

*“Chances are you never thought of your garden--indeed, all of your property--as a wildlife preserve that presents the last chance we have for sustaining plants and animals that were once common throughout the U.S. But that is exactly the role our suburban landscapes are playing.”* Douglas Tallamy, Professor of Entomology and author of The Living Landscape: Designing for Beauty and Biodiversity in the Home Garden and Nature's Best Hope: A New Approach to Conservation that Starts in Your Yard

## Pollinator Garden Project Teacher Overview

### Guiding Question

*How can I create a pollinator garden for native bees and butterflies that will provide the essential elements for a thriving, sustainable pollinator community?*

### Preparation:

Students should have a variety of resources to use before beginning this project. Mainstream magazines will often carry articles about how to create a butterfly garden. The library should have books at several different reading levels that would provide information. Many national organizations exist that have websites with appropriate information. A section of suggested resources is provided with this project-based learning plan. When considering the resources to use, remember that in order to create a thriving pollinator garden for the native pollinators you should use native plants, therefore your resources should reflect the plants and pollinators that are found in your area.

*Each step in this project should be modified as seen fit to meet the needs of the students. Student learning style, ability, and social skills will all play a part in whether all parts of the lesson are used or modified to meet those needs.*

### Explore the Issue

Introduce students to the idea of creating their own pollinator garden by eliciting student ideas and comments based on the quote by Douglas Tallamy.

Have each student complete the **Pollinator Garden Basics: Scavenger Hunt** student worksheet by using your variety of resources. Then go over the answers and any interesting facts with the class. Expect to have a variety of correct answers on many of the questions.

**Variation:** Assign different groups of students to answer different questions.

### Set Behavioral Expectations

Once students are ready to begin working on their project, go over expectations for appropriate behavior during their independent work if this has not already been established. Suggested expectations might be include:

- Stay on task.
- If working with others, use a quiet voice when talking with your group.
- Keep track of your resources using the teacher's choice of model (ex. MLA).
- If you have a question for the teacher, raise your hand and work quietly while waiting patiently until the teacher is available. Or...turn over your signal cup\* and work quietly while waiting patiently until the teacher is available. \*A colorful cup on each student's desk that is turned over to indicate that a student has a question to be answered by the teacher.
- Maintain your Daily Log of Work every day.

### Create a Timeline, Daily Student Log of work, and Criteria for Grading

Break down the project into smaller steps and provide students with a timeline that creates smaller goals. Requiring students to keep a **daily log of work** allows them to see how their time has been used, what resources were used and to review those if needed, and, with guidance, to be self-reflective. Providing students with a detailed list or **criteria for grading\*** their project will help students focus and is a great way of easing concerns that students and parents might



have about expectations. These 3 things will help some students avoid feeling overwhelmed and help to keep all students on task to meet those deadlines.

### \*Allow Creativity and Negotiation

One of the best ways to encourage a love of learning is to allow students to be the architect of that learning. One of the best things about doing a project is that it allows the opportunity for students to design their own learning experience within the framework of that project. Students may have specific, related areas of interest that they are simply curious about or have always been drawn to learn more about. Letting them express that interest and weave it into the project is a wonderful way to encourage a lifelong love of learning and to give the student a chance to be self-reflective about their learning goals. Adding "Creativity" as a part of their grading criteria lets the student know that they may use skills and interests of theirs to improve their grade. A simple statement like the following gives students the opportunity to pursue personal interests as a part of the project.

**"Do you have interests that you would like to make a part of this project? Talk them over with your teacher."**

*If you also tell students to write down their request before speaking with you about it, it will help them state their interest more clearly and prevent the random rush to you to discuss an idea they had for their project. You might choose to incorporate these interests into the grading criteria under the heading of "Creativity".*

### Suggested Concepts

Students will research and develop an understanding of:

- The life cycle of native bees and butterflies (complete metamorphosis).
- Adaptations of native bees and butterflies (ex. Monarchs are poisonous to predators; camouflage used by caterpillars)
- Native plants: adaptations (ex. Prairie plants are adapted for drought and fire.)
- Knowledge of local habitat and ecosystems

### Useful Skills depending on student ability

Students will research and develop an understanding of:

- How to define and refine questions for research
- How to research a topic (taking notes, creating a bibliography, how to find appropriate research sources)
- How to create a scientific drawing (create a key, label parts, scale drawing)

### Assessment

#### Formative:

- Creating **checkpoints in the form of short-term deadlines** will help to make certain that your students are staying true to the Essential Question and able to meet the project deadline. This will also provide the opportunity for discovering if they need additional instruction in a specific area or more overall guidance. Perhaps more importantly, this will provide an opportunity for encouragement and a boost in enjoyment of the learning experience to be given to individuals.
- **Presentation either orally** to a group or individually to the teacher of current progress.
- **Turning in a short diary, log, or a visual graphic of completed work.**

#### Summative

- **Presentation of the completed project sheets.** Oral presentations to the class allows students to showcase their work and share what they have learned. It is also a way for the teacher to assess the work. Giving the students the option of presenting to the class or turning it in to the teacher allows the shy student to avoid unnecessary stress. (See checklist for grading in Attachments)



If presentation to the class is chosen as a means of assessing work, instruction in how the presentation should be done and what the expectations are from the audience should be made clear early in the process. Giving points for appropriate audience behavior is a plus.

- **Completing a short essay or journal entry of what the student has learned** during the process of completing the project provides an opportunity for reflection on the learning process, what that learning might mean to the student, and the opportunity to be self-critical and further develop their learning skills.

#### Attached Resources for Pollinator Garden

- Teacher Background Information
- Student Information
- Pollinator Garden Basics: Scavenger Hunt, student worksheet
- Pollinator Garden Basics Scavenger Hunt, answer key
- Pollinator Garden Project template
- Pollinator Garden Project template, opt. 2
- Daily Log of Work Done
- Internet Resources
- Personal Garden Notes

#### Additional Resources: Attached

- ABC Garden Alphabet Book Criteria
- P.A.W. (Paragraph A Week: writing assignments) X 3
- P.A.W. checklist for grading
- Template for Pollinator Garden Visitor's Guide
- Mission Statement (*to be used as a starting point for creating your own*)
- Doug Tallamy quote to post



*Outdoor Classroom designed by student-created projects and built by students.*

#### Suggested Extensions and Connections

- Social Studies / Language Arts: Native Myths about local plants  
<http://www.native-languages.org/legends-plants.htm>
- Math: (geometry, perimeter, area, volume) Design additional beds
- Math: (geometry, perimeter, area) Design fencing for garden
- Language Arts: Create a garden journal/diary about project
- Language Arts &/or Science Vocabulary: Create a Word Wall and invite students to add vocabulary that they learned after visiting the garden.
- Science: Dichotomous key or identification key for any of the garden plants or animals.  
<https://www.brighthubeducation.com/science-homework-help/91372-make-a-plant-dichotomous-key/>
- STEAM: Design water collection system



- STEAM: Projects for hardscapes– making the garden attractive and informative for visitors during all seasons (ex. Signage, *“In the winter, some bee babies, called pupa, sleep underground!”*)
- STEAM: Art, for fences and beds
- STEAM: Art & Language Arts, combine art & poetry
- STEAM: Mason bee homes – a nonaggressive native
- STEAM: Butterfly feeders: Students could research how butterflies see the world in UV. Then they could create feeders, either for themselves or the garden (preferably both :)
- STEAM: Design planters and seating areas for the garden.
- STEAM: Emphasis Science - Soil Tests: Research soil chemistry and create a natural plan for maintaining and/or amending soil quality. (composting)
- STEAM: Permeable Pathway: an engineering project. Research, project development, create proposals with materials list and budget.
- STEAM: Plant Signs: Design signs with scientific name for each plant. Choose materials and create a budget.

