NEW YORK STATE
Conservationist
for kids!

WHAT'S ALL THE BUZZ ABOUT POLLINATORS?

THERE ARE ABOUT 50 SPECIES OF BUMBLEBEES IN NORTH AMERICA

NEW YORK STATE

Conservationist for Kids!

IN THIS ISSUE: We will learn about what pollinators are, what they do, and how we can help them.

Want to receive *Conservationist for Kids* at home? Subscribe to *Conservationist* magazine!

You'll get six issues of the award-winning *Conservationist* magazine each year, plus *Conservationist for Kids* in the October, February and April issues. Call 1-800-678-6399 for information about how to subscribe. Or, write to us at:

NYS Department of Environmental Conservation
Conservationist for Kids, 625 Broadway, 4th Floor
Albany, NY 12233-4502
kidsconservationist@dec.ny.gov

Cover image by Susan Shafer

Answer to Outside Page

WHAT ARE POLLINATORS?

A pollinator is any animal that helps a plant to produce fruits or seeds. This is done by moving pollen from the male parts of a flower to the female parts, where it fertilizes the plant. Pollen is the yellowish substance you see in many flowers – if you have ever touched a flower and then had yellow on your fingers, that was pollen. If you have gotten a yellow nose after smelling a flower, that was pollen! Only a fertilized plant can produce fruit and seeds, and pollinators play a very important role in this process.

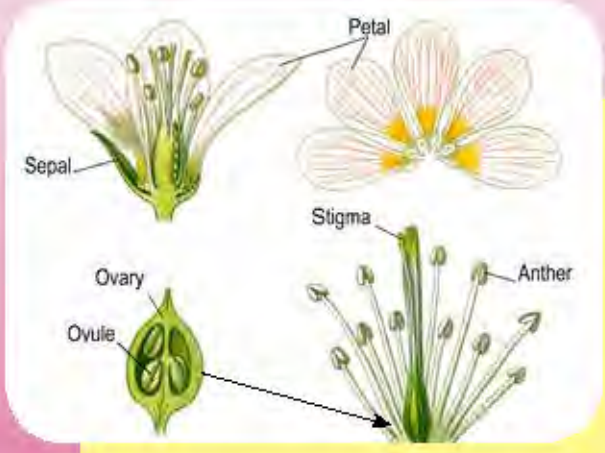
hummingbird

A variety of animals can be pollinators, including bees, butterflies and moths, beetles, flies, birds, and even some bats! Bats typically serve as pollinators in places like Mexico, Africa, Southeast Asia, and the Pacific Islands. Most bats in the United States only eat insects, although there are bats that pollinate some plants in Arizona, New Mexico, and Texas. In New York State, our primary pollinators are insects like bees, flies, beetles, and butterflies, although some birds such as hummingbirds also play a role in pollination. Some plants are entirely wind pollinated, but most plants rely on some form of animal pollinator to help with the process.

Did you know that there are more than 200,000 species of pollinators around the world? Roughly 1000 of these are birds and mammals, and the rest of them are invertebrates. An invertebrate is an animal without a backbone, which includes insects. Insects make up the largest group of pollinators worldwide.

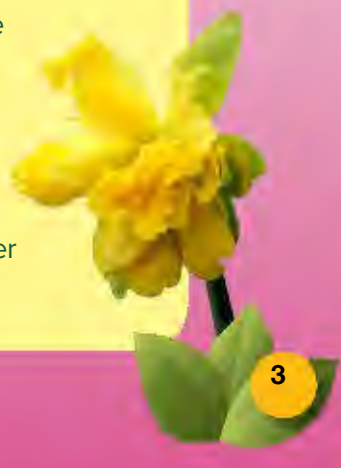
People use more than 1000 plants for food, medicine, or other purposes that require the help of pollinators. Although many people are allergic to some kinds of pollen, it is very important to our survival, because much of the food that we eat comes from pollinated plants. Without pollinators, the plants would not produce the fruits or seeds that people need, and also would not be able to produce new plants.

Besides helping produce much of the food that we depend on, pollinators are critical components of wildlife habitat and the natural world.



WHAT IS POLLINATION?

Seeds and fruit develop in the ovary, beneath the stigma. Pollination is the process in which plants are fertilized, meaning that they are able to produce seeds and fruit. In order to be fertilized, pollen must be transferred from the male part of a flower (anther) to the female part of a flower (stigma). Sometimes this can happen in the same flower, other times it requires multiple flowers. Pollinators help this process by visiting flowers and moving the pollen around. Some pollination is done as insects such as bees collect pollen for food, and when they move from flower to flower they spread the pollen. Bees have very fuzzy bodies, and as they drink nectar to produce honey in their hives, pollen sticks to them and is transported to other flowers. Other nectar-drinking animals that help spread pollen include butterflies and hummingbirds.



MEET THE POLLINATORS:

Pollinators help pollinate native wildflowers, herbs, shrubs, and trees. Many of these plants are important sources of food for other animals, or are used as shelter and nesting sites. Without pollinators, many of these plants would not survive, and as a result neither would the animals that depend on them. Many pollinators are also important food for a variety of animals, such as birds, frogs, and small mammals. If the pollinators disappeared, the animals that eat them would have a hard time surviving.

Hummingbird moths get their name from the way that they fly, which is very similar to hummingbirds. They are active during the daytime, and drink nectar from a wide variety of flowers. Most active during the summer, they are especially drawn to plants like honeysuckle, dogbane, hawthorn, cherries, and plums. Some species of moth pollinate at night when certain plants are in bloom.

There are several species of **bumblebees** native to New York State. Pollen easily sticks to their fuzzy bodies as they move from flower to flower. They are not only important in pollinating wildflowers and other native plants, but are also an important pollinator of crops including tomatoes, peppers and eggplants.

Wasps' bodies aren't as fuzzy as bees, but they are still important pollinators, visiting a number of different flowers as they gather pollen and nectar. Wasps are also an important form of natural pest control, capturing many plant pests to feed to their young.

Hoverflies are one of the most important groups of pollinators, both for wildflowers and agricultural crops. They pollinate as they drink nectar and eat pollen. Their larvae eat aphids and other plant pests. Although they look like bees, hoverflies don't sting – they mimic bees as a form of protection!

Hummingbirds drink nectar, and in the process, they help pollinate a variety of plants. In New York, the ruby-throated hummingbird (female shown here) is our main species, and is present from spring through fall.

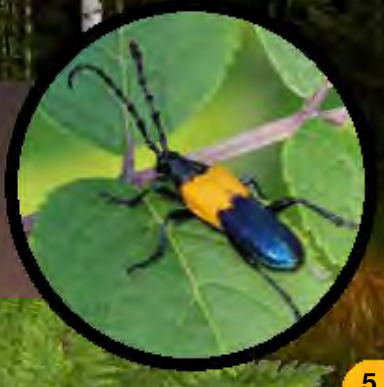
Paper wasps build large nests up in trees or attached to buildings. They will usually leave you alone if you leave them alone.
Don't disturb the nest, or these social insects will actively defend it with many painful stings!

Bee-flies or ***Bombyliid* flies** look very much like honey bees and bumblebees, and are found throughout much of the world. They have very hairy bodies, which collect pollen as they drink nectar. *Bombyliid* flies are believed to pollinate more than bees in some parts of North America.

The **swallowtail butterfly** is one of many **butterfly species** found in NYS. Butterflies drink nectar, and as they fly from flower to flower, they help to spread pollen, although not as effectively as bees. They are most active during the summer, and will visit a wide variety of wildflowers.

Monarch butterflies are dependent on milkweed plants for the completion of their life cycle. Planting milkweed native to your area can greatly help this pollinator survive! Monarch butterflies migrate south in the fall, over-wintering in the southern United States and Mexico.

A variety of **beetles** such as the **elderberry borer** (pictured) and scarab beetles are very important pollinators. Beetles were some of the first insects to visit flowers in prehistoric times, and are especially important as pollinators of some ancient plant species.



THE BUZZ ON BEES

Here are some photos of various bees and wasps found in New York. How many of them do you recognize? Have you seen them before?

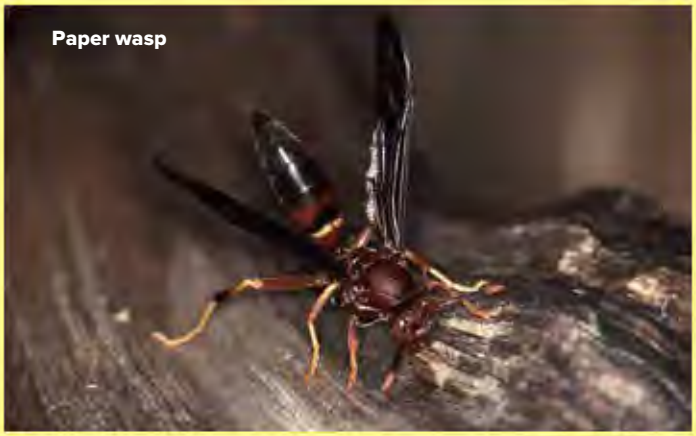
New York is home to many species of bees and wasps. Many people are allergic to some of them, but not all, although most people are afraid of being stung by them! Most will leave you alone as long as you leave them alone. Don't actively swat at them, and as long as their nests are not in a place that could be a danger to people, try to leave the nests alone and avoid disturbing them. Sometimes nests such as beehives do need to be moved, but this should only be done by a professional! By learning how to recognize the different types, you will be better able to deal with them.

Bumblebee

Yellow jacket

Honey bee

Honey bees are native to Europe and were introduced to North America, but are important pollinators.



Paper wasp

Baldfaced hornet

Many bees are social, as seen in this honey bee swarm.

HOW CAN WE HELP POLLINATORS?

Unfortunately, many species of pollinators are disappearing, for a variety of reasons. Habitat loss, chemicals such as pesticides, and diseases are all major reasons why pollinators are declining. When they do not have places to eat or nest, they will have a hard time surviving. Some pollinators such as monarch butterflies migrate long distances, overwintering in the southern United States and Mexico. Loss of winter habitat and places to rest along their journey have led to large drops in numbers of some species.

Many of the chemicals that farmers and homeowners use to protect their crops, lawns, trees/shrubs, and flowers from diseases and pests are also harmful to pollinators, especially bees and butterflies. By using fewer chemicals or less harmful chemicals, people can help pollinators survive.

The ways DEC manages Wildlife Management Areas also helps pollinators. An example is using fewer chemicals or natural alternatives to control unwanted vegetation or pests. Restoring habitats such as grasslands and young forests are also important ways of helping pollinators. Both of these are important habitat types to pollinators as well as a variety of other species, and DEC is actively working to improve habitat across the state.

In 2015, Governor Cuomo created a Pollinator Task Force to put together a plan to help the pollinators in New York State. In addition to the benefits to native wildlife and the overall health of the environment, pollinators are also very important to agriculture. The Task Force released a state pollinator protection plan with recommendations of how everyone from state agencies to businesses and individual citizens can help pollinators survive and thrive. As part of the Task Force, the NY Natural Heritage Program (www.nynhp.org) will be doing an inventory to help determine how some of our native pollinators are doing. A citizen science component is in development, so stay tuned for ways you can help!

Some people keep bees, either as a hobby or as a business. By providing places for bees to nest and overwinter, as well as appropriate plants where they can gather pollen, beekeepers can help them to survive. Most beekeepers also harvest some of the honey and wax that the bees produce, which can be turned into a variety of products.

You can help pollinators at home too! By **not spraying them** with chemicals **or hitting them** with fly-swatters, you can help them to live. It is also important to **plant native plant species** in your yard or garden, because the pollinators will rely on them for food sources. **Provide homes or other forms of shelter** for bees, **put out nectar feeders** for butterflies and hummingbirds, and try to **avoid spraying chemicals** on your lawns, gardens, and other areas if at all possible. Many local home and garden centers and other stores sell pollinator seed mixes for your area.

The UTSIDE Page

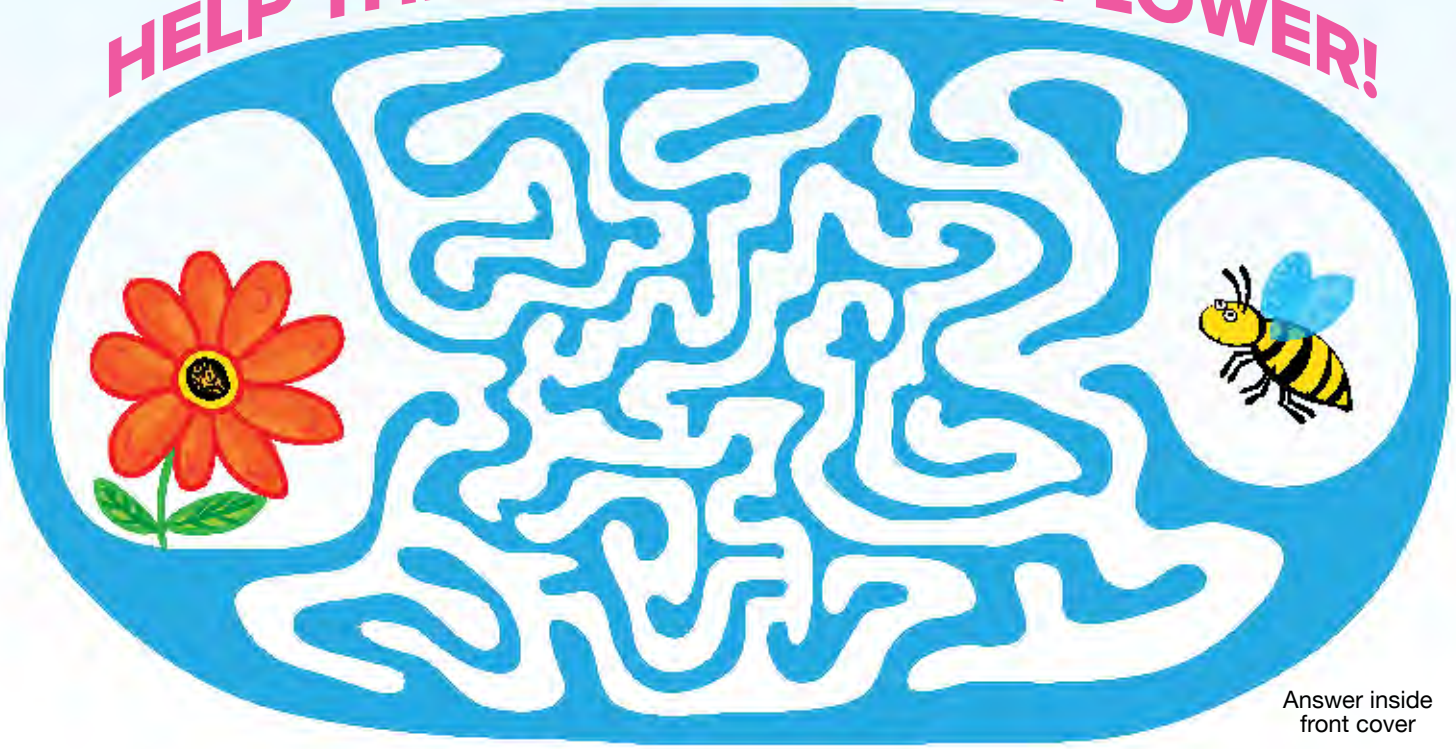
Exploring Your Own Environment

BUILD A BEE HOUSE

With the help of a parent, scout leader, or other adult, you can easily build a bee house for your yard or garden. With a variety of sizes of drill bits, have an adult help you drill holes part-way through a piece of untreated scrap lumber, being careful not to drill all the way through. The holes should be three to five inches deep. The bee house can be covered in chicken wire if you would like to keep birds away from it, and should be placed on the south side of trees, fence posts, or buildings. Don't disturb the bee houses or spray chemicals near them, and leave them in place until at least late fall (November). Some bees also like to nest in the ground, so try to keep some areas cleared of vegetation if possible.

Citizen Science There are a number of citizen science projects that you can participate in that have to do with pollinators. The website of the Xerces Society has a list of many different projects that you can take part in. Visit **www.xerces.org/citizen-science/pollinator-citizen-science/** to learn more.

HELP THE BEE FIND THE FLOWER!



Answer inside front cover

New York State *CONSERVATIONIST FOR KIDS*
Volume 10, Number 3, Spring 2017
Andrew M. Cuomo, Governor

NEW YORK STATE DEC:
Basil Seggos, Commissioner
Sean Mahar, Assistant Commissioner for Public Affairs

OFFICE OF COMMUNICATION SERVICES
Harold Evans, Director
Jeremy Taylor, Editor
Jennifer Peyser, Designer

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

PRINTED ON RECYCLED PAPER

This issue funded by NYSDEC's Division of Fish & Wildlife.

EDITORIAL OFFICES - *Conservationist for Kids* ISSN 1940-8099, © 2017 by NYSDEC, is an official publication of the New York State Department of Environmental Conservation published 3 times per year at 625 Broadway, Albany, NY 12233-4502. Telephone (518) 402-8047. TO SUBSCRIBE TO *CONSERVATIONIST FOR KIDS,* visit the department's website at www.dec.ny.gov or call 1-800-678-6399. *CONSERVATIONIST FOR KIDS* and the Teacher Supplement are available online at www.dec.ny.gov. The New York State Department of Environmental Conservation does not discriminate on the basis of race, national origin, disability, age or gender.

CONSERVATIONIST FOR KIDS

New York State Department of Environmental Conservation
625 Broadway, 4th Floor, Albany, NY 12233-4502
P: (518) 402-8047 | F: (518) 402-9036 I kidsconservationist@dec.ny.gov
www.dec.ny.gov

Conservationist for Kids

Supplement for Classroom Teachers – Pollinators

Why Pollinators?

From the food we eat to the clothing we wear, many of the products we rely on are made possible by pollinators. Without them, plants would not develop seeds or fruit, and in many cases the plants would not exist at all, as they would be unable to reproduce and grow the next generation. Pollinators are incredibly important to the natural world as well, pollinating many of the plants that wildlife depends on for food and shelter. The pollinators themselves are also an important source of food for many other animals. Unfortunately, pollinators are in trouble for a number of reasons, including chemical use and loss of habitat. A recent study has shown that of the more than 1,400 species of bees native to North America, roughly half are at risk of extinction. In this issue, we explore what pollinators are, what they do, and how we can help them to survive.

This Issue's "Outside Page"

The "Outside Page" in this issue of *Conservationist for Kids* instructs students on how to build a simple bee house for their yard or garden. Some solitary species of bees don't nest in traditional hives, but prefer to nest in small holes such as those created in the project. A link to a variety of citizen science projects involving pollinators is given, and lastly, students are challenged to help a bee find its way through a maze to reach a flower on the other end. By completing the maze, the students can experience what it is like for a bee as it makes numerous trips back and forth between flowers and the hive each day.

Supplemental Activities for the Classroom

Explore Biodiversity

Pollinators are an excellent example of biodiversity, and why it is important to the survival of life on Earth. As was discussed in this issue of *Conservationist for Kids*, there are more than 200,000 species of pollinators around the world. Approximately 1000 of these are birds and mammals, and the rest are invertebrates such as bees, butterflies, beetles, and flies. Biodiversity is a term to describe the variety of life on the planet. Pollinators alone have huge diversity, as do the different plants that they pollinate. Some are specific to certain plants, while others are more generalist in nature. To learn more about biodiversity, read the Fall 2013 issue of *Conservationist for Kids*, available online at www.dec.ny.gov/education/100637.html.

Meet a Beekeeper

In addition to being critical pollinators to many native plants and agricultural crops, bees are also important for another reason – honey! Bees collect nectar from flowers and take it back to

the hive, where it is turned into honey. The nectar is placed in many cells of the honeycomb, and the bees in the hive fan their wings over it, causing increased evaporation to take place. This slowly thickens the nectar, which has mixed with enzymes from inside the bee's crop, and turns it into honey. Apiarists (or beekeepers) have been raising bees and producing honey for many years. Contact a local apiarist to see if they might be willing to come give a talk to your class about keeping bees, and how they make honey and other products. For contact information to local beekeeping groups, visit www.agriculture.ny.gov/PI/Beekeeping_Club_Contacts.pdf [PDF download].

Online Resources

DEC's Animals, Plants, Aquatic Life webpage www.dec.ny.gov/23.html
DEC's Biodiversity & Species Conservation webpage www.dec.ny.gov/animals/279.html
DEC's Native Flowers for Gardening and Landscaping [PDF download] www.dec.ny.gov/docs/lands_forests_pdf/factnatives.pdf
DEC's New York Natural Heritage Program webpage www.dec.ny.gov/animals/29338.html
New York State Pollinator Protection Plan [PDF download] www.dec.ny.gov/docs/administration_pdf/nyspollinatorplan.pdf
DEC's Sustainable Landscaping webpage www.dec.ny.gov/public/44290.html
DEC's Wildlife Management Areas webpage www.dec.ny.gov/outdoor/7768.html
DEC's Young Forest Initiative webpage www.dec.ny.gov/outdoor/104218.html
Great Pollinator Project's Education webpage http://greatpollinatorproject.org/education
Million Pollinator Garden Challenge http://millionpollinatorgardens.org
Monarch Joint Venture http://monarchjointventure.org
National Wildlife Federation's Garden for Wildlife webpage www.nwf.org/Garden-For-Wildlife.aspx
NYS DOT's Pollinator Project webpage www.dot.ny.gov/regional-offices/region4/other-topics/pollinator-project
Pollinator Partnership's Education Resources webpage www.pollinator.org/education
USDA Forest Service Pollinators webpage www.fs.fed.us/wildflowers/pollinators/
USDA Natural Resources Conservation Service Insects & Pollinators webpage www.nrcs.usda.gov/wps/portal/nrcs/main/national/plantsanimals/pollinate/
U.S. Fish and Wildlife Service Pollinators webpage www.fws.gov/pollinators/
The Xerces Society for Invertebrate Conservation's Education webpage www.xerces.org/educational-resources/

Books

100 Plants to Feed the Bees, The Xerces Society, Storey Publishing, 2016.
Attracting Native Pollinators: The Xerces Society Guide to Conserving North American Bees and Butterflies and Their Habitat, Storey Publishing, 2011
Insects as Pollinators, Lyn A Sirota, Rourke Educational Media, 2016
What If There Were No Bees? A Book about the Grassland Ecosystem, Suzanne Slade, Picture Window Books, 2010
What is Pollination?, Bobbie Kalman, Crabtree Publishing Company, 2010
You Wouldn't Want to Live Without Bees!, Professor Alex Woolf, Franklin Watts, 2016

Conservationist for Kids **and an accompanying teacher supplement are distributed free of charge to public school 4th grade classes in New York State three times per school year (fall, winter and spring).** If you would like to be added to or removed from the distribution list, need to update information, or if you have questions or comments, please e-mail the editor at **KidsConservationist@dec.ny.gov** or call 518-402-8047. Limited quantities of some back issues are also available on request. The full archives can be found online at **www.dec.ny.gov/education/100637.html**