National Association For
Family & Community Education

The Hearth Fire Series #82

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POLLINATORS! THEY'RE NOT JUST BEES

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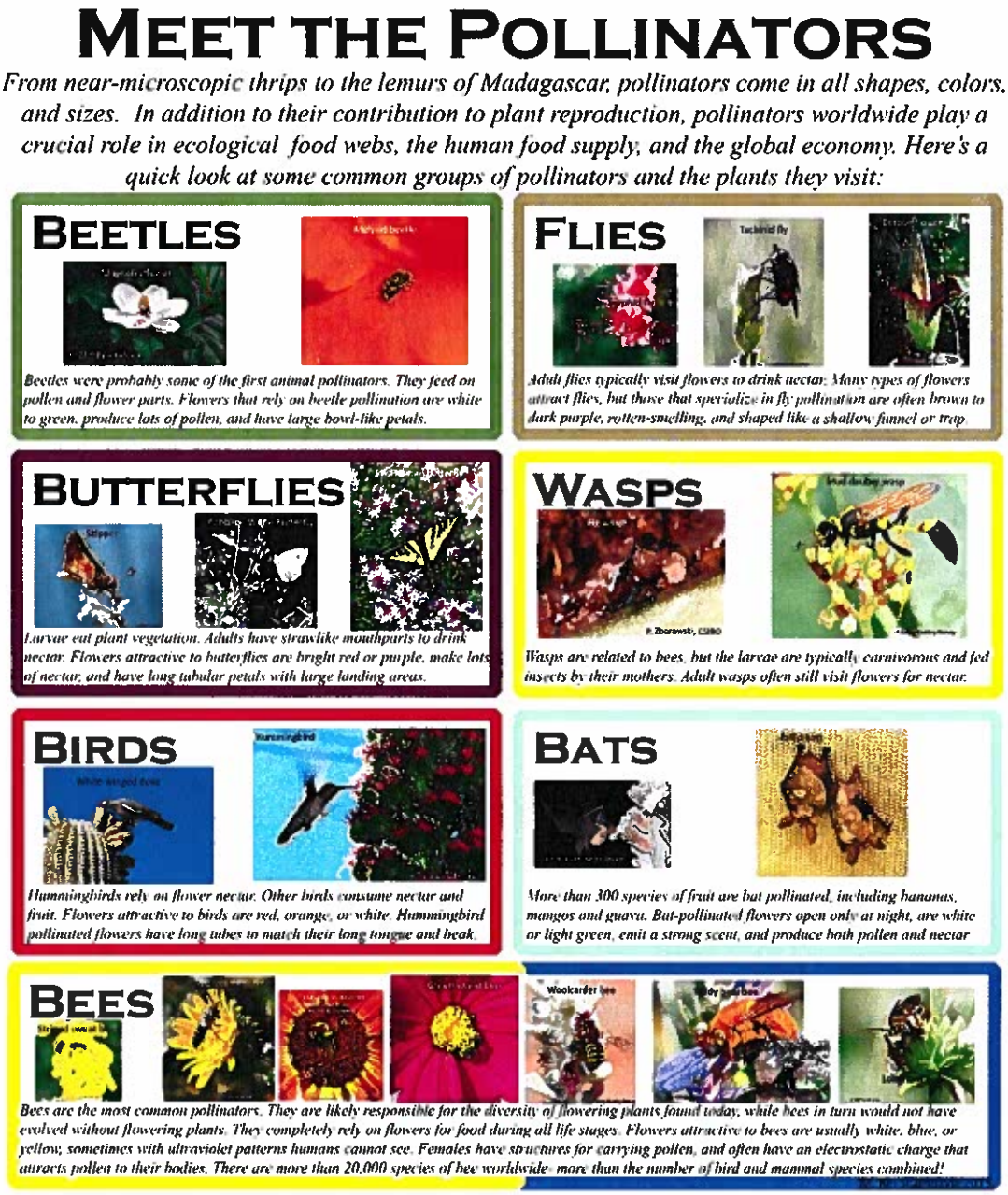
POLLINATORS! THEY'RE NOT JUST BEES
LET'S DEFINE POLLINATORS

The National Park Service defines pollinators as anything that helps to carry the pollen from the male portion of a flower to the female portion (can be the same or another flower). The pollen can be carried to the original flower or to a second or multiple flowers. Here is just a partial list of groups of pollinators: wind, water, insects, birds, animals, and humans.



https://diadasia.wordpress.com/wp-content/uploads/2015/05/meet-the-pollinators.jpg

Many groups of bugs, animals, plants, and even humans move pollen grains from one plant to another to cause fertilization. Pollinators play a huge part in helping with increasing food security, yet they are facing dwindling numbers, in part this is being caused by the very farming industry pollinators are so vital to.

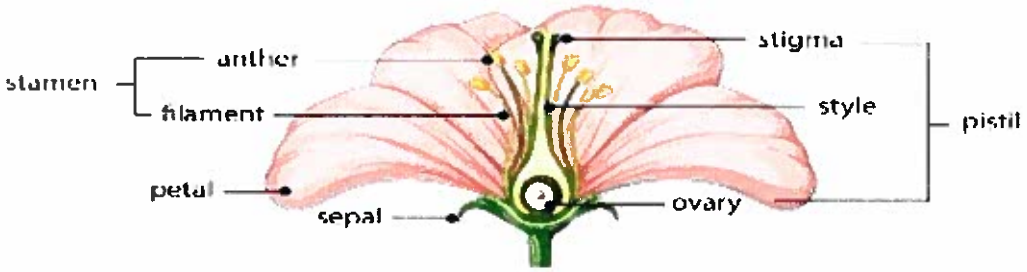
A FEW FACTS

- According to the National Park Service pollinators are responsible for one out of every three bites of food you eat, that is 75%!
- Almost all the world's seed plants (plants that produce seeds) require pollination. This is not just vegetables, but seed oils/fats in our diet and more than 150 different types of food crops. In fact, according to the USDA pollinated foods make up about $15,000,000,000 (billion) a year in the United States…
- And $3,000,000,000,000 (trillion) dollars globally.
- As a side note, honeybees also produce honey which in 2017 was a 3.2-million-dollar industry. They play a role in preventing soil erosion, and carbon sequestration.
- It is essential for the survival of the ecosystem. Humans, along with earth's biomes (grasslands, deserts, forests, and tundra) would not survive.
- There are 1,400 types of crop plants from around the world that produce all our foods and industrial products that are plant based and 80% of them require animal pollination.
- Pollinators provide us with fruits that are more flavorful and larger and higher crop yields.

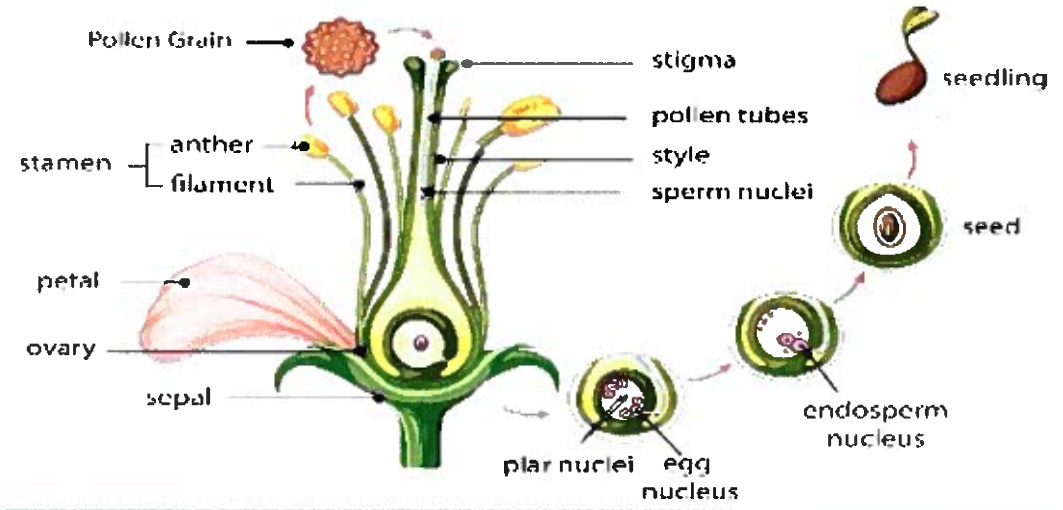
WHAT IS POLLINATION?

Pollination occurs when any form of pollinator (bats, hummingbirds, robins, bears, humans, paint brushes, dogs, cats, caterpillars and butterflies) brushes against, paints, moves across, or lands on a plant looking for food, a mate, or even water and their body moves the pollen grains from the anther or male part of a flower to the stigma or female part. This necessary process is the first step in seed production, producing fruits or nuts and creating the next generation of plants.

Parts of a flower



Pollination of Flowering Plants



WHAT IS HAPPENING TO OUR POLLINATORS?

Several of our world's pollinators' numbers are on the decline, threatening our global food security. The threats are coming from many sources, and the reasons for the drop in pollinators are being studied in many different countries, by government agencies and universities. In the U.S. USDA, Land Grant Universities, as well as other agencies are partnering together to study and address the problem.

There has been a tremendous loss in the numbers of monarch butterflies in the western part of the world with a documented loss in their numbers from 35-49% in population to 58% seasonally. We are facing a decline in several species of bumblebees geographically and numbers over a period of 20 years, these species include the common bumblebee, western bumblebees, and rusty patch bumblebees. There has been a drop in managed honeybee colonies in the US. In the 1940s we had five million and in 2023 we had approximately 2,680,000. This information was taken from the Pollinator.org website.

The common bumblebee (left) the western bumble bee photo by David Broadland (middle) and the rusty patch bumblebee (right)

JUST A FEW OF THE THREATS FACING POLLINATORS

- Habitat loss
  - Human developments are spreading into the habitat of pollinators.
  - Expansive lawns and increase use of non-native plants can remove entire species of plants needed by the pollinators, this can also be hybridized versions of plants.
- Pesticides
  - Certain pesticides can remove whole entire groups of pollinators.
- Parasites and Pathogens
  - Parasite organisms remove vital nutrients that the host organism needs to survive and thrive.
  - Pathogens are microorganisms (i.e., bacteria, virus) that cause disease to the pollinators.
- Non-native and invasive plant species
  - Pollinators and native plants have evolved together over thousands of years.
- Climate change
  - The climate and its changes have impacted pollinators in quite a few ways.

LET'S LOOK AT EACH OF THESE FACTORS IN DEPTH

HABITAT LOSS:

Pollinators need both food and shelter, and for insect pollinators, these two options are much narrower for their larvae. The larvae for some insect pollinators eat a narrow range of plants, for example the larvae of the monarch butterfly are laid onto the native variety of the milkweed plant, the caterpillar feeds on the milkweed plants and processes the plant's toxin

(this protects the caterpillar from predators of all kinds), the adult monarch butterflies use the milkweed to fuel its migration. This relationship has "evolved" into a mutual dependency. Many consider milkweed to be a weed and is often removed from lawns and yards. This is causing a loss of habitat for the monarch butterfly and could be in part responsible for this pollinator's decline in numbers.

Loss of appropriate nesting sites for birds and animals has had an impact on pollinator numbers and is helping with their decline. When we remove logs, fill in ground cavities, and keep our lawns or fields mowed, we are removing potential habitats from our pollinators. Certain pollinators are migratory (think birds and animals) habitat loss can also impact overwintering of these species.

PESTICIDES:

Pollinators are affected by the overuse and misuse of pesticides. They are exposed to herbicides, fungicides, neonicotinoids, and INSECTICIDES (biggest impact). There could be an entire Hearth Fire on neonicotinoids, a special category of pesticides all their own. Pollinators are affected when pesticides are misused or used incorrectly. By taking the time to understand the way beneficial insects and other types of pollinators are, we are taking the necessary steps to protect them and the human pollinators too. One of the most impactful things we can do is simply withhold the use of pesticides during the blooming portion of the plant cycle.

PARASITES AND PATHOGENS:

A parasite is any organism that lives in or on the host: mites, lice, and some insects (mosquitoes). A pathogen is a bacterium, fungus (mold), or a virus that attacks the bee colony from within and can be carried onto a particular mite that attacks the bee's food source. Whether the pollinator is wild or human managed can help determine if parasites or pathogens can infect the hive or host.

NON-NATIVE AND INVASIVE SPECIES:

Let's go back to the lovely monarch butterfly and their dependent on milkweed. There are more than one hundred different varieties of milkweed: the native variety is the one that the monarch butterflies are drawn to. At some point someone thought "hey let's plant the tropical variety and give the pollinators a choice." The problem is by planting an invasive species it is not a variety that is optimized for most North American growing regions, and it doesn't have the same life cycle (it grows all year long) and confused the monarch on when it is time to fly south into Mexico for the colder months.

In the southern United States, there is an invasive plant species called Kudzu. It is particularly hardy (think almost impossible to eradicate) and amazingly fast growing. A few of the problems caused by kudzu are that it grows over everything and kills the native plants pollinators need to survive.

Source: https://en.wikipedia.org/wiki/Kudzu

CLIMATE CHANGE:

Changes in temperature, severe weather patterns, natural disasters, fires are all ways climate change is affecting our pollinators. The pollinator information website: www.**pollinator.org** notes that in the state of California instances of severe weather in 2023 caused a loss of 60 percent of the state's monarch butterflies. Wildfires can have both a negative and positive direct impact on pollinator populations. The negative of course is the burning off habitat and death of whole groups of pollinators, especially those living above the ground. The positive effect is when the regrowth of vegetation happens, it almost creates a new habitat.

WHAT CAN WE DO TO HELP SAVE OUR POLLINATORS

We can help to increase the number of pollinators in several ways:

- In our plantings, lawns and yards we can learn to love weeds, especially the flowering ones, plant wildflowers in with our grass, create a bed of wildflowers and milkweed. Grow a butterfly garden!
- We can limit the use of pesticides on our vegetables, fruits, and berries. They will be safer for both pollinators and our consumption.
- We can start supporting our local beekeepers and organic farmers, buying honey and produce from small producers. This helps our local community and sustainable pollinator practices.

IN CLOSING

The loss of pollinators would impact our food security with a decrease in crop yields. A drop in pollination of our food supply means less crops are produced, which is less food to feed the world's population. Pollinators contribute more than $24,000,000,000 (billion) to the U.S. economy according to the United States White House, USDA, and the Xerces Society. This loss of income affects farmers, and several related industries. Protecting our environment's pollinators helps to protect our mental health by giving us green spaces to enjoy, we have the benefit of medicinal plants, and most importantly, protecting our pollinators helps us gauge our environmental health by showing us indicators of eco systems that may be in crisis. This benefit is essential for a healthy planet.

AGENDA:

2 minutes Welcome and Introduction of speakers and their board position

7 minutes **Activity #1**: Name three Pollinators. Ask for Volunteers?

What if I asked you to name three pollinators? Could you name three different ones?

1) Using a flip chart or large piece of paper to record answers.
2) Have small prizes for the winners of the game, small jars of local honey or fruit jams or jelly as a suggestion.
3) Ask for a volunteer to stand up and name three different pollinators. Have the first person remain standing.
4) Ask for a second and third (or as many gifts as you have) volunteer to stand up and name three different pollinators from each of the prior volunteers. Have each of them remain standing.
5) At the end of the round, distribute a small gift to each volunteer of the activity.

20 minutes Introduction to the lesson:

Let's define and meet the pollinators,
Some facts and figures,
What is pollination?

10 minutes **Activity #2:** Let's use our cell phones for research

Break into groups of 2-4 and distribute wildflower seed packets or photos of seed packets. Ask each group to use their phones to research the seeds and determine the best match between the flowers and different pollinators. After 5 to 10 minutes ask one person from each group to report on their findings.

15 minutes What is happening to our pollinators?
How can we help save our pollinators?

6 minutes **Activity #3:** Word Search

60 minutes Total time

ITEMS NEEDED FOR PRESENTING HEARTHFIRE

1) Small gifts such as honey, jelly, etc.
2) Flip chart or large pieces of paper plus Sharpie for writing down answers.
3) Unopened seed packets, enough for one per person You can use photos of wildflowers, vegetables (flowering) and other plants. This is a good option if you have members that are traveling and might have restrictions.
4) A computer and projector for PowerPoint (optional).
5) Copies of handout and answer key for Pollinators Wordsearch.
6) Pens or pencils for wordsearch activity.

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HANDOUTS:

Activity #3:

Distribute the Word Search and give each member 6 minutes to complete in conjunction with the closing. Wait to distribute the answer key until after the time allotted for the word search.

1) Word Search and answer key.

Pollinators Wordsearch

X P F U A R Y U K Y U F R U I T B A T Z Z X D Y L S Q W Q A V W D E G J J O H Y
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S Y M H J N W U R P V C U Q S W G Y U U Z H H S I S A U H F J S N B A P Q R O Y
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Q I R O J W L P J S X C A V B D V S M T K N S Z H I Z L C C L K A M R E L L A K
R I U C M Z H K P R Z P A E W L J B L N H S P M S K C O O I L L U U V T J G H L
K P O P J K Z F Y E Y Y W C A E C T P O G O Y P W U G R X Q F L A B U H E G T Y
F N K B F W W M H R K E R O K U O O N E D E R Q D J R S J F Y E B W H Y D I E C
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P T Q S X Y P E A T Y F U C M B T V O Z M D O C R E B H O J G I M O I G C Y R B
H G E X W V M A A K N C I R E R N W V C I H Z V D Z X H J A H W S Z G X X A P V
Z P X H O A C L K K I A O E W U J J K X X Q R Z E Y I Z S G I K B A M Q K R L Z
R E C L F D X Q T O L W H G D A S E I Z Y W F S E E B N O S A M D R A H C R O B
V U F V Y C O V D E N Y U P C C L B X A J R X W E K L E O M Q Q T K G Y T N J N
W Z B X S L Q H J R R K W K E M P P M W D F B D A N E Q I N A Y Z W Y Q I S F L
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H Q B J D W T P P T V Z S B V C P E B W H R F M L S D I R A K E Z D D F O J K Y
I O L C I J V L D A E R N V G U G D U V V A Y J T F S A M E P N A S U D N Q K Z
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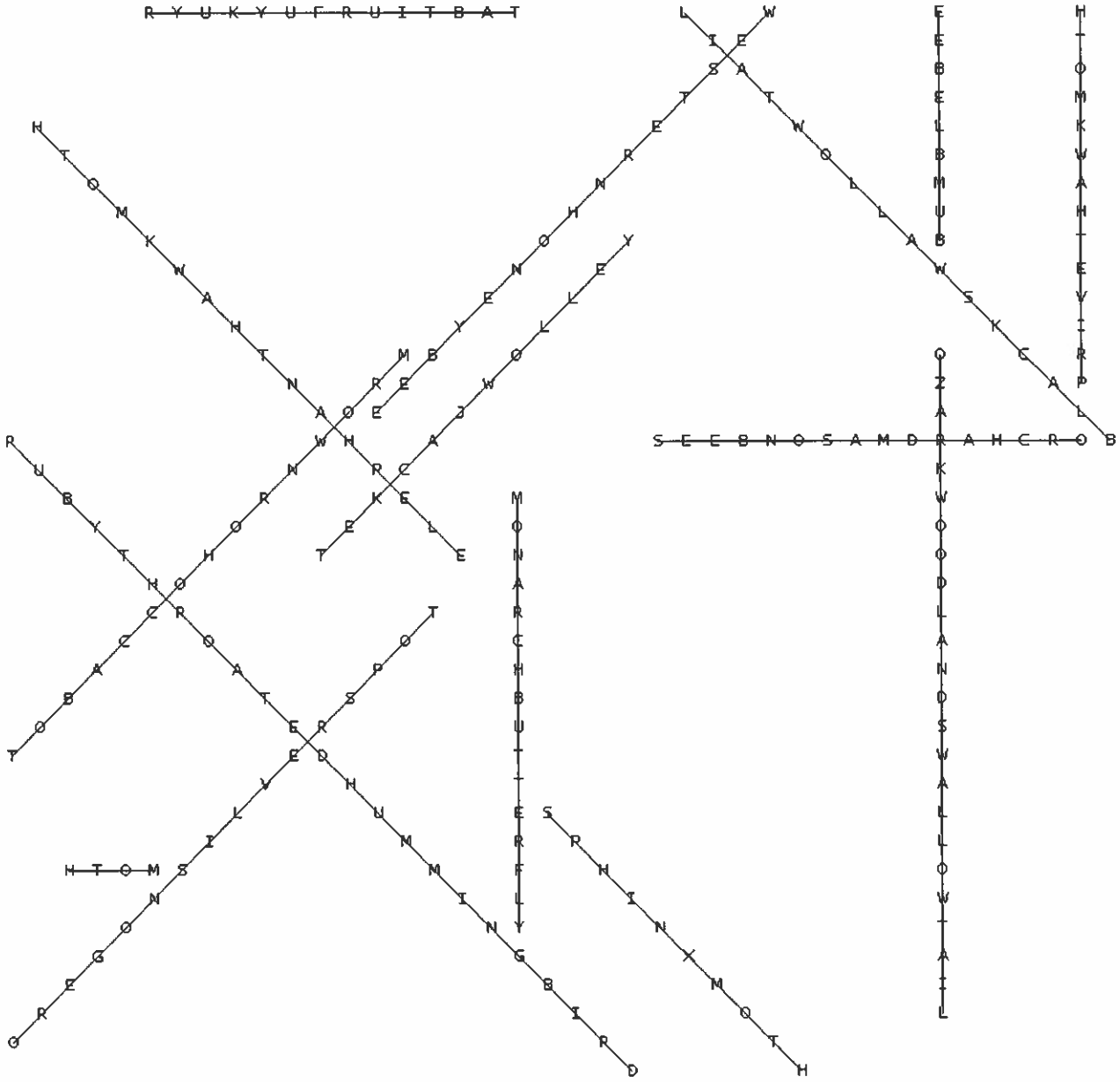
B G S D Z W B G Q U K A E A Q E I D L R X F C E I K W O X R N P L L O E P U H F
N L T I L B R Y Y Z M E Y P J M L Q A T T Z K N D N Y E K J X Y J X Y U C Y Y M

Ruby Throated Hummingbird
Tobacco Hornworm
Orchard Mason Bees
Ozark Woodland Swallowtail
Bumble Bee
Western Honeybee
Sphinx Moth
Privet Hawk
Elephant hawk Moth
Oregon Silver spot
Black Swallowtail
Monarch Butterfly
Ryukyu Fruit Bat
Yellow Jacket Moth

Pollinators Answer Key



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2) https://www.usda.gov/about-usda/general-information/initiatives-and-highlighted-programs/peoples-garden/importance-pollinators/honey-bees.
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4) https://www.pollinator.org
5) https://www.fws.gov/initiative/pollinators
6) https://www.xerces.org
7) https://coastalbg.uga.edu
8) https://diadasia.wordpress.com/wp-content/uploads/2015/05/meet-the-pollinators.jpg
9) https://esajournals.onlinelibrary.wiley.com/doi/10.1890/120126 ** I found this peer reviewed article particularly helpful in understanding the stressors on pollinators and honeybees.

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