

BUTTERFLY GARDEN (K-2)

Overview: Students will learn about the life cycle of the butterfly and the interrelationship between butterflies and plants. As a group, students will find the native plant in the butterfly garden that each butterfly needs to lay its eggs on.

Content Standards Correlations: Science, p. 307

Grade: K-2

Key Concepts: Butterflies need water, air shelter, space and the right kind of plant food to survive. Many butterflies need specific native plants as their larval food source. Their larvae are important links in the food chain.

Objectives:

Students will be able to:

- Describe the life cycle of the butterfly
- Identify at least one butterfly and its plant “partner.”

Materials:

Provided by the Refuge

- 1 large plastic egg
- 1 sock caterpillar
- 1 green “chrysalis” bag
- 1 plastic butterfly
- 1 artificial flower
- 6 native plant labels
- Butterfly Life Cycle poster
- 6 eggs with pictures of butterflies
- Monarch Metamorphosis display
- 12 carpet squares
- 1 poster of spider, mammal, butterfly, reptile

Note: Description and illustrations of Butterfly and Plant Partners of the Butterfly Garden can be found on p. 213.

TIME FRAME FOR CONDUCTING THIS ACTIVITY

Recommended Time: 30 minutes

Butterfly Life Cycle Demonstration(12 minutes)

- Demonstrate butterfly life stages with the puppets

Butterflies and Plants (15 minutes)

- Search for the native plants and butterflies in the butterfly garden

Wrap-Up(3 minutes)

- Go over why native plants are important to butterflies and at which stage of their lives they use the plants. Discuss how to we can protect butterflies.

HOW THIS ACTIVITY RELATES TO THE REFUGE’S RESOURCES

What are the Refuge’s resources?

- significant wildlife habitat
- endangered species
- migratory birds

What makes it necessary to manage the resources?

- Loss of butterfly habitat due to development and pesticides..

What can students do to help?

Refuge staff work with volunteer organizations to plant native plants and garden without using chemicals, but we need you help.

- Plant native plants that are beneficial to butterflies.
- Maintain your gardens without using chemicals.
- Teach others what you have learned about the importance of the upland to butterflies and birds.

SUPPORTING INFORMATION FOR THIS ACTIVITY

Upland Ecosystem

- One of the major plant communities of the Santa Clara Valley is grassland, which was once dominated by native bunchgrasses intermixed with many kinds of wildflowers.
- Many years ago, European settlers brought European plants with them, which they introduced into the California landscape.
- They did not realize the major impact it would have on the environment. California's vegetation was drastically changed by the invasion of these alien plants.
- Furthermore, domestic livestock destroyed the perennial bunchgrasses and many of the herbs and shrubs were replaced by the annual European grasses, which could tolerate heavy grazing.
- Also, annual grasses could compete better than slow-growing native perennials for sunlight, soil moisture and nutrients. Plowing, farming and fire control by European settlers further changed the natural patterns of plant growth in coastal California.
- In a short period of time, the grassland was converted from a perennial cover of nutritious native plants to an annual grassland of introduced species with diminished food value for wildlife.
- Near the San Francisco Bay the upland plant communities are now characterized by nonnative grasses, trees and drought-resistant perennial herbs and shrubs.
- A number of native plants from various plant communities have been planted in the Butterfly Garden, including sticky monkey flower, coffee berry, lupine, ceanothus, yarrow, buckwheat, milkweed, tree mallow and purple needlegrass.
- Not all would naturally grow together in the same community, but all are endemic to the Bay Area.
- These native plants are important in the upland ecology. Native California plants are the plants best suited for our landscape because they have evolved with the climate and soil conditions found in Northern California. They provide homes, shelter and many different food sources for endemic animals, such as deer rabbits, grey foxes, birds and countless insects.
- Butterflies are one group of insects that form a

vital link between plants and animals higher on the food chain, such as lizards and birds. Plants of the Butterfly Garden were selected especially to attract these beautiful insects.

Butterflies

- The butterfly goes through four (4) distinct stages in its life cycle, beginning with an egg cluster or a single egg laid by the female, usually on the host plant that will feed her young.
- The tiny caterpillar is well designed for eating. It devours its host plant rapidly and grows so fast that it sheds its skin about five (5) times before changing into a pupa. Some caterpillars can eat only one kind of plant and others may feed on many kinds.
- To protect themselves from predators, caterpillars eat from the underside of the leaf, or they may weave a silk roof over it, pulling its edges together to form a shelter.
- After two to three weeks, the fattened caterpillar stops eating and changes into a chrysalis. Within the hardened chrysalis, a miracle occurs. The insect dissolves and rearranges itself into a completely new insect.
- After seven to ten days, the chrysalis shell splits and a butterfly emerges with shriveled wings. The brand new butterfly sits on the chrysalis and pumps fluid into the wings to expand them until they are strong enough to fly.
- Then it flutters off to feed on flower nectar, mud, carrion or dung. While nectar supplies energy food, muddy water provides the salts and minerals they need.
- The butterfly's main purpose is to find a mate and lay eggs for the next generation. At all stages of its life, the butterfly needs food, water, air, shelter and space, just like humans do.

Butterfly Garden

- The plants in the Butterfly Garden were chosen specifically for their value to wildlife, especially butterflies. The plant/butterfly associations for this activity are listed on p. 214
- The arrival of the Europeans caused replacement of native cover with weedy introduced species which they brought with them. The composition of California's vegetation is changed drastically by this invasion of non-native species.

- Ecologists are beginning to recognize the importance of preserving California's native plant populations. That is why we should we grow and preserve native California plants.
- Their restoration efforts include introducing and nurturing the original plant species in degraded areas where they once thrived.
- Although the Butterfly Garden is an artificial plant community and not a restoration project, it allows for students to study interrelationships between endemic plants and animals.
- Students will gain a better perspective of the work performed by restoration ecologists by planting seeds and tending native plants in a school garden or greenhouse and then bringing them back to the Refuge to plant in the Butterfly Garden or at school.

HOW TO LEAD THIS ACTIVITY FOLLOWING THE "DO, READ, ASK" TEACHING FORMAT

Butterfly Life Cycle Demonstration

(10 minutes)

Do

- Before the students arrive, familiarize yourself with the location of the native plants used in this activity.
- Ask a staff member to show you the area in the butterfly garden where the labels with pictures of the plant and its butterfly "partner" are located.

Do

- When the students arrive, have them sit in a circle on the carpet squares in front of the bench.
- Refer to Monarch Butterfly life cycle poster as needed.

Read

"In this activity we will be learning the life cycle of a butterfly, and looking at the different plants that butterflies need as they grow and change. To learn the life cycle of the butterfly we are going to read a story and demonstrate the life cycle using puppets. Let's pretend this is a butterfly egg, the first stage in the butterfly life cycle."

Do

Show the students the plastic egg with the sock puppet inside.

Read

"Inside this egg is Maggie, who will one day be a

Monarch butterfly.

To keep Maggie and all her brothers and sisters safe, their mother laid her eggs in a pile of leaves that fell to the ground."

Ask

? Why would Maggie's mother need to hide her eggs?

Read

"Birds and insects like to eat butterfly eggs, they make a great lunch! Hiding the eggs also protects Maggie from the weather which can drown the eggs, dry them or blow them away!"

Ask

? How many eggs do you think a butterfly lays in her life, which is only a few weeks?

Read

"Up to 1,600 eggs! Most butterflies lay their eggs one at a time, but a few lay them in sticky groups that look like foam. Some butterfly eggs hatch a few days after the eggs are laid, but Maggie has been waiting very patiently until spring to hatch."

Ask

? Why would it be better for Maggie's egg to hatch in the spring instead of the winter?

Read

"In the spring it is warmer. Insects usually can't survive cold temperatures, and there is also more food to eat in the spring. Let's pretend it's spring now and Maggie's egg is ready to hatch."

Do

- Select a student volunteer.
- Have them open the butterfly egg.
- Place the scrunched-up sock puppet over their hand, and give them the paper leaf to munch on.

Read

"Maggie right now is a *very hungry* young butterfly. In fact, the first thing she will probably eat is her egg shell!"

Ask

? What are young butterflies called? (caterpillars)

Read

"Young butterflies are called caterpillars. Maggie is lucky, because she hatched on the one and ONLY plant that she likes to eat.

"Some caterpillars, like Maggie, only like to eat one kind of plant, while others will eat a few different kinds of plants. Maggie is a monarch butterfly so she only likes to eat milkweed.

"If her mother hadn't laid Maggie's egg on the right plant, then Maggie would have had to crawl around to find her food plant."

Ask

? What would happen to the Monarch butterflies if all the milkweed plants disappeared?

Read

"The Monarch caterpillars would starve and die, so then there would be no Monarch butterflies. Some kinds of butterflies have become extinct/ endangered, like the bay checkerspot and the San Bruno elfin butterflies, because their caterpillars' favorite plant disappeared.

"Plants are important to caterpillars because caterpillars spend ALL their time eating, growing and storing energy to become butterflies.

"As Maggie eats, she will grow BIGGER and BIGGER and shed her skin several times."

Do

- Stretch the caterpillar sock puppet over the student's arm.

Ask

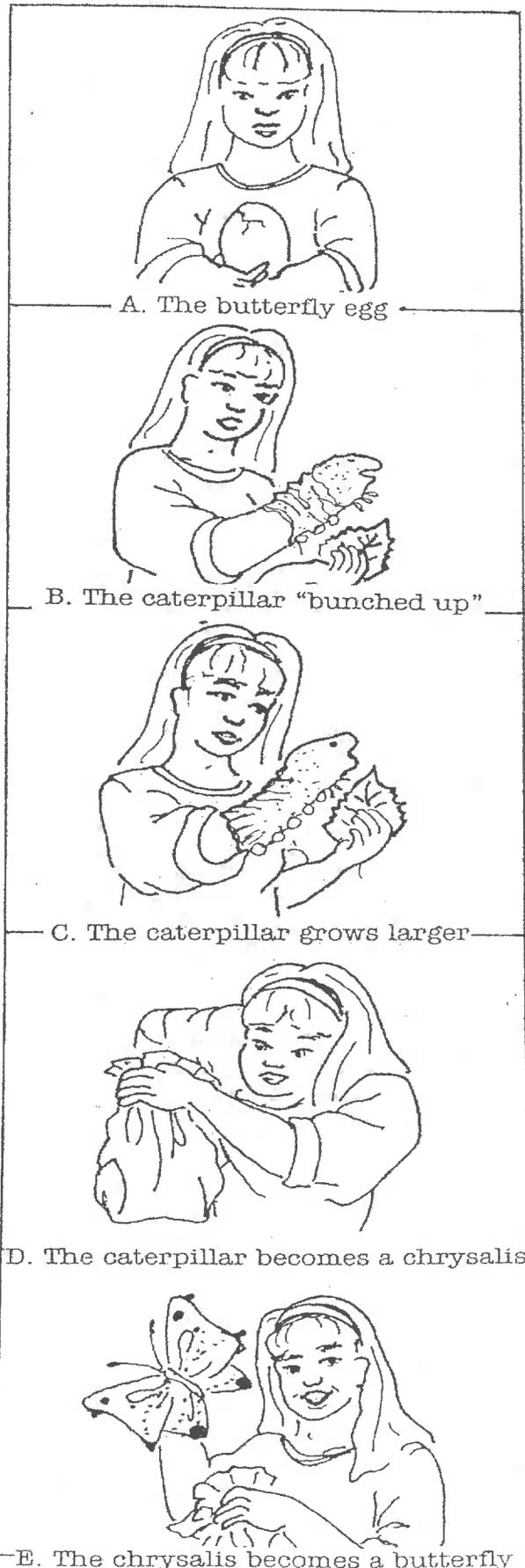
? What do you think like to eat caterpillars?

Read

"Birds and insects like to eat caterpillars!"

Ask

? How do you think Maggie the caterpillar could protect herself from being eaten?



Read

"Some caterpillars are camouflaged, so that they blend in with their habitat and the birds can't see them. Other caterpillars are fuzzy or have spiky skin that make them hard to eat, or that fool birds into thinking they are dangerous to eat.

"Monarch caterpillars like Maggie are poisonous because they eat milkweed. Like some caterpillars they eat poisonous plants to protect themselves.

"To warn predators that they taste bad, these caterpillars have bright colors on their bodies like Maggie does. So if a bird tries to eat a Monarch caterpillar, it will vomit and next time it sees a caterpillar with the same colors, it will remember being sick and not eat the caterpillar.

"Other caterpillars pretend they taste bad by being brightly colored too."

Do

- Select a second student volunteer.

Read

"Now that Maggie has eaten lots and lots, she's ready to become a pupa. This is the third stage of her butterfly life cycle.

"To become a pupa, Maggie finds a safe hiding place and attaches herself to a branch or rock. Then she sheds her skin, and her skin becomes a hard protective shell. This is called her chrysalis."

Do

- Have the second volunteer hold open the green chrysalis bag.
- The first volunteer removes the puppet and places it inside the bag.

Read

"Now Maggie is in her pupa stage. Inside the chrysalis, her body is turning into a mushy liquid, and the mush is rearranging to become a butterfly. Close your eyes and pretend your body is changing and rearranging itself like Maggie's."

Ask

? What does it feel like to be a pupa?

(Discuss any answers.)

Read

"It could take a few weeks or up to a year for a chrysalis to become a butterfly. Let's pretend that it

is a month later, and Maggie is ready to chew her way out of her chrysalis."

Do

- Ask the second student to reach into the bag and pull out the plastic butterfly.

Read

"Maggie the butterfly hangs onto the chrysalis while her wings dry and unfold. When she's ready, Maggie will fly off to look for her favorite flowers.

As a Monarch butterfly Maggie and all her friends migrate towards Mexico like birds do. Once there, they lay their eggs to start the next generation of butterflies."

Do

- Hold up the pictures of the monarch butterfly, wolf spider, barn swallow and jackrabbit.

Ask

? Is a butterfly an insect or a mammal? Why?

Read

"An insect. Insects have a hard skeleton on the outside, like a shell; you have an inside skeleton made of bones."

Ask

? How many legs does an insect have?

Read

"Six. Spiders have 8, so they are not really insects but arachnids.

"Everyone bend your knees. Imagine having six legs, and each leg has two or three knees. Imagine how differently you could move, how much faster you could crawl, and how much easier it would be to hold onto food and to climb."

Ask

? Let's count how many wings does a butterfly have?

Read

"Four. Birds have two. Butterfly wings are like huge pieces of clear plastic, covered with thousands of tiny scales that are brightly colored. If the scales are rubbed away, then the butterfly wings would be clear."

Ask

?What does an adult butterfly eat?

Read

“As an adult butterfly Maggie will drink nectar, not eat leaves like she did as a caterpillar. Maggie drinks nectar by poking her long, straw-like nose (proboscis) into a flower. While Maggie is drinking, she gets pollen from the flower on her nose. When she flies to the next flower of the same kind, some pollen is left behind to help that plant make seeds.”

Do

•Using the plastic flowers and plastic butterfly, demonstrate how butterflies probe for nectar and transfer pollen.

Read

“So plants help butterflies by giving them food, and butterflies help plants by spreading their pollen so they can make seeds, and more plants. There are lots of helping relationships in nature.”

Butterflies and Plants (15 minutes)

Read

“Many native California plants, like those we have around us in this garden, and butterflies need each other. In a few minutes we will walk around the garden to learn which plants each kind of butterfly needs to lay their eggs on.
“At each plant I want you, with a buddy, to look with your eyes for a butterfly egg hidden in the garden. But only look with your eyes, and raise your hand when you see the egg. Do not step on any plants, and look carefully for live caterpillars once you have seen the egg. When everyone sees the egg, we will identify which butterfly laid it using our identification poster.”

DO

- Pair the students and lead them toward the **TREE MALLOW**.
- Let the students look for the pink egg, and then open it, and identify the **WEST COAST LADY**

butterfly by comparison with the id poster.

Repeat for:

* **NARROW-LEAF MILKWEED**

Yellow egg MONARCH

* **COMMON YARROW**

Green egg PAINTED LADY

* **CALIFORNIA BUCKWHEAT**

Light blue egg ACMON BLUE

* **QUAIL BUSH (BIG SALTBUUSH)**

Dark blue egg WESTERN PYGMY BLUE

* **CEANOTHUS (WILD LILAC)**

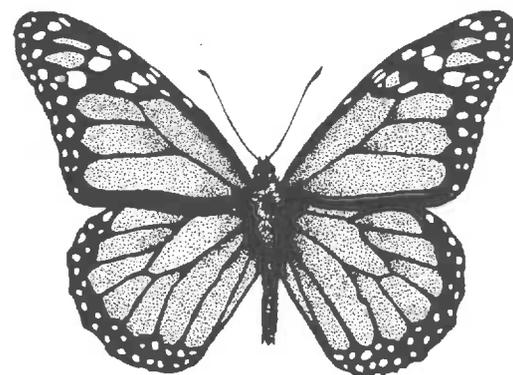
Purple egg ECHO BLUE

Discussion (3 minutes)

?**Why are native plants important to butterflies?**
(Provide food and shelter for native caterpillars and butterflies.)

?**When in their life cycle do butterflies need the plants we just saw?**
(As caterpillar, for food and shelter.)

?**How can humans hurt butterflies/caterpillars?**
[Catching butterflies/caterpillars, using insecticides (bug killers) and herbicides (plant killers), and destroying habitat with buildings and roads.]



Monarch Butterfly