PLANT HEROES

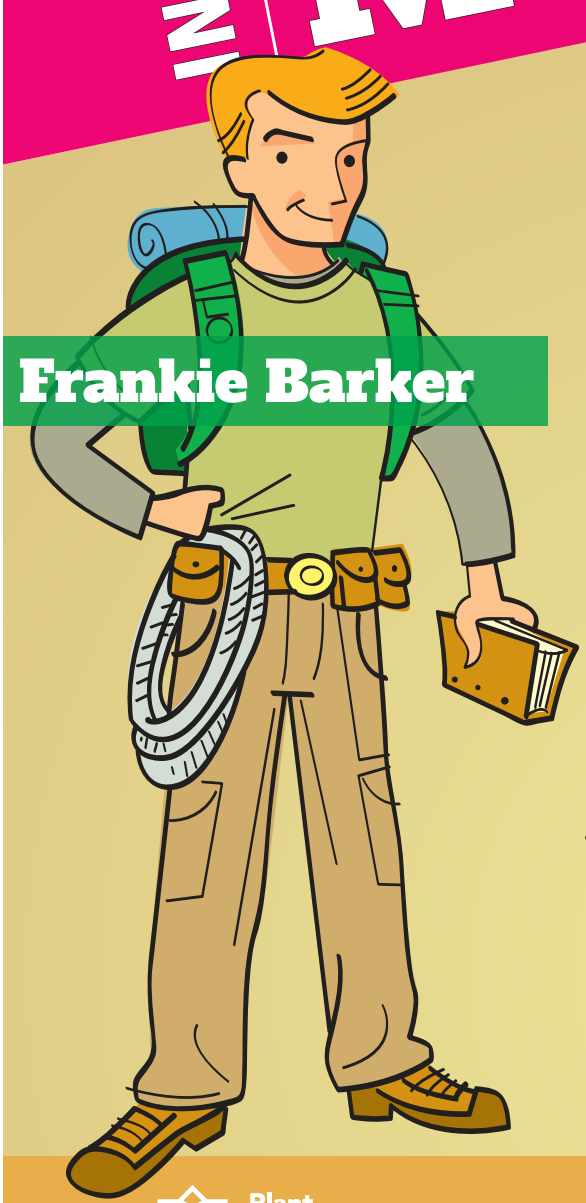
Help the Plant Heroes protect our forests by slowing the spread of pests and diseases!

INSECT

GYPSY MOTH

PLANTHEROES.ORG

ADVANCED ACTIVITY BOOK



Frankie Barker

BE A PLANT HERO!

Help Frankie slow the spread of the gypsy moth!

Plant Protection Program

AMERICAN PUBLIC GARDENS ASSOCIATION

Meet the PLANT HEROES!

LAURA WILKINS
From: Athens, Georgia
Hobbies: playing the trumpet, gardening, studying ecology

FRANKIE BARKER
From: Shrewsbury, Massachusetts
Hobbies: climbing trees, camping

NATE GREEN
From: Tacoma, Washington
Hobbies: going on adventures, learning about fungi

APONI STAR
From: Southeast Illinois
Hobbies: learning more about entomology (the study of insects)

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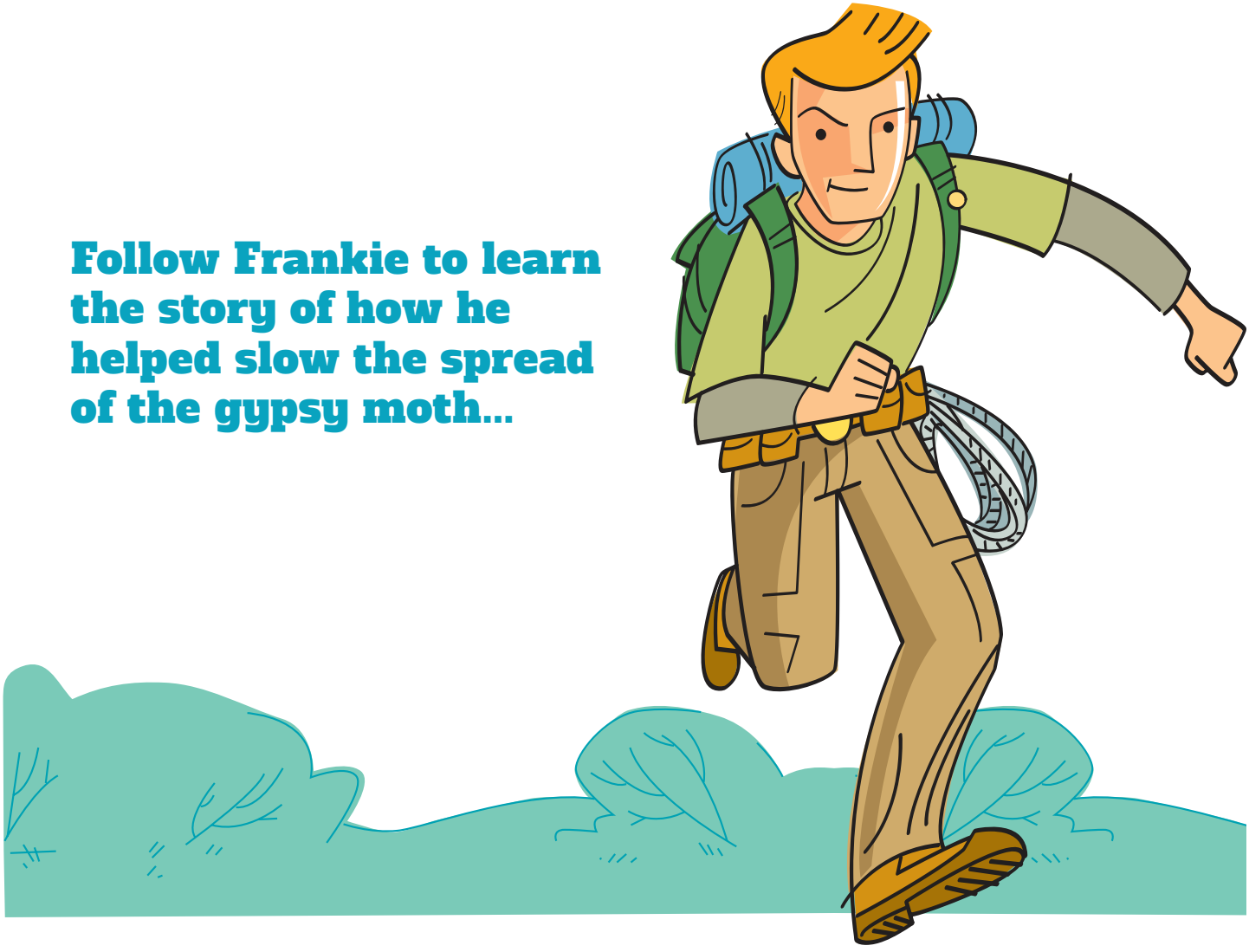
The Plant Heroes are four friends who love spending time in nature more than anything else! They enjoy climbing trees, walking trails, and camping.

The heroes are learning about why our forests are in danger. There are insects and fungi that can impact trees, sometimes affecting the health of whole forests. Trees may become sick or die when they are weakened by an invasive species, a living thing that is introduced to a new environment where it can cause damage to existing organisms.

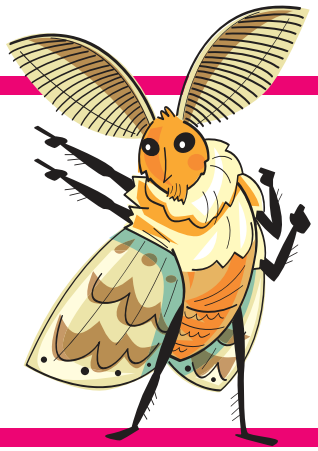
Follow Frankie to learn the story of how he helped slow the spread of the gypsy moth...



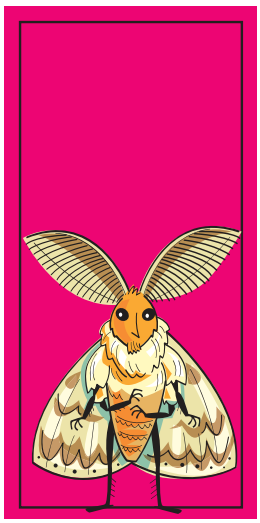
PLANT HEROES

STOPPING THE SPREAD WITH FRED

Before heading back to school in late August, Frankie pays a visit to his Uncle Fred in Cleveland to help him with a big landscaping job on the other side of Ohio, in Columbus.



Planting trees, hanging out with family and hard work? Check! Frankie is all in on this venture!



Frankie checks the equipment list and helps load the rakes, shovels, and other landscaping equipment onto the flatbed. They drive down the long, narrow, tree-lined road out to the highway for the big job.

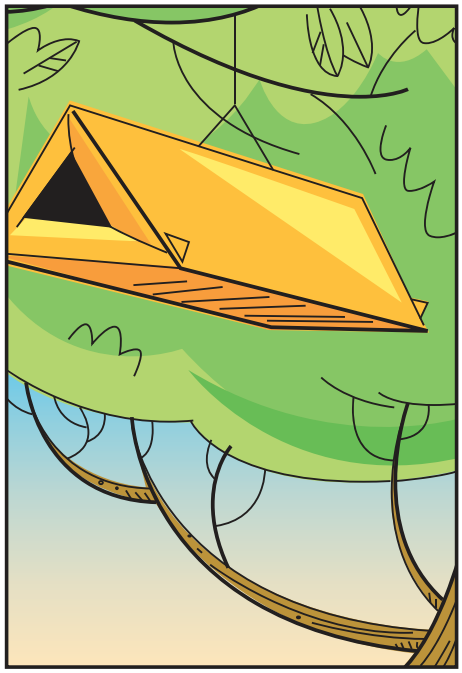
As Frankie and Fred leave Fred's Landscaping, Frankie notices a triangular box hanging in a tree. "Hey Uncle Fred, I think I just saw some debris in a tree on your property!" "No, Frankie, that is a pheromone trap for the gypsy moth. I just found out that there is a gypsy moth infestation in the area where I live. I gave the Department of Agriculture permission to place the trap to keep track of progress." "Oh, OK just a pheromone trap you say..."

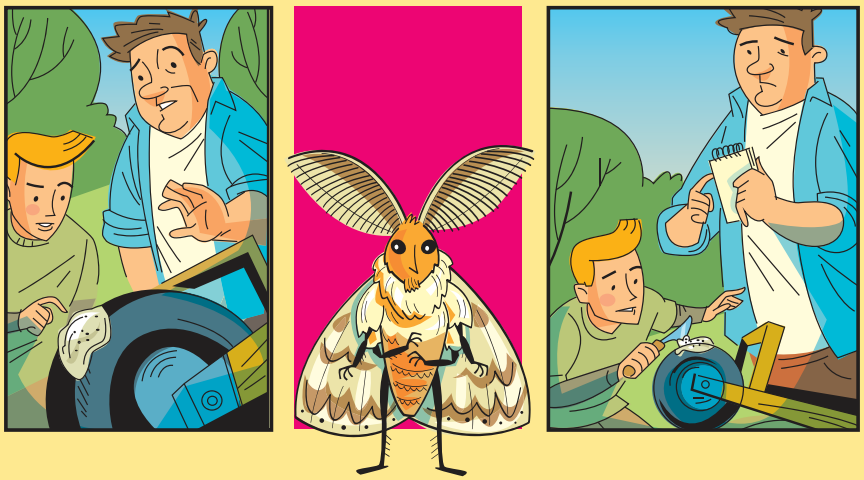
The Plant Heroes are brought to you by the American Public Gardens Association. This comic was developed with financial support from the USDA — Animal and Plant Health Inspection Service and reproduced with financial support from the USDA — Forest Service. Play games and learn how you can protect plants at plantheroes.org.

Plant Protection Program
AMERICAN PUBLIC GARDENS ASSOCIATION
APHIS USDA FOREST SERVICE DEPARTMENT OF AGRICULTURE

STOP THE FLATBED!

Frankie tells Uncle Fred that Columbus is a gypsy moth free zone, and that they should check all the landscaping equipment to see if there are any moth egg clusters.





After a careful check, Fred finds an egg cluster on the side wheel of the wheel hoe. Frankie and Fred work to get rid of the cluster and dispose of it properly.

Later that day, Frankie and Fred join the Plant Heroes team to confidently plant new trees in Columbus Park, while knowing the threat of spreading gypsy moth is no longer present!

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Metamorphosis Time

The gypsy moth has four different life stages, and the process of the egg changing into an adult gypsy moth is called "metamorphosis." Learn how entomologists (people who study insects) identify these life stages in the descriptions below and see if you can match each life stage to its description!

WORD BANK:
ADULT, EGG, LARVA, PUPA

SEPTEMBER–APRIL

1. _____

The female lays this life stage on a tree or other outdoor surface and covers it with tan-colored hairs that she plucks from her body to protect her offspring.

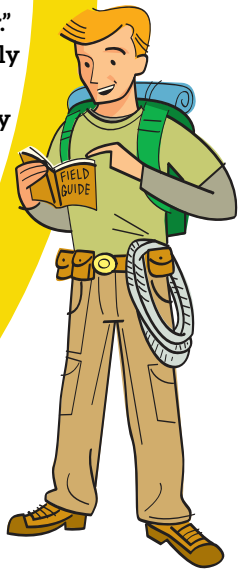
MASTER DEFOLIATORS!
Caterpillars can consume a huge amount of leaves, completely stripping all leaves from a tree, a process called "defoliation."

Look at the months for each life stage in the diagram. Which life stage could you find in the woods near you now? Scout around outside and see if you can find any adults, pupae, larvae, or eggs!

APRIL–JUNE

2. _____

A moth in this life stage is also called a "caterpillar." This species of moth only eats as a caterpillar, but boy will it eat! It is hairy and has five pairs of blue dots followed by six pairs of red dots along its back.



HANDY TIP!
Add an "e" at the end of larva or pupa if you are talking about more than one larva or pupa!

JUNE–JULY

3. _____

During this life stage, the immature moth wraps itself in a cocoon and rests while it metamorphosizes.

JULY–SEPTEMBER

4. _____

During this life stage, female moths lay eggs. Female moths are white and fuzzy with a 2-inch wingspan, and male moths are brown and slightly smaller with feathery antennae. Check out a photo of their antennae on page 2 of your field guide.

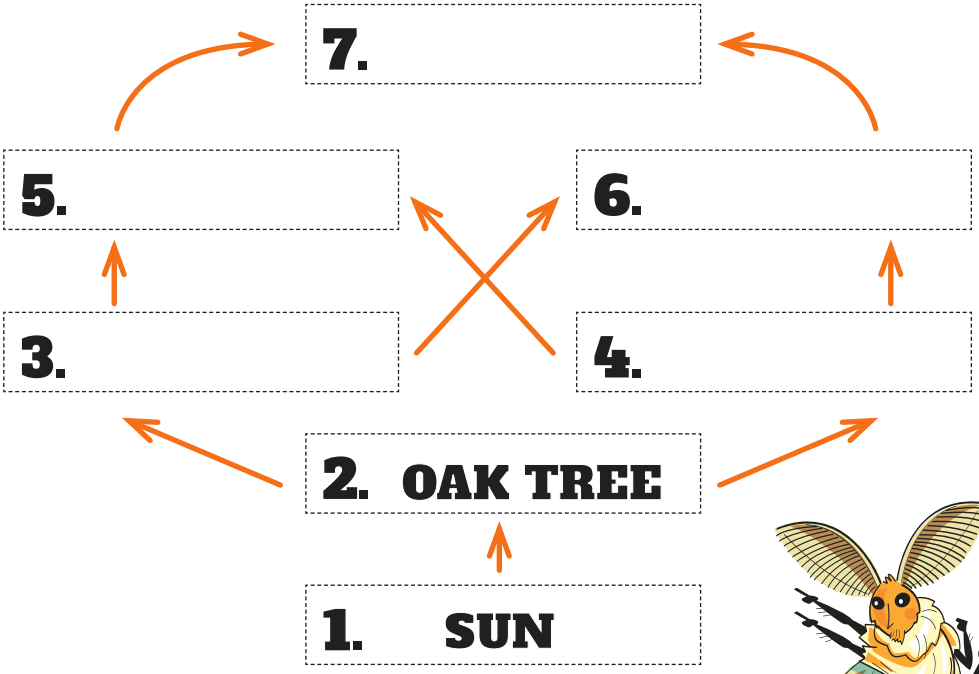
Scan this QR code or type bit.ly/mothmetamorphosis to watch metamorphosis in action!

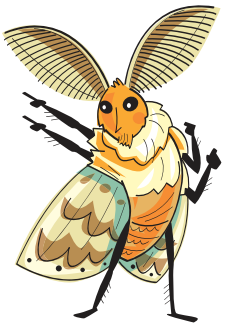
PHOTO CREDITS: A: Anita Gould, Flickr.com; B: echoe69, Flickr.com; C: Seabrooke Leckie, Flickr.com; D: USDA APHIS PPQ, Bugwood.org

Everything is Connected

"Ecology" is the study of how living things (fungi, animals, plants) interact with one another and with the environment they live in. An ecologist is someone who studies ecology to understand the connections between different living and nonliving things. Think like an ecologist by putting this food web together. Then think about what might happen if elements of the food web changed. A food web is like a food chain, but includes more living beings and the interactions between them. To build the food web, start by filling in #3 and #4 with what gets food or energy directly from the oak tree. For #5 and #6, add the animals that eat the living things that rely directly on the oak tree. Hint: Mice and squirrels are predators of the gypsy moth. The animal in spot #7 will be the top predator in this food web.

WORD BANK:
ACORNS, GYPSY MOTH HAWK, MOUSE, SQUIRREL





The population of a certain species will increase if it has lots of food but will decrease if it has many predators. How would each species in this food web be affected if there were fewer hawks? What if there weren't many oak trees? Do you think the other species numbers would go up or down? What if there were a lot of squirrels? Use the space below to write some of your ideas about how the numbers of these animals and plants could rise and fall.

Scan this QR code with your phone, or type in this link to learn more about food chains! https://bit.ly/FabulousFoodChains

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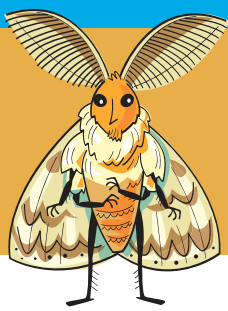
A Meal Fit for a Moth

Gypsy moth caterpillars will eat the leaves of many different types of trees. These trees are called "hosts" because the caterpillars are the "guests" that feed on them. Below are some of the common host trees. Search in your backyard, a garden, or park near you to see if you can identify any of these trees by their leaves (check the hints for help). Draw or describe in the boxes below what each leaf looks like.



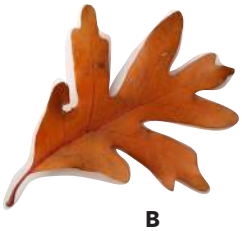
RED OAK

This tree is tall with deep ridges in its trunk and produces acorns, which are its seeds. Its leaves are usually dark green and shiny with pointy edges, and sometimes turn red in the fall.

A

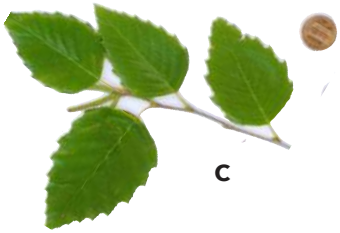
WHITE OAK

This tree is also tall with deep ridges in its bark, but its leaves have rounded edges. It also produces acorns—if you find acorns, you know you've spotted an oak!



B

PHOTO CREDITS: A: Dave Bonta, Flickr.com; B: Benny Mazur, Flickr.com



C

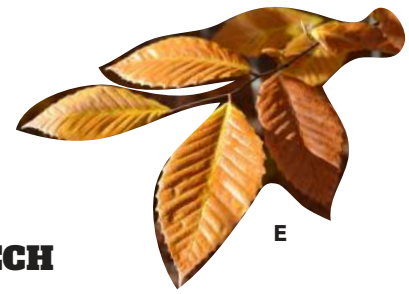
BIRCH

This tree often has bark that looks like paper and peels off in strips! Birch trees are tall and skinny with multiple trunks coming out of the ground. The leaves are usually diamond or triangular shaped with small serrations on the edges.

D

WILLOW

A common type of willow is the weeping willow, which has drooping branches and yellow stems. They have skinny, long leaves and often grow near ponds and streams.



E

BEECH

Beech trees are tall and have smooth, light-gray trunks with wrinkles—like elephant skin! The leaves turn a caramel color in the fall and often hang onto the tree throughout the winter. Their buds are super long and pointy.

PHOTO CREDITS: C, D: Maggie, Flickr.com; E: Joe Blowe, Flickr.com

Make your Own Gypsy Moth Poster!

Why does it matter that the gypsy moth is defoliating forests? Make your own poster in the space below with information about the gypsy moth and include some illustrations. Write whatever you think people need to know about the moth. What would convince your friends and family to care about the spread of this species?

GYPSY MOTH

DESCRIPTION

HOW CAN THEY AFFECT TREES?

WHAT CAN YOU DO?

LIFE STAGES

Egg

Larva

Pupa

Adult

Try This at Home!

IMPORTANT! Wear gloves during this activity so you don't touch the hairs of the egg clusters—sometimes the hairs can make your skin itch.

Have you noticed gypsy moth egg clusters on the trees near you? You can help remove these egg clusters and save our trees! Ask an adult to help you with this project.

To remove egg clusters, take a butter knife or paint scraper and gently scrape them from the bark of the tree. Be careful not to hurt the bark! Put these egg clusters in a bucket of warm, soapy water for a day or two before throwing them away. Thanks for being a Plant Hero!

ANSWER KEY

Metamorphosis Time: 1. Egg, 2. Larva, 3. Pupa, 4. Adult

Everything is Connected: 3. Acorns or Gypsy Moth, 4. Acorns or Gypsy Moth, 5. Mouse or Squirrel, 6. Mouse or Squirrel, 7. Hawk

How would each species in this food web be affected if there were fewer hawks? Populations of squirrels and mice would increase, numbers of acorns and gypsy moths would decrease. Because more acorns would be eaten, there would be fewer oak trees in the future.

What if there weren't many oak trees? Do you think the other species numbers would go up or down? The entire food web relies on the oak tree, so the number of acorns, gypsy moths, squirrels, mice, and hawks would decrease.

What if there were a lot of squirrels? If there were many squirrels, the numbers of hawks would go up, gypsy moth populations and acorns would decrease, mice populations may decrease if squirrels are eating their food source, and there may be less oak trees in the future if most of the acorns are eaten.

PHOTO CREDITS: Karla Salp, Bugwood.org

PLANT HEROES

Join our team of Plant Heroes and learn about trees, forests, and the natural world around you!

PLANTHEROES.ORG

You can be a Plant Hero!

Are you curious about plants and animals? Do you like asking questions about nature? Do you enjoy being outdoors and having fun, climbing trees, balancing on logs, or finding a new butterfly or beetle? If so, you are already on your way to becoming a Plant Hero! We invite you to join forces with Nate, Laura, Aponi, and Frankie to protect the plants and ecosystems we all love.

How can you become a Plant Hero?

Join our team and go on a journey with Nate, Aponi, Laura, and Frankie. As a Plant Hero, you will learn to notice when plants are in trouble. You will also find out ways you can act quickly to help find solutions in your own neighborhood. Follow their adventures and learn how they help plants and ecosystems stay healthy.

On the Plant Heroes website, you will find materials to help you learn about plants, forest health, and ecosystem balance. The more you know, the more you can help protect plants and ecosystems in your own yard, neighborhood, and community!

Plant Heroes strives to spark curiosity about nature and science in all children. Our program provides hands-on, nature-based learning materials for educators to engage children in topics of plant health, ecosystem balance, and forest health. We also spotlight the amazing work our public gardens do in protecting the plants and ecosystems we all depend on through our website and printed materials. Visit **plantheroes.org** today to learn more!

Plant Heroes is brought to you by the American Public Gardens Association, founded in 1940. Over the last eight decades, the Association has supported the work of public gardens in North America and beyond. Our mission is to champion and advance public gardens as leaders, advocates, and innovators in the conservation and appreciation of plants. Our vision is "A world where public gardens are indispensable" as they provide botanic, conservation, community, education, and economic resources to their community.

The Association is committed to increasing the knowledge of public garden professionals throughout North America through information sharing, professional development, networking, public awareness, and research, so that they have the tools to effectively serve visitors and members.

American Public Gardens Association

PublicGardens.org

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USDA