



## Curriculum Connections

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### Wild Wisdom

After you've had some time to make and record observations in your schoolyard garden, take a wander to a wilder place to see how butterflies behave in a more natural environment, where "weeds" and other plants grow freely. Ask your students to share anything the trip helped clarify for them, or new questions it created, such as, *What kinds of plants grow here? Is there a greater variety of butterflies? Do species seem to favor different plants than in our garden, maybe even some we call weeds? Are there more caterpillars here than in our garden? Does the area have something (maybe tall trees or a mix of shrubs, grass, and flowers, or a muddy brook bank) that our garden doesn't?* Students' findings might suggest things that they can do to make their garden more inviting to butterflies and their caterpillars. It can also serve as a lead-in to a discussion about biodiversity, or the effects of habitat loss on wild creatures such as butterflies.



### Through Butterflies' Eyes

As human habitat continues to expand, wildlife homes and mating and feeding grounds are being fragmented and destroyed. Designing your schoolyard butterfly garden to provide for their habitat needs can truly make a difference for these creatures, as well as for other invertebrates and birds.



For students, it can also provide a lens for examining the natural history of the area in which they live, and how humans have altered it over time. Have your class seek archival photos, sketches, or written descriptions of what your region looked like through the eyes of Native Americans and/or western historians, and compare it to the present landscape. Have them list of elements that people have built over the years (houses, roads, farms, dams, playgrounds, golf courses). Then challenge their thinking with the question, *How different would our town look if butterflies had been part of the "planning commission" all along? Using what we know about butterflies' needs, how might we redesign our town to accommodate them as well as humans?* For instance, to reduce butterfly traffic fatalities, they might come up with "butterfly crossing" signs, erect nets over all the highways, or equip automobiles with "butterfly radar".

Invite the class to rewrite history, or compose fictional stories or newspaper articles, and illustrate them with pictures and maps. Bring your lesson back to the present with a discussion of who they think represents wildlife when it comes to planning building projects (e.g., state wildlife departments and environmental protection agencies, nonprofit wildlife organizations). You might invite a speaker from one or more of these agencies to your class to discuss the issue and answer questions about how they advocate for to the needs of butterflies and other creatures.

### Caterpillars Up Close

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Rearing butterflies indoors is a great way to start your study, and opens up opportunities for controlled experiments that are hard to manage outside. You can order caterpillars from educational materials suppliers, or raise them in home-made or purchased caterpillar condos. (For directions for building your own, [click here](#). To learn about options from the Gardening with Kids Store, [click here](#).) Prior to ordering, work with your students to choose one or two investigations to pursue. At the end, they can make a presentation on the project to other classes, parent groups, or science fair attendees. Here are a couple of ideas.

**Explore Food Preferences.** As they plan the butterfly garden, students will learn that butterflies have cosmopolitan tastes compared to their offspring. Most caterpillars have very specific host plants. Might this reflect a requirement, or a preference? After all, it was mom who chose where to lay the egg! When your caterpillars arrive, plan to offer them a couple of new salad bar options along with their known host plant(s), and have students record their observations.



**Test environmental variables.** To spur a discussion, pose this question: *How might the classroom caterpillars' environment compare to that of their wild cousins?* (This might include differences in temperature, light, moisture, predators, disease, food availability, and so on). If you have the opportunity, experiment with two rearing chambers, one inside and one outside, and have students record as many environmental variables and other observations as they can. Or, set up a controlled experiment in the classroom with a single variable, such as temperature (even a difference of 2 or 3 degrees can affect these cold-blooded insects), and chart the rate of development of two or more groups of caterpillars.

### Exploring Butterfly Behavior

Encourage students to keep track of questions that arise as they monitor butterfly activities in their garden. *Do butterflies prefer some flower color, shapes, or fragrances over others? What path does a butterfly take as it travels among the plants?* As you discuss these questions in class, challenge students to consider which they can best explore through more observation in the garden, and which are good candidates for classroom investigation.

If students wish to pursue butterfly color preferences, here's one approach. First, ask if your classroom scientists' observations corroborate those of other scientists (i.e., butterflies will sip from flowers of many colors, but certain species tend to have favorites). Encourage students to ponder what's behind this preference (e.g., nectar flavor, nutrient value, learned habit). Plant scientists tell us that nectar from different flower species has different concentrations of high-energy carbohydrates (sugars) and amino acids (for building proteins). And entomologists have discovered that captive butterflies can quickly learn to change their color preferences to take advantage of more nutritious nectar. Challenge older students to come up with a way of testing some feeding variables (see, [Feeding Butterflies in the Classroom](#), at right). For instance, do their butterflies prefer certain colors, or nectar with a specific sugar concentration? Can they learn or recall a color, nectar mixture, or feeder location?

### Art in the Wings



There's so much about butterflies that stimulates creativity in observers: their brilliant colors, lilting grace, fragile appearance, and stunning metamorphosis. For thousands of years, people have recognized butterflies as symbols of transformation, and expressed admiration for their beauty in art and words. Students excited by what they see in their

#### Feeding Butterflies in the Classroom

This is the standard recipe for homemade nectar for butterfly and hummingbird feeders: Dissolve 1 part granulated white sugar in 4 parts water, and bring to a boil for 2 minutes. Cool before filling your feeder. Store any unused nectar in the refrigerator for up to 3 days.

[Click here](#) for a sample feeder design. If you don't have a way to hang feeders, make the holes slightly larger and insert wicks made from pieces of a cotton ball into the liquid to draw it to the surface.

A few tips for butterfly health:

Clean feeders thoroughly before adding fresh nectar.

Do not use food coloring to tint nectar. Put nectar in colored dishes, or cover feeders with colored paper "petals."

Do not use honey, syrup, or molasses in place of sugar; they encourage mold growth.



NGA's latest book for educators, *Growing Ventures*, features stories of 18 student-run business projects, as well as step-by-step guidelines, activities, and worksheets for engaging students in planning and implementing a plant- or garden-related business that meets your curriculum goals. You'll find more details at our [Gardening with Kids Store](#).

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own butterfly garden should be primed for writing poetry or prose inspired by their experiences. You might have them warm up to the exercise by brainstorming adjectives and similes as a class, and then composing individual pieces. You can also use focused observation to help kids draw, paint, or sculpt what they see. Why not publish an illustrated book of youngsters' works to share with others?

### Wings Across the Curriculum

Here are some suggestions for other butterfly-inspired activities:

- Create maps, to scale, of your butterfly garden.
- Compare the habitat needs of butterflies with those of other animals, including humans.
- Discuss or write about other types of metamorphoses or transformations in nature or personal lives.
- Create butterfly kites, origami, masks, collages, and so on.
- Develop a newsletter to highlight your butterfly project for other students, teachers, and parents.
- Design a "caterpillar cafe" collage, illustrating favorite food and host plants for species in your area.
- Learn the differences between butterflies and their cousins, moths.
- Ponder the significance of butterfly coloring as an adaptive trait (e.g., camouflage, attracting mates, frightening predators)
- During the butterfly "off-season," visit a nearby public garden that's hosting a live butterfly exhibit. Back in class, discuss what most piqued students' curiosity, and what they'd like to investigate further.



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