

'Planting' for the Future

"The best time to plant a tree was twenty years ago. The next best time is today." –Chinese Proverb

Background Information:

Bin Information

This bin is the third in a series of three that focuses on pollinators. In previous lessons, students learned specifically about two types of pollinators; bumblebees and monarch butterflies to learn what a pollinator is and build empathy and interest in them. In this lesson, there will be more of a focus on the importance of pollinators to ecosystems and their own lives, and to design a pollinator garden.

This lesson can also be taught in conjuncture with the Phenology bin lesson Out of Sync. Phenological mismatch ties in as a concept since pollinators need blooming plants all throughout the time that they are active, especially early spring and late autumn, and that is something that a changing climate threatens.

Information for Instructors

Pollinator gardens are gardens that designed specifically in order to attract pollinators like bees, butterflies, moths, and hummingbirds. Pollinator gardens are popular as a way to both attract pollinators for the pleasure of the viewer and to support pollinator populations. Some key elements for successful pollinator gardens include:

- Choose flowers that bloom at different times so that you will be providing pollinators with energy from early spring to late fall.
- Choose native plants and avoid modern hybrids.
- Eliminate pesticides to avoid harming the pollinators that you are trying to help. If you must use them, choose the least toxic option, use the product as directed, and spray at night when bees are not active.
- Include plants for all life stages of pollinators, such as larval plants to be eaten by caterpillars.
- Add other non-nectar resources for pollinators, like leaving some brush for habitat, or a damp salt lick for butterflies.

There are many other things that are involved in the planning of a pollinator garden. This is an incomplete list.

Materials and Set-Up:

This kit includes:

Author:

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Themes:

Pollinators, Social Action, Service project, Gardening

Estimated Duration:

Design: 45-minute class period

Implementation: 2-3 class periods

Audience Identified:

Middle and High School

Location:

Planning portion in a classroom

Implementation will vary

Goal:

Students will learn about pollinators needs to design a pollinator garden.

Objectives:

Students will explain why pollinators are important to ecosystems.

Students will identify at least three components to a successful pollinator garden.

Students will list at five native plants beneficial to pollinators.

- Graphing/Drafting paper for planning
- Copy of *Landscaping for Clean Water at Your School*

You will need:

- Class set of iPads, chrome books, or equivalents

Set-Up:

- Arrange a classroom space as needed

Introduction:

Estimated Duration: 10 minutes

On scratch paper, have students make a quick list of what they ate at their last meal. Then, have them break that down into ingredients, and break the ingredients down to their source. For example, a hamburger might become “bun, beef, cheese, tomato, lettuce, ketchup” and then the bun could be further broken down to “wheat, egg, yeast, water, salt, sesame seeds” or beef could be broken down to “corn or grass eaten by the cow.”

For middle school, pick one example and break it down together as a class.

Once the meals have all been broken down, have students highlight or star all of the plants that were involved in their meal. Approximately 75% of those plants required pollination. Pollinators are very important to our survival, so what can we do to help them?

Content and Methods:

Estimated Duration: 30 minutes

Designing a garden

- Set students up with their research devices. For the first task, give about 5-10 minutes for students to research important elements to pollinator gardens and add them to a group list. Some examples of key elements include:
 - Using a variety of plants to have blooms from early spring to late fall
 - Plants native to the area
 - Plants specifically for caterpillars to eat
 - Nesting spots, like a bee box or dead tree limb
- Students can write this list on a whiteboard if one is available, or a large sheet of paper, or use another method, like a shared document. Whatever the set-up, they should keep updating it during the research period.
- When this is done, talk through the criteria that the class came up with, having individual students comment on items that they added. Determine if there is anything that needs to be changed, added, or removed.
- With the criteria in place, have students take what they learned and create a sample plan for a pollinator garden. Alternatively, students can work in pairs or small groups for this portion. They will need to continue to research. Their plans should include the following;
 - A drawing showing a visualization of what the garden would look like

- A key listing what types of plants (at least five different types) would be used and general information about them, such as when they are in bloom, or if any special care would be needed.
- An explanation of any other pollinator garden features (should include at least one)

Conclusion:

Estimated Duration: 10 minutes

If the students have all worked individually, for the conclusion divide them into three groups and have each student share their design within their group. After all students have gone, the group should nominate the best design to share with the whole class. If students have worked in pairs or small groups and time permits, then students can all share directly with the class, and the top three designs chosen.

As a group, determine what elements from each design are best, and if there is a way to combine or modify one design to include all of them. Be sure to talk about why each part would be important or beneficial to pollinators.

Reflection and Evaluation:

Estimated Duration: During lesson

Reflection

Reflection for this activity takes place during the conclusion where students must verbalize considerations in their designs and evaluate other designs.

Evaluation

Students will be evaluated on their pollinator garden designs. The instructor can collect them, or walk around and check off that the designs include all of the items required in the objectives depending on what best fits the purposes of the group.

Extensions:

Implementation

While this lesson can be ended with creating theoretical designs, if possible, extend the lesson to include creating an actual pollinator garden somewhere.

Several of the extensions below can be used to help do this. Students can be divided into committees to better accomplish the goal of implementation. These would vary based on the group and scope of the project, but could include:

- A committee to finalize the design of the garden
- A committee to put together a budget and source materials (math extension)
- A committee to design educational signs to put in the garden (art extension)
- A committee to find a location or raise money (if necessary)
- A committee to create a plan for long term care of the garden

Implementation will take a minimum of one more class period to plan, and one to work to put in the garden, but may be more depending on the specific group.

Math

Set a budget for the pollinator gardens and have students total all the costs for components of their designs using Excel or a different applicable program. Budgeting is a very important real-world skill to practice. Students can practice sourcing materials, getting the most value for the price, and presenting the information in a way that is easy to share with others. This step is also very valuable for groups who plan to pick a design and plant a pollinator garden.

Art and Design

Have students create small informational signs that would be placed in the pollinator garden. The signs could give information about types of plants, pollinators that are likely to be seen, or other relevant fun facts. Students can express creativity with the signs and practice balancing aesthetically pleasing signs with ones that are helpful to the public.

Landscaping for Clean Water

Produced by the Dakota County Soil and Water Conservation District, this landscaping for Clean Water is a guide for teachers and staff with background information on watershed, runoff, water quality, soil ecology, native plants and pollinators and a collection of resources for activities, lessons and videos for all of those topics. The guide can be found [here](#).

Reference Materials:

Smithsonian in your Classroom. (1997). Partners in Pollination. Retrieved from:

http://www.smithsonianeducation.org/images/educators/lesson_plan/partners_in_pollination/pollen.pdf

U.S. Fish and Wildlife Service. (n.d.) Pollinators. Retrieved from <https://www.fws.gov/pollinators/>

