

Pollinator Habitats

Background

Pollination is the transfer of pollen grains from the anther to the stigma of the same or another flower. Pollination is required to produce seeds and fruits in up to 80 percent of the world's flowering plants, including 2/3 of the world's food plants. Exposure to pollinators may also maintain and promote genetic diversity in crops and other plants. There are over 100,000 species of pollinators, including mammals, birds, insects and other invertebrates.

In recent years the population of native pollinators has declined in the US and in Oklahoma. Some possible reasons for the decline include disease spread by non-native species of mites, pesticide use, loss of pollinator habitat and disruptions in migration corridors pollinators have typically followed in search of pollen.

Migratory pollinators require a continuous supply of nectar sources to maintain their energy requirements for migration. In some areas development or agriculture has disrupted traditional corridors, and the pollinators have to find alternative routes or discontinue migration. Some migratory pollinators include monarch butterflies and hummingbirds. New research shows that each spring, as monarch butterflies travel north from Mexico, the adults lay their eggs and die. The eggs hatch and pupate into new adults, which continue north into Canada. By fall, it is actually fifth- or sixth-generation adult monarchs that complete the cycle back to Mexico. Monarchs are one species of about 180 butterflies and skippers that have been counted in Oklahoma.

Home gardens, farms, parks, open spaces, even outdoor classrooms and schoolyards can be designed to help provide and improve pollinator habitat. Some ways to improve habitat include providing water, food resources, nest sites and nest-building materials. Avoiding pesticides is also important.

The best food for pollinators comes from native plants. Some highly specialized pollinators may depend on only one or a few plant types for food, shelter, or reproduction. In addition, native plants are better suited to the growing conditions of a region and generally require less care.

Pollinators benefit from food resources, but nest sites, overwintering sites, and other resources may be needed even more. Birds, bats, and butterflies require a water source. Butterflies require hiding places for pupae. Butterflies and bees benefit from a damp salt lick (a damp or muddy area of soil in which sea salt or wood ashes are mixed). Some bees and wasps require mud as nest-building material. Other bees use dead trees or tree limbs or open patches of bare earth as nest sites.

Overwintering sites are also in short supply for many pollinators, especially in areas with extensive urban and suburban development. Many homeowners attempt to keep a neat yard and garden area by cleaning up dead

P.A.S.S.

GRADE 6

Reading— 1.1; 3.1b;
5.1ab,2ad

Writing— 1.1; 2.3a,4a,7

Oral Language— 1.1; 2.2

Visual Literacy— 3

GRADE 7

Reading— 1.1; 3.1c;
5.1abc,2a

Writing— 1.1;

2.2abc,3a,4b,8

Oral Language— 1.2;
2.2

Visual Literacy— 3.1

GRADE 8

Reading— 1.1; 3.1b;
5.1abc,2a

Writing— 1.1;

2.2b,3b,5ac

Oral Language— 1.1,2;
2.2

Visual Literacy— 3.1

Resources Needed

computer and library
access

index cards

plant and insect reference
books

seed catalogs

Experts

OSU County Extension
educator (listed in the
phone book under county
government)

Oklahoma Conservation
Commission (listed in
phone book according to
county)
<http://www.conservation.ok.gov/>

Oklahoma Department of
Wildlife Conservation
405-521-3856
<http://www.wildlifedepartment.com/>

OSU Department of
Entomology and Plant
Pathology
405-744-5527

leaves and brush that could serve as winter shelter for pollinators. To aid pollinators in finding suitable overwintering habitat, homeowners could consider leaving cut plant stems exposed and leaving twigs and brush in small piles. Artificial nest sites can be built for some pollinators.

Prairie restoration, establishment of wildlife preserves, and encouragement of diverse wildlife landscaping rather than monoculture lawns, are other examples of ways to help pollinators.

Background Sources: National Biological Information Infrastructure, Xerces Society

Activities

1. Read and discuss background and vocabulary.
2. Students brainstorm to determine the best sources for developing a list of native and migratory pollinators and information about pollinator needs. (online sources, library).
 - Review “How Reliable Are Your Sources?” included with this lesson.
 - Students divide into research groups to develop a list of native and migratory pollinators and to find as much information as possible about pollinator needs.
 - Students use index cards to keep research notes
3. Use the list at left to find an expert on native pollinators and their habitats.
 - Students may invite experts to visit your class or arrange interviews by phone, via email or by writing letters.
 - Students prepare detailed, specific questions in advance, based on their research.
 - Students use their questions to conduct the interview. Bundle questions for mailing if the interview is to be conducted by mail.
 - Students take detailed notes of the experts’ responses to questions.
4. Students work in groups to design habitats, based on what they learn from their research and interviews with experts.
 - Students select flowers from seed catalogs (look online or order free catalogs through the mail) or gardening books. Many seed catalogs specifically list plants attractive to butterflies and other pollinators.
 - Students use technology to present their designs to the class, using visual aids such as charts, drawings, etc.
 - Students discuss the pros and cons of each design and develop a class habitat plan, using the best ideas from each design.
 - Students write reflective paragraphs about what they learned from the activity.
5. Students research online, in the library or by interviewing experts to find what pollinates these Oklahoma crops: alfalfa, soybeans, peanuts, cotton, wheat, sorghum, pecans.
6. Students research to find what plants attract the official state insect (the Black Swallowtail).
7. Students build artificial nesting boxes, based on what they learned from their research and interviews. (Instructions for one example of a bee nest-

ing box are included with this lesson.)

- Students keep notes as they build the boxes.
- Students write detailed instructions from their notes.
- Students prepare demonstrations, with visual aids, to teach younger students how to build the boxes.

Extra Reading

Buchmann, Stephen, *Honey Bees: Letters from the Hive*, Delacorte, 2010.

Gibbons, Gail, *The Honey Makers*, HarperCollins, 2000.

Pringle, Laurence, and Bob Marshall, *An Extraordinary Life: The Story of a Monarch Butterfly*, Scholastic, 2000.

Souza, DM, *Freaky Flowers*, Franklin Watts, 2002.

Stetson, Emily, and J. Susan Cole Stone, *Kids' Easy-to-Create Wildlife Habitats*, Williamson, 2004.

Vocabulary

diverse—differing from one another

genetic diversity— many different versions of otherwise similar organisms in an ecosystem.

habitat—the place or type of place where a plant or animal naturally or normally lives or grows

invertebrate—lacking a backbone

migration—passing from one region or climate to another, usually on a regular schedule for feeding or breeding

migration corridor—a stretch of nature that facilitates the migration of animals

monoculture—the cultivation or growth of a single crop or organism especially on agricultural or forest land

nectar— a sweet liquid that is secreted by the nectaries of a plant and is the chief raw material of honey

pesticide—an agent used to destroy pests

pollen—a mass of microspores in a seed plant appearing usually as a fine dust

pollination— the transfer of pollen from an anther to the stigma

pupae—an intermediate stage of a metamorphic insect that occurs between the larva and the imago, is usually enclosed in a cocoon or protective covering, and undergoes internal changes by which larval structures are replaced by those typical of the imago

pupate—to become a pupa : pass through the stage of the pupa

skipper—any of various insects that differ from the related butterflies especially in having stout bodies, smaller wings, and usually antennae with curved ends

stigma—part of the pistil of a flower which receives the pollen grains and on which they germinate

wildlife preserve—a protected area of importance for wildlife, flora, fauna or features of geological or other special interest, which is reserved and managed for conservation and to provide special opportunities for study or research.

How Reliable Are Your Sources?

When conducting research, make sure you use reliable information from legitimate sources. Reliable information is well-researched from sources that are well-respected and as objective, or neutral, as possible. The best way to find legitimate sources is to go to the library and use scholarly journals, reference books and other well-researched sources.

Another place to find information is the Internet. Conducting research on the Internet is convenient, but it can also be tricky. There are many thousands of Web pages that have little actual content and are mainly links to other pages, which may be links to other pages, and so on. Anyone can post anything to the Internet. To make sure you have found a reliable source of information, ask yourself these questions:

1. Who is responsible for the Web site? Is the Web page associated with a reliable organization, such as a university or a government agency? What interest does the organization responsible have in the information presented. For example, will the organization profit from the information presented?
2. Who wrote the information? If the author is not listed or has no credentials, it may not be a credible source. Pay attention to the author's credentials or experience. Is the source really an authority on this particular matter or someone with an impressive title that has no connection to the subject matter?
3. When was the information written? Is it current? Is it still relevant?
4. Are there other sources that agree with statements made on the site, or do other sources contradict this source? In that case you may need to search further. It's always a good idea to gather more than one source.
5. Are any sources cited? If the author does not document anything, then the information may simply be someone's opinion. If statistics used come from a survey, how was the data gathered? Who conducted the survey or poll? Was the sample representative of the population? How many were surveyed? What percent of the population?

When choosing between the library and the Internet keep in mind that up to 90 percent of the contents of college library collections are not on the Internet. Because of copyright laws it is too expensive to put all scholarly work on the Internet. This means that the most comprehensive source of information is still the library.

Bee Nesting Box

Materials needed: empty pint milk cartons, white glue, paper drinking straws, metric rulers, string, scissors, paint

Procedure:

1. Clean the milk carton.
2. Cut the carton to 10 cm high, with the bottom intact.
4. Cut each straw in half.
5. Cover the inside of the carton with glue.
6. Fill the carton with upright straws.
8. Trim straws so they are even across the top of carton. It should look like a honeycomb when complete.
9. Place the hive on its side to dry
10. When dry, hang the hive outdoors in a shady tree (away from children's play areas).

Observe the hives. Keep a journal of activity.

