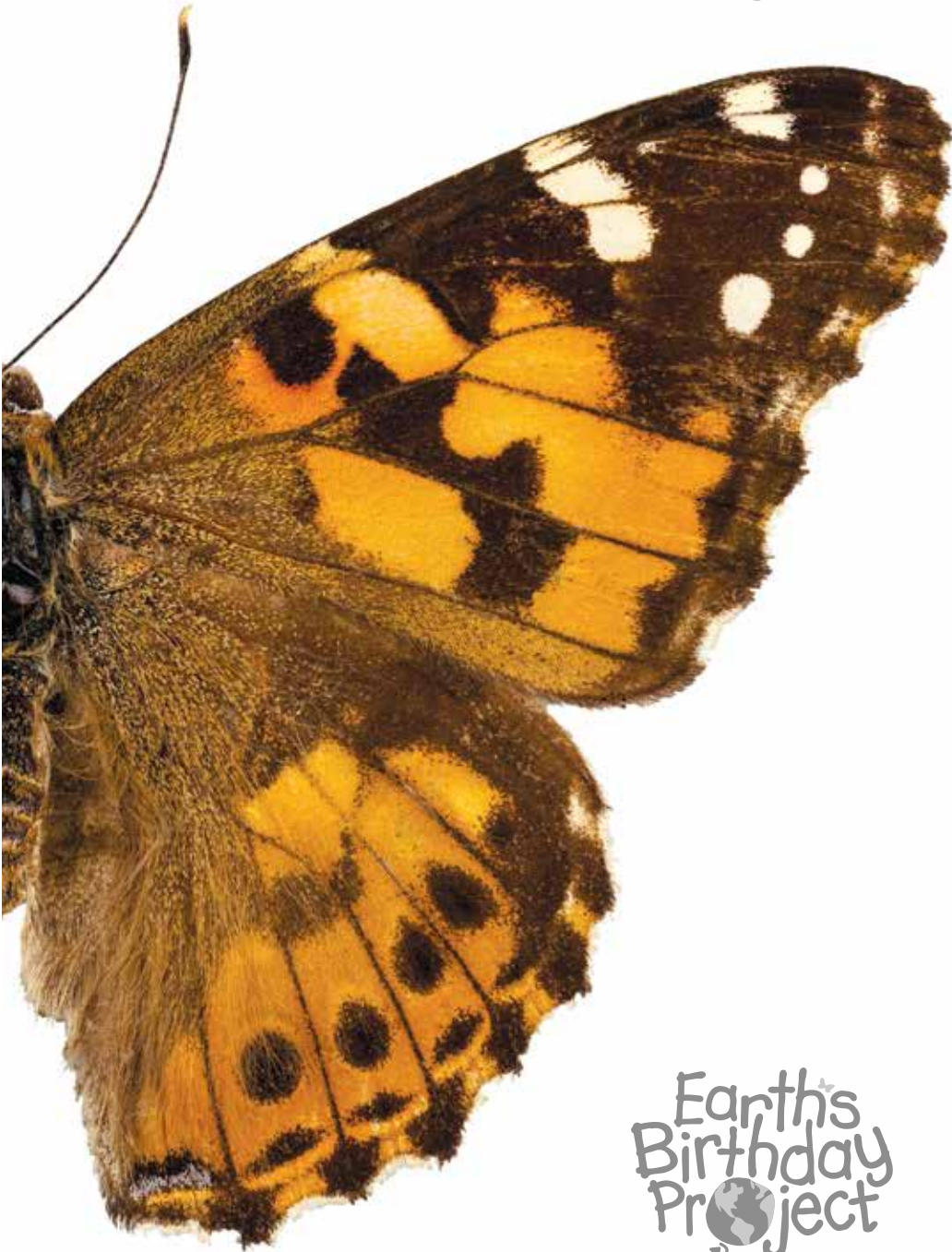


The BUTTERFLY LIFE CYCLE

Teacher's Guide
3rd Grade Science Unit



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BUTTERFLY LAB

BUTTERFLY LAB

Acknowledgements



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Earth's Birthday Project cultivates hope for the future by inspiring wonder, learning & care of the natural world in children, teachers & parents.

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

BUTTERFLY LAB

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BUTTERFLY LAB

Overview



Teacher's Guide

This hands-on lab for 3rd grade science builds observation skills and an understanding of the butterfly's life cycle.

The lab includes Pre and Post Assessments along with activities for learning and integration. Based on your students' skills, use the Butterfly Lab in the ways that you think are best. Please see the Calendar below as a suggested sequence.

Su	M	T	W	Th	F	Sa
			Day 1 Pre Assessment	Day 2 What We Know About Life Cycles	Day 3 What Is It Today? <i>Live caterpillars probably arrive.</i>	Day 4
Day 5	Day 6 Caterpillar Flipbook	Day 7 What Do Caterpillars Eat?	Day 8	Day 9 Caterpillar Body Parts	Day 10	Day 11
Day 12	Day 13 Parts of a Flower Handout	Day 14	Day 15 Chrysalis Flipbook	Day 16	Day 17 Life Cycle Flipbook	Day 18
Day 19	Day 20 Build a Life Cycle Model	Day 21 Narrative Writing: Life Cycles	Day 22 Post Assessment	Day 23 Climate Science & Butterflies	Day 24 Celebrate the Earth!	

BUTTERFLY LAB



Overview

Butterfly Lab is designed as a complete unit, but you may also select 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!

Before the Caterpillars Arrive

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.

Do the *Pre Assessment* with your students. Discuss what it means to be a good friend to the Earth and all her creatures. Make copies of all the handouts in advance.

Have your students share what they know about flowers with *What We Know About Life Cycles*.

The Caterpillars Are Here

The live caterpillars will arrive on a Thursday. They come with care instructions, a butterfly house & life cycle poster.

Begin using the *What Is It Today? Bar Graph* & the *Caterpillar Flipbook* right away. These activities introduce your students to thinking & acting like scientists—looking closely, recording information, making predictions and learning from results.

Each day, write a 1-2 sentence class observation on the whiteboard. Continue observing the caterpillars each day, recording what you see on the *What Is It Today? Bar Graph*.

When they all become chrysalises, transfer them into the butterfly house. Do the *Chrysalis Flipbook*.

Butterflies Emerge

When the butterflies emerge from the chrysalises, the students can observe them for a few days. Study the *Butterfly Life Cycle Flipbook*, now that you have seen the caterpillar, chrysalis and butterfly. Make a *Butterfly Life Cycle Model* by using different pasta shapes.

Observing the butterflies, your class can practice *Narrative Writing: Butterflies & Pollination*. Remember to do a *Post Assessment* with your students. Have a discussion with your students with the *Climate Science & Butterflies* guidelines from our partners, Climate Science Alliance.

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! You can sing songs to thank the butterflies for all that you have learned about them.

- 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. Be gentle and patient.

Discuss with the children what it means to care for the Earth and all her creatures.



3RD GRADE	Common Core: English Language Arts Standards	Reading: Informational Text
Key Ideas and Details:		
CCSS.ELA-Literacy.RI.3.1	Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.	
CCSS.ELA-Literacy.RI.3.2	Determine the main idea of a text; recount the key details and explain how they support the main idea.	
CCSS.ELA-Literacy.RI.3.3	Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.	
Craft and Structure:		
CCSS.ELA-Literacy.RI.3.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.	
CCSS.ELA-Literacy.RI.3.6	Distinguish their own point of view from that of the author of a text.	
Integration of Knowledge and Ideas:		
CCSS.ELA-Literacy.RI.3.7	Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).	
Range of Reading and Level of Text Complexity:		
CCSS.ELA-Literacy.RI.3.10	By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 2-3 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
Next Generation Science Standards		
3-LS1	From Molecules to Organisms: Structures and Processes	
	Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.	
LS1.B	Growth and Development of Organisms Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.	

BUTTERFLY LAB

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? Is the Earth that gives us so much - air, water, food, beauty - our friend? How might they like to be treated? What can we do to help them?

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

- **all living things have needs**
- **what are the needs of other living things**
- **how to 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 - What are 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 - How to 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. This is practical experience in understanding the needs of others and learning how to help.

BUTTERFLY LAB

Pre/Post Assessment



Overview

The activities begin with an individual assessment to effectively establish a baseline of students' understanding, help you decide what to emphasize and what needs to be adapted for your classroom. A pre-assessment provides a way to evaluate the children's growth at the end of the unit.

Materials

- Assessment Record (each sheet holds 15 names)
- handout for each student
- pencils/markers

Adapt the assessment, based on your students skill level.

1 Pass out the handouts and have them put their name and date on it.

2 Using a laptop or print-out with a small group, or projected on the white board for the entire class, show the handout and focus the students' attention on the stages of a butterfly life cycle.

- Tell the students that they will be identifying the 4 stages of a butterfly's life cycle by circling the 4 words.
- Read the list of words out loud; ask the students to repeat the words with you. Let the students know that it is alright if they don't know these words. The whole class will be learning the stages of the life cycle together.
- Have the students circle the 4 stages.

Note: In the list, caterpillar/larva and chrysalis/pupa are synonyms.

3 On the handout, focus attention on the second section.

- Tell the students that they will identify the order of a butterfly's life cycle.
- Have the students fill in the blank with the stages of the life cycle in the correct order.

BUTTERFLY LAB

Assessment Record



	Growth and Development of Organisms			
	Ability to identify the 4 stages of the butterfly life cycle		Ability to identify the sequence of metamorphosis	
Student Name	Pre	Post	Pre	Post

BUTTERFLY LAB

Assessment

Name _____

Date _____

Stages of a Butterfly Life Cycle

Circle the 4 stages of the butterfly life cycle.

larva

adult

insect

worm

pupa

chrysalis

egg

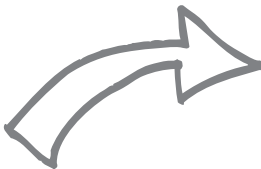
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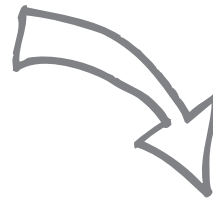
pest

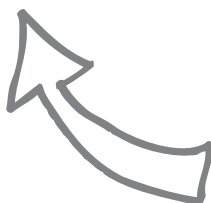
caterpillar

Order of a Butterfly Life Cycle

Write the 4 stages of the butterfly life cycle in the correct order.









BUTTERFLY LAB

What We Know about Life Cycles



Overview

Children discuss *What We Know about Life Cycles*. The teacher records information for display, including space to record *What We've Learned* during the unit.

Diagram

Diagram of a butterfly life cycle on the right

Time

30 minutes

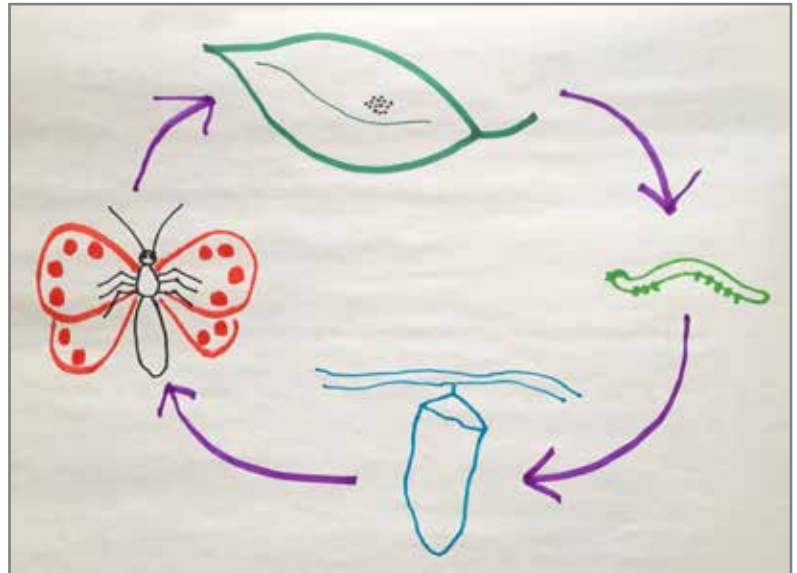
Materials

newsprint, markers, post-it notes, bulletin board, blank sheets of paper

Step One

Explain to students that you'll be learning about the life cycle of a butterfly and other insects, while observing live caterpillars and butterflies in your classroom. Tell them that this activity is an

opportunity to share what they already know about a butterfly's life cycle.



Ask the class to tell you - one at a time - a stage of the life cycle. On the whiteboard, draw the life cycle stage and write the label also. Follow the sequence of the diagram, so the students see the correct order. Be creative and use a variety of colors. On blank sheets of paper, have the students draw each stage with you and label each part.

The finished diagram should include these 4 stages - eggs, larva, pupa and adult .

If the class does not know one of the 4 stages, you can prompt or instruct them.

Step Two

Talk about the stages. What's happening in each one? What's its size? Color? Shape? What does it do? How can the class learn more?

Your students may know many things about butterflies like - *butterflies like flowers, a butterfly landed on my sister, butterflies always fly around*. Write these down on post-it notes and line them up beside the diagram of the flower parts.

Following the discussion, transfer the drawing and post-it note labels onto newsprint or a bulletin board.

Step Three

Explain that as the class makes observations and learns new facts, write these on post-it notes and add to the diagram as *What We Learned*.

Background: The Butterfly Life Cycle

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

The Egg (3-5 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.



The Larva or Caterpillar Hatches! (5-10 days)

The hungry caterpillar uses its strong jaws to munch through leaves, eating constantly and growing quickly. As it eats, the caterpillar's skin gets tighter. Soon it sheds this tight skin, emerging with new skin underneath. Each caterpillar sheds its skin four times before it's fully grown. When this hairy, black and yellow caterpillar stops growing, it's almost 2 inches long!



The Pupa Inside the Chrysalis (7-10 days)

The caterpillar finds a safe place to rest. 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 called the chrysalis.

What is happening in the chrysalis? Inside the chrysalis, the larva is becoming completely liquid and reforming itself into a butterfly. The butterfly pushes from inside until the case splits open, and it slowly struggles out.



The Butterfly Emerges! (2 weeks)

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 will live for approximately 2 weeks. During that time, its main goal is to reproduce and lay eggs so the cycle can begin again!



Background: Caterpillar Body Parts

A Caterpillar or Larva



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

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

Thorax—the midsection is called the thorax where the legs are attached

Abdomen—the abdomen contains its heart, digestive system and other organs

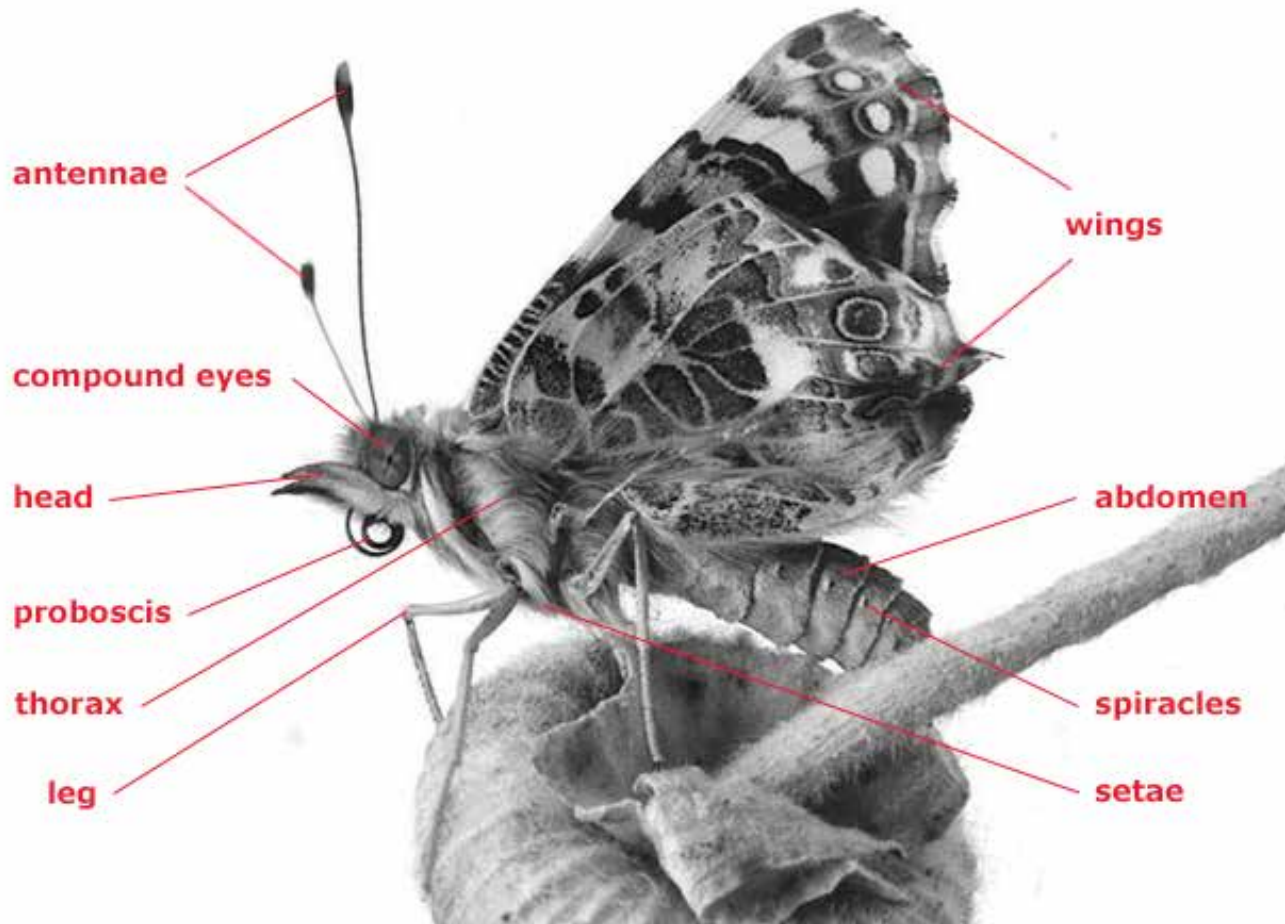
True Legs—all insects have 6 true legs with tiny claws attached to the thorax

Pro-legs—on the abdomen, pro-legs have microscopic hooks that help the caterpillar move and climb

BUTTERFLY LAB



Background: Butterfly Body Parts



Abdomen—the third section includes the stomach, heart and other organs

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

Head—the head includes a brain, a proboscis, 2 antenna and 2 compound eyes

Leg—the butterfly has 3 pairs of legs attached to its thorax

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

Setae—setae are like hairs or bristles on a butterfly's entire body

Spiracles—tiny openings on the abdomen that let the butterfly breathe

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

Wings—2 pairs of wings on the thorax allow the butterfly to fly

BUTTERFLY LAB



What Is It Today? Bar Graph

Bar Graph

Begin using the *What Is It Today? Graph* as soon as the caterpillars arrive.

Recording the life cycle stage on the graph will build a bar graph day-by-day and record the number of days for each stage.

Depending on your students' skills, you may want to do this as a whole class activity on the whiteboard, working together in pairs or individually.

Each day, paste a symbol of a caterpillar, chrysalis or butterfly on the bar graph. When the FIRST caterpillar forms a chrysalis, use the chrysalis symbol. When the FIRST butterfly emerges, begin using the butterfly symbol.

On the day that you release your butterflies, write the word FLY in the rectangle.

Count and compare the number of days the organism was a caterpillar, chrysalis or butterfly.

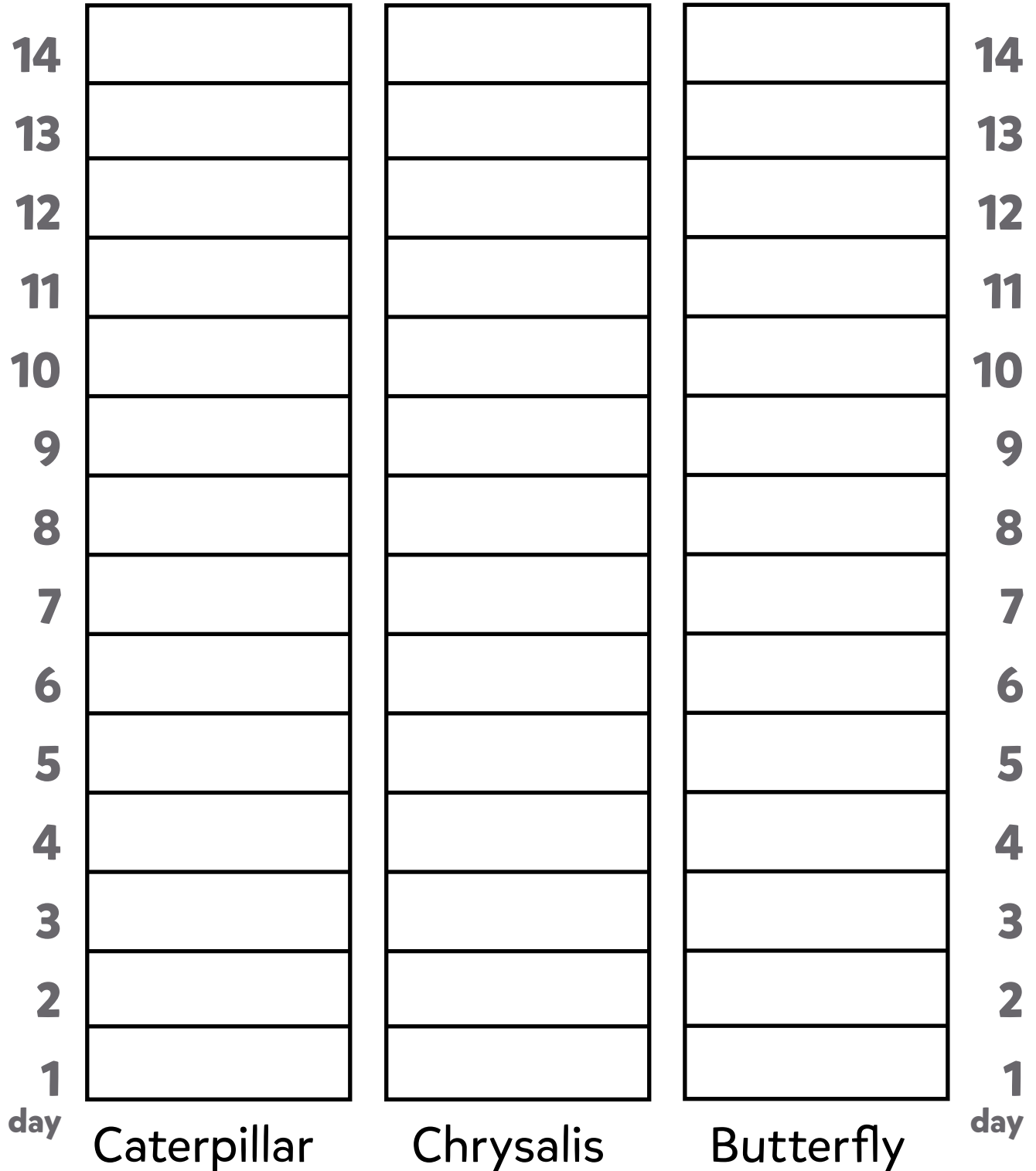
The information from the graph will be used in the third step with the flipbooks to compare the student's prediction with what was learned about the actual number of days in each life stage.

What Is It Today? *Graph*

Name

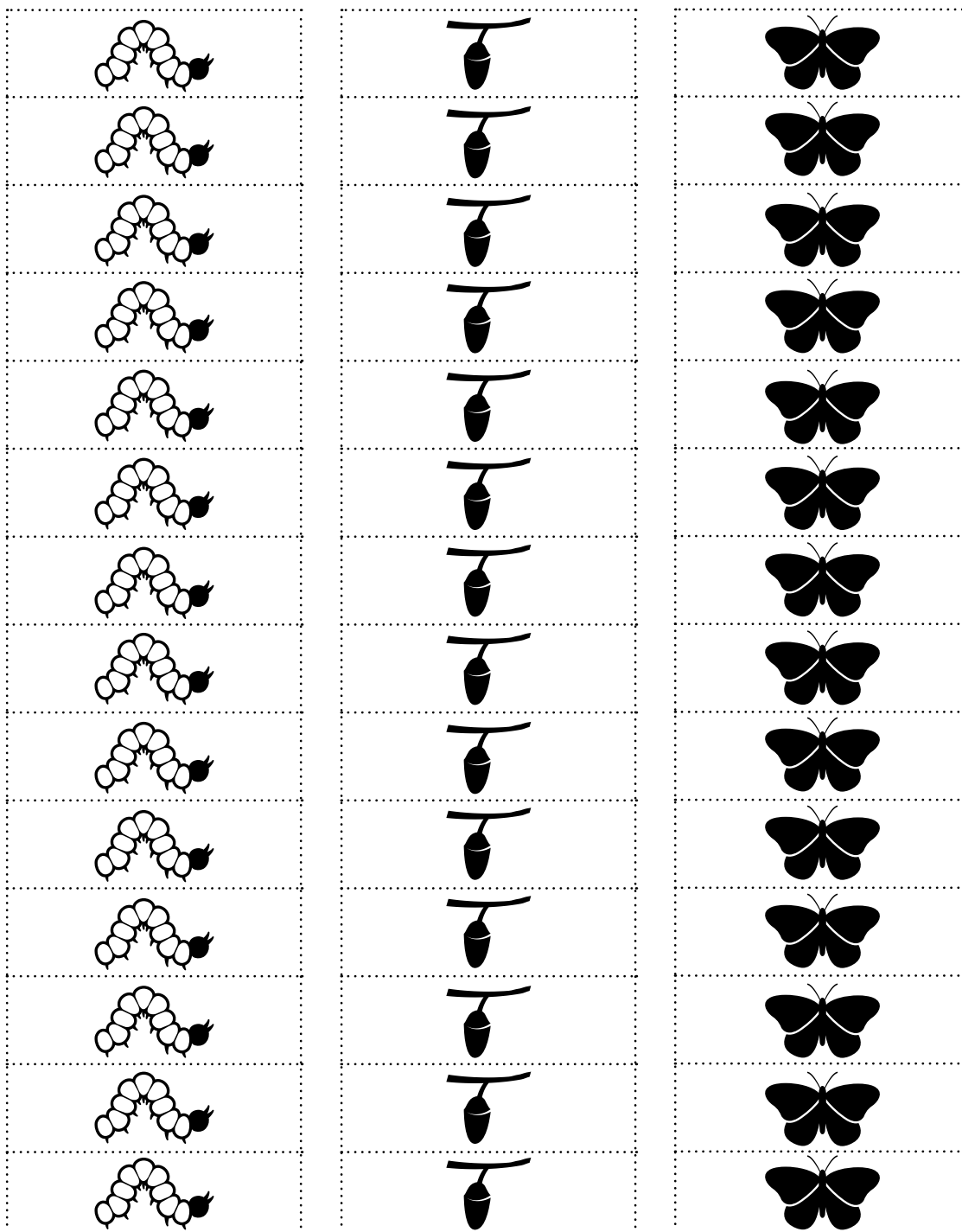
Date

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



What Is It Today? *Graph*

Symbol Cut Outs



SCIENCE READING

What Do Caterpillars Eat?

Caterpillars and plants have a very important relationship.

In the cup of live caterpillars, at the bottom of the cup, is a mixture of leaves that has been ground up for the caterpillars to eat. There is enough food for the caterpillars to grow until they form chrysalises.

When a female butterfly is ready to lay eggs, she searches for a host plant. The host plant is the preferred food of the caterpillar. Caterpillars are made to eat, eat, eat! When they hatch, they eat the leaves of the host plant and grow bigger every day.

Different kinds of caterpillars prefer to eat different plants. For example, a monarch caterpillar only likes the common milkweed. Its eggs are laid on milkweed plants, so that when the caterpillars hatch, they can start eating the leaves of the milkweed. Monarch butterflies live in areas where the milkweed grows abundantly.

The painted lady caterpillar likes to eat many different plants. Its eggs are laid on thistles, sunflowers, hollyhocks and many other plants. A female painted lady butterfly can lay her eggs on common plants that are found all over the world. In fact, the painted lady butterfly lives all over the world.

This is one of the ways that plants and animals are interconnected and depend on each other for survival.

See, Predict & Learn Flipbooks

Flipbooks

The following flipbooks help the students understand a scientific way of thinking—observing closely, making a prediction and comparing the prediction with what actually happened.

Make copies of the *Caterpillar Flipbook* and *Chrysalis Flipbook* in advance. They are 2-sided handouts. For the *Caterpillar and Chrysalis Flipbooks*, fold the handout in half lengthwise, then cut the paper halfway through on the two dotted lines. This makes 3 flaps that can be opened in sequence like a flipbook.

Begin using the ***Caterpillar Flipbook*** when the caterpillars arrive.

- Gather a small group of students around the cup of caterpillars with the *Caterpillar Flipbook* and colored pencils/crayons.
- As a group, read aloud the 3 statements on the cover—I SEE, I PREDICT, I LEARN—discuss what they mean and how they work together step-by-step.
- Read the first statement—I SEE—open the flap and read the—I SEE A CATERPILLAR.
- Ask the students to look closely at the caterpillars and describe aloud all the details that they can see. Then ask the students to accurately draw a tiny caterpillar on the right side. Remind them to make the drawing just like the caterpillars they see and to include the details that were mentioned.
- Close the flap when the drawings are finished.
- Read the second statement—I PREDICT—open the flap and read the what is inside. Discuss with your students what it means to make a prediction. A prediction is a statement about what will happen based on experience and facts. *How many days will the insects live as caterpillars?*
- Then ask the students to draw a prediction of a bigger caterpillar on the right side. Close the flap when the drawings are finished.
- Read the third statement—I LEARN—open the flap and read what is inside.
- Explain that the class is using the *What Is It Today? Graph* to record and learn the number of days that the caterpillars stay caterpillars. The class will wait and complete the flipbook when you have learned more.
- Continue to look closely at the caterpillars as they grow. *Can you see more details when they are bigger?*

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Flipbooks *continued*

- When the first caterpillar becomes a chrysalis, work together to complete the last part of the flipbook. Use the *What Is It Today? Graph* to count how many days the caterpillars stayed caterpillars. Write the actual number of days in the flipbook. Then ask the students to draw how big the caterpillar actually grew on the right.
- When the drawing is finished, open the three flaps and go through the sequence of what was observed, what was predicted and what you learned. Compare the three drawings and what was learned about the details of a caterpillar's body.
- Each day, as a class, ask the students what they observe about the caterpillars, their behavior and their environment. Write an observation as a class that is 1-2 sentences on the whiteboard.

Begin using the ***Chrysalis Flipbook*** when most of the caterpillars become chrysalises.

- Gather a small group of students around the cup of caterpillars with the *Chrysalis Flipbook* and colored pencils/crayons.
- As a group, read aloud the 3 statements on the cover—I SEE, I PREDICT, I LEARN—explain that you will be observing the chrysalis closely like you did with the caterpillars.
- Read the first statement—I SEE—open the flap and read—I SEE A CHRYSALIS.
- Follow the three parts of the sequence—reading and drawing each part inside.
- Continue to look closely at the chrysalises. *What is happening inside?*
- When all the caterpillars pupate, transfer the paper and chrysalises into the butterfly cottage. When butterflies emerge, work together to complete the last part of the flipbook. Use the *What Is It Today? Graph* to count how many days were the pupas in their chrysalises. Write the actual number of days in the flipbook. Then ask the students to draw how the butterflies look.
- When the drawing is finished, open the three flaps and go through the sequence of what was observed, what was predicted and what was learned.
- Compare the three drawings and what was learned about the details of a chrysalis and butterfly.



CATERPILLAR

Name _____

Date _____

I
SEE



I
PREDICT

I
LEARN

**I SEE A
CATERPILLAR.**

**I predict that
the caterpillar
will stay
a caterpillar
for ____ days.**

**I learned that
the caterpillar
stayed
a caterpillar
for ____ days.**

**This is how the
tiny caterpillar looks.**

**I predict the bigger
caterpillar will look
like this.**

**I learned the biggest
caterpillar looks like this.**

CHRYSAALIS

Name _____

Date _____



I
SEE



I
PREDICT

I
LEARN

**I SEE A
CHRYSALIS.**

**This is how
the chrysalis looks.**

**I predict that
a butterfly will
emerge in
____ days.**

**I imagine the butterfly
will look like this.**

**I learned that
in ____ days
a butterfly
emerged.**

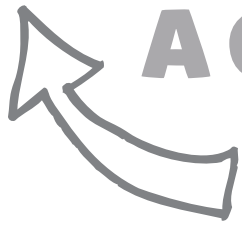
**I learned the butterfly
looks like this.**

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Life Cycle Flipbook

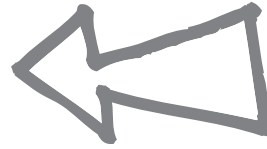
Use the *Life Cycle Flipbook* after butterflies have emerged.

- Make copies of the *Caterpillar Flipbook* and *Chrysalis Flipbook* in advance. They are 2-sided handouts. It has two folds and two cuts.
- The *Life Cycle Flipbook* is a good review of the complete life cycle.
- Read the sequence on the cover and help the students understand that it is a cycle that keeps going round and round.
- Then one at a time, lift a flap and read what is inside. Read the four stages.
- Cut out the four pictures. Have the students glue the pictures in the correct places. You could do this as a class or individually as an assessment.



**A CHRYSALIS
CHANGES**

**A CATERPILLAR
GROWS**



Name

Date

THE METAMORPHOSIS OF A BUTTERFLY



**A BUTTERFLY
FLUTTERS** 

**AN EGG
HATCHES** 

**A butterfly flutters
& lays eggs for
10-14 days.**

**An egg
hatches in
3-5 days.**

METAMORPHOSIS

**A chrysalis
changes for
7-10 days.**

**A caterpillar
grows for
5-10 days.**

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Butterfly Life Cycle

Cut out the four pictures.
Paste the pictures inside the Life Cycle Flipbook.



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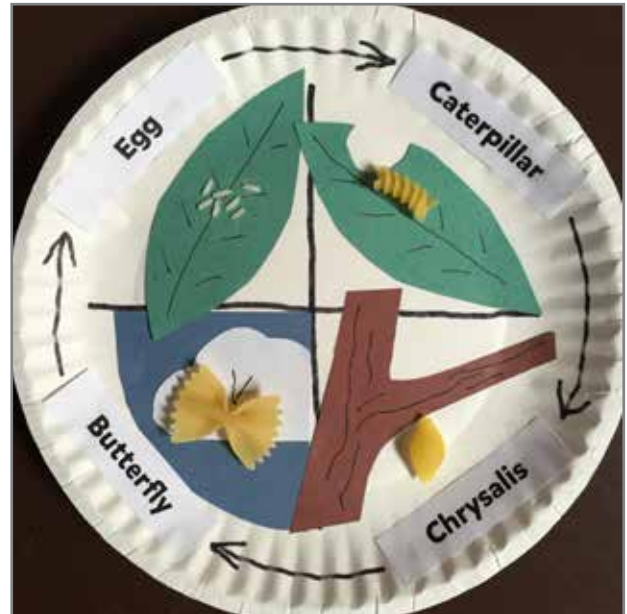


Butterfly Life Cycle Model

Learn the four stages of a butterfly's life cycle.

Materials

- Paper plates, one per student
- Construction paper, green, blue & brown
- Markers
- Scissors
- Glue
- Dry rice
- Rotini or fusilli pasta
- Small shell pasta
- Bowtie pasta



Directions

1. Have each student draw two perpendicular lines using a marker across the plate, dividing it into four sections.
2. Next cut two small leaf shapes out of the green construction paper. On one leaf, cut the edge as if the caterpillar is eating it. Glue the whole leaf in the top-left section and the eaten one in the top-right of the paper plate.
3. Then cut a branch shape out of the brown construction paper. Glue it in the bottom-right section of the paper plate.
4. For the bottom-left section, cut a blue wedge for the sky and a white cloud. Glue them in place.
5. Have your students glue a few grains of rice on the top-left leaf, one rotini pasta on the top-right leaf, one small shell pasta attached to the branch in the bottom-right, and one bowtie pasta in the bottom-left. Set the plates aside so the glue can dry completely.
6. Use markers or paints to add color and details to the pasta. Be gentle with the pasta.
7. Once glue is dry, have your students label each section with the stages of a butterfly: Egg - Caterpillar - Chrysalis - Butterfly.
8. Have your students draw arrows from one stage to the next. Discuss how the cycle is a circle that keeps going around.

BUTTERFLY LAB



Butterfly Life Cycle Labels

Egg	Caterpillar
Egg	Caterpillar
Egg	Caterpillar
Egg	Caterpillar
Egg	Caterpillar
Chrysalis	Butterfly
Chrysalis	Butterfly
Chrysalis	Butterfly
Chrysalis	Butterfly
Chrysalis	Butterfly

QUIZ

Life Cycle of the Butterfly

Name _____

Date _____

1. All insects have a life cycle called metamorphosis.
 - a. Metamorphosis means that the young insect changes into a different form as an adult.
 - b. The life cycle of a butterfly has 4 stages.
 - c. In each stage of the life cycle, the butterfly looks different.
 - d. All of the sentences are correct.

2. The first stage of the butterfly life cycle is the eggs.
 - a. The female butterfly finds any safe place to lay her eggs.
 - b. The Painted Lady eggs are the size of a pea.
 - c. Each egg contains a larva that likes special leaves.
 - d. Painted Lady eggs hatch into Painted Lady Butterflies.

3. The second stage of the butterfly life cycle is the larva.
 - a. Caterpillar is another name for the larva of a butterfly.
 - b. Not all butterflies begin as caterpillars.
 - c. Painted Lady caterpillars shed their skin 10 times.
 - d. All caterpillars are black and yellow.

4. The third stage of the butterfly life cycle is the pupa.
 - a. After the larva grows very large it changes into a puppy.
 - b. Inside the chrysalis the larva becomes like glue.
 - c. The caterpillar hangs upside down from a silk pad.
 - d. The pupa inside the chrysalis turns into a liquid and then reforms as an adult butterfly.

5. The fourth stage of the butterfly life cycle is the adult butterfly.
 - a. It usually takes 3 days for the adult butterfly to emerge from the chrysalis.
 - b. The main goal of the new butterfly is to mate and lay eggs.
 - c. The butterfly can fly as soon as it emerges from the chrysalis.
 - d. Painted Lady butterflies live all summer.

6. Metamorphosis is an amazing process.
 - a. All animals go through metamorphosis as they grow.
 - b. A frog begins as an egg. Then it hatches into a tadpole. It slowly changes into an adult frog with legs.
 - c. Humans are born and then slowly grow into adults.
 - d. The letters b and c are correct.

QUIZ

KEY: Life Cycle of the Butterfly

- All insects have a life cycle called metamorphosis.
 - Metamorphosis means that the young insect changes into a different form as an adult.
 - The life cycle of a butterfly has 4 stages.
 - In each stage of the life cycle, the butterfly looks different.
 - All of the sentences are correct.**
- The first stage of the butterfly life cycle is the eggs.
 - The female butterfly finds any safe place to lay her eggs.
 - The Painted Lady eggs are the size of a pea.
 - Each egg contains a larva that likes special leaves.**
 - Painted Lady eggs hatch into Painted Lady Butterflies.
- The second stage of the butterfly life cycle is the larva.
 - Caterpillar is another name for the larva of a butterfly.**
 - Not all butterflies begin as caterpillars.
 - Painted Lady caterpillars shed their skin 10 times.
 - All caterpillars are black and yellow.
- The third stage of the butterfly life cycle is the pupa.
 - After the larva grows very large it changes into a puppy.
 - Inside the chrysalis the larva becomes like glue.
 - The caterpillar hangs upside down from a silk pad.
 - The pupa inside the chrysalis turns into a liquid and then reforms as an adult butterfly.**
- The fourth stage of the butterfly life cycle is the adult butterfly.
 - It usually takes 3 days for the adult butterfly to emerge from the chrysalis.
 - The main goal of the new butterfly is to mate and lay eggs.**
 - The butterfly can fly as soon as it emerges from the chrysalis.
 - Painted Lady butterflies live all summer.
- Metamorphosis is an amazing process.
 - All animals go through metamorphosis as they grow.
 - A frog begins as an egg. Then it hatches into a tadpole. It slowly changes into an adult frog with legs.
 - Humans are born and then slowly grow into adults.
 - The letters b and c are correct.**

Narrative Writing: A Butterfly's Metamorphosis

Assign the students to write a science narrative about the metamorphosis of a butterfly. They should include a short sequence of events that describes each stage of the life cycle. Have them use words to communicate the order of events and to use a closing sentence.

Observation

Observe and make notes at every stage - larva, pupa and adult. Notice their behavior and how their bodies move, look at the environment and how it is changing and imagine what they might be sensing as they feed.

Each day, as a class, ask the students what they observe in the cup or the cottage, the insect's behavior and their environment. Write an observation that is 1-2 sentences on the whiteboard for the whole class.

Research

Using the school library or the internet, research the butterfly's life cycle.

- Do all species of butterflies have the same life cycle?
Does it happen in 21 days like the Painted Lady?
- Compare the lifecycle of a butterfly and a moth
- Compare the life cycle of a butterfly and a ladybug beetle
- You'll find life cycles for 6 organisms here:
<http://earthsbirthday.org/home/comparing-life-cycles>

Advanced

- Compare the 4 stages of the butterfly life cycle and the 3 stages of an amphibian life cycle
- Compare the complete metamorphosis of a butterfly with the incomplete metamorphosis of a grasshopper, dragonfly or cockroach

BUTTERFLY LAB

Post Assessment



Repeat the assessment with your students and compare the pre assessment and post assessment for each student on the rubric.

BUTTERFLY LAB

Celebrate the Earth!



Each school celebrates the Earth's Birthday a little differently, bringing their own unique ideas and interests to the event. Get creative!

Many schools choose a day close to the end of the school year, when the weather's warm, to celebrate by planting seeds, releasing butterflies and demonstrating ways to care for our home planet.

Your celebration is a special gift from the children to the Earth!

Here are some activities for your classrooms to share:

- Sharing a song that students learned in the Butterfly Lab
- Planting seeds in a school garden
- Creating an art project from recycled materials
- Releasing Painted Lady butterflies
- Students can draw pictures of their favorite animal, flower or tree
- Students reporting on ways to care for the earth like saving water, feeding birds, growing vegetables and more

At the close of your celebration, please remember to take the **Earth's Birthday Pledge!**

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

CLIMATE SCIENCE

Climate Science & Butterflies



Overview

This lesson introduces the concept of climate change and how it relates to plants and insects. This lesson builds off of the students' knowledge from the Butterfly Lab by heightening their understanding of the needs of the plant and how those needs are impacted by the environment. Students will learn the meaning of climate change, and what they can do to help.

Use the script below to engage the students. Write their answers to your questions on the board.

What does a caterpillar need to survive?

- Water (Rain)
- Light (Sun)
- Food (Plants)
- Air
- Soil

What other things might affect butterflies?

- Weather (wind, rain, snow, heat)
- Extreme Weather (drought, floods, hurricanes, tornadoes, fires)
- Climate (long periods of high or low temperatures)
- Plant Bloom Period
- Pollution
- Plant Pests
- Disease

Reading Activity

Read stories about butterflies and other insects to the kids and brainstorm some challenges these animals may face due to climate change.

Storybooks

Bugs! Bugs! Bugs! by Bob Barner

My Oh My a Butterfly by Dr. Seuss

Waiting for Wings by Louis Ehlert

The Reason for a Flower by Ruth Heller

Fever on the Land by ABDO Publishing

Use a few pages from *Fever on the Land* to talk about the effect of climate change on butterflies, pollinators, and insects.

<http://abdopublishing.com/shop/show/157>

- Page 24 (butterflies)
- Page 26-27 (pollinators)
- Page 8-9 (migration)
- Page 18-19 (forest fires)



CLIMATE SCIENCE

Climate Science & Butterflies

Has anyone heard of Climate Change? What is Climate Change?

Climate change is a long-term change in the average weather patterns of the entire planet. To understand this, it is important to know the difference between climate and weather. Weather is local and temporary, it's what happens at a particular time and place. Weather is rain, snow, wind, hurricanes, heat waves, etc. Climate is the big picture of weather. If an area like a desert has weather that is extremely hot with very little rain each year, it has a dry climate. If an area like a rainforest is warm and gets lots of rain, it has a tropical climate. We are seeing the average temperatures across the entire planet get higher and higher each year at a faster rate than we've ever seen before. The higher temperatures will change the climate all over the world, making dry areas dryer and wet areas wetter. We also expect climate change to cause more extreme weather events by changing the timing, frequency and duration of precipitation and unusual temperatures. This will affect the plants, animals, and humans living there.

What is causing Climate Change?

Climate change is caused by humans burning fossil fuels. Humans burn fossil fuels when we use electricity, drive our cars, fly in planes, etc. When we do these things, we release tiny molecules of pollution into the air, called greenhouse gases. There are different types of greenhouse gases, but the most common greenhouse gas is carbon dioxide (Other greenhouse gases are methane, nitrous oxide, ozone, and water vapor). Over time, these tiny, invisible molecules build up and act as a blanket over the planet that traps heat. This heat trapping blanket will cause the Earth to have a fever that changes the average climate and weather of the planet.

How is climate change affecting plants?

Imagine you are a flower and you lived your whole life on a snowy mountain. You would be used to living in a cold climate, right? Now imagine that the climate of your home has changed over time to be much, much hotter. How would you like that? Do you think that might affect your life as a flower? A hotter climate might mean less water available because there is less rain or because more water will evaporate out of the soil before the plants can use it.

Many humans, like us, are lucky enough to be able to cool off by going in the shade, changing our clothes, drinking lots of water, or going into an air conditioned room. But do you think a flower can just pull out its roots and walk somewhere else? No. Flowers and many other plants will struggle and have to adapt to dryer conditions to survive.

Climate change can also change the life cycle of a plant all together. If the Earth's temperature is warming, flowers will bloom earlier in the year. A lot of flowers bloom in the spring time when there is less frost and warmer temperatures, but if the temperature is warmer earlier in the year the flowers will not bloom at the right time. If the life cycle of flowers is changed, it will throw other species out of their seasonal routine as well. Insects count on flowers to bloom at a certain time so they can gather nectar from the flowers, but if the flowers bloom earlier than usual, the insects might have to migrate somewhere else to find nectar.

CLIMATE SCIENCE

Climate Science & Butterflies

What does this mean for caterpillars?

Caterpillars eat the leaves from these plants. If the plants are not growing as well due to less water, they will have less food to eat.

What does that mean for butterflies?

There is less food for butterflies, by the time they arrive to feed on nectar the flower will have already bloomed.

As we can see, climate change is a big factor that can impact plants and insects. We know that it's important for us to care for our fellow humans, but it is also important for us to care for our friends, the plants and animals. Can we brainstorm ideas to help save plants and animals from climate change?

Hang up the 10 Things I Can Do to Help Poster in Your Classroom

10 Things I Can Do To Help:

1. Use Less Electricity
2. Save Water
3. Recycle
4. Pick Up Trash
5. Walk or Ride Your Bike
6. Choose Reusable Bags and Water Bottles
7. Eat Your Veggies
8. Grow Plants for the Bees, Butterflies, and Birds
9. Read More About Climate Change and Share What You Learn
10. Start an Earth-Friendly Project with your Friends and Family



Climate Kids in Action!

10 things I can do to help



START AN EARTH-FRIENDLY PROJECT WITH
YOUR FRIENDS AND FAMILY



www.climatekids.org



FEEDBACK
Tell Us What You Think

Name _____
School _____
Grade _____

Please send your feedback to:
Earth's Birthday Project, PO Box 1536, Santa Fe, NM 87504-1536
Email :: info@EarthsBirthday.org Fax :: 505-984-9176

Thank You!