with tiny claws attached to the thorax

Pro-legs–located on the abdomen, pro-legs help the caterpillar move and climb

Antennae–near the mouth parts, antennae help caterpillars smell and find food

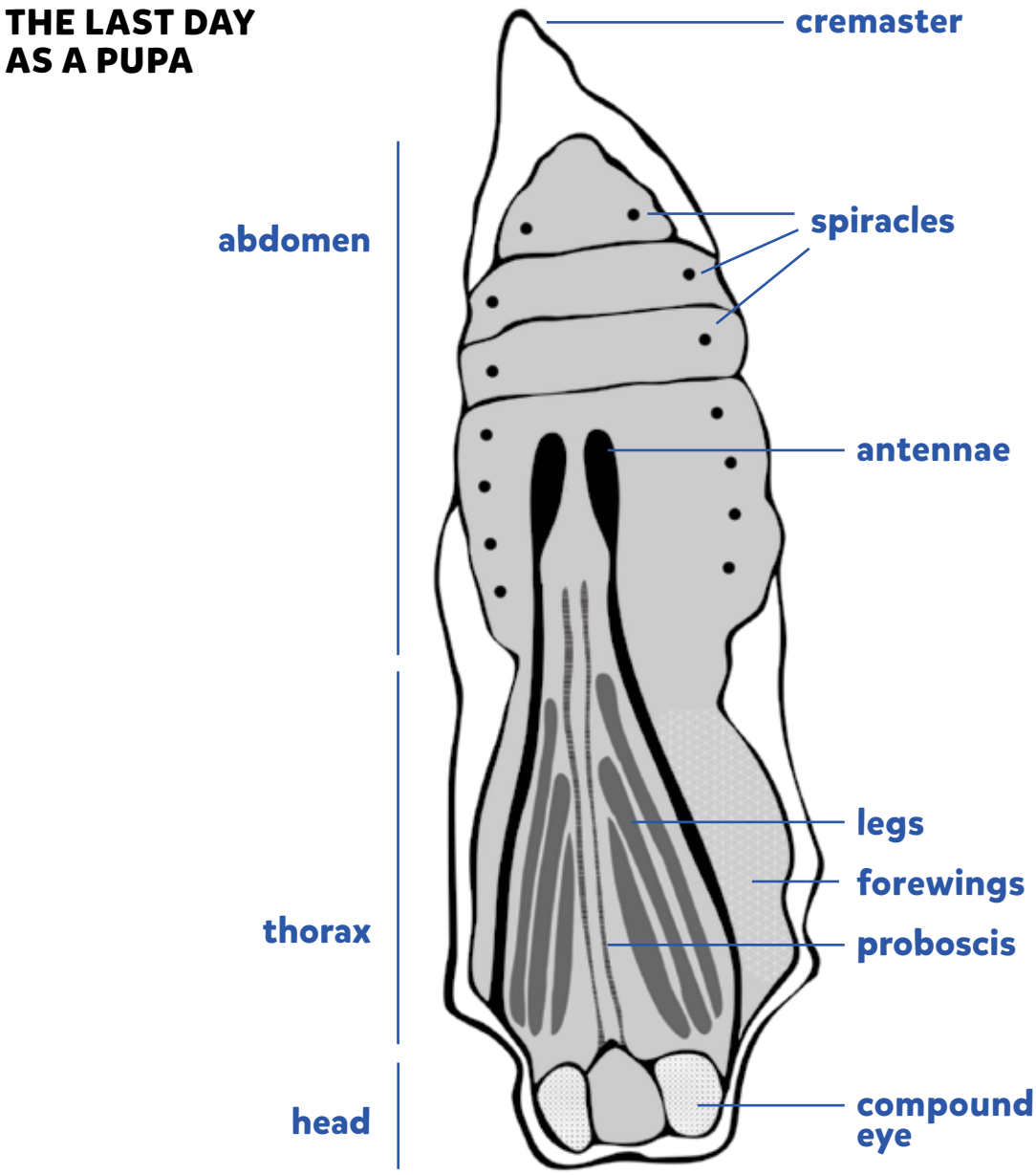
Mouth parts–on front of the head, a caterpillar has mouth parts or mandibles to tear and grind leaves

Simple eyes–a caterpillar has 12 simple eyes, 6 on each side of its head, that show light and dark

Setae–a stiff hair or bristle

EXPLAIN: For Teachers

Chrysalis Body Parts



Cremaster *(kri-mas-ter)*—a set of hooks on the end of the abdomen that attaches the pupa to a silk pad

Proboscis *(pro-bos-kis)*—a feeding tube that works like a drinking straw

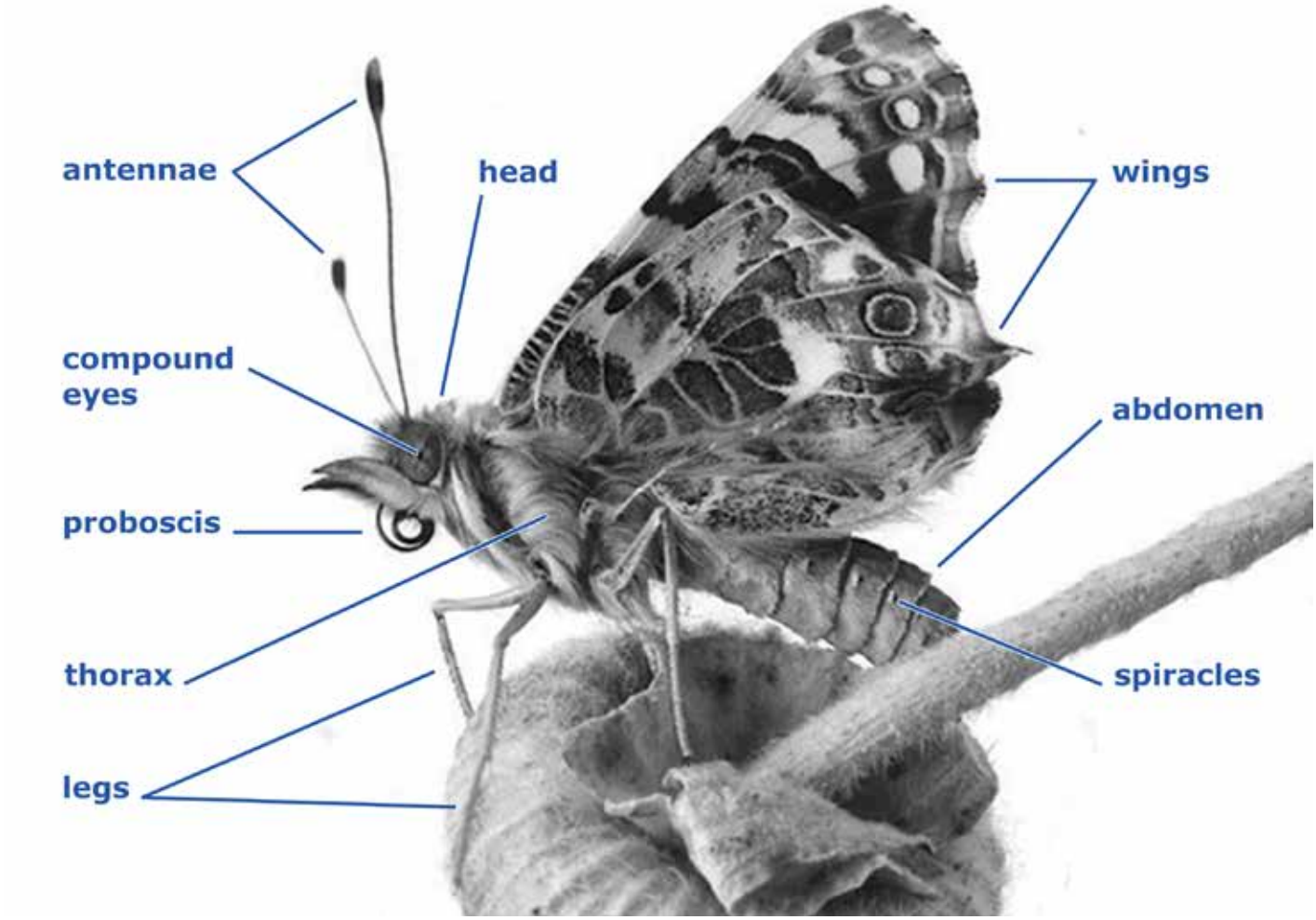
Chrysalis—a pupa, especially of a butterfly or the hardened case of a pupa

Pupa—the third stage within a hardened case of those insects which undergo complete metamorphosis

Cocoon—a protective case of silk or fibrous material spun to cover the pupa

EXPLAIN: For Teachers

Butterfly Body Parts



Antennae–on the butterfly's head, used to taste the air and help with balance

Compound eyes–thousands of tiny lenses help the butterfly see in all directions

Proboscis–the butterfly tongue, which works like a drinking straw

Thorax–the midsection of the butterfly with 3 pairs of legs & 2 pairs of wings

Legs–the butterfly has 6 legs, in 3 pairs, attached to its thorax

Head–the head includes the proboscis, 2 antennae and 2 compound eyes

Wings–2 pairs of wings, forewings & hindwings, on the thorax allow the butterfly to fly

Abdomen–this part of the butterfly includes the stomach, heart and other organs

Spiracles–a breathing hole, an opening through which air passes in the exoskeleton

EXPLAIN: For Teachers

Butterflies Have Super Power Senses

Butterflies and humans are not like each other. But we do have some things in common. We have the same senses like sight, sound, taste, smell and touch. But we use our senses differently. The senses of a butterfly are like super powers—Super Power Senses. Let's explore how the senses of a butterfly help it to survive in its environment.

Sight is a super sense for butterflies. They have two large **compound eyes**. These eyes contain hundreds of lenses. The many lenses form a single image. Compound eyes see a very wide area. They are able to detect movements quickly. This helps them to avoid predators. Butterflies can see special colors that humans cannot see. These special colors guide them to the flowers with their favorite nectar. Butterflies also have two simple eyes, called **ocelli**. These eyes cannot focus on objects. They can only detect light and dark.

Butterflies do not have ears. They do not hear sounds the way we do. They "feel" **sound vibrations** through a special sense organ. It is located under their wings. This helps them to avoid danger, especially at night.

Butterflies eat with a **proboscis**. It works like a straw. Butterflies suck nectar from flowers and drink water. So can butterflies taste? Oh yes, they taste and smell with their feet, legs, **palps** and antennae. Isn't that strange? Their sense organs are nerve cells with **receptors** that take messages to the brain. They are like the receptors in our nose and on our tongue. Butterflies depend on their senses of taste and smell to find their favorite foods. Many caterpillars are picky eaters. They only eat one type of leaves. The female butterfly must use her super senses to find the right plant to lay her eggs on.

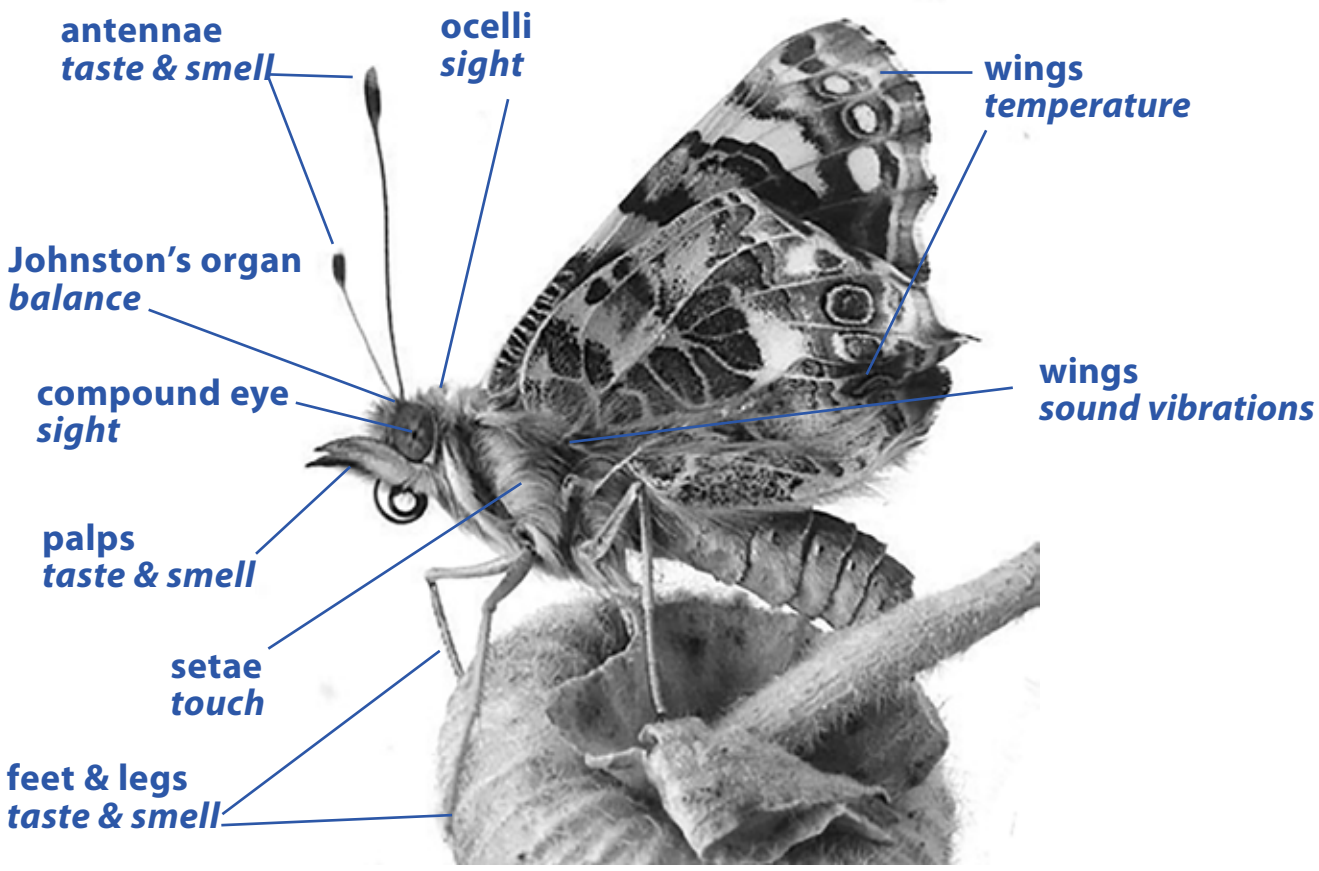
Butterflies have a super sense of touch. Their entire bodies are covered with tiny sensory hairs called **setae**. The setae are attached to nerve cells. The nerve cells send information to the brain when something is touched. At the base of the antennae is the **Johnston's organ**. It helps the butterfly to keep its balance when flying.

Butterflies are cold-blooded. They only live where it is warm enough. If butterflies are too cold, then they can't fly. If they get too hot, they become **dehydrated** and die. When they need to warm up, butterflies bask in the sunlight. Some butterflies shiver their wings to raise their body temperature. The most common way of cooling is to crawl into the shade.

The butterfly's super power senses are very powerful and help it to survive in its environment. Would you like to have compound eyes? Or be able to taste with your hands and feet? How would butterfly super power senses change your life?

EXPLAIN: For Teachers

Butterfly Sensory Organs



Antennae–on the butterfly's head, used to taste the air and help with balance

Compound eyes–thousands of tiny lenses see in all directions

Feet & legs–a butterfly can taste and smell nectar with its feet and legs

Johnston's organ–at the base of the antennae, helps the butterfly balance and orient in flight

Ocelli–simple eyes that perceive light and dark

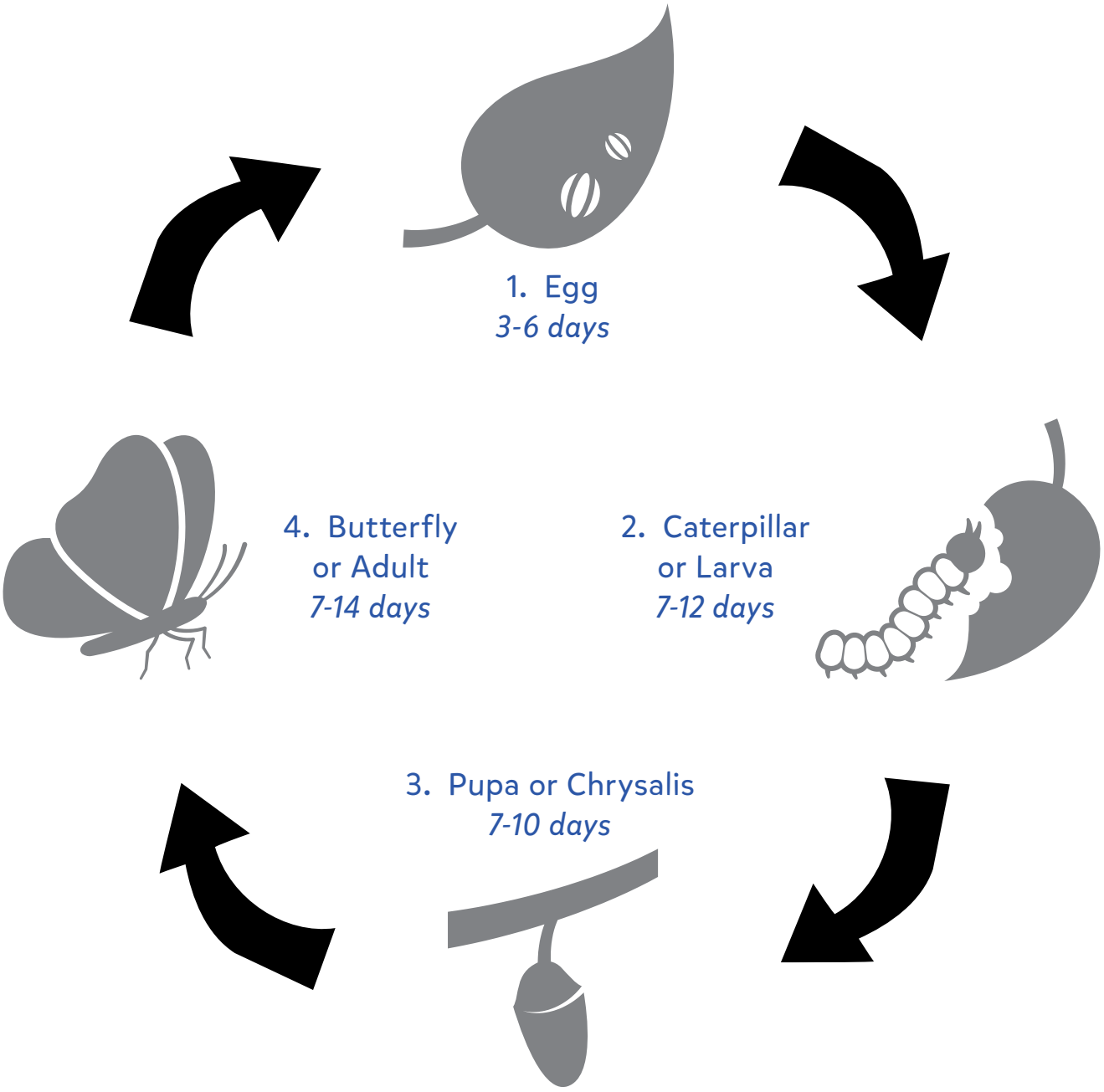
Palps–attached to the insect's mouth and used for smell and to handle food

Setae–bristle-like hairs that are sensitive to touch

Wings–wings sense sound vibrations & regulate its temperature

EXPLAIN: For Teachers

Painted Lady Butterfly Life Cycle



EXPLAIN: For Teachers

Painted Lady Butterfly Life Cycle

There are four stages in the life cycle of the Painted Lady Butterfly.

1. Egg (3-6 days)

Female butterflies lay their eggs on plants that Painted Lady caterpillars like to eat, like thistle or hollyhock. The eggs are the size of a pin head, each one containing a caterpillar beginning to grow.

2. Larva or Caterpillar (7-12 days)

The hungry caterpillar uses its strong jaws to eat leaves and grows quickly. As it grows, the caterpillar's skin or exoskeleton gets tighter. A caterpillar sheds its skin four times before it's fully grown.

3. Pupa or Chrysalis (7-10 days)

With a silk thread that comes out of a spinneret just below its mouth, the caterpillar spins a silk pad, attaches its abdomen, and hangs from this pad. Soon, the caterpillars' skin splits open, from head to abdomen, revealing a dull, brownish case underneath – the pupa or chrysalis.

What happens inside the chrysalis? Inside the larva becomes completely liquid and reforms itself into a butterfly. The butterfly pushes from inside until the case splits open, and it slowly struggles out.

4. Butterfly or Adult (7-14 days)

When the butterfly first emerges from the chrysalis, its wings are soft and crumpled. The butterfly rests, and then slowly pumps fluid into its its wings.

After a few hours, the butterfly will be ready to fly. The Painted Lady Butterfly has a 7-14 day life span. During that time, its main goal is to reproduce and lay eggs so the cycle can begin again!

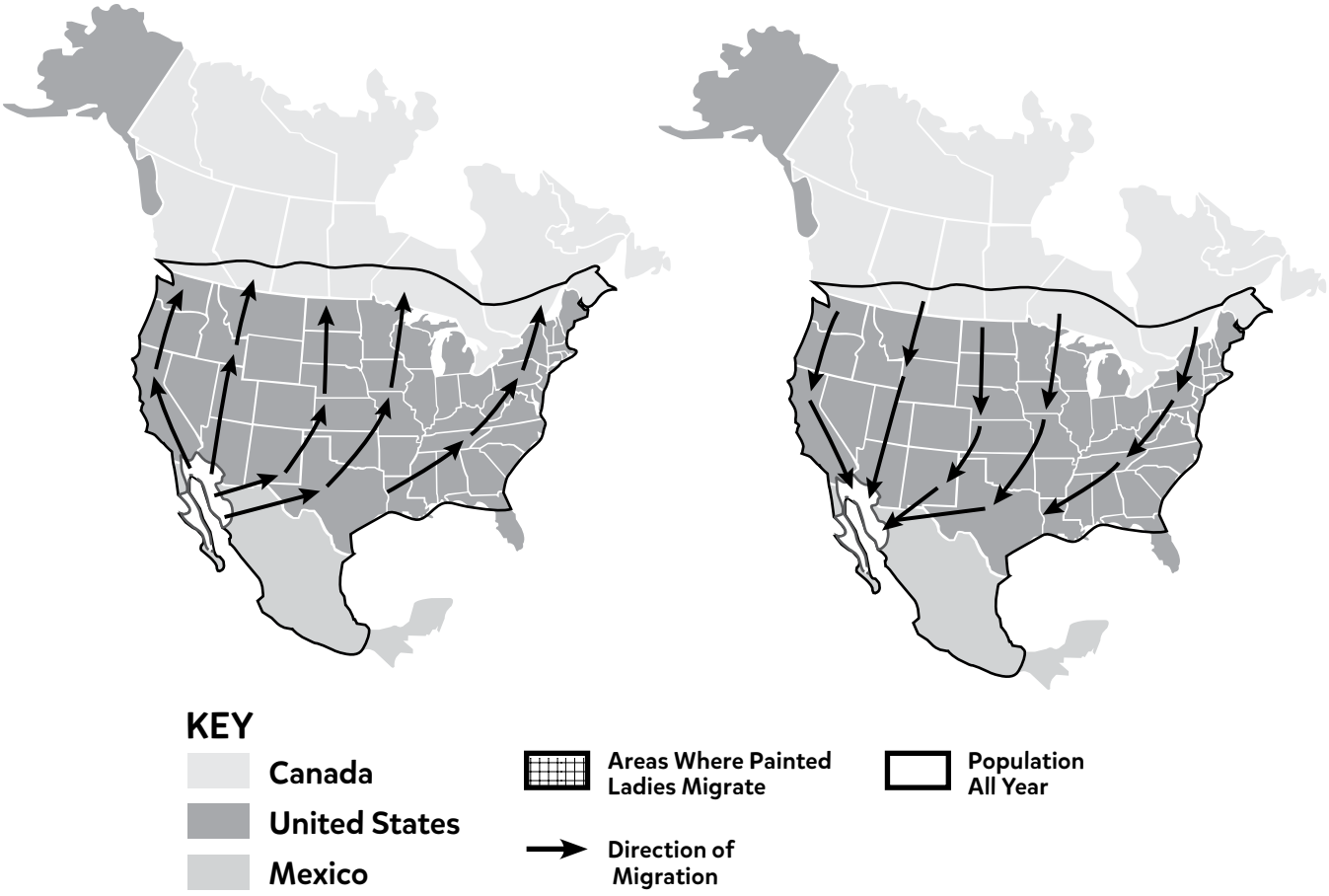
EXPLAIN: For Teachers

Where Do Painted Ladies Live?

Source:
https://www.butterfliesandmoths.org/species/Vanessa-cardui/
http://www.butterflymigration.org/

EXPLAIN: For Teachers

Do Painted Ladies Migrate?



Painted Lady butterflies have impressive migrations in North America. They also migrate between Europe and central Africa, and between northern and southern Asia. The Painted Lady migrates northward in the spring as flowers are blooming and southward in the autumn. Sometimes a large group of painted ladies flies at high altitudes, and other times, low to the ground, searching for nectar and host plants. The butterflies live year round in northwest Mexico.

Unlike many other migratory species, they do not migrate every year. Scientists think that their migrations might be linked to weather patterns like El Niño. With abundant rainfall, a lot of host plants grow all over North America and the butterflies spread out to find them.

It takes 5-6 generations for the painted lady's round trip journey from Mexico to Canada and back. That's 4,000-5,000 miles roundtrip. They fly up to 12 hours per day.

Source: https://vanessa.ent.iastate.edu/el-ni%C3%B1o-and-painted-lady-migrations
https://www.inaturalist.org/projects/butterflymigration-vanessa-cardui

EXPLAIN: For Teachers

Host Plants & Nectar Plants

What are butterfly host plants?

Butterflies and plants have an essential relationship.

Butterfly host plants provide female butterflies with the perfect place to lay their eggs. Female butterflies can fly for miles in search of host plants to lay their eggs on.

After the eggs hatch, caterpillars want to eat, eat, eat! They eat the leaves of the host plant.

Different host plants attract different species of butterflies. And each species of butterfly are only found where those host plants grow. Host plants can be wildflowers, herbs, shrubs or trees.

For example, the host plants of the monarch butterfly are several types of milkweed that grow in Canada, USA, and Mexico.

The host plants of the mourning cloak butterfly are elms, cottonwoods and willow trees.

The favorite host plant of the Painted Lady Butterfly is the thistle. There are 60 species of thistles native to North America. Painted Lady caterpillars feed on over 300 host plants including thistle, mallows, sunflowers, hollyhock, and asters. Found all over the world, the host plants grow in gardens, roadsides, open fields and sunny meadows. Some host plants contain toxins that make the Painted Lady caterpillars taste bad to predators.

Tall Thistle - by Eric Hunt - Own work, CC BY-SA 4.0, https://creativecommons.org/licenses/by-sa/4.0/deed.en

EXPLAIN: For Teachers

Host Plants & Nectar Plants

These are some of the ways that plants and animals are interconnected and depend on each other for survival.

IMPORTANT: The use of pesticides and herbicides, as well as mowing down host and nectar plants in our highway roadsides, city parks, school yards, gardens and homes, has been killing butterflies, bees and other pollinators. Pesticides and herbicides also have a serious impact on the health of children and adults.

What are butterfly nectar plants?

Flowering plants, shrubs and trees are all butterfly nectar plants. Nectar is a sweet liquid produced by flowering plants. Nectar attracts butterflies, hummingbirds, bats, and other pollinators. For butterflies, it is a good source of energy. Bees collect nectar to turn into honey. Nectar is also rich in vitamins and salts which insects need.

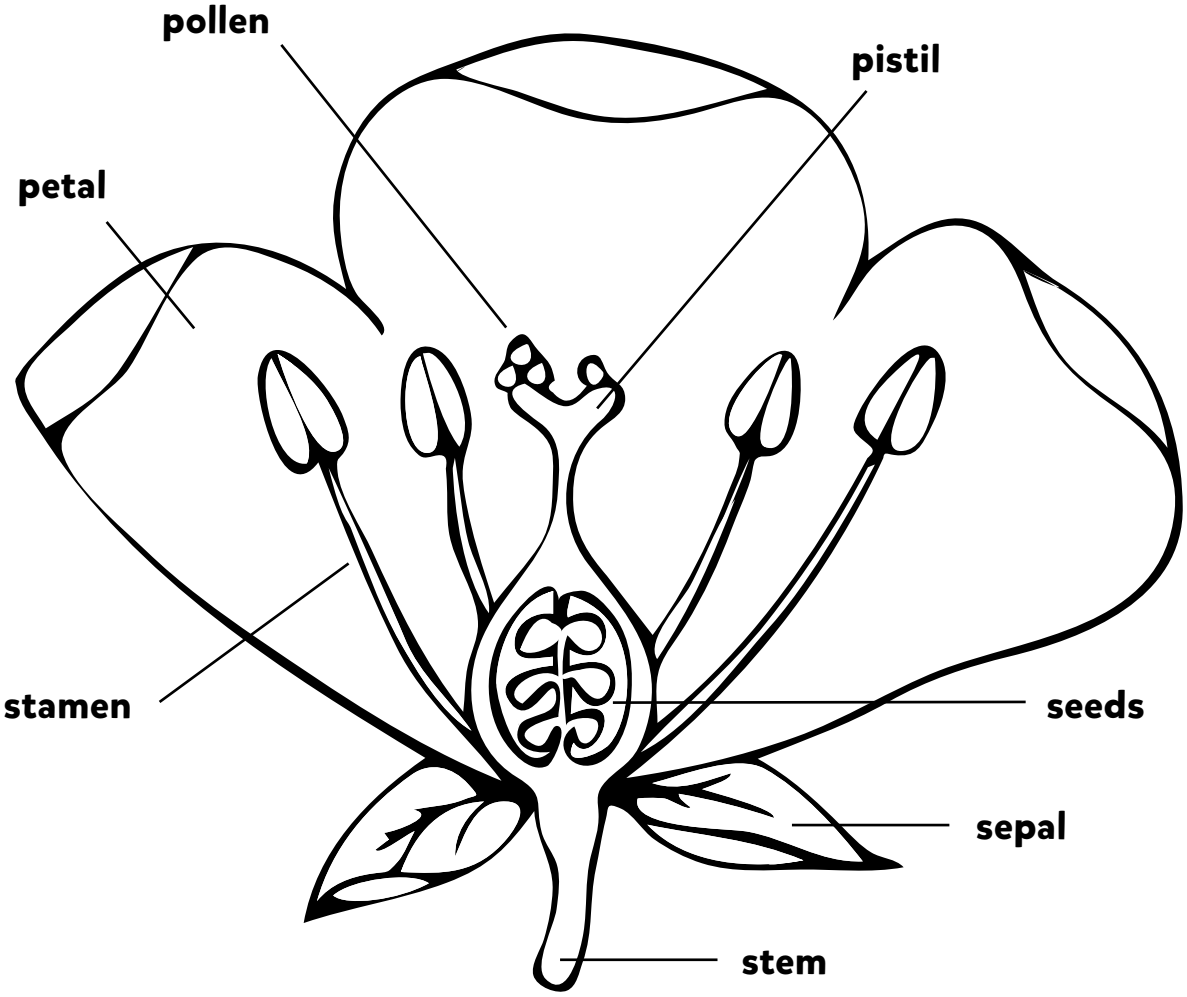
Nectar is important for pollination. The nectar attracts a butterfly or other pollinator. While feeding on nectar, pollen sticks to the butterfly. Some of the pollen is transferred ato the next flower. The butterfly just wants a meal, but is also helping the plant create seeds.

Hollyhock - by Ashish Thorat - Own work, CC BY-SA 4.0, https://creativecommons.org/licenses/by-sa/4.0/deed.en

Sunflower - by Firoooz - Own work, GFDL 1.2, https://creativecommons.org/licenses/by-nc/3.0/

EXPLAIN: For Teachers

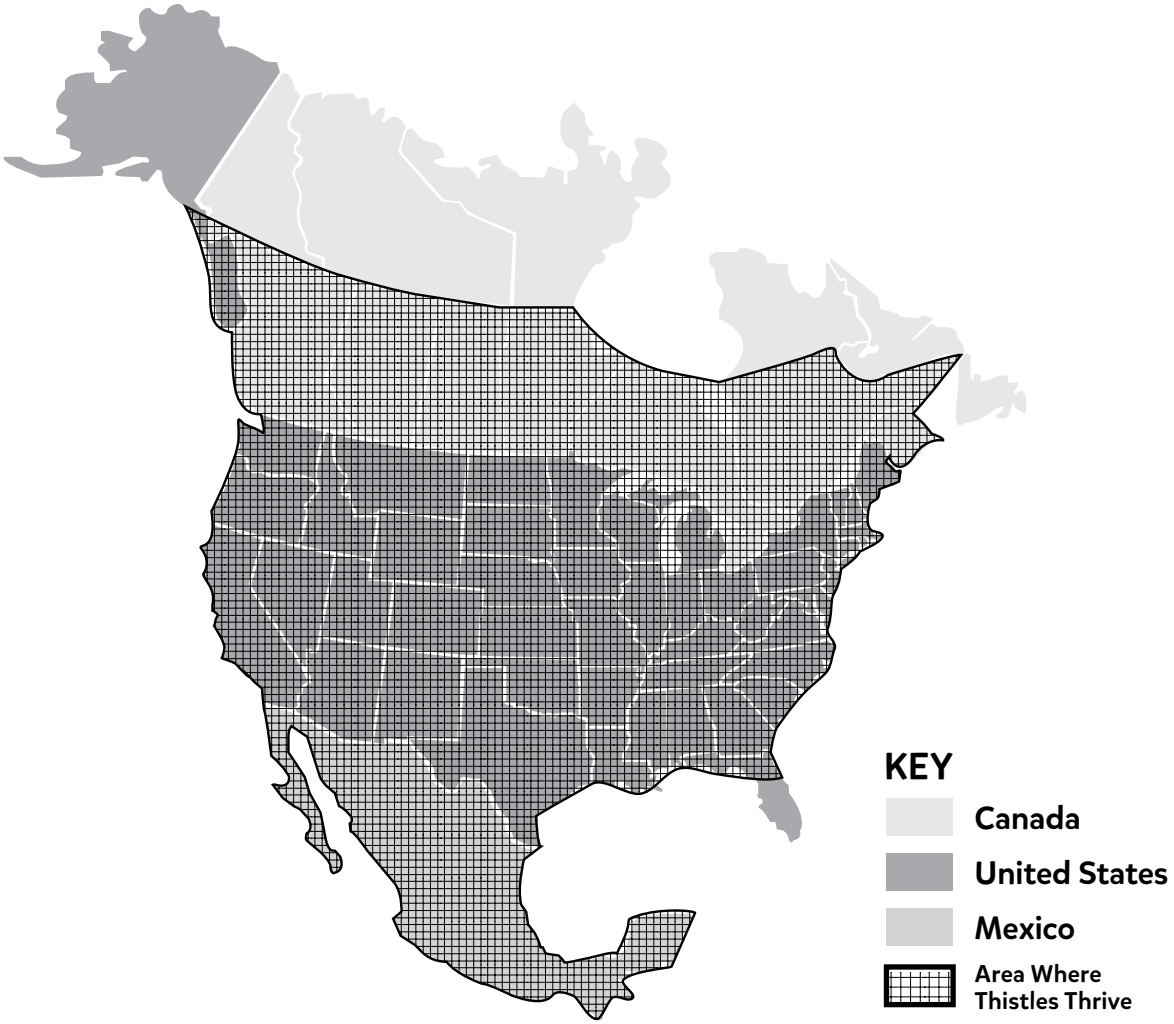
Parts of a Flower



fertilize–to make a flower able to produce seeds;
to make an egg able to grow and develop
fragrance–a pleasant smell
organ–a part of the body that has a particular function
petal–one of the colorful parts of a flower surrounding the pistil & stamens
pistil–seed-bearing female organ of a flower
pollen–a fine yellow powder released from the stamens
seed–a small, hard part of a plant from which a new plant can grow
sepal–green leaf-like parts that surround and protect the flower bud
stamen–the pollen-producing male organ of a flower
stem–the main stalk of a plant

EXPLAIN: For Teachers

Where Does Thistle Thrive?



Thistle is a favorite host plant for Painted Lady caterpillars. Thistle flowers are a favorite nectar source for Painted Lady butterflies, monarchs, skippers, swallowtails and fritillary butterflies. Thistles also provide important food for goldfinches and other thistle-feeding birds. Additionally, hummingbirds will feed on the nectar of the large-flowered species.

Thistle is the common name of a group of flowering plants that have leaves with sharp prickles along the edge. Prickles might also be all over the plant. These prickles protect the plant from being eaten by herbivores. Thistles are native plants in North America, Europe, Asia and northern Africa.

Source: https://www.fs.fed.us/wildflowers/plant-of-the-week/Cirsium-discolor.shtml
https://www.fs.fed.us/wildflowers/plant-of-the-week/cirsium_undulatum.shtml

EXPLAIN: For Teachers

How Can We Take Action to Help Butterflies?

- **Plant native plants that butterflies and caterpillars want to eat!**
  Butterflies and caterpillars love to eat, but can be picky. Imagine you went to a grocery store and all they had was one kind of food! Plant different kinds of plants and flowers to give them options. Ask students and learn together: *What plants are native to our area that would be yummy to our new friends? Where could we plant them?*

- **Make a space for butterflies to rest!**
  Butterflies are so busy they need a safe and sunny spot to warm their wings to fly. Collect flat stones and place them in your garden for butterflies to rest in the sun.

- **Butterflies like puddles?!**
  Butterflies like to hang out together and "puddle": they drink water and eat vitamins from damp puddles. Get a shallow pan and put coarse sand and stones and put it in the soil. Add a little water to keep the sand moist so butterflies can socialize and eat important vitamins!

- **Keep learning, asking questions and observing!** When we know more, we can do more to help our planet. After you release the butterflies, there's still so much more to explore and learn about. Find more books at the library, ask adults questions, and go on a walk to find butterflies, caterpillars and flowers.

- **Teach others!**
  Now that you've learned so much about caterpillars and butterflies, share something you learned each day with someone new at home or at school. You could share artwork you made, tell them something cool about caterpillars and butterflies, teach them a song, or read a book together. The more we all know, the better we can treat our planet.

ELABORATE K

Teaching Materials + Reproducibles

This section includes lessons and activities for students to do in class to deepen their understanding of butterflies and caterpillars through literacy, art, music, math and science. We recommend using these materials throughout the unit based on your existing teaching structures and classroom needs.

Activities (30 minutes each)

- **Science / Math:** Observe the symmetry, shapes and patterns on butterflies (page 62-63) by through different examples of butterflies (pages 64-67)
- **BEFORE:** Review the butterfly body parts (page 49) with the class
- **Art / Science:** Make patterns and your own butterfly! (page 68-69) using cut outs, paint, and a paper plate.

When the butterflies emerge, observe: *What patterns and shapes are on their wings? Does each butterfly look exactly the same or slightly different? Why?*

Butterfly Shapes & Symmetry and Butterfly Symmetry Painting

Mini-Book "Is a Butterfly an Insect?"
Students can practice folding, coloring and share this interactive mini-book with someone at home!

Read Aloud Books (Time varies)
There are so many engaging books for students to deepen their understanding of caterpillars and butterflies and increase their literacy.
You can choose to read the same book more than once or introduce new books throughout the unit. If you can't access some of these books, there are wonderful Read Alouds available online, too.

Song and Movement
Learning can be deepened through movement and song! Introduce these fun songs to students and sing and dance together. Model how to do it first and then have them join in! We recommend doing this when the kids need a wiggle break and as often as you'd like.

ELABORATE K

Butterfly Shapes & Symmetry

Science Questions
What shapes make up a butterfly?
Can those shapes be symmetrical?

Objectives
Learn about shapes & symmetry
Shapes & symmetry make patterns

Time: 30 mins

Materials for Classroom
- Paper cut-outs of 2-D shapes
- Markers, crayons and pencils
- Glue sticks
- Drawing paper for each child
- Photographs of butterflies

Overview

Butterflies are made up of shapes that your students can identify and use to make butterfly collages. Different butterfly species have different shapes for their forewings and hindwings. Let your students decide for themselves which shapes work best for their creative butterflies.

Step One: Review Shapes

Explain that the class will use two-dimensional shapes to create a picture of a butterfly.
If you need, review how a shape remains the same when you slide, flip, or rotate it.
Demonstrate with 3-4 shapes.

Step Two: Identify Butterfly Shapes

1. Project the photographs of butterflies that follow or show the children printouts. Point out different body parts of a butterfly and ask your students to name the shape of each part. Each student might see and interpret the shapes differently. *Are the forewings and hindwings the same shape? Are the wings on the left the same shape as the wings on the right? Is the body of the butterfly an oval or a rectangle?*
2. Explain that a butterfly's body is symmetrical. Show your students that if you draw a vertical line down the center of the butterfly, one half of the butterfly is a mirror image of the other half. Demonstrate symmetry with the 2-D shapes. Demonstrate asymmetry.

ELABORATE K

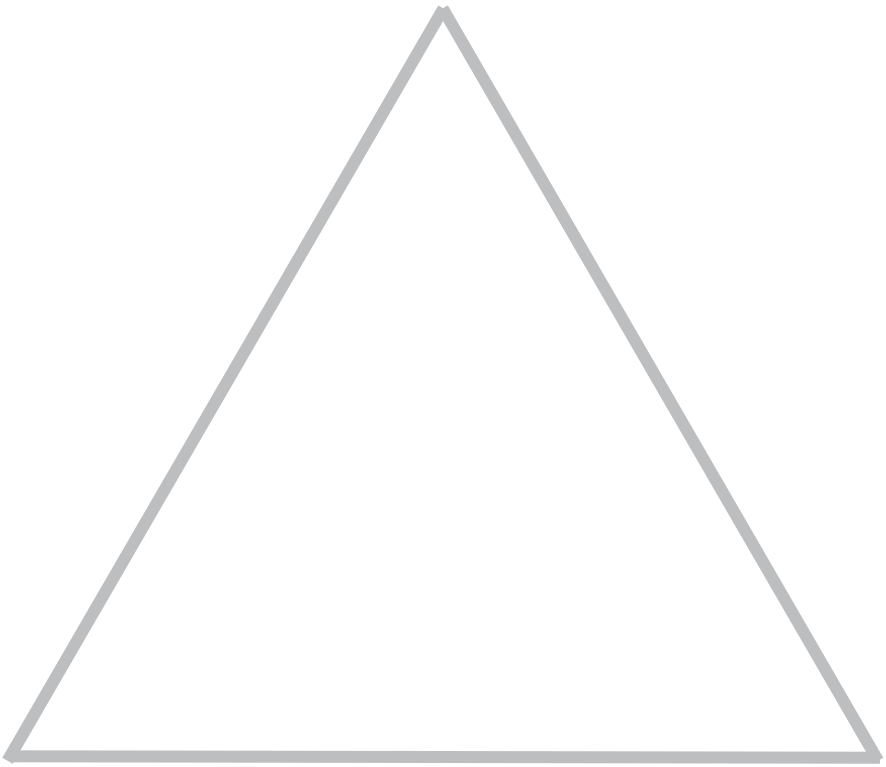
Butterfly Shapes & Symmetry *cont'd*

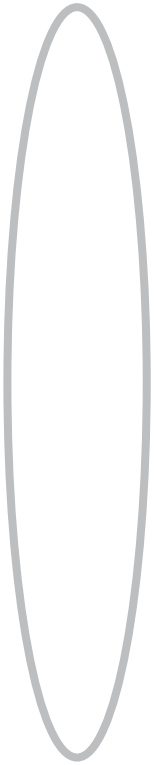
Step Three: Make Collages

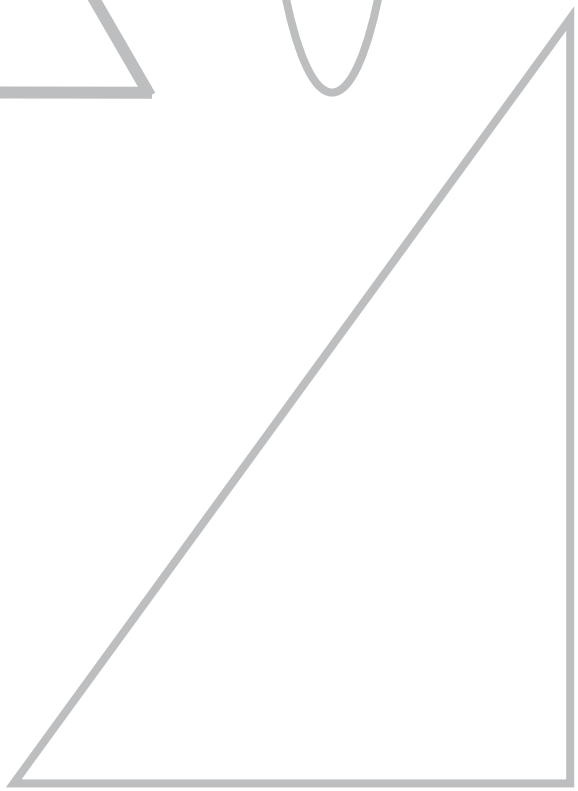
1. As a class, select one of the butterfly photographs to use as an example of shapes.
2. Have many shapes pre-cut for your students to choose from or have your students cut-out the shapes that they want to use. Shape templates can be used to make shapes that are the right size for the drawing paper. Each student can have their own idea of the shapes they want to use for a butterfly's wings and body.
3. Remind your students that a butterfly has symmetry and their collages should be symmetrical too. Have the children glue the body shape at the center of the paper. Then glue the wing shapes on both sides of the body.
4. Once the body and wings are glued, your students can use markers, crayons or small cut-out shapes to show the symmetry of butterfly wings.
5. Allow the children to share their collages and name the 2-D shapes that they used. Discuss the visual patterns of colors and shapes in the collages.

ELABORATE K

Butterfly Shapes & Symmetry *cont'd*

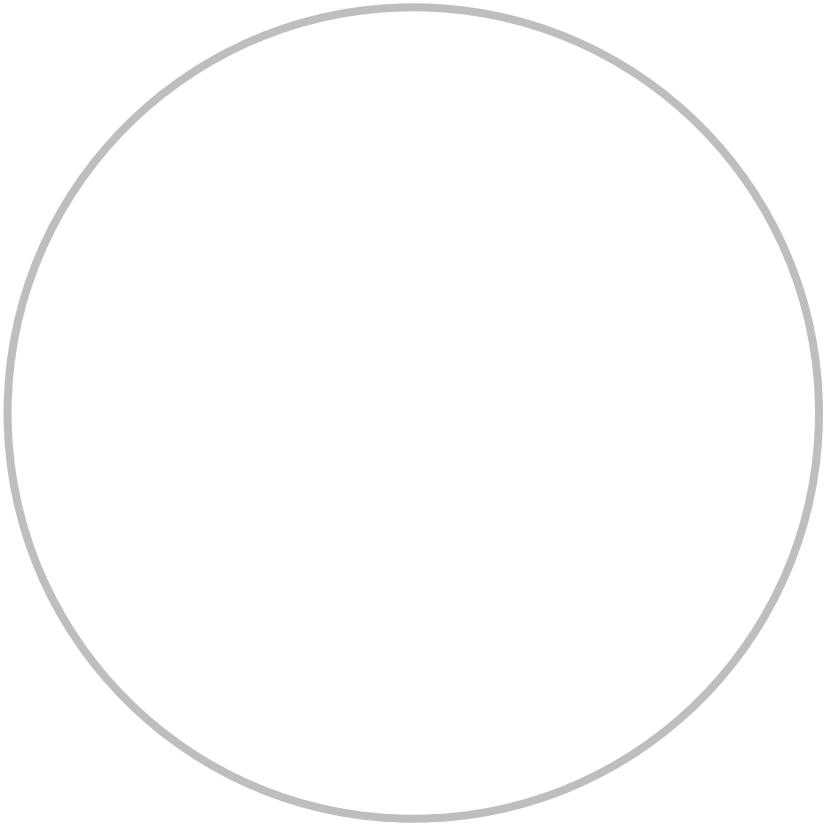


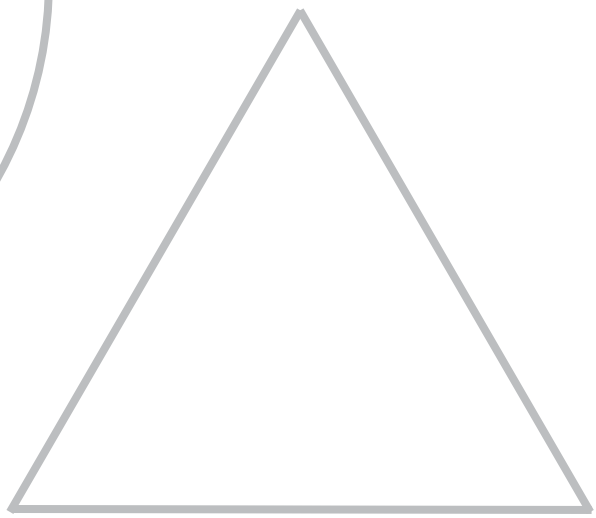




ELABORATE K

Butterfly Shapes & Symmetry *cont'd*





ELABORATE K

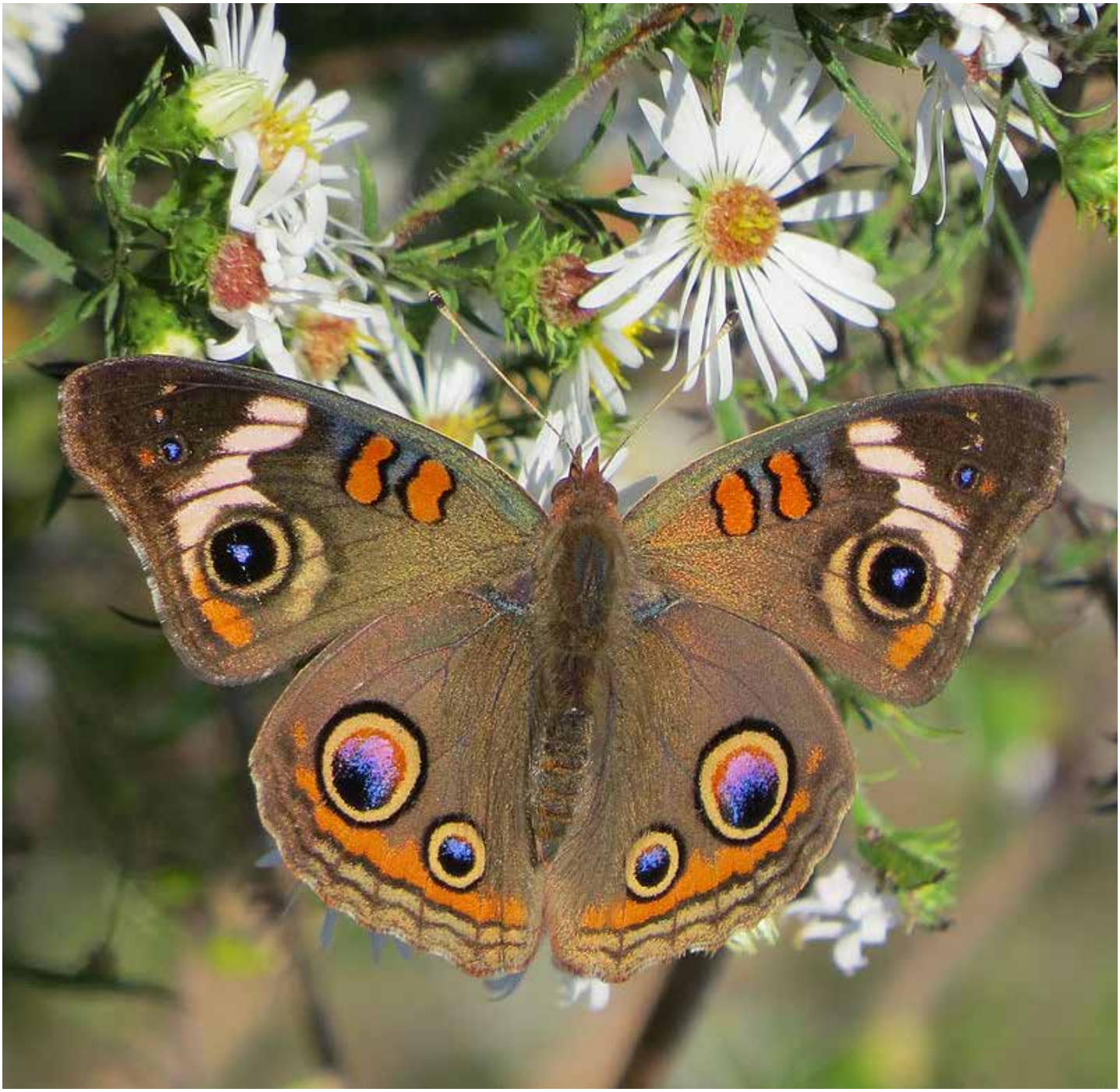
Butterfly Shapes & Symmetry *cont'd*

Painted Lady Butterfly

Photo: iStockPhotos

ELABORATE K

Butterfly Shapes & Symmetry *cont'd*



Buckeye Butterfly

Photo: David E. Hill, commons.wikimedia.org.jpg

ELABORATE K

Butterfly Shapes & Symmetry *cont'd*

Statira Sulphur Butterfly

Photo: Didier Descouens, commons.wikimedia.org.jpg

ELABORATE K

Butterfly Shapes & Symmetry *cont'd*

Palawan Birdwing Butterfly

Photo: Mark Pellegrin, commons.wikimedia.org.jpg

ELABORATE K

Butterfly Symmetry Paintings

Science Questions
What is symmetry?
Are butterflies symmetrical?

Objectives
Students learn about symmetry and the symmetry of animals

Time: 30 mins

Materials for Classroom
- Acrylic or tempera craft paint
- Paper plates or used folders
- Scissors
- Pencil
- Butterfly outline, cut from tag board

Overview

Symmetry is a **PATTERN** in nature. Butterflies are a great way to learn about symmetry. Children can see right away if you draw a vertical line down the middle of a butterfly, one half is a mirror image of the other half. Butterflies are a good example of reflective symmetry.

Step One: Prepare for Colorful Symmetry

1. Cover a table with newspapers or a drop cloth.
2. Put out a variety of paint colors to spark your students' creativity.
3. Work with 4-6 students at a time around the art table.
4. Fold many paper plates in half, flatten the crease with a scissor handle or the edge of a marker, unfold the plate so it lays flat. You want 1-2 paper plates for each student.

Step Two: Demonstrate, Fold & Squish

1. It's a good idea to demonstrate these steps so your students can follow you.
2. On one half of the paper plate, drop and drizzle 2-3 paint colors.
3. Fold the paper plate closed. Press and squish the plate to spread and blend the paint. Some paint will squish out of the edges.
4. Open the paper plate and look at the colorful, symmetrical patterns you made.
5. Set the plates where they can dry.

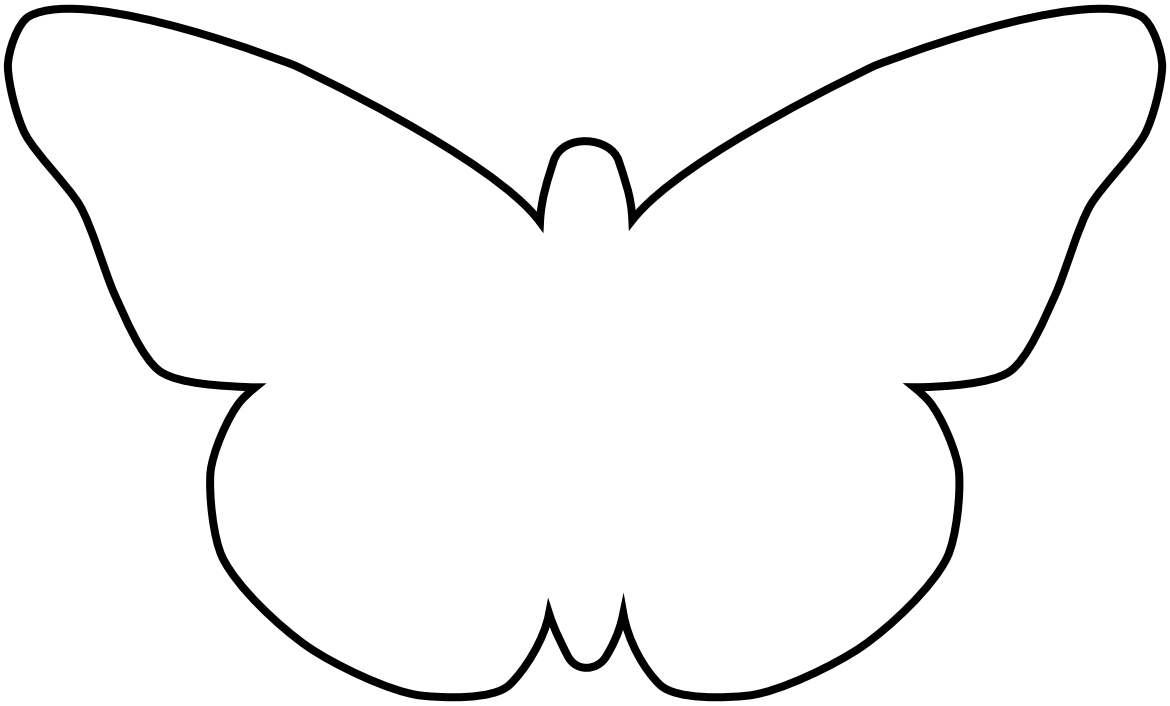
Step Three: Cut out your Butterflies

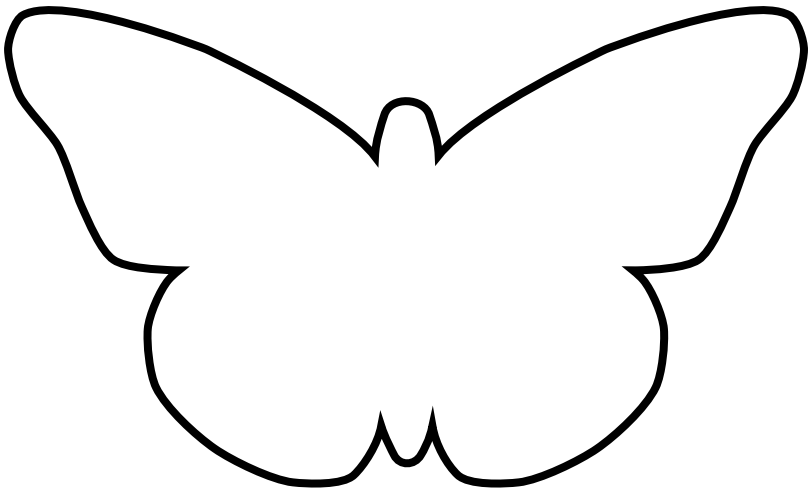
1. When the paint has dried, use the butterfly outline to trace the butterfly shape with a pencil on the paper plate. Line up the crease of the outline with the crease of the paper plate.
2. Cut along the outline to cut out the symmetrical butterflies.
3. Share the paintings and point out the patterns of symmetry in the colors and shapes.
4. Use your beautiful butterflies on the cover of your students' **My Butterfly Journal**.
5. Decorate a bulletin board or paste a butterfly onto a popsicle stick for a butterfly puppet.

ELABORATE K

Butterfly Outlines

Make copies of the 2 butterfly outlines on tag board or card stock.
Trace the butterfly outline with a pencil on the paper plates. Cut-out the butterfly.





ELABORATE K

Is a Butterfly an Insect? Mini-Book

Print out the following page, one for each child.

Have the students fold the page, following your demonstration.

First, fold the page in half, bringing the top down to the bottom with the images showing on the outside.

Next, fold it in half again.
The front cover of the mini-book says, “Is a Butterfly an Insect?”

The children can use crayons/markers to color the pictures.

Is a Butterfly an Insect?

Name _____

An insect body has three parts...

An insect also has...

And most insects have 4 wings

Yes, a butterfly is an insect!

ELABORATE K

Read Aloud: Butterfly Storybooks

Reading the storybook aloud with your class is a wonderful way for your students to learn about butterflies, learn new vocabulary and build close observation skills. Reading the story several times with your students will provide greater vocabulary gains. The vocabulary will also be repeated and reinforced by *What Is It Today?*, singing the songs included here, as well as the other handouts and activities in the *Butterfly Lab.*

Here are a few ideas to enliven multiple readings of a storybook:

- **Call & Response** - you read a line and the children repeat it back to you.
- **Close Observation** - point out details in the illustrations as you read and during other readings, ask students to describe details in the illustrations.
- **Relate to Live Caterpillars & Butterflies** - as the caterpillars grow and transform, relate events in the story to the children's observations of the insects.

Suggested storybooks:

The Very Hungry Caterpillar
by Eric Carle

A Butterfly is Patient
by Dianna Hutts Aston

Bye, Bye, Butterflies
by Andrew Larsen
and Jacqueline Hudon-Verrelli

The Butterfly Alphabet Book
by Brian Cassie

A Place for Butterflies
by Melissa Stewart

The Lamb and the Butterfly
by Arnold Sundgaard and Eric Carle

Are You a Butterfly?
by Judy Allen and Tudor Humphries

Pinkalicious and the Little Butterfly
by Victoria Kann

Glasswings: A Butterfly's Story
by Elisa Kleven

Ten Little Caterpillars
by Bill Martin Jr. and Lois Ehlert

I'm a Caterpillar by Jean Marzollo

Butterflies by Emily Neye

Farfallina & Marcel by Holly Keller

Waiting on Wings by Lois Ehlert

ELABORATE K

Head & Thorax, Abdomen, Abdomen

Sing to the tune of
"Head and Shoulders, Knees and Toes"

This song is a quick way to get your students moving and having fun. Be sure to touch your head, touch your chest and your belly while you sing. Make up your own movements for 6 legs, 4 wings and 2 antennae. Once your class knows the words and gestures, don't forget to speed up!

Head and thorax
Abdomen, Abdomen

Head and thorax
Abdomen, Abdomen

Six legs, four wings
and two antennae

Head and thorax
Abdomen, Abdomen

ELABORATE K

Butterflies, Yes, I Like Butterflies

Call and response to the tune of "Alouette," also known as "Ravioli"

Butterflies, yes.
I like butterfli-ies.
Butterflies, yes.
They're the bugs for me.

Do I see one butterfly?
Yes, I see one butterfly.
One butterfly.
One butterfly.

Oh-oh-oh-oh!
Butterflies, yes.
I like butterfli-ies.
Butterflies, yes.
They're the bugs for me.

Do I see two antennae?
Yes, I see two antennae.
Two antennae. *Two antennae.*
One butterfly. *One butterfly.*

Oh-oh-oh-oh!
CHORUS

Do I see three body parts?
Yes, I see three body parts.
Three body parts. *Three body parts.*
Two antennae. *Two antennae.*
One butterfly. *One butterfly.*

Oh-oh-oh-oh!
CHORUS

Do I see four pretty wings?
Yes, I see four pretty wings.
Four pretty wings.
Four pretty wings.
Three body parts. *Three body parts.*
Two antennae. *Two antennae.*
One butterfly. *One butterfly.*

Oh-oh-oh-oh!
CHORUS

Do I see five caterpillars?
Yes, I see five caterpillars.
Five caterpillars. *Five caterpillars.*
Four pretty wings.
Four pretty wings.
Three body parts. *Three body parts.*
Two antennae. *Two antennae.*
One butterfly. *One butterfly.*

Oh-oh-oh-oh!
CHORUS

Do I see six skinny legs?
Yes, I see six skinny legs.
Six skinny legs. *Six skinny legs.*
Five caterpillars. *Five caterpillars.*
Four pretty wings.
Four pretty wings.
Three body parts. *Three body parts.*
Two antennae. *Two antennae.*
One butterfly. *One butterfly.*

Oh-oh-oh-oh!
CHORUS

EVALUATE K

Evaluating Student Learning

Overview
Finish the unit with a small-group or individual assessment to effectively evaluate your students' understanding of the question: *What does a butterfly need to survive and thrive?*

Small-Group Assessment
Implement the interactive, storytelling activity - **Tell A Story: What Do Butterflies Need to Survive and Thrive?** Students will collaborate to create and tell a sequential story that explains what butterflies need to survive and thrive, reinforcing their understanding of an organism's need for food, water, air, and sunlight.

Individual Assessment
For individual assessments, use one of the 3 visual handouts. Teachers will find the handouts along with an answer key.

- What Do Caterpillars Need?
- How Do Plants & Butterflies Interact?
- What Do Butterfly Body Parts Do?

By integrating visual learning and hands-on experiences, teachers can effectively assess kindergarteners' understanding of butterflies in a meaningful and engaging way.

EVALUATE K

Tell A Story:
"What Do Butterflies Need?"

Objective
Students will collaborate to create and tell a sequential story that explains what butterflies need to survive and thrive, reinforcing their understanding of food, water, air, and sunlight.

Materials
- Butterfly puppets or paper cutouts
- Large picture cards (flowers, leaves, water, sun, trees, etc.)
- Storytelling wand or special object (Whose turn it is to tell the story?)
- Whiteboard or chart paper for teacher notes

Lesson Steps
1. Introduction (10 minutes)
"What do butterflies need to live and be happy?"
Show images of flowers, leaves, water, sunshine, and trees.
Encourage students to describe how these things help butterflies survive.
Tell students they will work in small groups to create a story about a butterfly's journey to find what it needs to live.

2. Storytelling Activity (15-20 minutes)
Grouping: Divide students into small groups of 3-4. Each child will take turns adding to the story in sequence.

Story Prompt: "Once upon a time, there was a butterfly named Sunny. Sunny was flying around, looking for the things it needed to survive. What did Sunny find first?"

Turn-Taking: The first student starts the story by describing where Sunny is and what it finds first (e.g., "Sunny was flying through a big green meadow when it saw a beautiful pink flower full of sweet nectar!").

The second student continues, adding another element the butterfly needs (e.g., "After drinking nectar, Sunny felt thirsty, so it looked for a puddle of water.").

Tell A Story: *continued*

The third student builds on the story, adding another survival need, such as sunlight or shelter.

The fourth student concludes the story by making sure Sunny has everything it needs and is happy (e.g., "Sunny found a big tree with lots of leaves where it could rest safely for the night.").

The teacher can guide students with questions like:
"What will happen next?"
"How does Sunny feel now?"
"Is there anything else Sunny needs?"

3. Sharing and Reflection (10 minutes)
Each group shares their story with the class. Encourage students to listen carefully and notice if all the survival needs (food, water, shelter, sunlight) were included.

After storytelling, ask:
"Did Sunny find everything it needed?"
"What would happen if Sunny couldn't find flowers or water?"
"How can we help real butterflies find what they need?"

Extension
Students can draw a picture of their group's butterfly adventure and dictate a sentence about what their butterfly needed to survive.

Assessment
Observe how students sequence their stories and include key survival elements. Listen for understanding during discussions and storytelling.

This lesson makes learning interactive, builds communication skills, and reinforces science concepts in a fun, engaging way!

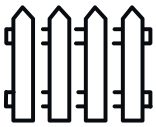
BUTTERFLY LAB

Name _____

Date _____

What Do Caterpillars Need?

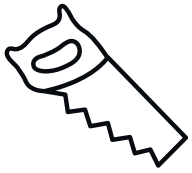
Circle 4 things that a caterpillar needs.



FENCE

AIR

SHOVEL



SAW

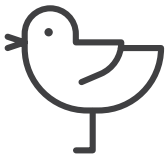
TRUCK

WATER

FOOD

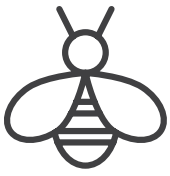
BUCKET

HAT



BIRD

SUN



BEE

BUTTERFLY LAB

Name _____

Date _____

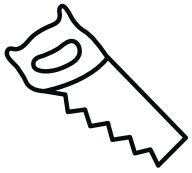
KEY: What Do Caterpillars Need?

Circle 4 things that a caterpillar needs.

FENCE

AIR

SHOVEL



SAW

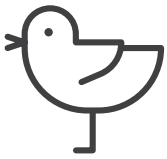
TRUCK

WATER

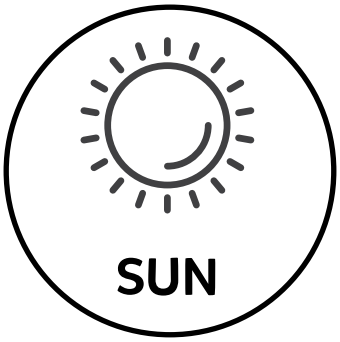
FOOD

BUCKET

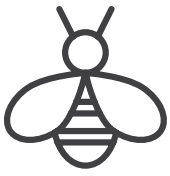
HAT



BIRD



SUN



BEE

BUTTERFLY LAB

Name _____

Date _____

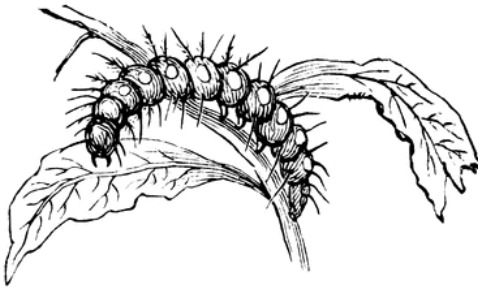
How Do Plants & Butterflies Interact?

Draw an arrow from the sentence on the left to the correct picture on the right.

Caterpillars eat the leaves of plants.

Butterflies lay their eggs on plants.

Flowers make nectar that give butterflies energy.



Butterflies flutter from flower to flower sipping nectar and carrying pollen from one flower to another.

BUTTERFLY LAB

Name _____

Date _____

KEY: How Do Plants & Butterflies Interact?

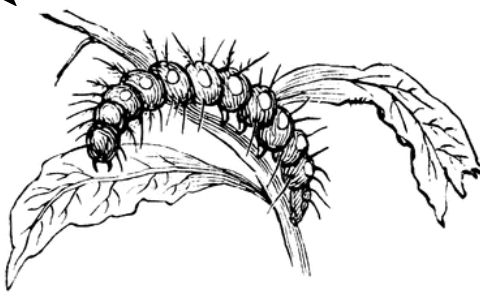
Draw an arrow from the sentence on the left to the correct picture on the right.

Caterpillars eat the leaves of plants.

Butterflies lay their eggs on plants.

Flowers make nectar that give butterflies energy.

Butterflies flutter from flower to flower sipping nectar and carrying pollen from one flower to another.



BUTTERFLY LAB

Name _____

Date _____

What Do Butterfly Body Parts Do?

Cut out the 5 words at the bottom.
Read the 5 sentences and glue the correct body part in the blank.

The four _____ fly from flower to flower.

The _____ drinks nectar like a straw.

Compound _____ see danger in all directions.

Six _____ hold on to branches in the wind.

Two _____ smell where food is.

---

legs

eyes

wings

proboscis

antennae

BUTTERFLY LAB

Name _____

Date _____

KEY: What Do Butterfly Body Parts Do?

Cut out the 5 words at the bottom.
Read the 5 sentences and glue the correct body part in the blank.

The four wings fly from flower to flower.

The proboscis drinks nectar like a straw.

Compound eyes see danger in all directions.

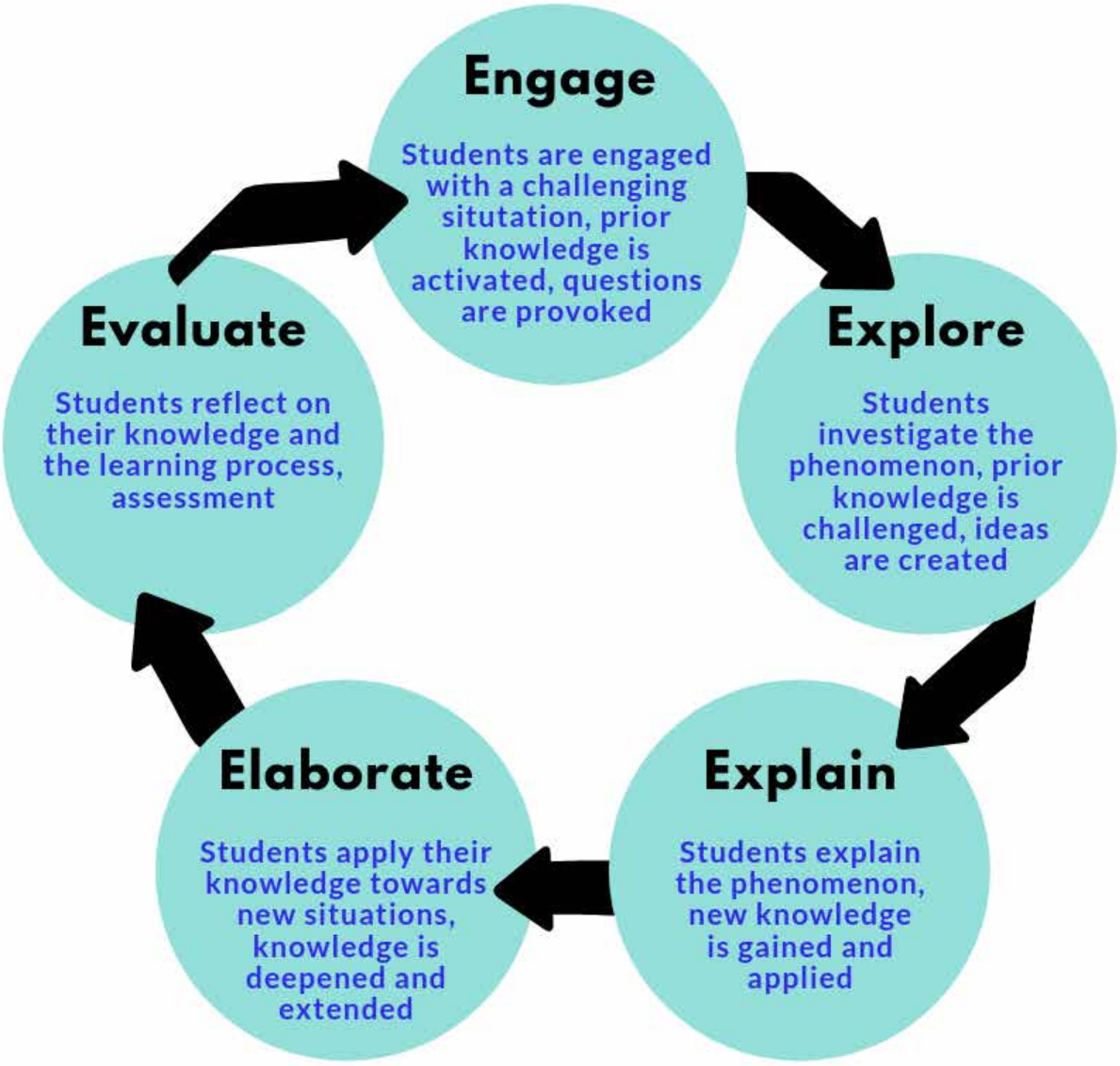
Six legs hold on to branches in the wind.

Two antennae smell where food is.

.....

BUTTERFLY LAB Kindergarten

The 5 E Inquiry-based Instructional Model



The 5E Inquiry-Based Instructional Model is based upon cognitive psychology, constructivist theory of learning, and best practices in STEM instruction (Bybee and Landes 1990). The 5E learning cycle leads students through five phases: Engage, Explore, Explain, Elaborate, and Evaluate. The 5E Instructional Model brings coherence to different teaching strategies, provides connections among educational activities, and helps science teachers make decisions about interactions with students (BSCS 2019). Compared to traditional teaching models, the 5E learning cycle results in greater benefits concerning students' ability for scientific inquiry (Bybee 2009).

Source: https://knowledgequest.aasl.org/the-5-es-of-inquiry-based-learning/

Next Generation Science Standards

Next Generation Science Standards K. Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment		
Students who demonstrate understanding can: **K-LS1-1.** Use observations to describe patterns of what plants and animals (including humans) need to survive. **K-ESS3-1.** Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. • Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** • Scientists look for patterns and order when making observations about the world.	**LS1.C: Organization for Matter and Energy Flow in Organisms** All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. (K-LS1-1) **ESS3.A: Natural Resources** Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (K-ESS3-1)	**Patterns** Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1)

Next Generation Science Standards website - https://www.nextgenscience.org/

BUTTERFLY LAB Kindergarten

Common Core ELA Standards

KINDERGARTEN	Common Core: English Language Arts Standards	Reading: Informational Text
Key Ideas and Details:		
CCSS.ELA-Literacy.RI.K.1	With prompting and support, ask and answer questions about key details in a text.	
CCSS.ELA-Literacy.RI.K.2	With prompting and support, identify the main topic and retell key details of a text.	
CCSS.ELA-Literacy.RI.K.3	With prompting and support, describe the connection between two events, or pieces of information in a text.	
Craft and Structure:		
CCSS.ELA-Literacy.RI.K.4	With prompting and support, ask and answer questions about unknown words in a text.	
CCSS.ELA-Literacy.RI.K.5	Identify the front cover, back cover, and title page of a book.	
CCSS.ELA-Literacy.RI.K.6	Name the author and illustrator of a text and define the role of each in presenting the information in a text.	
Integration of Knowledge and Ideas:		
CCSS.ELA-Literacy.RI.K.7	With prompting and support, describe the relationship between illustrations and the text in which they appear.	
CCSS.ELA-Literacy.RI.K.8	With prompting and support, identify the reasons an author gives to support points in a text.	
CCSS.ELA-Literacy.RI.K.9	With prompting and support, identify basic similarities in and differences between two texts on the same topic.	
Range of Reading and Level of Text Complexity:		
CCSS.ELA-Literacy. RI.K.10	Actively engage in group reading activities with purpose and understanding.	

BUTTERFLY LAB Kindergarten

Common Core Math Standards

KINDERGARTEN	Common Core: Math Standards
Counting & Cardinality: Count to tell the number of objects	
K.CC.B.5	Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects.
Counting & Cardinality: Compare numbers	
K.CC.C.6	Identify whether the number of objects in one group isgreater than, less than, or equal to the number of objects in another group, e.g. , by using matching and counting strategies.
Measurement & Data: Describe and compare measurable attributes.	
K.MD.A.1	Describe measurable attributes of objects, such as lengthor weight. Describe several measurable attributes of asingle object.
K.MD.A.2	Directly compare two objects with a measurableattribute in common, to see which object has "moreof"/"less of" the attribute, and describe the difference.
Measurement & Data: Classify objects and count the number of objects in each category	
K.MD.B.3	Classify objects into given categories; count the numbersof objects in each category and sort the categories by count.
Geometry: Identify & describe shapes	
K.G.A.1	Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.
Geometry: Analyze, compare, create, and compose shapes	
K.G.B.4	Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).
K.G.B.5	Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.

Butterfly Celebration:

A Fun & Educational Event for Elementary Schools

Celebrate the beauty and wonder of butterflies with an interactive, fun-filled **Butterfly Celebration!** This event engages students in hands-on activities that promote learning about metamorphosis, environmental stewardship, and the importance of butterflies in nature.

Event Overview

Theme: ***Transformation, Nature, and Conservation***
Who Can Participate: Elementary school students (grades K-5)
Duration: 60 minutes
Location: Schoolyard, gym, or classroom with space for movement

Event Schedule:

The Planet Earth Pledge

Kick off the celebration with students reciting The Planet Earth Pledge to inspire a sense of responsibility for nature. See page 94.

Butterfly Song Sing-Along

Sing fun, butterfly-themed songs to get everyone excited! See page 76.

Butterfly Stick Puppet Play

Each student brings a butterfly stick puppet, pre-made and decorated during class. See page 95.

Teachers or volunteers lead a simple story where students use their puppets to act out a butterfly's journey from egg to adult. Students can flutter their puppets around the room, "pollinating" paper flowers or acting out a migration journey.

Butterfly Hopscotch Game

Students play Butterfly Hopscotch, a fun and active game that reinforces the four stages of metamorphosis. See page 96.

Butterfly Celebration:

A Fun & Educational Event for Elementary Schools

Closing Reflection:

"Butterflies & Me"

Gather students in a circle and ask:
What did you learn about butterflies today?
Why are butterflies important to nature?
How can we help protect butterflies and their habitats?
Encourage students to share thoughts before thanking them for their participation.

Optional Add-Ons:
Craft Station: Students decorate butterfly masks or wings.

Storytime: Read books from our Butterfly Book List, page 74.

Planting Activity: Plant butterfly-friendly flowers like sunflowers in the school garden.

This Butterfly Celebration is a joyful way to inspire curiosity, creativity, and a love for nature!

Take the Planet Earth Pledge

Planet Earth Pledge

Say the Planet Earth Pledge out loud 3 times!

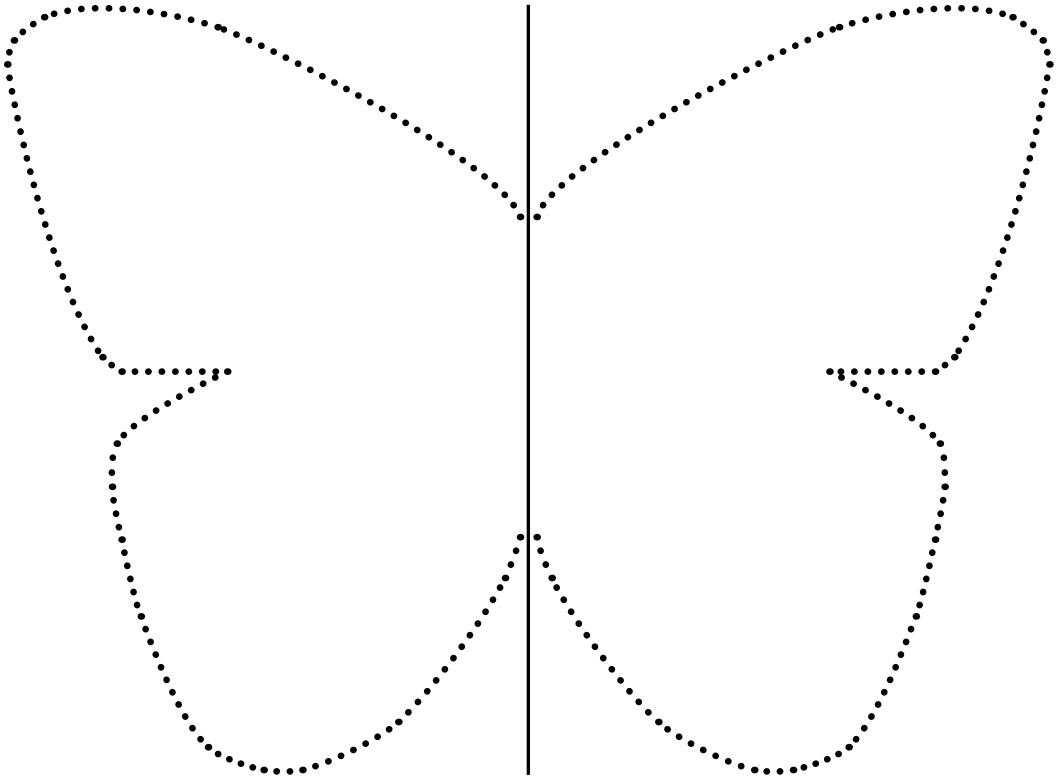
No job is too big
No action too small
For the care of the Earth
Is the task of us all!

El Compromiso de Nuestro Planeta Tierra

¡Repite la Promesa Para la Tierra Planeta en voz alta 3 veces!

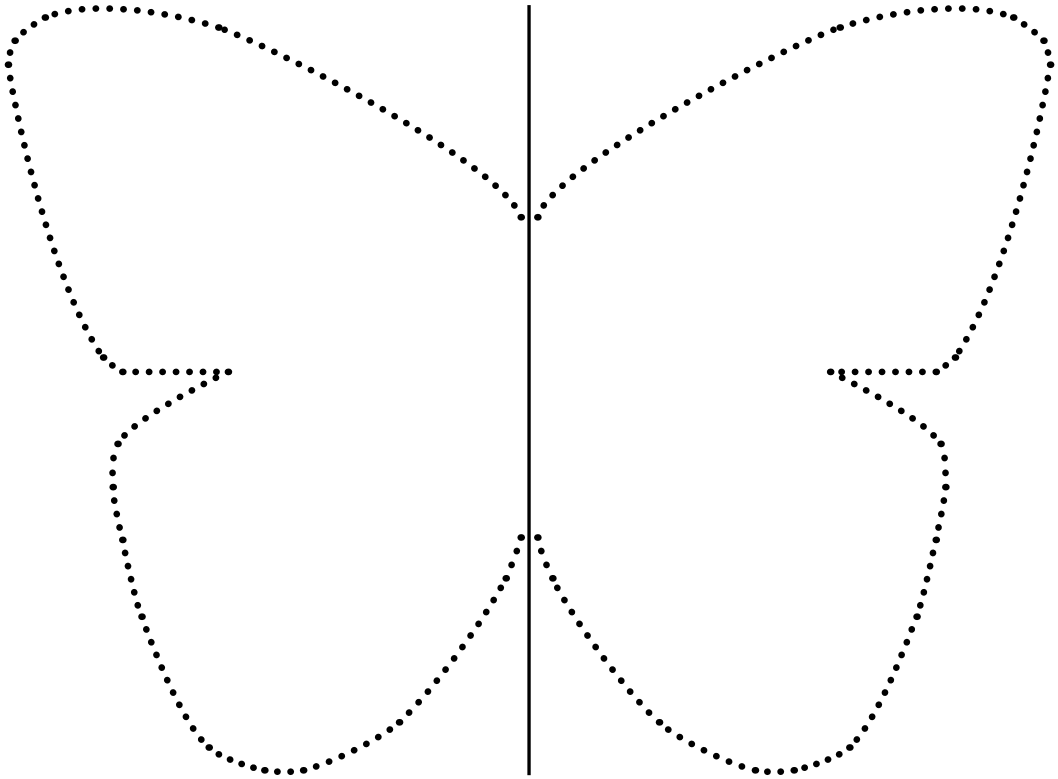
Ningún trabajo es demasiado grande
Ninguna acción es demasiado pequeña
¡Por el cuidado de la Tierra
Es el trabajo de todos nosotros!

Make a Butterfly Stick Puppet



- Fold the puppet in half along the solid line.
- Cut out the butterfly wings along the dotted line.
- Make the wings symmetrical. Open the wings so they are flat. On half, place drops of paint. Fold it over and press the paint on the other half. Open it and let the paint dry.
- Glue the butterfly to a popsicle stick.

Make a Butterfly Stick Puppet



- Fold the puppet in half along the solid line.
- Cut out the butterfly wings along the dotted line.
- Make the wings symmetrical. Open the wings so they are flat. On half, place drops of paint. Fold it over and press the paint on the other half. Open it and let the paint dry.
- Glue the butterfly to a popsicle stick.

CELEBRATE K

How to Play *Butterfly Hopscotch*

Butterfly Hopscotch is a fun and educational twist on traditional hopscotch that follows the four stages of a butterfly's metamorphosis. Players hop through the life cycle—from egg to butterfly—while learning about transformation in nature!

What You'll Need:

- Chalk (for drawing the hopscotch board)
- Small beanbag or pebble (to act as the "caterpillar")
- Outdoor space with a flat surface

Setting Up the Game:

Draw a hopscotch board with four main sections, each representing a stage of the butterfly's life cycle. Decorate each section with simple drawings to match the theme.

1. Egg Stage (Start Zone) – A small circle where players begin.
2. Caterpillar Stage (Hop Boxes) – A series of single and double squares where players hop from one foot to two feet like a crawling caterpillar.
3. Chrysalis Stage (Balance Zone) – A larger square or rectangle where players must stand on one foot for a few seconds to symbolize metamorphosis.
4. Butterfly Stage (Final Leap) – A wide space where players spread their arms and "fly" to the finish!

How to Play:

1. Toss the Caterpillar – The first player throws the beanbag (their "caterpillar") onto the first stage (Egg Stage).
2. Hop Through the Life Cycle – The player hops through the stages, avoiding the square where the beanbag landed. They must:
    - Hop on one foot in the Caterpillar Stage
    - Balance in the Chrysalis Stage for 3-5 seconds
    - Land with arms outstretched in the Butterfly Stage

3. Retrieve & Return – After reaching the Butterfly Stage, the player hops back, picking up the beanbag on the way without stepping out of bounds.
4. Advance the Beanbag – On the next turn, the player throws the beanbag to the next stage. The game continues until a player successfully completes all four stages.
5. Winning the Game – The first player to complete all stages wins and "becomes a butterfly"!

Fun Variations:

- Butterfly Facts Bonus – Players must name a fact about butterflies before taking their turn.
- Obstacle Challenge – Add extra rules like flapping arms during the Butterfly Stage or wiggling like a caterpillar.
- Timed Rounds – See who can complete the cycle the fastest without making mistakes!

This game is great for kids to learn about nature while staying active. Get ready to hop, balance, and fly like a butterfly!