Butterfly Gardening

Alabama Wildlife Federation Activity

Grade Levels
6-12

Overview
Students will help design a butterfly garden that provides all four components of habitat: water, food, shelter, and place to raise young.

Subject Areas
Science, Math, Language Arts, Physical Education

Duration
Design Activity: 2 hours
Installation Activity: 3-4 hours

Learning Objectives
Students will 1) define the major components of butterfly habitat, 2) use math skills to design a butterfly garden on graph paper, and 3) build a butterfly garden in your outdoor classroom site.

Alabama Course of Study Objective Correlations for Science
Sixth: 7
Seventh: 1, 4, 5, 6 & 7
High School Biology: 9, 10, 11, 12, 13,14, 15 & 16

Materials
Butterfly Field Guides (*optional*)
Graph Paper
Tape measure
4 Garden Stakes
100 ft of Cotton Cord
1 can of Spray Paint
Shovels, Cultivators and/or Trowels
Border (rocks or plastic edging)
Planting Soil
Host Plants (*see list on p4*)
Nectar Plants (*see list on p4*)
List of Plant Prices (*optional*)
Sand
Shallow Pie Pan(s) or Bowl(s)
1 Gallon of Water
Black Stones or Rocks (*optional*)

Background Info
Even though we might not think of butterflies and other insects as wild animals, they do need the same things that all animals need to survive: food to eat, water to drink, and shelter to protect them and their young from inclement weather and predators.

Shelter: Since butterfly larva (caterpillars) can only digest a specific type of plant foliage, the female butterfly only lays her eggs on this particular kind of plant. This plant is known as the **host plant**. (*See page 4 for a list of example host plants.*) Explain to your students that this is the caterpillar's home and food source at this point of the butterfly's life cycle. When the caterpillar hatches from an egg, it uses its chewing mouthpart to eat the leaves or flowers of the host plant exclusively, eating almost constantly as it molts (losing its old skin as it grows).

Food: After the caterpillar goes through metamorphosis as a chrysalis, it then emerges as a new butterfly which also has very specific food requirements. The plants that adult butterflies use for food are called **nectar plants**. Often the host plant for the caterpillar isn't the same as the nectar plant for the adult butterfly of the same species. (*See page 4 for a list of example nectar plants.*) Rather than the chewing mouthparts of immature caterpillars, adult butterflies have sucking mouthparts. The mouthparts are shaped into a long coiled tube, called a proboscis. The adult butterfly can uncoil its proboscis and use it to suck up nectar or tree sap much like you might use a drinking straw. Most fragrant, nectar-rich plants can grow in areas that receive as least five to six hours of sunlight, and will provide food for butterflies. You can explain to the students that nectar is much like sugar water.

Water: Lastly, butterflies cannot get their water from lakes, rivers or deep streams. They need shallow pools of water like **puddles**, which provide butterflies with the water and other essential salts and nutrients they need to survive. Many times, you can find numerous male butterflies drinking from one mud puddle, forming a "puddle club."

Preparation
You can create your own grid paper with large squares if you prefer that to typical graph paper (optional).

Design Procedure
1. Explain to the students that they are going to design and build a butterfly garden in the shape of a butterfly. The butterfly garden should provide all four components of habitat for butterflies: water (puddles), food (nectar plants), shelter, and places to raise young (host plants for butterfly eggs & caterpillars).

At this time, you may review the butterfly gardening tips on page 5 to help the students with their designs.

Note: You can turn it into a contest for the best butterfly garden design, and then use that student's design when the class builds the butterfly garden in the habitat lab.

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Habitat Lab Connection
Students will design and build a butterfly garden in your habitat lab.

Literature Connections
- ⇒ *National Wildlife Federation's Attracting Birds, Butterflies and Other Wildlife* by David Mizejewski **(**ISBN:10-1580111505)
- ⇒ *Attracting Butterflies and Hummingbirds to Your Backyard* by Sally Roth (ISBN: 10-0875968880)

Butterfly Field Guides
- ⇒ *Stokes Butterfly Book: Complete Guide to Butterfly Gardening, Identification, and Behavior* by Donald & Lillian Stokes **(**ISBN:10-0316817805)
- ⇒ *The Life Cycles of Butterflies: From Egg to Maturity, a Visual Guide to 23 Common Garden Butterflies* by Judy Burris **(**ISBN:10-1580176178)
- ⇒ *Peterson Field Guide to Eastern Butterflies* by Paul A Opler (ISBN: 10-0395904536)
- ⇒ *Peterson First Guide to Caterpillars of North America* by Amy Bartlett Wright and Roger Tory Peterson (ISBN: 10-0395911842)
- ⇒ http://bugguide.net

Design Procedure Continued…

2. Have the students research the different butterflies that can be found in Alabama and their shapes using the internet and/or field guides for butterflies. Point out that the butterflies have different shapes, colors, sizes, etc.

3. Once the students have chosen their favorite butterfly, they should research what types of host plants and nectar plants that species of butterfly requires for its habitat.

4. Pass out one sheet of graph paper to each student. The students should sketch their butterfly's shape onto their graph paper. Again, this will be the shape of their butterfly garden. Remind the students that the butterfly should be symmetrical.

5. The students will need to decide what scale they want to use for their drawing to determine the size of the garden. For instance, 1 grid on the graph paper may equal 1 inch. If this is the case, and the drawing is 60 squares tall and 36 squares wide, how many square feet will you need in the habitat lab for the garden? How long and wide will the garden be? Ask the students to include these calculations in their design.

6. Next the students must decide which host plants and nectar plants they are going to include in their garden and plot out where they will place each plant in the garden. They will need to consider how big (height & width) each plant will grow, so they will know how much space to provide for each plant on their drawing. For example, a butterfly bush will need much more room to grow than zinnias. Tell the students to use different shapes or symbols to represent different types of plants, and to include a Key at the bottom of their drawing listing the shapes/symbols and the names of the plants they represent.

7. Finally, the students should incorporate at least one "puddling" area inside their butterfly design, and if they would like they can include an area for butterfly "basking stones."

8. Once they have finalized their design, tell the students to write out a budget for all of the plants they will need for their butterfly garden. You can provide a list of plants with their prices from a local nursery, or the students can look up the prices on the internet.

9. The students should submit their design and budget to you on paper for review, or you can have the students present their designs and budget to the rest of the class explaining why they chose their specific butterfly, host plants, and nectar plants.

10. After reviewing all of the designs, you (and/or the class) should pick the best butterfly garden design for your habitat lab.

Installation Procedure

1. Now that the best butterfly design has been chosen, have the students gather the installation materials and take them to the habitat lab.

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Black Stones or Rocks (*optional*)

Installation Procedure continued...

2. Survey the site with the students to decide where you should build your butterfly garden. Keep in mind that most nectar plants require 6 hours of sunlight a day.

3. Once you have chosen the location of the garden, use a tape measure to locate the four corner points of your grid area for the garden. Refer to the scale and calculations on the graph paper to ensure that your measurements are correct. Place a stake in the ground at each of the four corners.

4. Using cotton cord, connect the four corners to form the outer perimeter of your garden. Then attach cross lines to complete the grid to the scale you want for the garden. For instance, if you want 12 squares on your graph paper to equal 1 foot in your garden, then place then place your cross lines at 1 foot intervals to create 1' x 1' squares inside your garden area.

5. Redraw the butterfly on the ground inside the larger grid using the drawing on the graph paper as a guide. Hint: You can use spray paint so that the drawing does not wash away in the rain.

6. Once the drawing is complete, place the rocks around the outside border of the butterfly.

7. Then begin digging out the grass inside the butterfly's outline using your shovels, garden claw, cultivators, and/or trowels. You may need to till the soil and add some potting soil to it after the grass has been removed.

8. Plant your host plants and nectar plants, still referring to the design for placement to make sure that you have enough space between each plant to allow growth.

9. Lastly, place your shallow bowl(s) in the spot(s) where the "puddle(s)" should be located inside the grid. Pour a 1 inch layer of sand inside each bowl, and then pour water into each bowl until the sand is completely saturated.

10. A butterfly house can be added to the butterfly garden to provide additional shelter. In addition, black stones can be placed in the butterfly garden to provide a warm area for the butterflies to sun themselves.

Assessment

► Did the students drawing match the shape of the butterfly they chose?
► Did they choose the correct host plants and nectar plants for their specific butterfly species?
► Did they make the correct calculations for the scale, the placement of the plants, and the total budget of the garden?

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Supplemental Information…

Host Plants and Nectar Plants for Alabama Butterflies		
Butterfly Species	**Host Plant**	**Nectar Plant**
Swallowtails		
Zebra Swallowtail	Paw-Paw	blueberry, blackberry, butterfly weed, butterfly bush, lilac, red bud, verbena
Black Swallowtail	parsley, dill, fennel, Queen Anne's Lace, celery, carrots	red clover, butterfly weed, thistle
Zebra Longtail	passionflower	blueberry, blackberry, butterfly weed, butterfly bush, lilac, red bud, verbena
Giant Swallowtail	trees and shrubs of the citrus family, hop tree, prickly ash	lantana, azalea, bougainvillea, goldenrod, butterfly bush, dianthus
Eastern Tiger Swallowtail	wild cherry, sweet bay, tulip tree, birch, ash, cottonwood, willow	wild cherry, butterfly bush, lilac, phlox, dianthus
Brush-footed Butterflies		
Monarch	butterfly weed and other milkweeds	nectar from all milkweeds, lilac, clover, lantana, thistle, goldenrods, blazing stars, coreopsis, butterfly bush, and mints
Painted Lady	thistle, white yarrow, daisy, hollyhock, mallow	aster, cosmos, blazing stars, coreopsis, joe-pye weed, red clover, butterfly bush, zinnia, privet, butterfly weed
Viceroy	willows, poplars, cottonwoods, apple	aster, goldenrod, joe-pye weed, thistle, butterfly weed
Gulf Fritillary	passionflower vine	butterfly weed, black-eyed susan, thistle, verbena, vetch, joe-pye weed, passionflower vine, purple coneflower
Red Admiral	nettle	prefers tree sap and fermenting fruit, but will also nectar at daisy, aster, goldenrod, butterfly bush, red clover, gaillardia
Whites and Sulphurs		
Cabbage White	cabbage, broccoli	mustards, clover, asters, mints
Clouded Sulphur	alphalpha, clover	flower nectar of many plants including butterfly bush, cosmos and gallardia
Gossamer-wing Butterflies		
Red-banded Hairstreak	wax myrtle, sumac, oak	yarrow, coreopsis, butterfly weed
Summer Azure	dogwood	most nectar producing flowers
Skippers		
Common Checkered Skipper	globe mallows, mallow, hollyhock	aster, red clover, dianthus
Horace's Duskywing	red oak, willow oak, water oak, white oak	goldenrod, peppermint

Information derived from: http://www.druidcityonline.com/oa-bc-butterfly%20garden.htm

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ALABAMA WILDLIFE FEDERATION ACTIVITY

Supplemental Information…

Helpful Hints for Growing a Great Butterfly Garden

Locate the garden in a **sunny area.** Butterflies and most butterfly-attracting plants require bright sunshine.

Plant **nectar-producing flowers** and plants. Butterflies visit flowers in search of nectar, a sugary liquid, to eat.

Select **single flowers** rather than the double flowers. The nectar of single flowers is more accessible and easier for butterflies to extract than the nectar of double flowers which have more petals per flower. Clusters of short, tubular flowers or flat-topped blossoms are the ideal places for butterflies to easily land and feed.

Use large **splashes of color** in your design. Butterflies are first attracted to flowers by their color. Many native butterflies seem to prefer purple, yellow, orange, and red blossoms. Groups of flowers are easier for butterflies to locate than isolated plants.

Plan for **continuous bloom** throughout the growing season. Butterflies are active from early spring until late fall. Plant a selection of flowers that will provide nectar throughout the entire growing season (e.g. spring—azaleas, summer—buddleia, fall—chrysanthemums).

Include **host plants** in the design. Host plants provide food for caterpillars and lure female butterflies into the garden to lay eggs. They will be devoured by the caterpillars so don't use them as the focal point of your garden. You many need to plant them three or more times during the summer to maintain a constant food supply.

Include damp areas or **shallow puddles** in the garden. Butterflies love to drink from puddles. You can make a permanent puddle by sinking a container in the ground and filling it with sand. Keep it wet and butterflies will flock to the moisture, especially males who draw salts and nutrients from the sand.

Include butterfly **basking stones** in the garden. Butterflies often perch on stones, bare soil, or vegetation; spread their wings; and bask in the sun. Basking raises their body temperature so they are able to fly and remain active. Black stones in particular will absorb and retain the sun's heat and create a striking visual effect.

Avoid using insecticides or pesticides in or near a butterfly garden. Most traditional pesticides are toxic to butterflies. Limit weeding and cutting back plants. You might accidentally deprive caterpillars of food, possibly remove cocoons, and destroy newly laid eggs.

Helpful Hints provided by the HLL Planning Guide and The Canebrake Gardens website at http://www.druidcityonline.com/oa-bc-butterfly%20garden.htm.

The Habitat Learning Lab Program is a partnership between:

Alabama Cooperative Extension System

Alabama Wildlife Federation
www.alabamawildlife.org/habitat-learning-lab/

Alabama Department of Conservation & Natural Resources