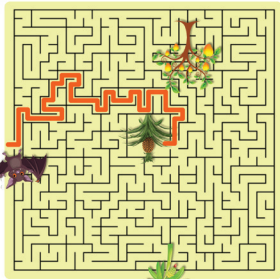


Do Your Part; Protect a Pollinator

There are lots of ways you can do your part to protect pollinators in your neighborhood.

- Create a pollinator-friendly garden by planting native flowering plants. If you don't have room for a garden, use containers on your porch, patio or deck.
- Don't "bug" pollinators. When you see pollinators like butterflies, beetles or birds, don't touch or frighten them.
- Cut down on the amount of pesticides and other poison sprays used around your home and in your yard. Learn about natural remedies for unwanted pests.



Pg 6:



Pg 4:

Ask MAXINE!



Maxine worked for NACD for 47 years. That's why we always ask Maxine.

Question: Besides humans, what other animals depend on pollinators for their food?

Answer: Lots of animals wouldn't have enough food to eat without pollinators! One example is bears. Pollinators can be a food source for bears in two ways:

- 1) Bears can eat the pollinators themselves or their larvae.
- 2) Bears can eat the fruit, nuts, roots, leaves, and seeds of plants that have been pollinated.

Many bears are considered endangered in the United States, which means that we need to do our part to protect their habitats and food sources. One way we can do this is to protect pollinators.



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Bananas-4,000, Pineapples-99,075, Midge flies-17
Pg 5&6: Blueberry bee-75, Honey bee-9,000,000,000, Food crops-35,

flies, butterflies, beetles and moths are INVERTEBRATES.
of a flower is the STIGMA. The male part of a flower is the ANTHER. Bees,
REPRODUCE. Many species of pollinators are ENDANGERED. The female part
and NECTAR. Pollen contains PROTEIN. Without pollination most plants can't
Pg 4: An animal that transports pollen is a POLLINATOR. Pollinators eat pollen

bees, moths and fruit bats, Pineapple-hummingbirds and bats
bumblebees, solitary bees and flies, Alfalfa-leafcutter and honey bees, Cashews-
midges (flies) and stingless bees, Strawberry-honeybee, Cherry-honey bees,
Pg 3: Banana-fruit bats and birds, Blueberries-15 species of bees, Chocolate-

Pg 2: Circle-3 honey bees, Line through-insects, "X" through-bat

Fill in blank and puzzle answer: Pollinator

Pg 1: THREE-FOOD P SPECIES O ENDANGERED L INVERTEBRATE BEES-FLIES-MOTHS-VERTEBRATE L BIRDS-MAMMALS-REPTILES-MEAL I
POLLEN PLANT N REPRODUCE COMFORTABLE A COTTON-IMPORTANT HEALTHY I ECOSYSTEMS COLOR SHAPE O SCENT FLOWER R NECTAR

Answer Key:

Special thanks to the NACD S&E Committee and reviewers.

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Visit: www.conservationlearn.org

for the educators guide, additional worksheets and resources

Visit: <http://www.pollinator.org> for additional resources

Booklet designed for use with Grades 4-6

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www.pollinator.org





It's a bird... It's a plane... It's a _____!

Use these clues to discover what "it" is and fill in the blank above:

- Without "it" you wouldn't have one out of every **three** bites of **food** you eat!
- Many **species** of "it" are **endangered**.
- Invertebrate** species like **bees**, **flies**, beetles, **moths** and butterflies can be "it."
- Vertebrate** species such as **birds**, **mammals** and **reptiles** can be "it."
- While enjoying a **meal**, "it" carries **pollen** on its body from plant to **plant**.
- A lot of plant species depend on "it" to **reproduce**.
- Without "it" you wouldn't have some of your **comfortable** clothes like **cotton** tee shirts.
- "It" plays an **important** role in **healthy ecosystems**.
- "It" usually has a favorite **color**, **shape** and **scent** it looks for in a **flower**.
- Nectar** and/or pollen are "its" favorite foods.

STILL NEED SOME HELP IN FIGURING OUT WHAT "IT" IS?

Solve the puzzle below and you will have the answer! **First**, circle the words printed in orange in the clues above. **Second**, find those same words you circled in the box below and mark them out. **Third**, place the letters that aren't marked out in the circles below the puzzle and you will find out what "it" is!

THREFOODPSPECIESOENDANGEREDLINVERTEBRATE
 BEESFLIESMOTHSVERTEBRATELBIRDSMAMMALS
 REPTILESMEALIPOLLENPLANTNREPRODUCECOMFORTABLE
 ACOTTONIMPORANTHEALTHYTECOSYSTEMSCOLOR
 SHAPEOSCENFLOWERRNECTAR



POLLINATOR: An animal that moves pollen from the male anthers of a flower to the female stigma of a flower resulting in fertilization.

INSECT: A six-legged, air-breathing invertebrate with a body that has well-defined segments, including a head, thorax, abdomen, two antennae and usually two sets of wings.

MAMMAL: A warm-blooded vertebrate characterized by a covering of hair on some or most of the body, a four-chambered heart and nourishment of offspring with milk from maternal mammary glands.

VERTEBRATE: An animal with a backbone.

INVERTEBRATE: An animal without a backbone.



Plants Need Pollinators We Need Plants

Most plants depend upon pollinators to reproduce. Animals can travel and move around to find mates and reproduce. Plants are rooted to one spot and can't move, so they depend on pollinators to move pollen for them from their anthers to their stigma. On planet Earth there are more than 100,000 species of insects, including bees, flies, moths, butterflies and beetles that work hard as pollinators. There are also over 1,000 species of other animals such as birds, reptiles and mammals, including bats that pollinate plants.

We depend on plants for air to breathe, food to eat, homes to live in and clothes to wear. Many of the medicines we use come from plants.

All POLLINATORS are NOT alike!

Some fly; some don't. Some are colorful; some aren't. Some are insects; some are mammals, and some are birds. Some are vertebrates; some are invertebrates. Some bite or sting; some don't. Circle the 3 pictures that are the exact same pollinator. Draw a line through the invertebrates. Draw an "X" through the mammals. Draw a square around any of the pollinators you see in your neighborhood.



Pollinators are PICKY EATERS!

Pollinators don't "dine out" at just any flower or eat just anything. Pollinators can be picky about where they choose to eat. Pollinators prefer certain colors of flower petals as well as certain flower scents. The shape of a flower petal is important too; it serves as a landing pad for the pollinator! Pollinators seek out flowers to find the food they like: pollen and nectar.

The nectar produced by flowers is very healthy and nutritious for pollinators; it is packed with sugars needed for energy, B-vitamins, amino acids, and lipids. Pollen, located on flowers' anthers, is also a healthy part of the pollinator diet. It contains protein that pollinators need to grow.

While the pollinator is eating pollen or nectar, pollen gets stuck to its body. As the pollinator moves from flower to flower eating, some of the pollen on its body falls onto a flower's stigma and fertilization occurs. Without this transfer of pollen, a flower can't produce healthy fruit and seeds.



Who Pollinated My Banana Split?

Draw a line to match the topping on the left with the pollinator who made it possible on the right.

TOPPING

- blueberries
- strawberry
- chocolate
- nuts (cashews)
- banana
- cherry
- alfalfa
(ate by cows that provided the milk for ice cream)
- pineapple

POLLINATOR

- moths, bees & fruit bats
- honey bees, bumblebees, solitary bees & flies
- fruit bats & birds
- leafcutter and honey bees
- 115 species of bees
- midges (flies) & stingless bees
- honey bees
- hummingbirds & bats

ENDANGERED

Several species of bats are endangered. Indiana bats are one of them. These bats can be found in most states in the eastern half of the U.S. Many of these bats hibernate in caves in Indiana.



Working after DARK

Bats are pollinators that work at night while we are sleeping. Bats are a nocturnal animal; they are busy at night, and they rest during the daylight hours. They get around in the dark by using echolocation.

Echolocation works like the sonar used by submarines under water. Bats use echolocation to fly and find food in the dark. The bats make noises that send out sound waves; when the waves hit an object they bounce back to the bats' ears. Using echolocation, bats can navigate as well as find insects to eat and flowers to visit. As bats reach into flowers to get to the nectar inside them, pollen clings to their head. The bats spread this pollen around as they move from flower to flower.

Visit <http://www.msb.unm.edu/mammals/batcall/html/speciesaccounts.html> to hear bat sounds!

BAT FACTS

- Bats are the **ONLY** mammals that can fly.
- Female bats usually give birth to **ONE** offspring per year.
- Several species of bats are on the federal **ENDANGERED** species list.
- Using **ECHOLLOCATION**, bats can detect objects as thin as a human hair in complete darkness.¹

¹“What is Echolocation?” ASU School of Life Sciences, <http://askabiologist.asu.edu/echolocation>.

POLLINATION BY ANIMALS IS NOT ONLY IMPORTANT TO OUR ECOSYSTEMS AND FOOD SUPPLIES, IT IS ALSO VALUABLE ECONOMICALLY.

Fill in each blank with the correct number from the box at the bottom of the page.



A single southeastern blueberry bee can pollinate 50,000 blueberry flowers in one year. This one bee gives us \$_____ worth of blueberries per year.

The yearly value of honey bee pollination to the agricultural plants they pollinate in the U.S. is estimated at over _____ dollars.



_____% of the world's food crops rely on animal pollinators.

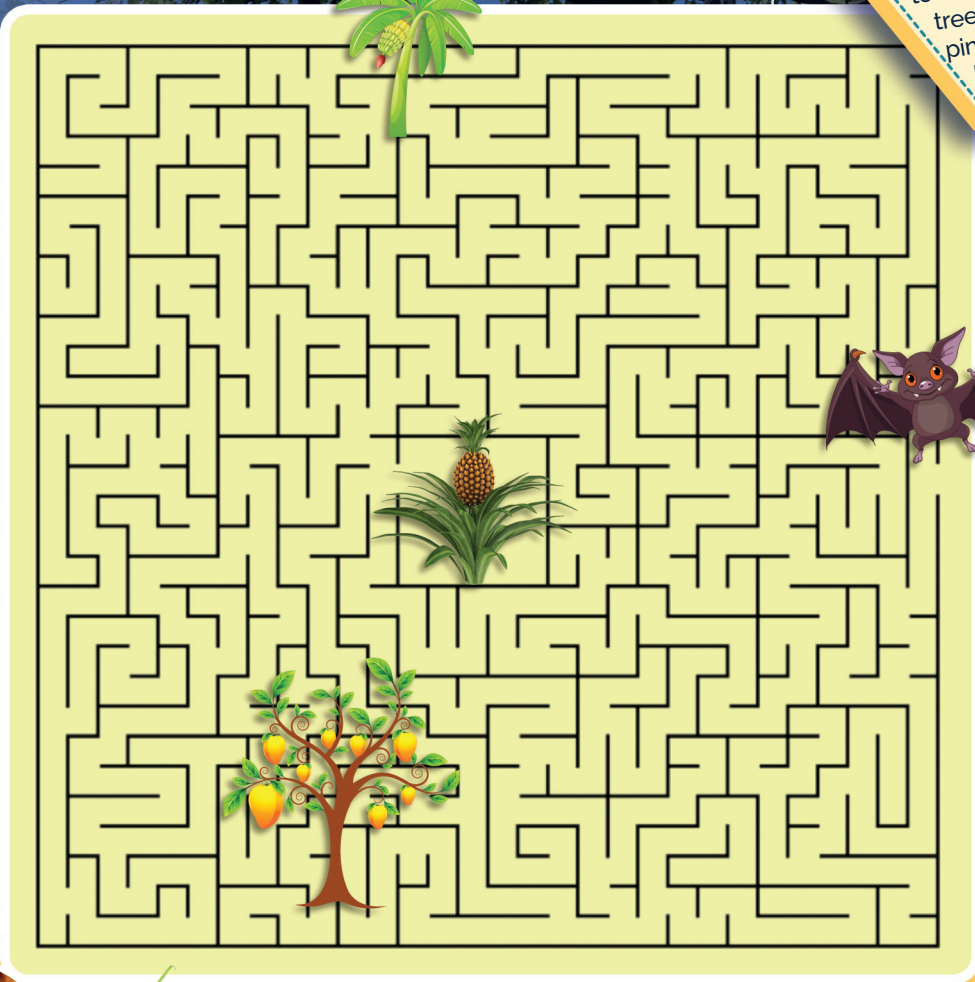
17

35

75

NAVIGATION & POLLINATION

Does a fruit smoothie sound good? How about a tropical smoothie with banana, mango and pineapple? We need some bat pollination for that smoothie! Help the bat get to the flowers on the banana tree, mango tree and the pineapple plant so we'll have plenty of fruit.



HIBERNATION: to be in a dormant state resembling sleep over the winter while living off reserves of body fat, with a decrease in body temperature and pulse rate and slower metabolism.

Bats hibernate upside down!!!



Imports: Bananas, pollinated by fruit bats and birds, is the #1 fresh fruit eaten in the U.S. Over _____ tons of bananas were imported in 2011.



Exports: In 2010 the U.S. exported _____ metric tons of pineapples. Hummingbirds are one of the pineapple pollinators.

The Midge fly pollinates cocoa trees. Cocoa is used to make the chocolate we love to eat. Chocolate sales in the U.S. were over \$ ____ billion in 2010.



4,000

99,075

9,000,000,000