

Building a Butterfly Garden



STANDARD COURSE OF STUDY CORRELATIONS:

Science, Grade 2, Goal 1: The learner will conduct investigations and build an understanding of animal life cycles.

1.01 Describe the life cycle of animals including: Birth, Developing into an adult, Reproducing, Aging and death.

1.02 Observe that insects need food, air and space to grow.

1.03 Observe the different stages of an insect life cycle.

Math, Grade 2, Goal 2: The learner will recognize and use standard units of metric and customary measurement.

2.01 Estimate and measure using appropriate units. Length (meters, centimeters, feet, inches, yards).

Science, Grade 5, Goal 1: The learner will conduct investigations to build an understanding of the interdependence of plants and animals.

1.01 Describe and compare several common ecosystems (communities of organisms and their interaction with the environment).

1.02 Identify and analyze the functions of organisms within the population of the ecosystem: Producers, Consumers, Decomposers.

1.03 Explain why an ecosystem can support a variety of organisms.

1.04 Discuss and determine the role of light, temperature, and soil composition in an ecosystem's capacity to support life.

1.05 Determine the interaction of organisms within an ecosystem.

Science, Grade 6, Goal 4: The learner will investigate the cycling of matter.

4.01 Describe the flow of energy and matter in natural systems:

- Energy flows through ecosystems in one direction, from the sun through producers to consumers to decomposers.
- Matter is transferred from one organism to another and between organisms and their environments.
- Water, nitrogen, carbon dioxide, and oxygen are substances cycled between the living and non-living environments.

4.02 Evaluate the significant role of decomposers.

4.03 Examine evidence that green plants make food.

- Photosynthesis is a process carried on by green plants and other organisms containing chlorophyll.
- During photosynthesis, light energy is converted into stored energy which the plant, in turn, uses to carry out its life processes.

4.04 Evaluate the significance of photosynthesis to other organisms:

- The major source of atmospheric oxygen is photosynthesis.
- Carbon dioxide is removed from the atmosphere and oxygen is released during photosynthesis.
- Green plants are the producers of food that is used directly or indirectly by consumers.

4.05 Evaluate designed systems for ability to enable growth of certain plants and animals.

MATERIALS

- Plant field guides, gardening books, gardening magazines and seed/plant catalogs
- Chart paper
- Markers
- Graph paper
- Pencils with erasers
- Colored pencils
- Stencils in various basic shapes (circles, ovals, etc.)
- Sample template for a butterfly garden (optional)
- Plants and other supplies
- Internet access

PREPARATION

- Before planning a garden, get permission from your administration and discuss funding sources. The budget will determine how extensive the garden can be.
- If funds are limited, ask parents to bring items from your list. You might also ask local gardeners to share plants from their gardens.
- Walk the grounds to determine appropriate sites—choose a place that receives full sun and is near a source of water. Let students help with this.

Science, Grade 6, Goal 7: The learner will conduct investigations and use technologies and information systems to build an understanding of population dynamics.

7.01 Describe ways in which organisms interact with each other and with non-living parts of the environment:

- Coexistence/Cooperation/Competition.
- Symbiosis.
- Mutual dependence.

7.02 Investigate factors that determine the growth and survival of organisms including:

- Light.
- Temperature range.
- Mineral availability.
- Soil/rock type.
- Water.
- Energy.

7.03 Explain how changes in habitat may affect organisms.

Math, Grade 6, Goal 2: The learner will select and use appropriate tools to measure two- and three-dimensional figures.

2.01 Estimate and measure length, perimeter, area, angles, weight, and mass of two- and three-dimensional figures, using appropriate tools.

2.02 Solve problems involving perimeter/circumference and area of plane figures.

Math, Grade 6, Goal 3: The learner will understand and use properties and relationships of geometric figures in the coordinate plane.

3.01 Identify and describe the intersection of figures in a plane.

3.02 Identify the radius, diameter, chord, center, and circumference of a circle; determine the relationships among them.

3.03 Transform figures in the coordinate plane and describe the transformation.

3.04 Solve problems involving geometric figures in the coordinate plane.

INTRODUCTION TO LESSON: Students will plan, design, build and monitor a butterfly garden. They will research which butterflies live in the area and which host plants and nectar plants they should include in their design.

BACKGROUND FOR TEACHER: To attract as many butterflies, moths and other insects as possible, the garden will need to have nectar plants and host plants that are native to your area. Nectar plants provide butterflies with a source of food. Host plants provide butterflies with a place to lay eggs and are the source of food for the caterpillars. Some species of plants double as nectar and host plants.

Some butterfly plants (most native to North Carolina):

- black-eyed Susan (*Rudbeckia* spp.)
- butterflyweed* (*Asclepias tuberosa*)
- cardinal flower (*Lobelia cardinalis*)
- swamp milkweed* (*Asclepias incarnata*)
- goldenrod (*Solidago* spp.)
- purple coneflower (*Echinacea purpurea*)
- New England aster* (*Aster novae-angliae*)
- Joe-pye weed (*Eupatorium* spp.)
- ironweed (*Vernonia* spp.)
- coreopsis (*Coreopsis* spp.)
- phlox (*Phlox* spp.)
- butterfly bush (*Buddleia* spp. *non-native*)

* Both host and nectar plant



BEYOND THE CLASSROOM

Students could use the same design or a modification of it to create a butterfly garden at home or in the community.

Additional Resources:

Monarch Watch • (<http://www.monarchwatch.org>) • Provides a variety of resources about raising monarch butterflies, tagging monarchs and attracting monarchs to your site.

Journey North • <http://www.learner.org/jnorth> • Tracks the northward migration of various animals in the spring, including monarch butterflies.

Sources of Native Plants (recommended by the N.C. Botanical Garden and the N.C. Native Plant Society) • <http://ncbg.unc.edu/pages/48/> • <http://www.ncwildflower.org/natives/sources.htm> • Many have catalogs available.

Allen, et.al. 2005. *Caterpillars in the Field and Garden: A Field Guide to the Butterfly Caterpillars of North America*. New York: Oxford University Press.

Opler, et. al. 1998. *A Field Guide to Eastern Butterflies* (Peterson Field Guides). New York: Houghton Mifflin Company.

Stokes, Donald and Lillian. 1991. *The Butterfly Book: An Easy Guide to Butterfly Gardening, Identification and Behavior*. Boston: Little, Brown and Company.



Some butterflies and their preferred host plants:

American lady (everlasting, pussytoes, cudweeds)
 black swallowtail (parsley family: dill, parsley, carrots, fennel, Queen Anne's lace)
 buckeye (snapdragon, plantain, purple gerardia)
 cloudless sulphur (wild senna—*Cassia* spp.)
 monarch (milkweed family)
 pearl crescent (aster species)
 red-spotted purple (black cherry*, willow*)
 silver-spotted skipper (black locust*, beggar's ticks—*Desmodium* spp., wisteria)
 spicebush swallowtail (sassafras*, spicebush)
 Eastern tiger swallowtail (black cherry*, tulip poplar*)

* Tree species

engage ➤ Ask students: What do you know about the life cycle of butterflies? Do all butterflies have the same needs? If we were to create a butterfly garden on our school grounds, what things would we need to consider? Have students, individually, jot down a few thoughts about what they'd include in a butterfly garden. Then tell them they'll be using their ideas later to design a butterfly garden. **Show the video.**

After showing the video, divide the class into groups. Ask them to use everything they know about butterflies to design the garden. Have them combine the notes from their individual lists. Then have them discuss any new ideas they gathered from the video. Have each group make a master list on chart paper of all the steps necessary for creating a butterfly garden.

Have each group share its list. Then ask everyone to decide as a class all the tasks that will be necessary for creating a plan. Guide them in discovering the following needs:

- Choosing a site—necessary parameters for the site (e.g., exposure to sunlight, soil type, moisture needs).
- Planning the size of the garden.
- Researching butterflies in the area.
- Researching plants these butterflies need.
- Deciding what plants to use, including host plants and nectar plants.
- Determining the cultivation requirements for individual plant species.
- Designing the garden.
- Making a budget.
- Determining what care the garden will need—(e.g., equipment, water source).

explore ➤ Divide the class into four teams: a site team, a research team, a design team and a planning team. Each of these groups may be subdivided into smaller groups. Give each group the corresponding task sheet and have them complete the assignments.

explain ➤ Have the four teams present the results of their investigations. Have them explain how and why they made their choices. This should be an open forum in which the students question the presenters, allowing for changes to be made in the plan before implementing it.

elaborate ➤ Using the design they created, students are to install a butterfly garden on the school grounds. Organize and assign tasks based on students' work in the classroom. An excellent kickoff is a garden party to encourage family involvement in the project. Families could be invited to participate in either the soil preparation or the actual planting. This can be done on a weekend or as an all-day project with a picnic lunch. Ask your students for ideas for this sort of event.

Once the garden is completed, divide the class into crews that will be responsible for maintenance (e.g., watering and weeding on a weekly basis). They should discuss how to care for the garden during holidays and breaks. They may solicit community volunteers to help with maintenance.

evaluate ➤ Schedule regular visits to observe the garden, either in small groups or as a class. Have students use field guides to identify the caterpillars or adult butterflies they see. Such visits are an excellent opportunity for ongoing one-on-one assessment of the students' understanding of the life cycle of the butterfly and the effectiveness of their garden in hosting butterflies. Students should be able to change aspects of the garden that are not working.

Teacher's Notes:

Planning Team

Budget and Project Dates



Your task is to make a budget for plants and garden supplies and to set dates for various stages of the project.

- 1.** Set a budget for how much you can spend on the garden. Ask your teacher for advice.
- 2.** Make a list of the necessary plants and supplies (e.g., gardening tools, topsoil). Next to each item, write the cost.
- 3.** Obtain final plant list from the research team.
- 4.** Make a timeline for preparing the garden, purchasing plants, planting and ongoing care.

Site Team

Identify Garden Site



Your task is to identify the perfect site on the school grounds for a butterfly garden. Use the following questions to guide your decision-making:

1. Consider these questions as you search for a location:

- ✿ Does the site get full sun? If not, does it receive morning sun?
- ✿ Is it flat so that water will not run downhill and away from the plants?
- ✿ Where will you get water for irrigating the plants?
- ✿ What do you want the area of the garden to be?
- ✿ What do you want the perimeter of the garden to be?
- ✿ Make some observations about the soil (e.g., color, texture). Will you need to amend the soil to improve it?

2. Now describe the place you've chosen. Explain why the site is a good location for a butterfly garden.

3. Pass your information to the design team.

Design Team

How Will Your Butterfly Garden Look?



Your task is to decide exactly how you want the butterfly garden to look.

1. Brainstorm what the garden should look like. Make sketches.

- ✿ What size plants do you picture?
- ✿ How should plants be grouped?
- ✿ Do you want a bench? A path?

Use your imagination!

- 2.** The Research Team will give you a list of plants that will attract native butterflies and that can be purchased nearby. Consult field guides or the Internet to see what these plants look like (e.g., color, size).
- 3.** The Site Team will tell you the area and perimeter of the garden. Make a final sketch of the garden to scale. Label it with the name of each plant.

Research Team

Plan Your Plants



Your task is to determine exactly what plants should be included in the garden.

- 1.** Make a list of the butterflies that live in our area. To get started, go to <http://149.168.1.196/nbnc/>. On this Web site, you can find a list of butterflies in our area by clicking on our county on the interactive map.
- 2.** Once you have a list of butterflies, go to <http://www.monarchwatch.org/garden/plant.htm> to find out which host plants are needed to feed butterfly larvae (caterpillars). Make a list of the host plants for our butterfly species.
- 3.** To find out what nectar sources will feed the adult butterflies, go to <http://www.monarchwatch.org/garden/nectar/htm> and make a list of the nectar sources required by our butterflies.
- 4.** Now that you have a list, narrow it down to the number and types of plants that you think are feasible for the garden. How much space will they require? Use field guides or the Internet to do your research. Use garden catalogs to find out if your chosen plants are available and what they will cost. Consult the Planning Team for budget guidelines. Use this figure to determine how many plants you can buy.
- 5.** When you have a final list, submit it to the Design Team and the Planning Team.