



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

PLANTHEROES.ORG  
ADVANCED  
ACTIVITY  
BOOK

# INSECT LIGHT BROWN APPLE MOTH

**Nate Green**



**BE A PLANT HERO!**

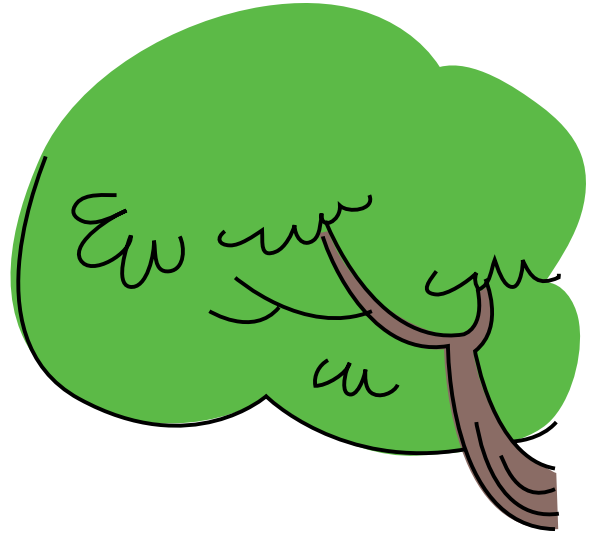
Help Nate slow the spread of the light brown apple moth!



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

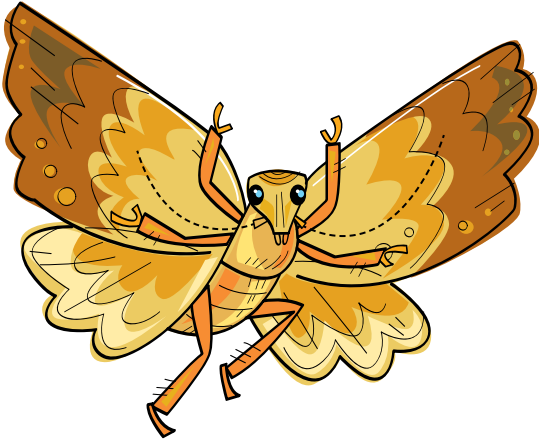
## APONI STAR

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



[plantheroes.org](http://plantheroes.org)

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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.

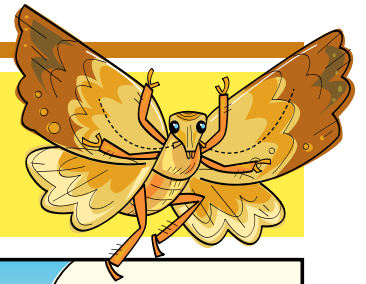
The heroes are learning about why our forests are in danger. There are insects and fungi that can impact trees, sometimes affecting the health of whole forests. Trees may become sick or die when they are weakened by an invasive species, a living thing that can cause damage to existing organisms when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

**Follow Nate to learn the story of how he helped slow the spread of the light brown apple moth...**

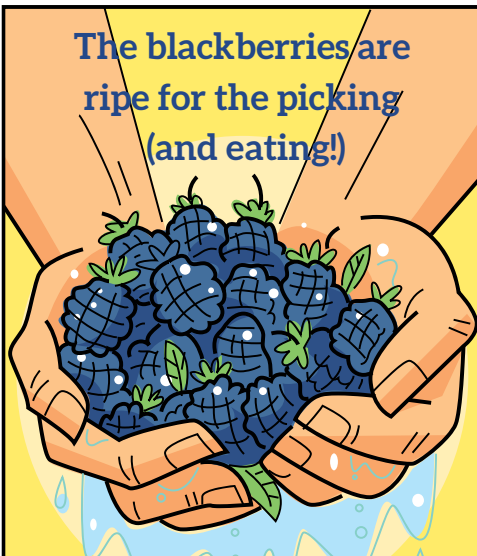


# IN A JAM WITH LBAM!

## A.K.A. LIGHT BROWN APPLE MOTH



It's harvest time in California, and Nate sets out to visit his older cousin Sammy who, with his father, owns and operates a blackberry farm in the Napa Valley.



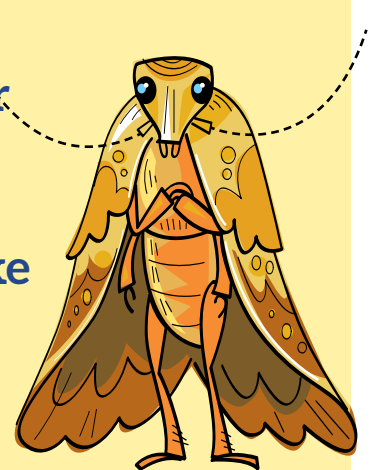
The blackberries are ripe for the picking (and eating!)



Nate and Sammy decide to haul the berries to a local market for sale! With tourist season in full swing, these California blackberries are sure to go quickly and provide a good bit of pocket money as well.

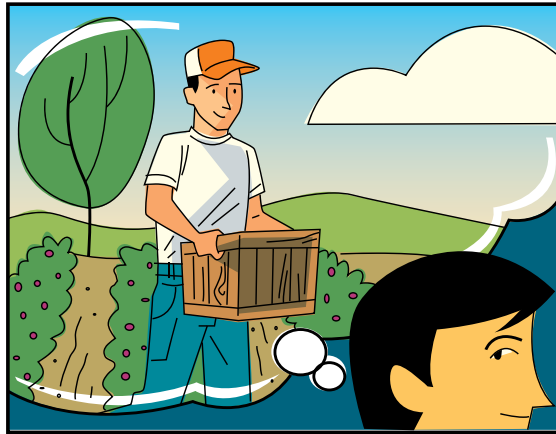
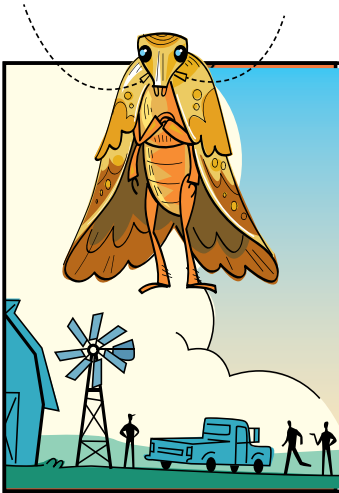


As they're leaving for market the next day, Nate says, "Is it just me or does it seem like there are more crates than yesterday?"



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](http://plantheroes.org).





Sammy explains that his dad got up extra early to pick a few crates from their other patch across the street.

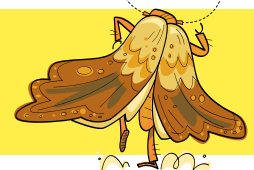


Nate has a flashback of the inspector visiting the day before and cries out, "WAIT! You mean AFTER the inspector was here?" We can't be sure that they're not infested with light brown apple moth and we shouldn't bring them to the Lake County Market because the area is practically moth free!

Nate and Sammy decide that the only way to get themselves out of a potential jam by spreading light brown apple moth is to well, make jam!



The boys were delayed a day, but at the market, music is in the air, everyone is cheery by far, and there is money to be made with fresh blackberries in a jar!

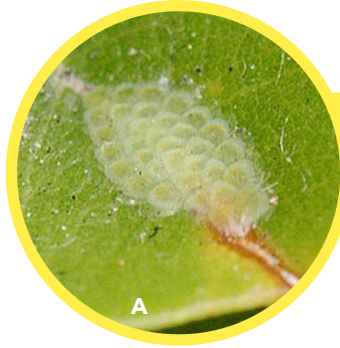


# Metamorphosis Time!

The light brown apple moth has four different life stages, and the process of the moth changing during these stages is called "METAMORPHOSIS." Read the descriptions below to learn how entomologists (people who study insects) identify these life stages, and see if you can match each life stage to its description!

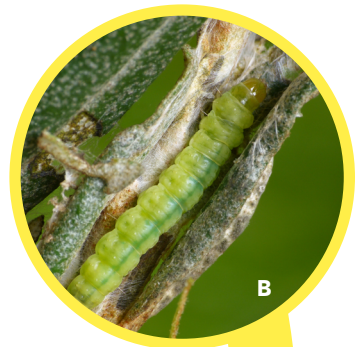
## WORD BANK:

**ADULT**  
**EGG**  
**LARVA**  
**PUPA**



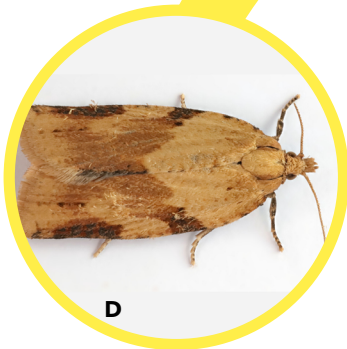
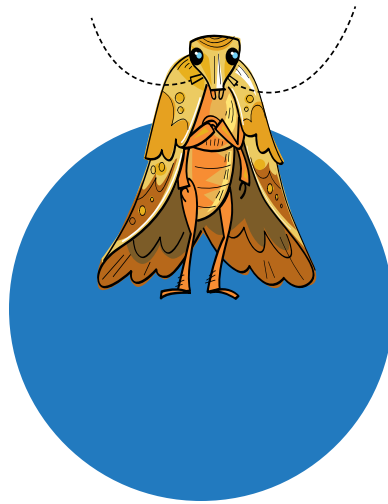
**1.**

The female lays this life stage in an overlapping pattern that looks like fish scales on the upper surfaces of leaves.



**2.**

A moth in this life stage is also called a "caterpillar." When a moth starts this life stage, it can be the size of a grain of sand. By the end of this life stage, it can be 1.5 centimeters long (around half an inch).



**4.**

Female moths lay eggs at this life stage. During this life stage, male and female moths look different. The males are much smaller with smooth antennae.

**3.**

During this life stage, the immature moth uses its silk to roll a leaf and create a cocoon where it rests while it metamorphoses.



### HANDY TIP!

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



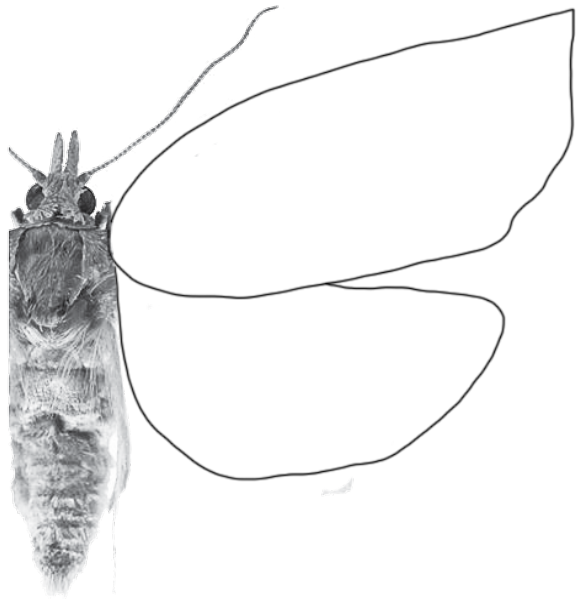
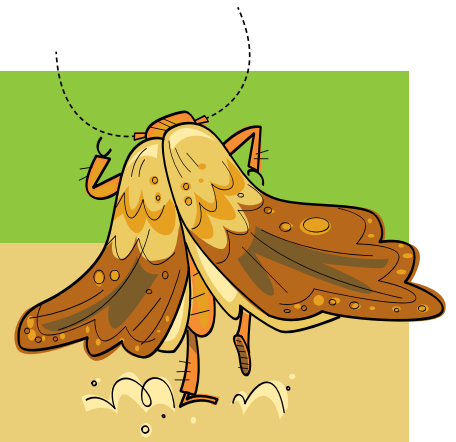
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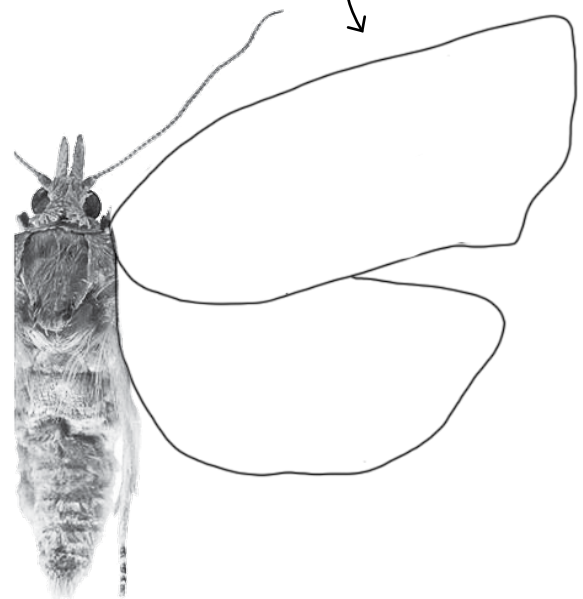
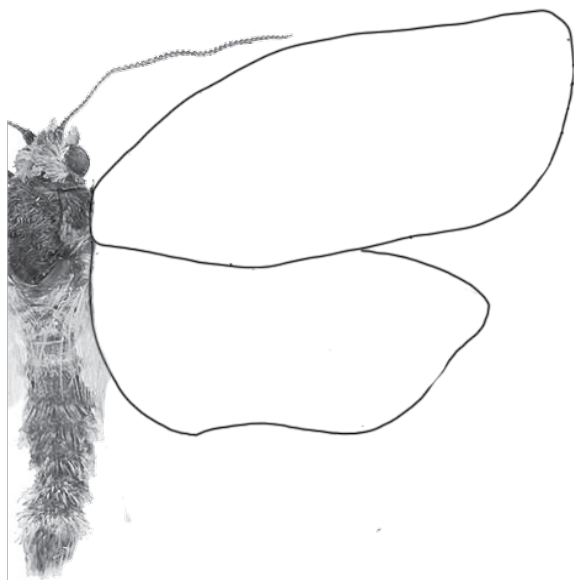
PHOTO CREDITS: A: Bugwood.org; B: Patrick Clement, Flickr.com; C: Bugwood.org; D: Janet Graham

# Wing Diversity

Scientists use the word “DIVERSITY” to describe differences between two or more things. For example, the different patterns on the wings of light brown apple moths are an example of diversity. Using page 2 in your field guide, draw the different wing patterns on the moths below.

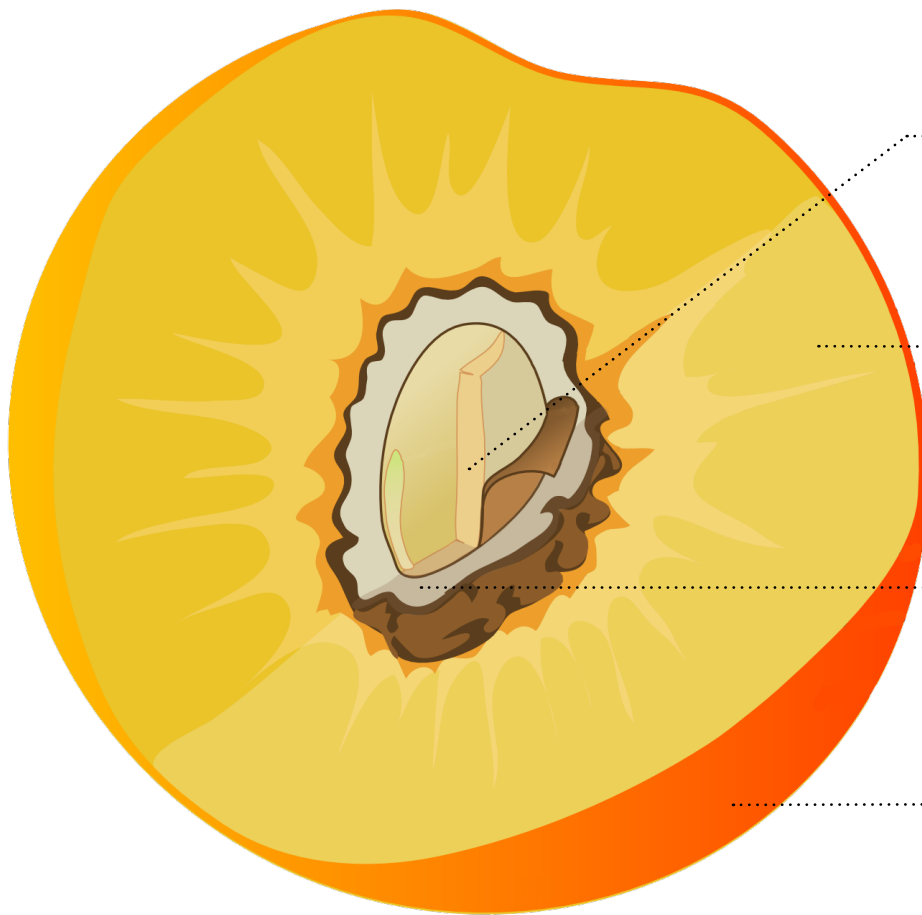


Create your own wing pattern!



# Peach Parts

Light brown apple moth larvae can eat many different plants, but fruit trees are some of their favorites. Using the picture of a peach below, match the parts of the fruit with the correct description.



**SEED**

**MESOCARP**

**ENDOCARP**

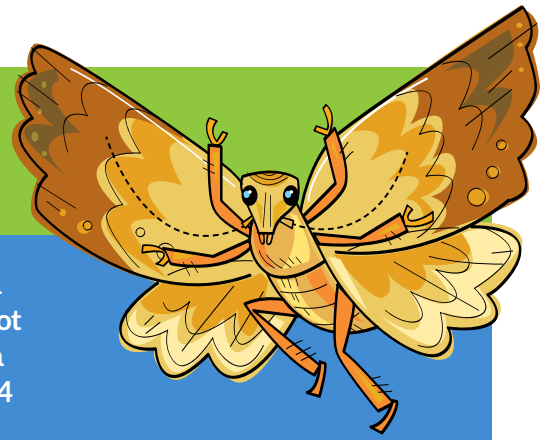
**EXOCARP**

1. \_\_\_\_\_ The fleshy part of a fruit. This is the part of a fruit you usually eat.
2. \_\_\_\_\_ The outer skin of a fruit. This is where the caterpillars of the light brown apple moth do the most damage.
3. \_\_\_\_\_ Sometimes called the “core,” this hard part of the fruit protects the seed.
4. \_\_\_\_\_ The most important part! This is the part of the fruit that will grow into a new fruit plant.





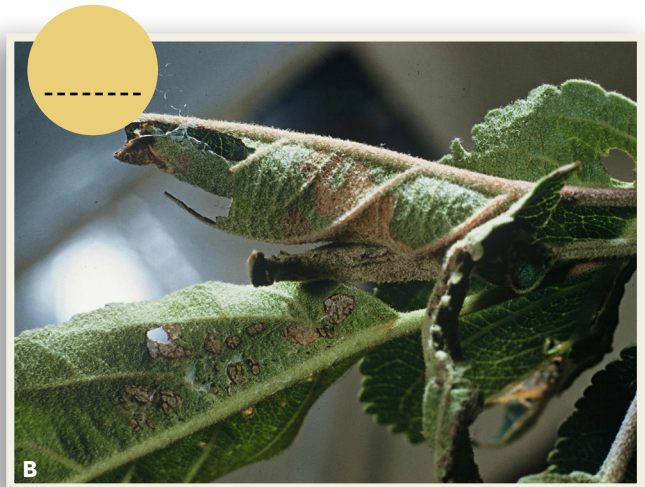
# Trees in Trouble



Light brown apple moth larvae can chew up leaves, damage buds, and damage the surface of the fruit. There are several different ways to spot potential signs or symptoms of light brown apple moth damage. Learn more about the signs and symptoms by labeling each photo from 1 to 4 with the right description.



A



B



C



D

**1.** Light brown apple moth caterpillars can “skeletonize” leaves by eating the tissue between the leaf veins. This damage can result in small plants that grow very slowly.

**2.** When the larvae roll up the leaves to make their cocoons, they reduce the ability of the leaves to capture sunlight to make food for the plant.

**3.** Light brown apple moths can damage grape clusters and can cause the fungal disease Botrytis bunch rot to spread more easily.

**4.** Light brown apple moths feed on and make their nests between fruits, which causes the fruit to be damaged as it grows.



# Make Your Own Light Brown Apple Moth Poster!

Why is it important that we learn about the light brown apple moth? Make your own poster in the space below with information about this moth and include some illustrations. Write whatever you think people need to know about the moth. What would convince your friends, family, or maybe someone at the grocery store to care about the spread of this species?

## LIGHT BROWN APPLE MOTH

### DESCRIPTION:

.....  
.....  
.....  
.....

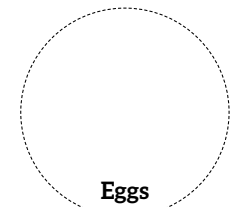
### HOW CAN LIGHT BROWN APPLE MOTHS AFFECT FRUIT?

.....  
.....  
.....

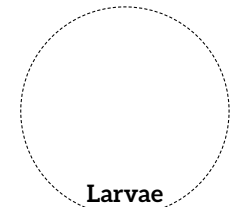
### WHAT CAN YOU DO?

.....  
.....  
.....  
.....

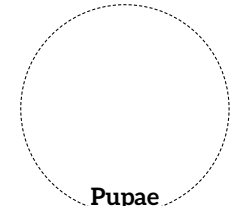
### LIFE STAGES



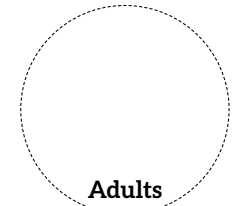
Eggs



Larvae



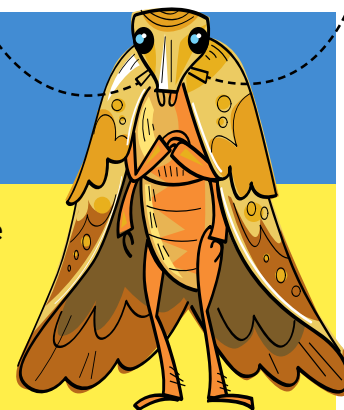
Pupae



Adults



# Try This at Home!

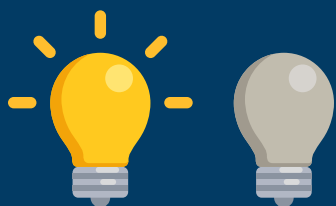


Interested in getting an up-close look at moths? Want to know which moths live near you? Ever notice that insects fly around lights, like a porch or streetlight at night? Lights at night disorient insects and can cause them to stop flying. With the help of an adult, you can “trap” moths and other night-flying insects using a light and a white sheet.

- 1.** Hang a white sheet or towel outside on a night that is not too windy or below freezing.
- 2.** Shine a light (flashlight or desk lamp will do) onto the white sheet.
- 3.** Wait! Moths will get disoriented by the light and get trapped on the sheet.
- 4.** Observe! If you have a magnifying glass, take a closer look, or snap a photo with a camera. Avoid touching the moths as their wings can be easily damaged.
- 5.** Release. Be sure to turn off your light when you are done observing. As the insects recover, they will fly away on their own.
- 6.** Share! Share your photos or tell a friend about what you saw. To identify the insects you found, use the Seek app ([bit.ly/PH-Seek](https://bit.ly/PH-Seek)) or upload your photo to [iNaturalist.org](https://iNaturalist.org).



## TURN OUT THE LIGHTS!



Lights at night can be disorienting and harmful to animals like migrating birds, hatching sea turtles, and animals who are active at night. In towns and cities, excessive lights at night create light pollution. If you can, think about turning out the lights both inside and outside when you aren't using them. More info on keeping the skies dark at: <https://www.darksky.org/>

## ANSWER KEY

### Metamorphosis Time:

- 1.** Egg; **2.** Larva;
- 3.** Pupa; **4.** Adult

### Peach Parts:

- 1.** Mesocarp; **2.** Exocarp;
- 3.** Endocarp; **4.** Seed

### Trees in Trouble:

- 1.** bottom left; **2.** top right;
- 3.** top left; **4.** bottom right



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PHOTO CREDIT: Bernard Dupont, Flickr.com



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

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### 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](http://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.



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Association**

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This publication was developed with financial support from the US Forest Service and the USDA Animal and Plant Health Inspection Service.

