

Teacher Resources for Visiting the Gardens

Background Information: The Tucson Botanical Gardens was once a home and nursery belonging to the Porter Family. Several of the original buildings are still on the property. Once the Gardens became a non-profit endeavor, it grew to almost five acres consisting of many different garden areas that flow one into another. There are thousands of different species of plants, everything from eucalyptus, grapefruit and mint to boojum, desert willow, and Indian corn. One of the draws of the Garden is the Butterfly and Orchid pavilion which features butterflies and plants from tropical areas of the world. Your students will also enjoy our Herb Garden, Desert Pavilion, Zen Garden, Chicken Coop, Native Crops, Prehistoric Garden, Thornville Train and Children's Garden. A map of the various areas is located on the website.

Visiting Information: The best way for children to visit the gardens is in small groups with one or two chaperones. This way, the groups can wander the grounds at their own pace and spend more time in the areas that interest them the most. Some teachers have attempted to lead large groups or schedule the groups to visit different areas at pre-determined times. These plans almost always dissolve into groups splitting off and enjoying the garden areas at their own leisure. However, the Orchid and Butterfly pavilion will have to be visited at a set time according to the instructions given in the Field Trip Letter to Teachers.

Lesson Plans: The following lesson plans have ideas for before, during and after your visit as you desire. Resource Trunks featuring various parts of the Gardens will also be soon available.

Kindergarten

Arizona State Science Standard for Kindergarten:

Strand 4: Life Science

Concept 3: Organisms and Environments

PO1. Identify some plants and animals that exist in the local environment

PO2. Identify that plants and animals need the following to grow and survive: food, water, air, space

PO3. Describe changes observed in a small system

Objectives:

Students will use a scavenger hunt to identify the needs and the resources used to meet those needs of plants and animals that reside at the Gardens.

Students will describe possible changes in the enclosed Butterfly Pavilion in the Gardens and suggest possible outcomes of those changes

Before the Visit:

1. In a few days we will be visiting the Tucson Botanical Gardens. What do you think you will see there? (Plants, flowers, butterflies, lizards etc.) Do you think the people who work at the gardens have to take care of the plants and animals there? How do they do that?
2. Give each child a copy of "**Your Pet Lizard**". Ask "If we had a little pet lizard, what would we have to give it so that it would be safe happy and healthy?" Guide the children to draw and color in: food, water, air, (netting on the top of the cage) and space (room to move).

All animals need these things: food, water, air and space. Show the video short

<https://www.pbslearningmedia.org/resource/tdc02.sci.life.colt.eat/what-do-animals-eat/#.WbGbH8iGMdU> and have students call out the needs as they see them on the video.

3. What about plants? What do they need in order to be safe, healthy and happy? Have students draw in the sun, water drops, air in the form of wind, and space in which the plant can grow (perhaps a pot). Help students to understand that plants do get some nutrients from soil, but that they make their own food using light as their energy source.
Show this video short to reinforce these ideas:
<https://www.google.com/search?q=youtube+needs+of+plants&og=youtube+needs+of+plants&aqs=chrome..69i57j69i64.5687j0j8&sourceid=chrome&ie=UTF-8>
4. When we visit the Tucson Botanical Gardens, we will be looking to see if the plants and animals there are getting what they need in order to be safe, healthy and happy!

During the Visit:

1. Give each student a **Scavenger Hunt** and a crayon or pencil. As you tour the grounds point out the great variety of plants, insects and animals.

Be sure to see the Herb Garden, the Prehistoric Garden, the Butterfly Pavilion, the Desert Pavilion and Mrs. Potter's Chicken Coop.
2. Let students cross off the items that they see and have them tell you how the Gardens is meeting the needs of plants, butterflies, birds and animals.

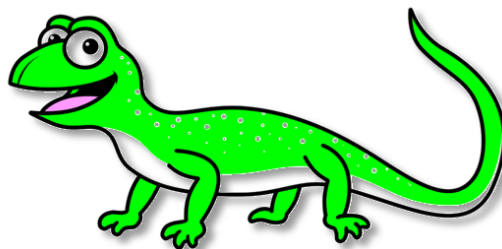
After the Visit:

1. Talk about the Butterfly Pavilion and what they saw there. Give each student a "**Butterfly Pavilion**" handout and have them draw in the items that are provided for the butterflies' needs (water – ponds, food – flowers and feeders, air – fans, space – large flying area)
2. What would happen to the butterflies if the flowers started dying? What if the door was opened and the butterflies were allowed to fly out? Discuss other changes that could occur and what the effects of that change would



Your Pet Lizard!

Draw what he needs in order to be safe, happy and healthy.



Name _____

Food

Water

Space

Air



Your Pet Plant!

Draw what it needs in order to be safe, happy and healthy!



Name _____

Light
















Water

Space

Air



Scavenger Hunt



Butterflies!

Pencil in what you saw at the Tucson Botanical Gardens that helps keep the butterflies safe, happy and healthy.



Name _____

First Grade

Arizona State Science Standard for First Grade:

Strand 4: Life Science

Concept 1: Characteristics of Organisms

PO2. Compare the following observable features of living things

Movement – legs, wings

Protection – skin, feathers, tree bark

Respiration – lungs, gills

Support – plant stems, tree trunks

Objective:

Students will be able to identify the special characteristics of butterflies and relate them to their own body parts

Before the Visit:

1. Ask the class “What part of your body do you use to taste something? What if you used your foot to do that – what would happen?” Take some answers. “What do you use to see with? What if you didn't just have 2 eyes, but had more than a thousand little eyes! What would that be like?”
2. “An animal that uses its feet to taste and has over a thousand eyes is the butterfly! Take a look at this picture of a butterfly and tell me whether or not it is an insect.” Point out the exoskeleton, the three body parts, the 6 legs, antennae and wings (some butterfly pictures may appear to show only 4 legs, this is because in some butterflies the pair closest to their head is greatly reduced in size).
3. “Why do they use their feet to taste? Let's take a closer look at butterflies and find out other unusual things!”
4. Have students examine the picture of the butterfly head. “What do you see?”

- a. **Hairy!** The hair goes through holes in their exoskeleton so that they can feel things as gentle as a breeze. What does your hair do for you?
 - b. **Very Large Compound Eyes** – these are actually composed of thousands of smaller eyes. Each little eye sees a small bit and the brain puts all the little pictures together to see one big picture. Try using the Straw Butterfly “Eye”. How do your eyes see? Butterflies can see some colors that we cannot see! (Show Butterfly Vision Poster)
 - c. **Antennae** – that can smell and feel. What do you use to smell? Why would it be important for the butterfly to be able to smell? Why would it need to smell? Butterflies also use their antennae to feel. What do you use to feel things?
 - d. **Long Rolled up “Tongue”** -that is called a Proboscis. This is actually a long tube, like a straw, that the butterflies use to drink nectar. What do you use in order to eat? How can you drink liquids? If you couldn't use your hands, how could you drink?
5. “We've mentioned 3 senses of the butterfly – seeing, feeling, and smelling – what are the other senses?”
- a. **Hearing** – Butterflies do not have ears like we do, but they can feel loud noises in their bodies – like you can “feel” a loud drum.
 - b. **Tasting** – As mentioned, butterflies taste with their feet. Why? (Show the picture of a butterfly on a flower). As they land on a flower, they can taste it and know immediately that they want to stay and drink the nectar.
6. Look at the Butterfly picture again. “What other special parts do you see on a butterfly?”
- a. **Wings** – Butterflies have 4 wings. Most butterflies have different coloration on the top of the wings as compared to the bottom of the wings. The wings are actually transparent; the tiny scales on the wings give them color and in some cases, iridescence. Use a magnifying glass and the sample wings provided to see the wings close- up. Sometimes the coloration on the wings helps to protect them – it may look like the eyes of an owl or the head of a serpent. (look at poster examples)

- b. **Legs** – Look at the picture of the gulf fritillary butterfly or look at our own butterfly. How many legs do you see? (4) The gulf fritillary have 6 legs, however, only 4 are standing legs. The other two are folded close to their thorax under their heads
7. Point to the Butterfly Diagram and have students name the parts. Use the activity sheets
8. Create an accurate butterfly using the Gulf Fritillary Model pages or have students color and cut their own butterfly.

During the Visit:

1. Give each student a Butterfly Discovery Page to use while in the butterfly greenhouse.
2. Students should examine the butterflies at the feeding tube closely. Magnifying glasses will be available. They should look for each of the body parts on the Discovery Page. They can check off each part that they see and note anything unusual. They may have to examine several butterflies to observe all the parts

After the Visit:

1. Have students share what they saw when they examined the butterflies. How long was the proboscis? Did they look hairier than they expected? What were the eyes like?
2. Hand out the Butterfly Matching sheet to reinforce the learning.

Butterfly



Butterfly Head

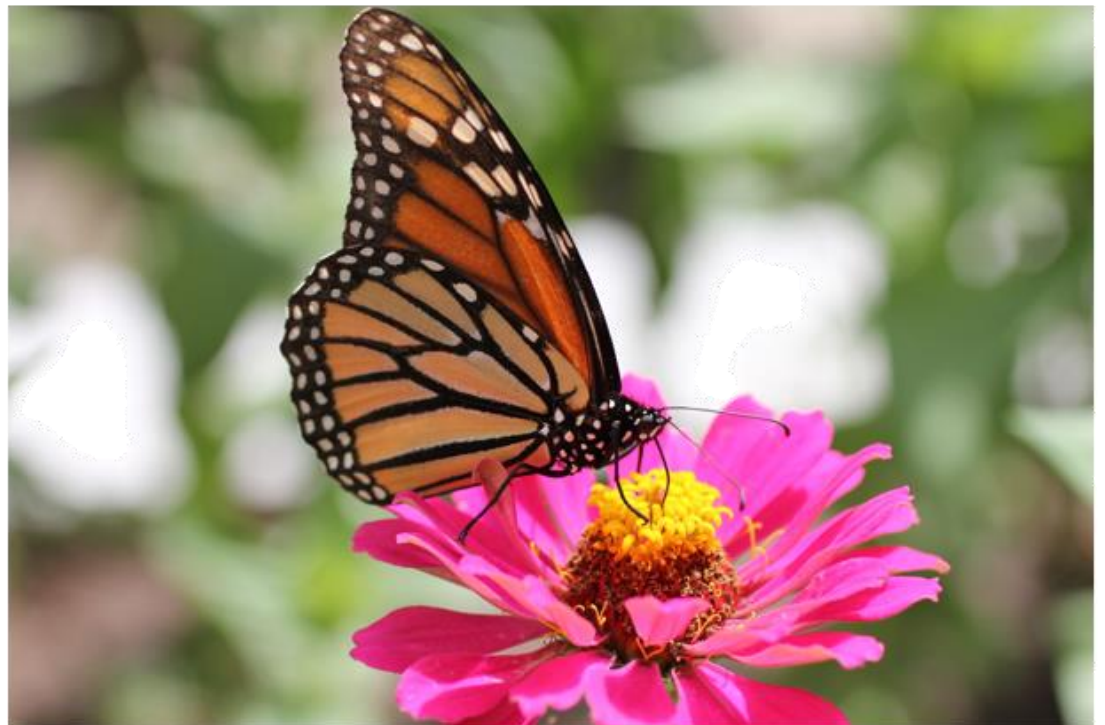


Butterfly Wings



Close up of Butterfly wing "scales"

Butterfly Tasting



Butterfly Vision



Butterflies can see ultra violet light. This helps them find the nectar in the center of the flower.

Gulf Fritillary Butterfly



Top View of a Gulf Fritillary

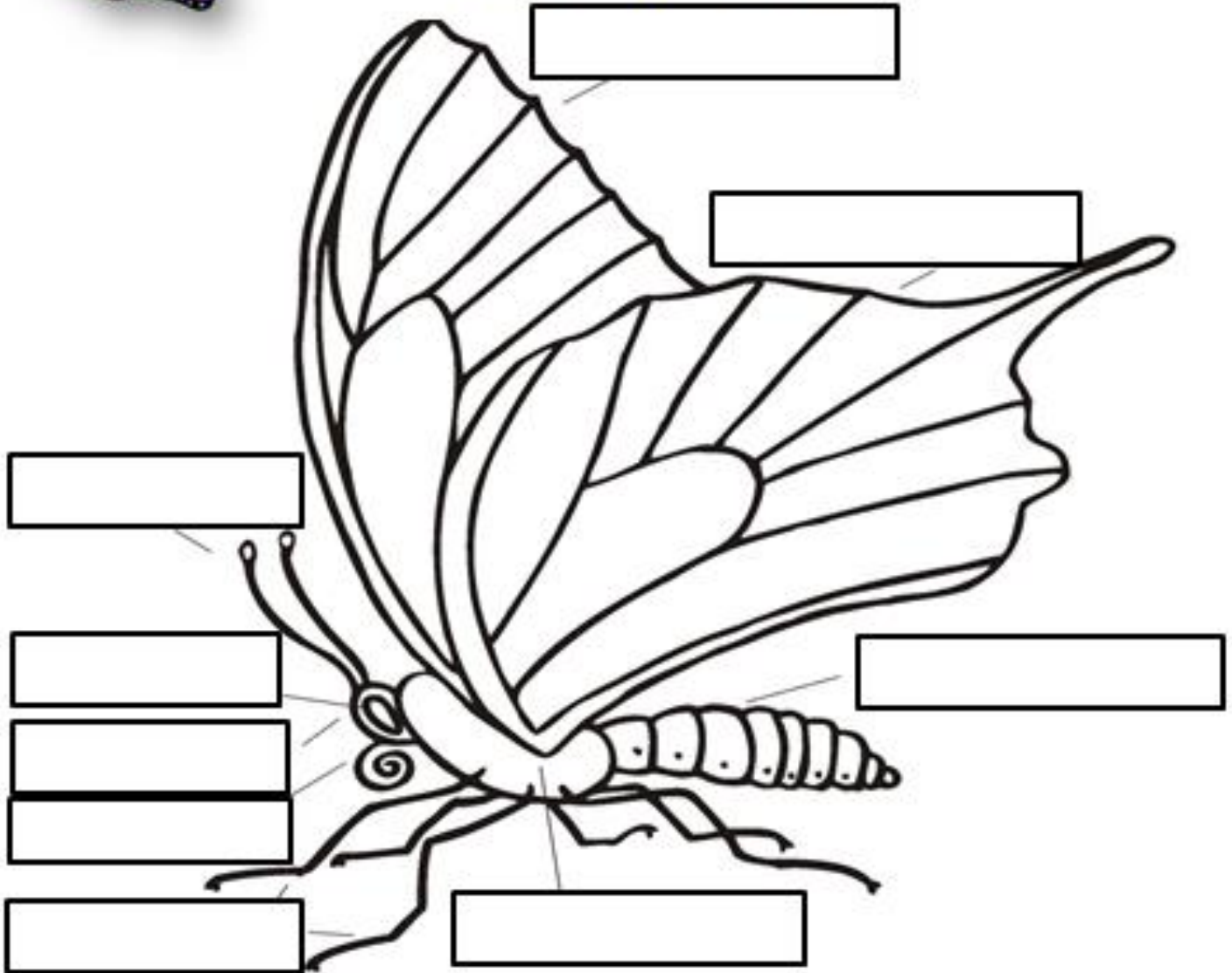
Underside of a Gulf
Fritillary Butterfly





Name _____

Butterfly Parts



Word Bank

Head

Thorax

Abdomen

Legs

Eye

Antenna

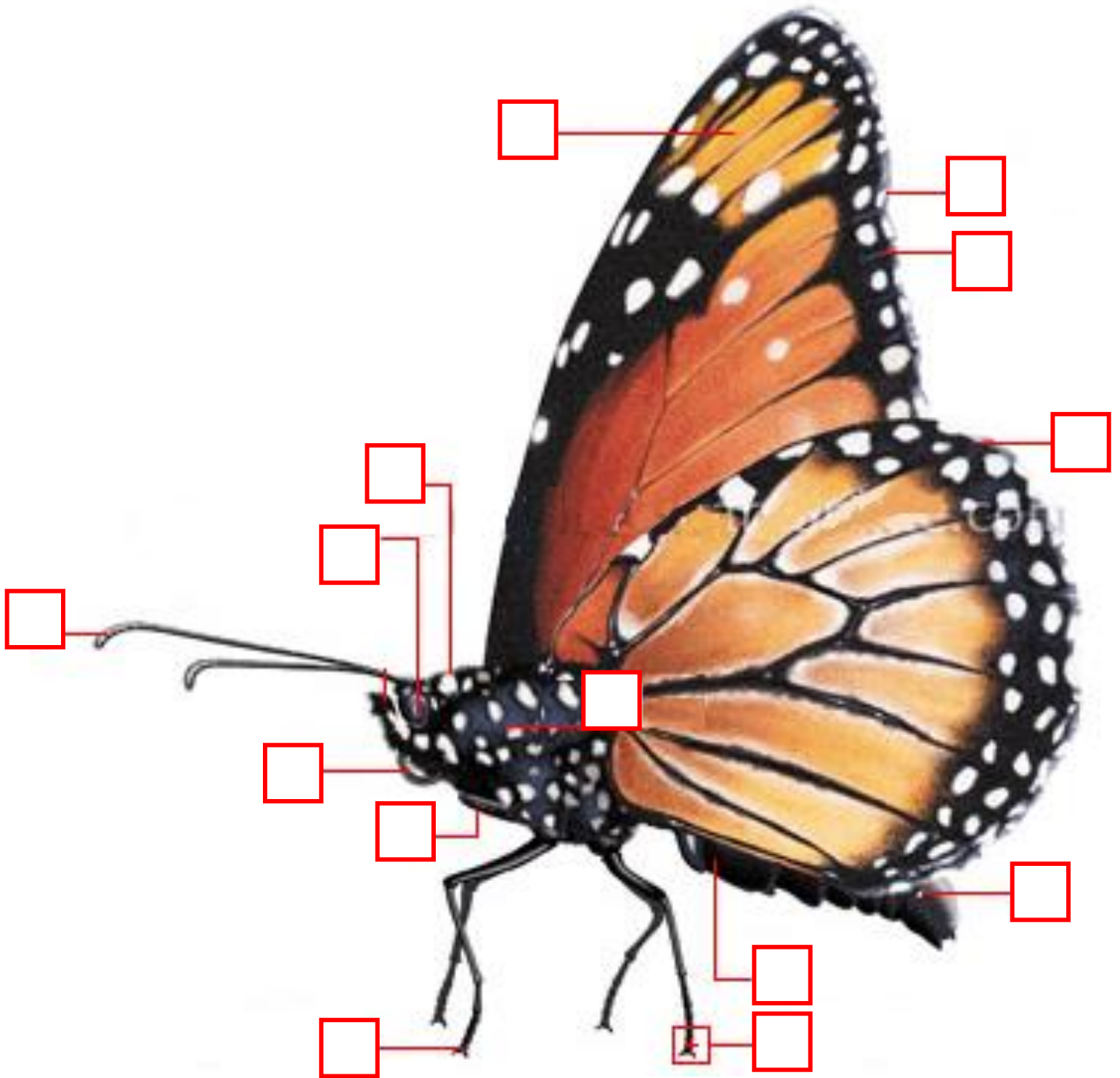
Proboscis

Front wing

Back wing

Butterfly Discovery!

Check off the parts that you observe on the real butterflies



Name _____



Name _____

Butterfly Matching

Draw a line to each butterfly part



What part helps a butterfly to:

Taste

Smell

Fly

Stand

See

Draw a line to each part:

Legs

Head

Antennae

Proboscis

Thorax

Abdomen

Wing

Eye



Second Grade

Arizona State Science Standard for Second Grade:

Strand 4: Life Science

Concept 2: Life Cycles

PO1. Describe the life cycles of various insects

Objectives:

Students will be able to describe the life cycle of a butterfly.

Before the Visit:

1. In a few days, you will be visiting the Tucson Botanical Gardens. What do you think you will see there? (Plants, flowers, butterflies, lizards etc.) One of the things we will be observing very closely are the butterflies and discovering what we can about their life cycle.
2. When a baby or a puppy or a kitty is born, they look a lot like their parents, with many insects, including butterflies, it is very different!
3. Use the Life Cycle Poster and the detailed posters to show the following:

“The mother butterfly finds a plant she knows her caterpillar will like, and lays an egg. For the Gulf Fritillary, this plant is the passion vine. After a while, the egg hatches and out comes a larva or caterpillar. Caterpillars spend their time eating the leaves of this plant and growing very quickly. They will molt an average of 4 times, but this may vary depending on the temperature. When the caterpillar is ready, it will attach its rear end to a leaf or branch and take on a “J” shape. It will molt one more time, revealing a pinkish skin that hardens into a brown/gray chrysalis. This is the pupa. Inside the pupa the caterpillar changes completely into a butterfly and later emerges. The process from caterpillar to butterfly is called metamorphosis.”

Have the students repeat this word (metamorphosis) and repeat each of the phases in the life cycle.

4. Review the life cycle with hand motions. “What is the first stage in a butterfly’s life? An egg” (hand clutched tight in a fist). “What is the second stage? A caterpillar” (index finger extended, scrunched, extended, scrunched). “What is the third stage? A chrysalis” (index finger wrapped by other hand). “What is the last stage of a butterfly’s metamorphosis? A butterfly (thumbs interlocked, fingers moving up and down like a flapping butterfly).

During the Visit:

1. Take students to the Chrysalis Exhibit Window. Explain to them that we get our butterflies from special greenhouses in the tropics. Here female butterflies lay their eggs on their favorite plants (plants that the caterpillars like/need to eat). These eggs hatch and the caterpillars start eating the leaves. After several weeks (depending on the type of butterfly), the caterpillar attaches its hind end to a spot on the plant and begins to molt to form the chrysalis. This is when we receive the chrysalises. We hang them up here until the caterpillars have changed and emerge. Once they emerge and have dried their wings, they are brought in a traveling cage to the butterfly greenhouse.
2. Have students observe the different types of chrysalises and work on the Chrysalis to Butterfly Worksheet.
3. Next, take students into the butterfly greenhouse to see the wide variety of butterflies that had emerged from the various chrysalises. Ask the volunteers for a butterfly identification sheet. Students should try to identify the blue Morpho butterfly and notice the difference between the top and bottom of its wings. They can then go back to the Chrysalis Window to find the Blue Morpho chrysalis.

After the Visit:

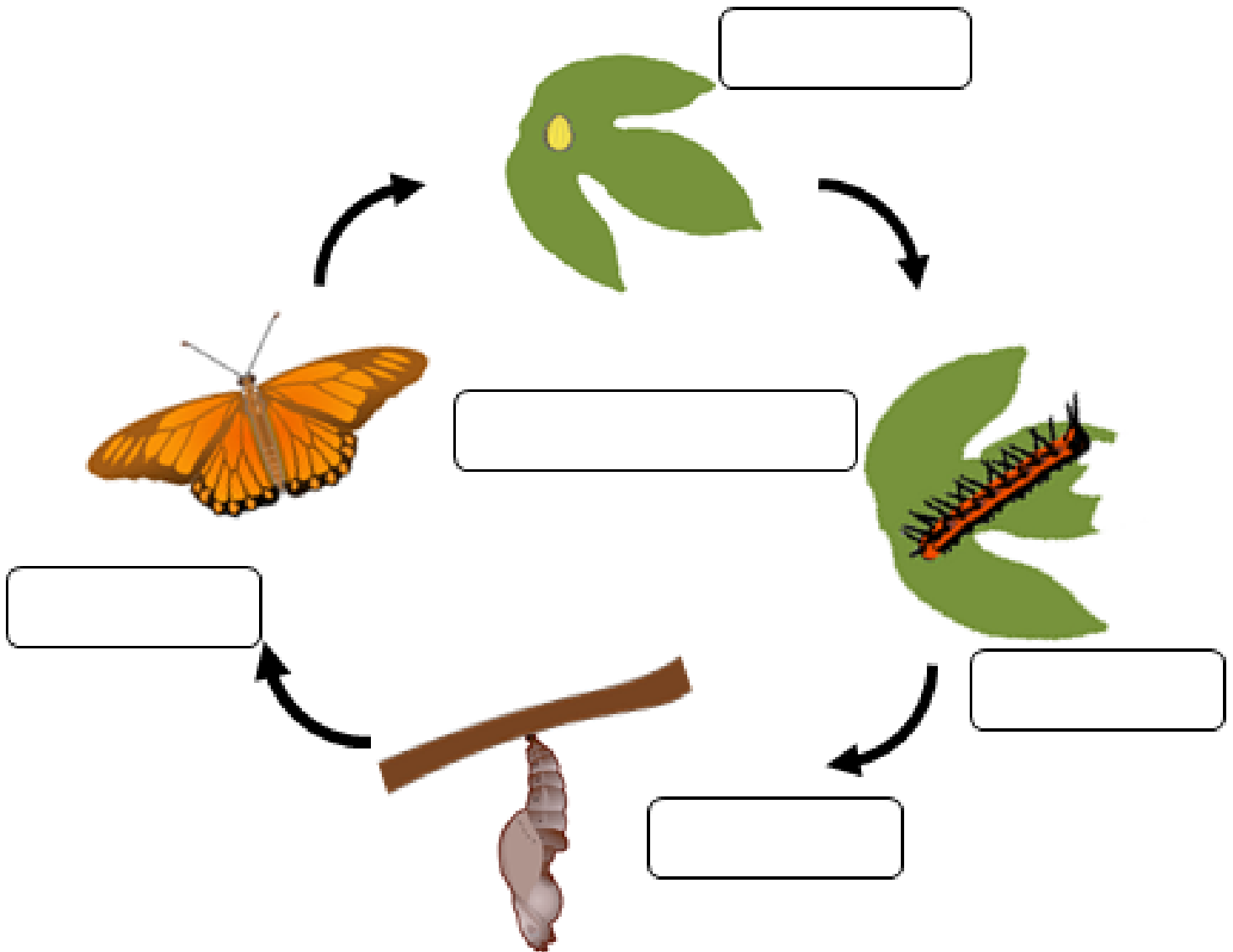
Help Students create a Butterfly Life Cycle booklet and have them explain the cycle to another student.



Name _____

Life Cycle of a Butterfly

Gulf Fritillary Butterfly



Chrysalis	Caterpillar	Metamorphosis
Butterfly	Egg	

Gulf Fritillary



Gulf Fritillary chooses a passion flower plant on which to lay its eggs.



(c) Kathy Krasley Garvey

Gulf Fritillary egg



Gulf Fritillary caterpillar (or larvae) eats the leaves of the passion flower



Gulf Fritillary caterpillar finds a spot and hangs head down.



The caterpillar has its last molting and the new exoskeleton takes on weird shape of the pupa.

The butterfly emerges

Gulf Fritillary



Chrysalis to Butterfly!

Look at the Chrysalises

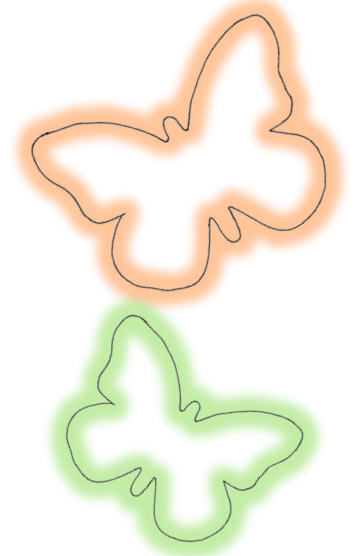
Look at the different chrysalises.

How do they differ in size?

How do they differ in color?

How do they differ in shape?

What is inside each chrysalis?



Find the Blue Morpho Butterfly

What do the wings look like from the top?

What do the wings look like from the bottom?

Go back and find its chrysalis. Describe it:

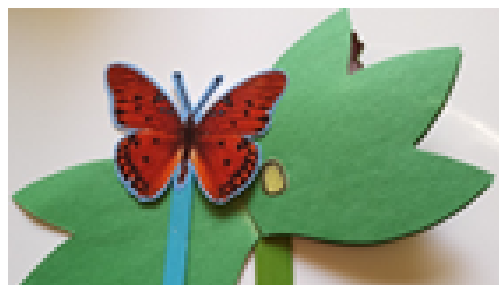
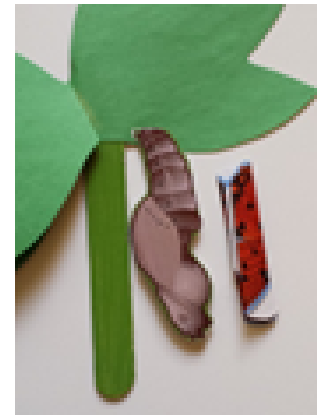


Butterfly Life Cycle Leaf Booklet – Assembly Instructions

Materials Needed:

Green Construction Paper, glue stick, 2 craft sticks, Copy of Butterfly Life Cycle Leaf Booklet page

1. Cut out the items on the Butterfly Life Cycle Leaf Booklet page
2. To use the leaf template, fold green construction paper in half “hamburger” style (width wise). Place template on the fold, trace and cut out. Repeat.
3. Glue fold of one leaf onto the center of other to make a book with 4 pages. Glue Title onto first page
4. Glue booklet at an angle onto colored craft stick
5. Glue egg onto second page
6. Glue caterpillar onto third page and cut “bites” out of the leaf
7. For Chrysalis, fold in half and glue edges slightly so that a pocket is formed. Glue hanging down from last leaf page in the book
8. Fold one of the butterflies lengthwise in fourths and push into chrysalis pocket
9. Take last butterfly and mount on the end of a narrow craft stick.
10. Have students use these to act out the life cycle of the Gulf Fritillary butterfly.



Butterfly Life Cycle Leaf Booklet



Gulf Fritillary Life Cycle

