

Join Our

Pest Patrol!



Photo Courtesy Minnesota Department of Transportation.



Purple Loosestrife

**A Backyard
Activity Book
for Kids
On Integrated Pest
Management**



Ladybird Beetles Eating Aphids

Photo Courtesy U.S. Department of Agriculture.



Have you ever been bitten by a flea or mosquito? Treated your dog for fleas? Had head lice? Been stung by a wasp or bee? Watched weeds overtake your garden? Fought to keep cockroaches out of your school building?

We've all been bugged at one time or another by pests. For many of us, our first reaction is to reach for the nearest can of bug spray. But, pesticides and fertilizers that run off from lawns and other locations are a significant source of pollution in our environment. There's a better way to solve pest problems called Integrated Pest Management (IPM). IPM is an effective and environmentally sensitive approach to pest management that relies on a combination of common sense practices. Teaching IPM at the grade school level can provide children with important information about pest identity and biology, and ecology. It can also help children understand the impact that personal choices—like whether or not to use chemicals to control pests—can have on our environment.

Join Our Pest Patrol: A Backyard Activity Book on Integrated Pest Management, originally developed by the Minnesota Department of Agriculture, is for educators of children in grades 1–6. *Join Our Pest Patrol* is chock full of fun activities that can easily be incorporated into reading, science, and even math and art classes. The activities are written for the 3–5 grade level, but can be easily adapted for the lower or upper grades. Each activity includes fun facts in "Did You Know," and "Tips for Grown-ups." There are also lots of links to interesting web sites that allow educators to expand their students' learning. Answers to all quizzes are located at the end of the book inside the back cover. We've also included a Web Resources List on pages 26 and 27 of all the web links identified in the activities for easier reference.

We hope you enjoy *Join Our Pest Patrol* and invite you to tell us about how you've used this resource by completing our Customer Feedback Form on page 28. Good luck, and thanks for your interest in Integrated Pest Management!

EPA thanks the following people who contributed to the activity book:

Acknowledgments

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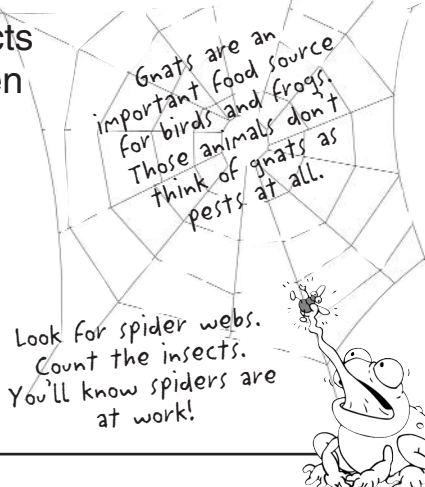
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Insects: What's a Pest?

The world has more insects than all other living things combined. We need insects! Many insects work for us. They visit flowers and spread pollen so plants can produce fruits and vegetables. Some insects eat other insects that damage plants. These "worker" insects are welcome **guests**.

All insects have a place in the web of life. However some insects are a nuisance and some can be harmful. We call insects **pests** when they hurt, damage, destroy, or make us or our animals sick.



Insects destroy 10–15% of the world's food each year.

Did You know?

Pests or Guests

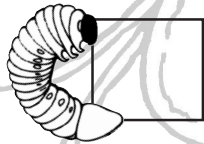
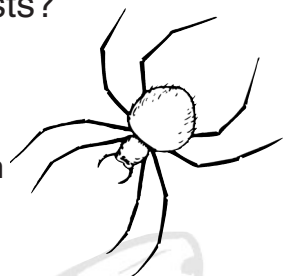


When are insects pests? And when are they welcome guests?

A In the boxes mark **P** for pest or **G** for guest.

B Fill in the blanks below.

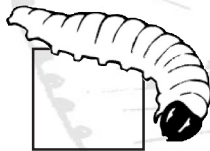
Ant, bee, cockroach, grub, mosquito, spider, wasp, worm



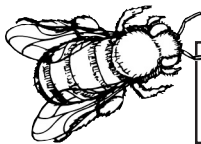
1 It chews and kills corn plants. No corn for us!

5 It preys on other insects that may harm plants.

2 It bites into apples.



6 Its bite can give your dog or cat heartworm disease.

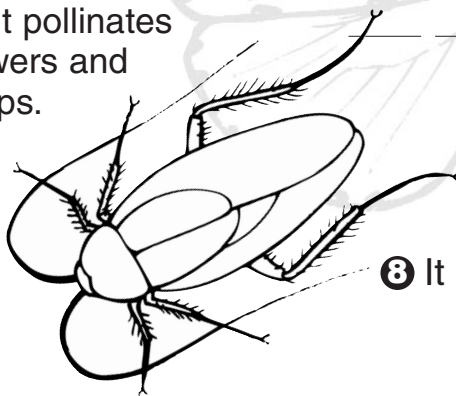


3 It pollinates flowers and crops.

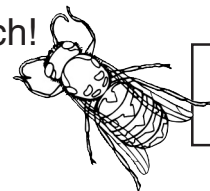
7 It shows up at your picnic.



4 It can trigger an asthma attack.



8 It may sting. Ouch!



This book shows some ways to fight the pests with least harm to the earth and other creatures.



Insect Pests and Pals

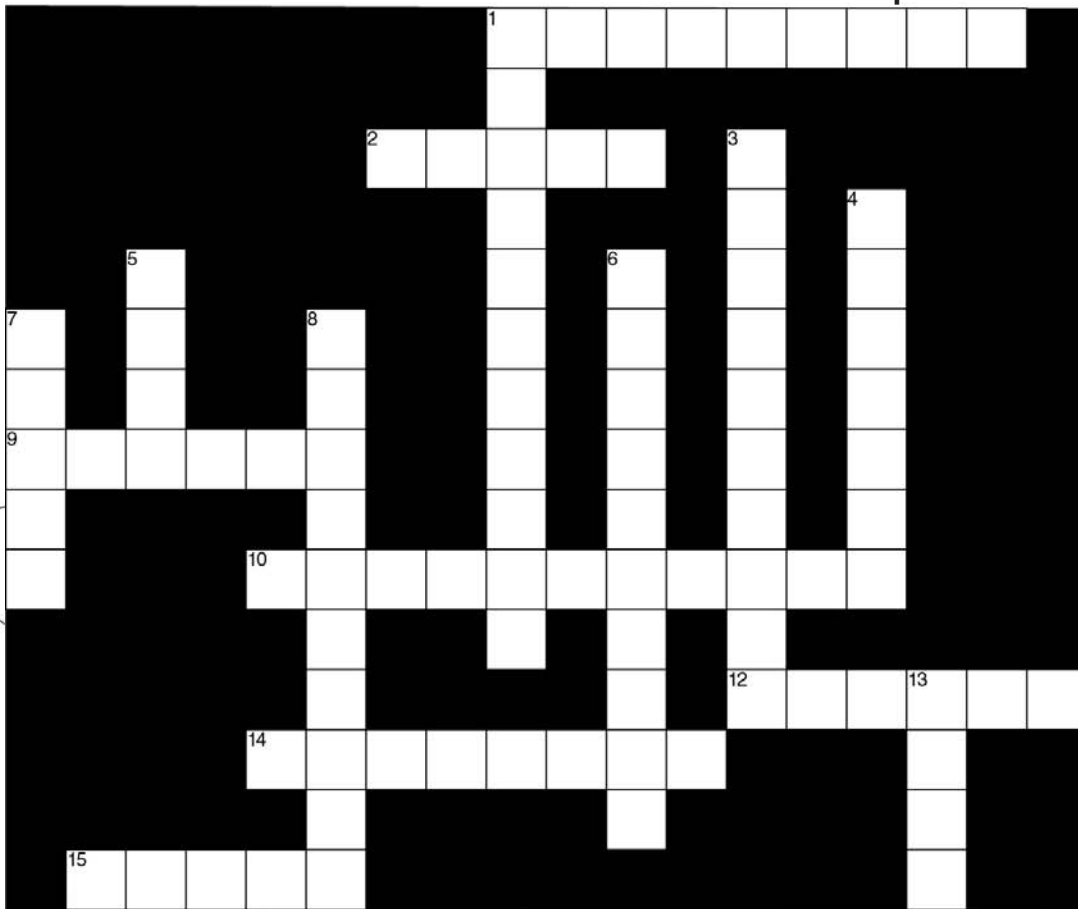
Some bugs help us. Some bugs pester us. All bugs are part of the web of life. If you think all bugs belong in bug zappers, think again!

Use words from the word bank below to do this puzzle.



What's the only insect that makes food humans eat?

See puzzle No. 13!



Word Bank

- Aphids
- Bees
- Boxelder
- Butterflies
- Carpenter
- Cockroaches
- Fruitflies
- Gnats
- Houseflies
- Mosquitoes
- Moth
- Spiders
- Sowbug
- Ticks
- Wasps

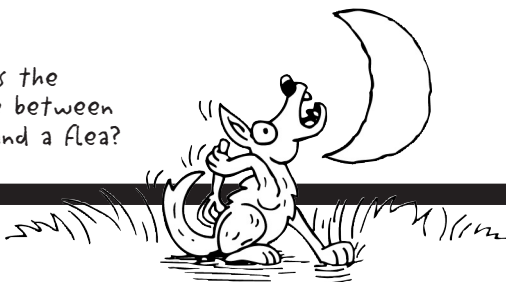
Across:

1. Large black ant that nests in wood.
2. They get on you to suck your blood.
9. They harm plants by sucking sap.
10. Beautiful insects that drink nectar.
12. Outdoor creepy-crawly that eats rotten plant matter.
14. Red and black bugs that eat tree leaves and seeds but don't kill trees.
15. They sting, but also kill harmful insects.

Down:

1. They eat almost anything, they like the dark, and they are hard to get rid of.
3. Tiny, flying insects that breed in fruits and vegetables.
4. They have eight legs and eat insects.
5. It eats holes in wool and fur clothing.
6. They spread germs with their feet. Frogs eat them.
7. Small, flying bugs. The female's bite is itchy.
8. They give itchy bites. Bats eat them.
13. They sting, but also make food that humans eat.

What's the difference between a coyote and a flea?



A coyote howls on the prairie. A flea prowls on the hairy.





Fighting Pests with the 3 Ps

Many scientists are trying to find ways to fight pests. One way is to use pests of pests, or the three Ps!

Predators hunt and kill pests for food.

Parasites live on or inside pests and also may kill them.

Pathogens cause disease in pests. Pathogens are germs like bacteria or viruses.

The 3 Ps in Action

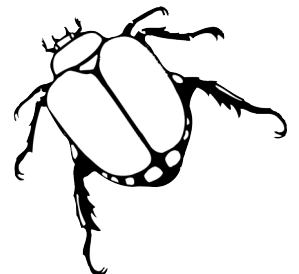
In the examples below, which of the 3 Ps is fighting pests?

1 Bugs are attacking the plants in your school playground. Upon close inspection, you find tiny insects called scales on plant leaves. Insect killers (insecticides) would kill the scales, but might also harm other creatures in the playground. Also, school officials do not want to use insecticides where kids play. School officials work with agricultural extension agents to put tiny stingless wasps to work. These wasps lay their eggs inside the pesty scales. Wasp larvae hatch and grow inside the scales. That kills the scales.



P _____

2 Japanese beetles have invaded America. They eat roots, leaves, flower buds and fruit. They can kill bushes, trees, grasses, and garden and field crops. Now a germ is on the job. It causes a disease that kills the Japanese beetle.



P _____

3 The brown bat can catch 1,200 mosquito-sized insects in just one hour.



P _____



Imagine you are one of the 3 Ps. **Make a poster to advertise yourself.**



What's a Weed?

A weed is a plant growing where you don't want it. Weeds steal sunlight, growing space, and moisture from grass and plants we do want.

Weeds spread by seeds. Pull weeds before they set seeds. Then you'll have fewer weeds in the future!

"Seeds one year, weeds for seven."

Each letter is something plants (including weeds) need to survive.

- P** place
- L** light
- A** air
- N** nutrients
- T** thirst-quenching water



Tips

Take a whack at weeds!

- Pull or hoe weeds out. Be sure to get every tiny bit of root so the weed doesn't grow back.
- The best time to get rid of weeds is when they are small.
- Weeds pull more easily from moist soil.



Poison ivy is a pest when it grows where we hike or play. It gives you an itchy rash and weepy blisters. Is poison ivy good for anything?

Some animals and birds eat the leaves and berries.

Bees sip nectar from the flowers.

Tip for Grown-ups:

Teach children to know poison ivy when they see it and to stay away! See http://www.fda.gov/fdac/features/796_ivy.html

"Leaves of three, let it be."



Who Needs Weeds?



Milkweed can be a pest when it grows in fields of crops. But what would happen if it disappeared? Monarch caterpillars eat milkweed. Without milkweed, what would happen to monarchs?

Monarch butterflies taste bad to birds because when they were caterpillars they ate milkweed.



Dandy... or not?

Many people think dandelions make lawns ugly. Dandelions crowd out grass and can damage sidewalks and pavements. But people long ago thought dandelions were dandy. They used them for medicines. They made fried **flower** blossoms and leafy salads. They boiled and fried **roots** and made roasted root tea. Some people still do!

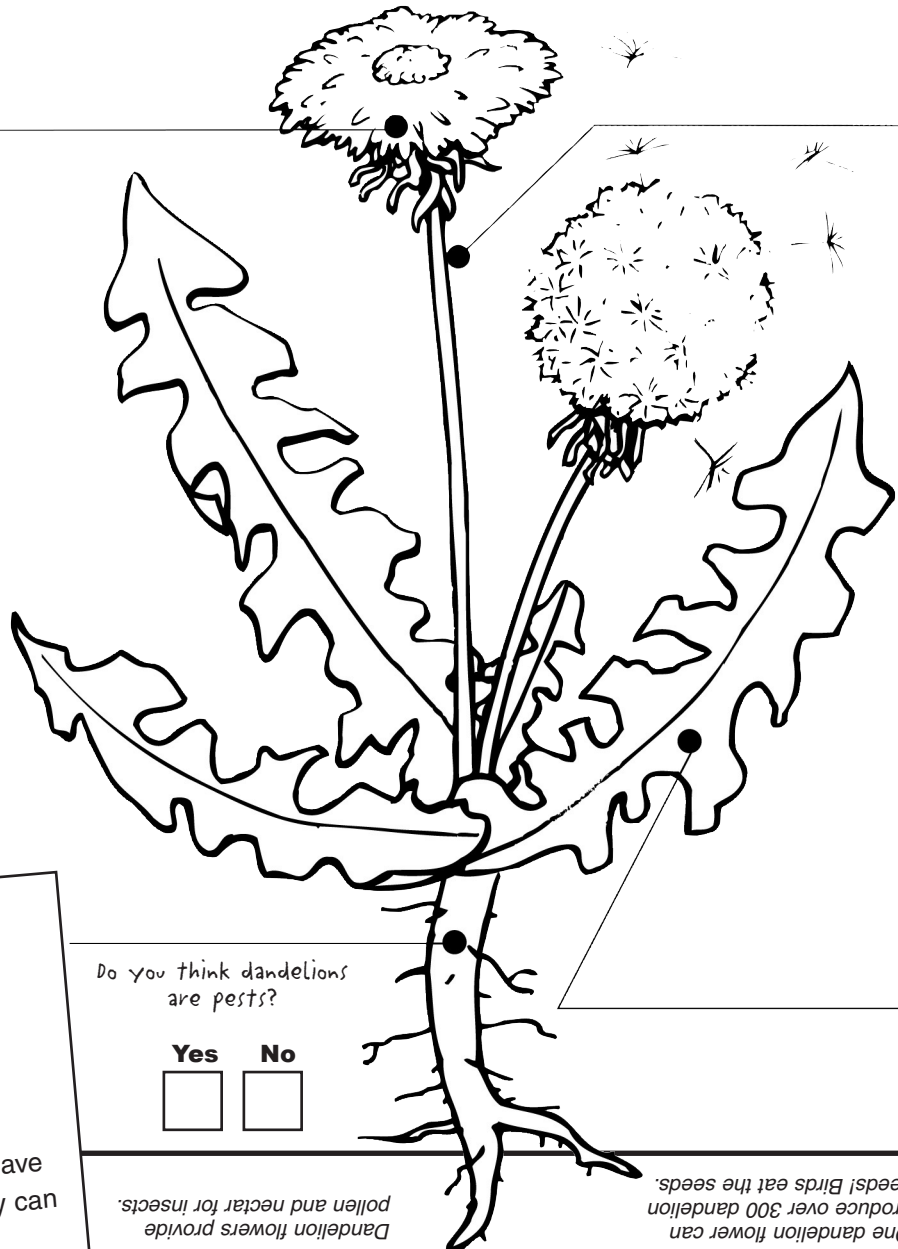


Color the dandelion. In the blanks, write the name of the plant part and possible uses for the part.

Dig THIS!

What can you do with dandelions?

- Make a bouquet.
- Make a dandelion chain. Pick several dandelions with long stems. Make a small slit in the dandelion stems. Poke the end of the **stem** from one dandelion through the slit on another dandelion. Repeat until you have a chain of dandelions.
- Tie-dye a t-shirt! The dandelion's yellow **flowers**, green **leaves**, and red **roots** can be used to make colorful dyes.



Do you think dandelions are pests?

Yes No

Dandelion flowers provide pollen and nectar for insects.

One dandelion flower can produce over 300 dandelion seeds! Birds eat the seeds.



Tip

Want to get rid of dandelions? Pull them out while they still have yellow flowers—**BEFORE** they can spread seeds.

Dandelion seeds are carried by the wind. They travel like tiny parachutes. A strong wind can carry a seed miles away from the parent plant (Science Museum of Minnesota). For more information go to <http://www.smm.org/sin/tf/d/dandelion/dandelion.html>



Green, Green Grass

It's hard for crabgrass and weeds to take over healthy grass. Grass that is healthy should require few, if any, chemical weed and insect killers. What times of the year do people feed (fertilize) grass to keep it strong and healthy?

A bear can help your family remember the right times to fertilize grass.



In winter, a bear sleeps. It eats nothing.

Grass needs nothing.



In spring, bears are hungry when they wake up. They need food.

Grass needs _____.



In summer, bears get what they need without extra help.

Grass needs _____.



In fall, a bear pigs out before it hibernates.

Grass needs _____.



Dress each bear for the season.

Tip for Grown-ups:

Use a mulching mower to put nutrients back without fertilizing. Mow grass at a height of 2.5 to 4 inches to help screen out light to the soil surface. This slows growth of weeds like crabgrass that need light to germinate. Grass also grows a deeper root system, which helps it tolerate stress.

Check with your local agricultural extension service to find the right time of year to fertilize your lawn where you live.



A healthy lawn always has some weeds and insects (helpful insects included).

The Right Plants in the Right Places

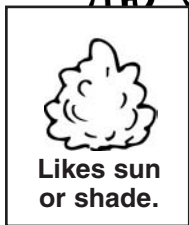
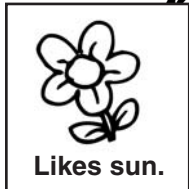
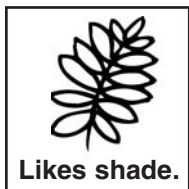
You do best in a certain kind of habitat. So do plants! To grow and thrive, it's important to have the right conditions. Be a friend to plants. Notice where each grows best. Then let it grow there!

Walk around your lawn, schoolyard, or neighborhood park. Notice where different plants grow well. What is it like? Is it wet or dry? Shady or sunny? Are there places where nothing grows?

Use what you learned on your walk. Draw ferns, cattails, flowers, and other plants where each would grow best.

**Make a path from the cabin to the lake.
Put the right plants in the right places.**

Plants growing in their own best habitat are the best survivors.



Tips for Grown-ups:

Use native plants in your landscape. Not only are they interesting, but they also result in less water use; less need for pesticides and fertilizers; and better habitat for butterflies, birds, and other wildlife.

See:

U.S. EPA's Green Landscaping with Native Plants
<http://www.epa.gov/greenacres/>

EPA Mid-Atlantic Region Green Landscaping
www.epa.gov/reg3esd1/garden/index.htm

Audubon at Home
http://www.audubon.org/bird/at_home/index.html

National Wildlife Federation Backyard Wildlife Habitat Program
<http://www.nwf.org/backyardwildlifehabitat/>

The Nature Conservancy's Wildland Invasive Species Team Web Site
<http://tncweeds.ucdavis.edu/>

Purple Plague!

America's Most WANTED

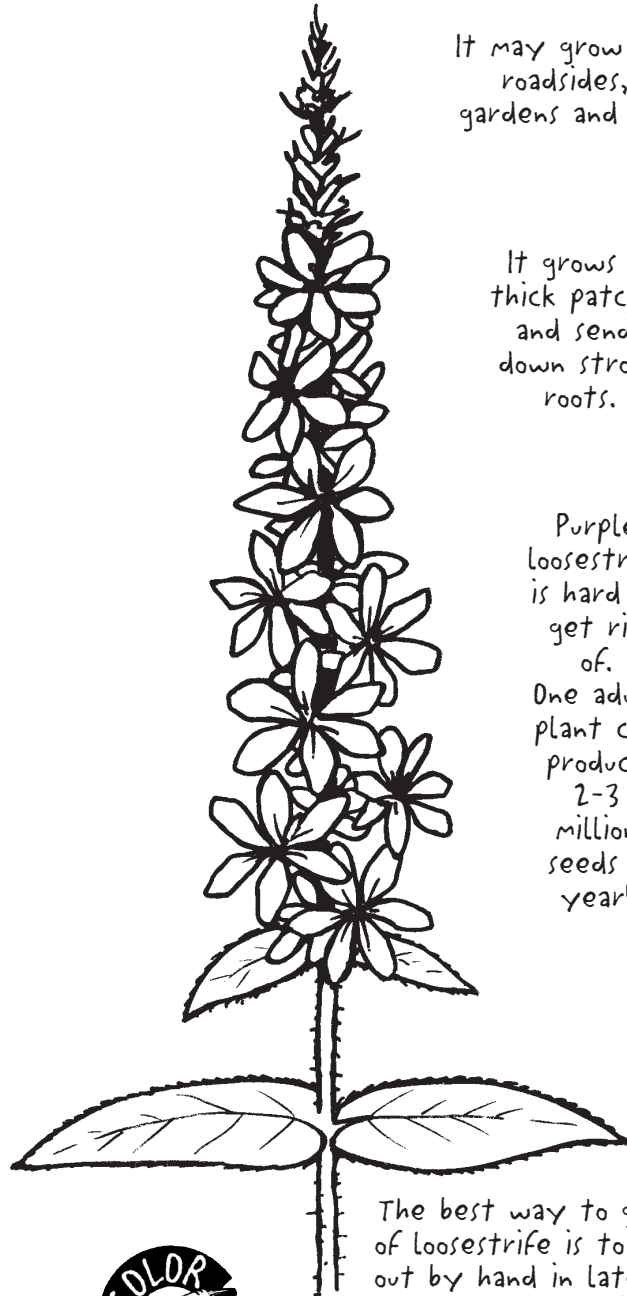
Purple loosestrife is pretty—and pretty dangerous. Why? This weed hogs the land and crowds out native plants and wildlife. It causes trouble when it grows in wetlands. The stems and roots are so tough that boats and wildlife can't get through. Other plant life can't survive where purple loosestrife takes over. Then wetland animals lose their food and shelter.

When purple loosestrife was brought to North America, its natural enemies were left behind. With nothing to stop it, the plants spread like wildfire. Now something's bugging purple loosestrife. Experts brought natural insect enemies from Europe to eat the plants. These beetles can slow purple loosestrife's spread.



People have increased the spread of purple loosestrife by planting it in gardens and by using it as a pollen source for honey bees. Have you seen purple loosestrife in a garden near you?

Did You Know?



It may grow along roadsides, in gardens and parks.

It grows in thick patches and sends down strong roots.

Purple loosestrife is hard to get rid of. One adult plant can produce 2-3 million seeds a year!



The best way to get rid of loosestrife is to pull it out by hand in late June, July, and early August, before the plant has gone to seed.

Unscramble the words to see the only states where purple loosestrife does NOT grow!

O R A D F I L A W I I H A





Tips

Stop Purple Loosestrife!

- If you see purple loosestrife, pull it up right away. Put the plant pieces in plastic bags.
- Tell others about purple loosestrife. It destroys native plants, animals, and wetlands.
- Read labels before you buy any seed packages. You'll find purple loosestrife seeds in some wildflower seed mixes. Don't buy them!

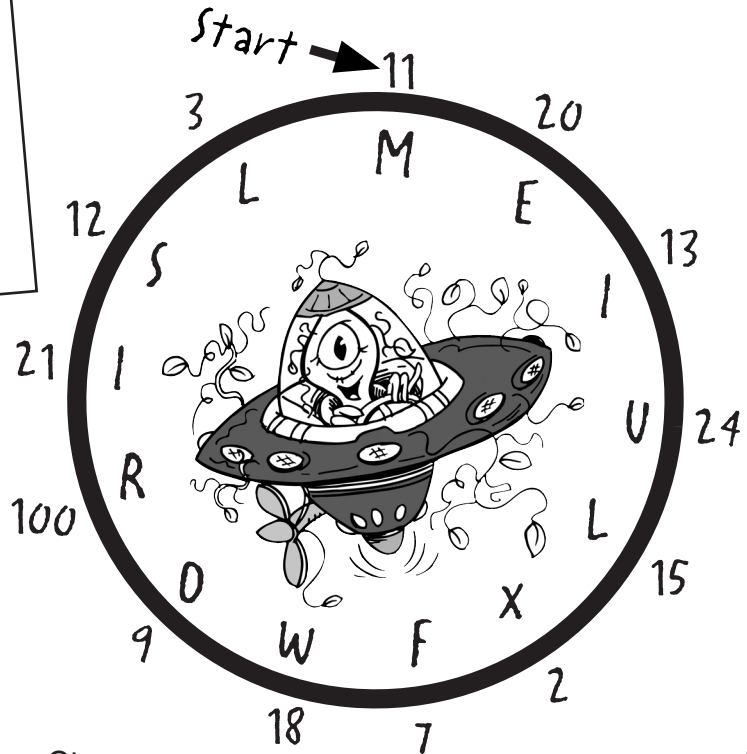
Check boats for milfoil!



BEWARE

Another alien weed has invaded America. This weed

- clogs rivers and lakes,
- crowds out native plants,
- grows into mats so thick that boats and swimmers can't get through, and
- destroys food and habitat for our fish and water birds.



Circle the letters by the odd numbers. You'll spell the name of this weed!

Date: _____ Feet _____ Inches

With moist soil and full sun, purple loosestrife can grow up to 10 feet tall. How tall are YOU?

Did You Know?

Tip for Grown-ups:

Pulling purple loosestrife? Thoroughly brush off your clothes and equipment before leaving the site so you don't transport the small seeds to new areas. Put all purple loosestrife plant pieces in plastic bags (vegetation rots quickly in plastic). Take the bags to a sanitary landfill site. Be sure the landfill site doesn't require bags to be broken open for composting. Composting is not advised, as purple loosestrife seeds may not be destroyed and the thick, woody stems and roots take a long time to decompose. If facilities exist in your area, incineration is an effective way to dispose of plant material.



z 1
y 2
x 3
w 4
v 5
u 6
t 7
s 8
r 9
q 10
p 11
o 12
n 13
m 14
l 15
k 16
j 17
i 18
h 19
g 20
f 21
e 22
d 23
c 24
b 25
a 26

Outsmart those pests!



1

Put up _____
25 18 9 23 19 12 6 8 22 8

Plant _____
8 6 13 21 15 12 4 22 9 8

and plants with berries. These attract birds to feast on insects that harm plants.

2



Welcome _____
7 12 26 23 8

They eat _____
8 15 6 20 8

that eat and damage plants.



4

Take

20 26 9 25 26 20 22

and recycling outdoors.

3



Clean up

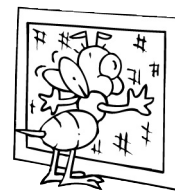
24 9 6 14 25 8

Wipe up spills. Keep rooms clean.

5

Put _____
8 24 9 22 22 13 8

on doors and windows. Keep insects out!



6

Stake up

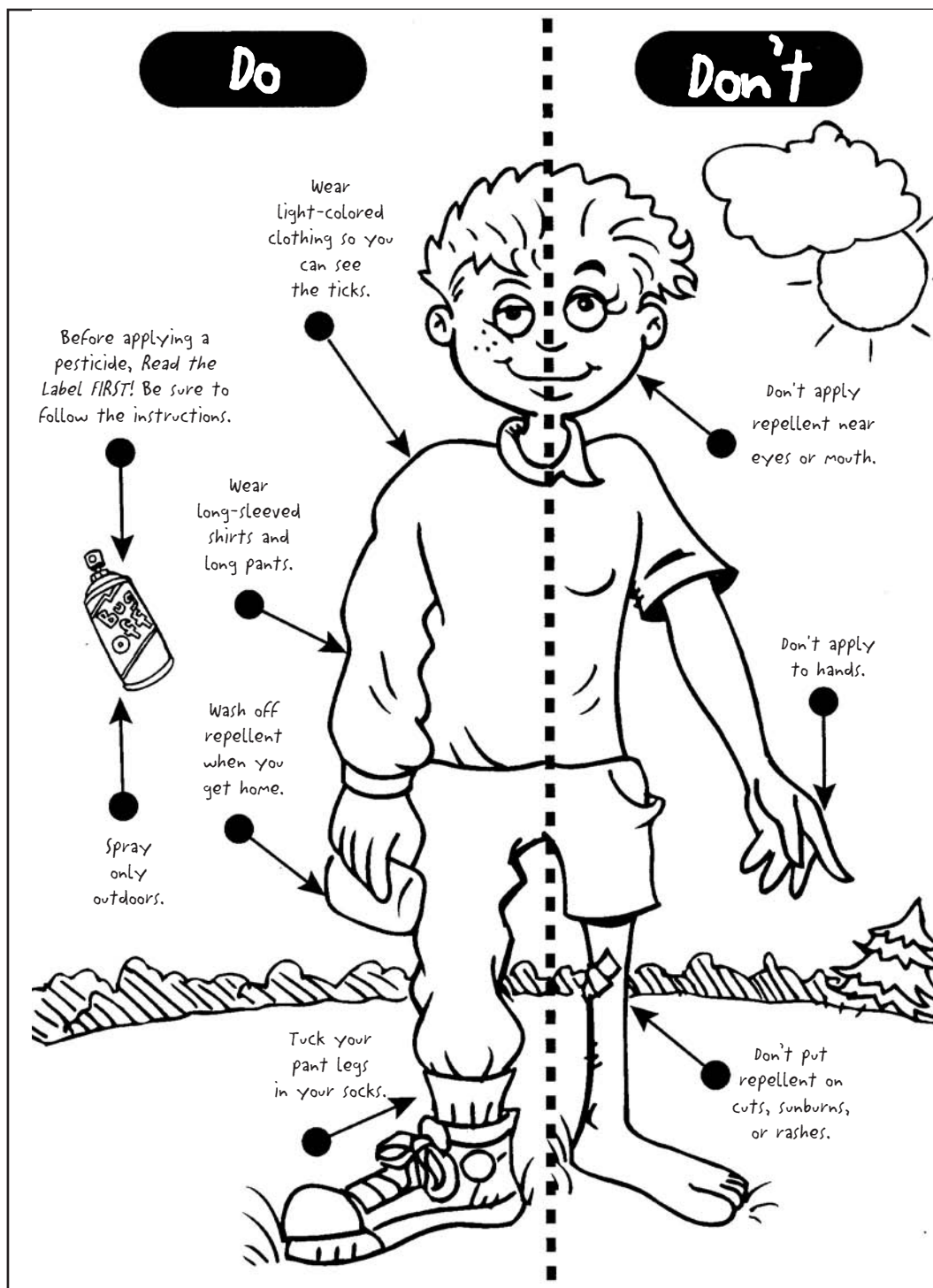
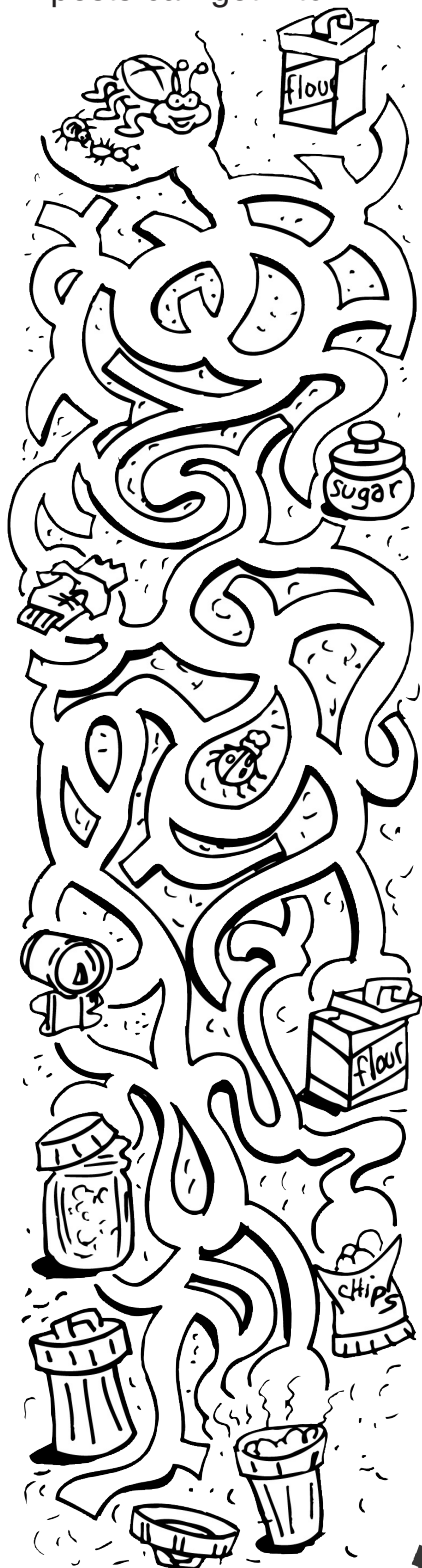


_____ to keep
7 12 14 26 7 12 22 8

their leaves off the ground. Water them with a can or bucket, not a spray. Then spores that live in the soil won't splash up on the plants and make them sick.

Keep Pests from Pestering You Inside and Outside Your House!

Kitchen pests like cereal, flour, oatmeal, crackers, and pancake mix. Travel the maze to see which containers pests can get into.



Tip for Grown-ups:

Think you've got pests? Identify the pest problem before you decide what to do. Some pests (or signs of them) are easy to spot. But sometimes we are fooled. What looks like a plant "disease" may actually be a sign of poor soil or lack of water. To help you identify your pest and learn the most effective ways to control it, use free sources from the library or local nurseries. Or contact your local Cooperative Research, Education, and Extension Service. (<http://www.reeusda.gov/1700/statepartners/usa.htm>)

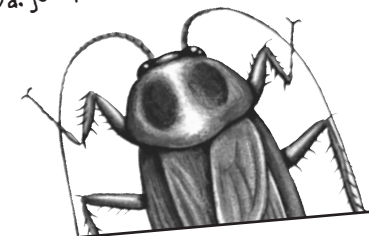


Midnight Raiders: Cockroach Invaders

Cockroaches love living with people. Homes give them lots of food and cozy spaces to rest and breed. But no one wants cockroaches in their home. They smell bad. They run all over at night. They can cause allergies, too.

To get rid of roaches, think like a roach. What would make you leave a cozy human home?

See the Roach Prevention Activity Web Site for Kids at <http://www.epa.gov/pesticides/kids/roaches/english/>



Tips

Get Rid of Roaches

Check things to do:

- Fix leaky pipes and faucets. (Cockroaches need water.)
- Take out the garbage every day.
- Keep food in closed containers.
- Don't leave dirty dishes in the sink overnight.
- Wash food from cans before recycling.
- Plug up cracks and holes. Young roaches can squeeze through a crack as thin as a dime.
- Clear out warm, dark places so roaches can't hide.

Cockroach Menu

What's yummy to a roach? Search for the hidden words to find out. Then make sure the roaches won't get to these goodies in your home!

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

Word Bank: peanut butter; fingernail clippings; crumbs; pet food; glue; bookbindings; grease; soap

- Roaches scatter faster than you can blink your eye. Their waxy coat lets them flatten, and they easily slip through tiny cracks and holes.
- Cockroaches can cause asthma in many kids. The skins cockroaches shed when they grow cause the allergies. These skins float around in homes.



Nasty! When they eat, cockroaches barf a little bit. They also leave poop. These smelly things mark the spot so the roaches can find food later.

Frogs, lizards, birds, and mice think cockroaches make tasty treats!

Ticked OFF!

Ticks are pests that live off blood. They find the blood in people and animals. While feasting on their host, ticks can pass along sicknesses like Lyme Disease.

Ticks wait for their food to come to them. Ticks can sense body heat and carbon dioxide—a gas people and animals breathe out—to find prey. When blood sources like humans brush against them, ticks hop on.

Uck, a Tick!

Ticks can be found all over the United States. People living in the shaded states of the country have a higher risk of being bitten by ticks carrying the bacteria that causes Lyme Disease. **Mark an "X" on the state that YOU live in.**



Source: Centers for Disease Control and Prevention (<http://www.cdc.gov/health/>). Cited by the American Lyme Disease Foundation, Inc. (www.aldf.com/).

For more about Lyme Disease, see: <http://www.cdc.gov/ncidod/dvbid/lyme/>

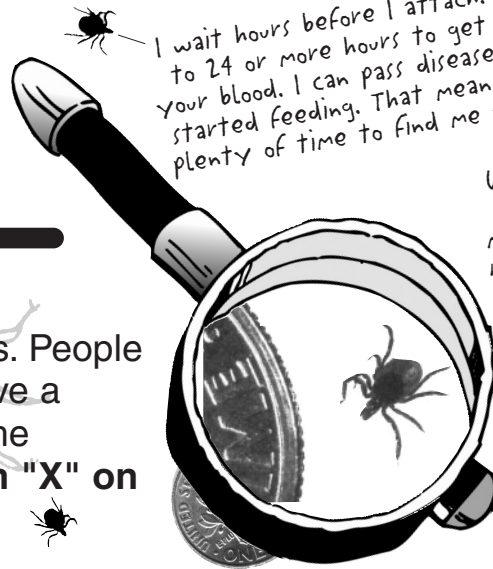


Check and protect your pets, too.

When ticks attach, they place a barbed mouth-piece into your skin—NOT their head.

Did You Know?

- Ticks live in the woods and tall grass.
- They only eat three times: once as larvae, once as nymphs, and once as adults.



I wait hours before I attach. Then I take up to 24 or more hours to get ready to suck your blood. I can pass diseases **ONLY** once I've started feeding. That means that you have plenty of time to find me and take me off.

Under a magnifying glass you can see me. Otherwise I am really quite small!

Photo Courtesy
Minnesota Department
of Health - Disease
Prevention and
Control

Least Toxic Tips

Avoid Tick Bites!

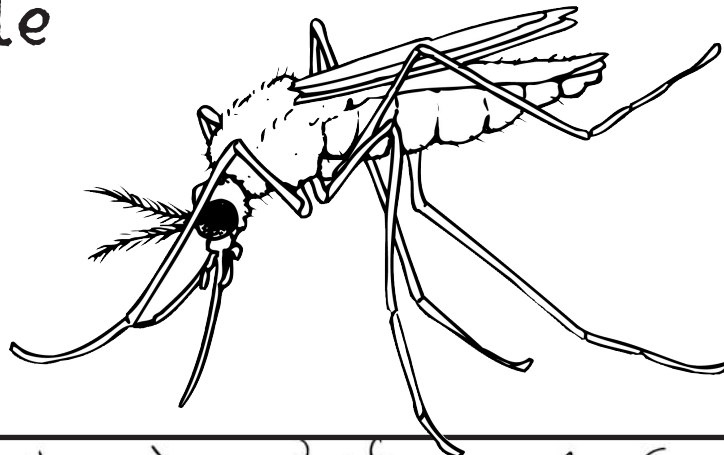
1. Dress right! See page 11.
2. At home, check yourself from head to toe. Check your clothes, body, and hair for ticks.
3. Ask an adult to pull any ticks off with tweezers.

Stop! If you feel like you have the flu after being in the woods, or if you get a rash where a tick bit, see a doctor. These could be signs of Lyme Disease. A doctor can help you get well.

Tip for Grown-ups:

Ticks attach themselves to your body with their mouths. The best way to remove them is with tweezers, making sure not to leave any tick body parts in your skin.

Join the Tree Hole Mosquito Patrol!



Mosquitoes bite and make you itch. They can also make you sick. Some mosquitoes lay eggs in ponds or swamps. The tree hole mosquito can lay eggs in your yard! It breeds any place it finds still or slow-moving water. That includes tree holes that hold water.

This mosquito finds lots of other places to lay eggs, too. You'll see 10 in the picture. Cross them out. Then go on a mosquito patrol in your own neighborhood. Turn over empty pots. Dump water from toys. Don't grow mosquitoes in your area!



COLOR THIS

Did You Know?



Some mosquitoes can carry the **West Nile Virus**. Very few mosquitoes carry it, but children can get sick if bitten by one that does.

Skeeter Scat



Tips

- Read labels on all repellents and avoid over-use of pesticide products.
- Wear light, loose clothing to cover your skin.
- Stay inside one hour before and after sunset when mosquitoes are most active.

Mosquito-Eating Machines

Mosquitoes have a place in the food chain, but not on your skin. Bats and birds are mosquito patrols, too. Build a bat house and you'll have fewer mosquitoes!

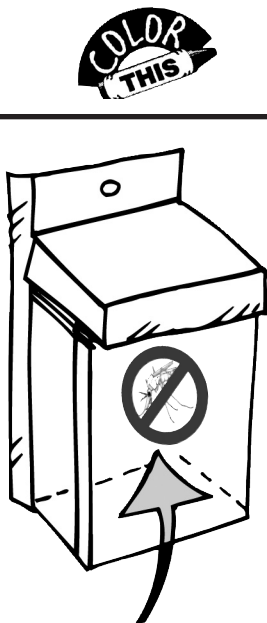
Try This!

Build a Bat House!

- *Woodworking for Wildlife* by Carroll Henderson has a bat house plan. You can build it from one piece of lumber for \$5.00.

For more, see

- <http://www.batcon.org/bhra/bhcriter.html>



Enter at the bottom!



What does one big brown bat eat each night? Use the clues to find out!

A bat eats between (A) and (B) mosquitoes and other insects each night.

Clues

How many years in a century? _____

Add a zero. _____

Multiply times 3. _____ (A)

How many pennies in a dollar? _____

Multiply times the number of days in a week. _____

Add one more zero. _____ (B)



Pests have enemies, too!

Aphids and Ladybugs

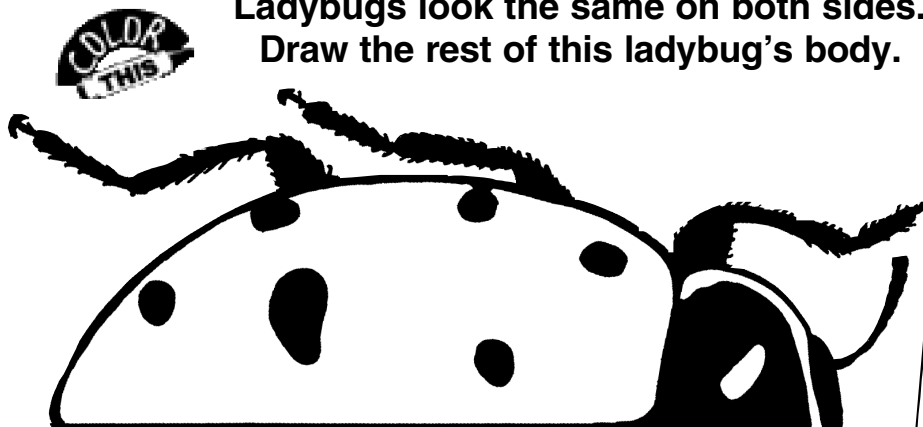


Aphids are tiny insect pests. They suck the sap from plants—vegetables, crops, flowers, and trees. They take away the plant's nutrients, and they can give the plant viruses. Aphids attract even more pests to the plant with the sweet, sticky juices they make.

Natural enemies that gobble up aphids are lacewings, assassin bugs, wasps, spiders, and chickadees. But ladybugs (ladybird beetles) are the champion aphid eaters.



**Ladybugs look the same on both sides.
Draw the rest of this ladybug's body.**



Ladybugs won't harm any of your plants, but they eat many pests that do! Let ladybugs do their work!

For more on ladybugs, visit the National Wildlife Federation's Back Yard Wildlife Habitat Program: <http://www.nwf.org/backyardwildlifehabitat/goodbugsbadbugs.cfm>. Click on the picture of ladybugs about half way down the screen.

Tip for Grown-ups:

When fighting spider mites or aphids, go for the least toxic ways. You can buy beneficial insects (enemies of pests) such as ladybugs. You can also use insecticidal soaps or wash aphids off plants with your garden hose.



Leaf TOXIC Tips

For fighting aphids

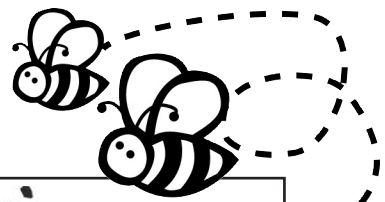
- Pick off aphids from the underside of leaves, or spray them with water.
- Grow plants such as marigolds that attract aphids' natural enemies.
- Buy a bag of ladybugs from a garden nursery. Set them free in your yard.
- Many trees, shrubs, and flowers have resistance to aphids. Call your local agricultural extension service to identify resistant types for your yard.

- When it hatches, a ladybug larva will eat about 400 aphids. As an adult, it may eat up to 5,000 more aphids!
- Insect sprays are the ladybug's number one danger!



What's all the BUZZZZZZZZ?

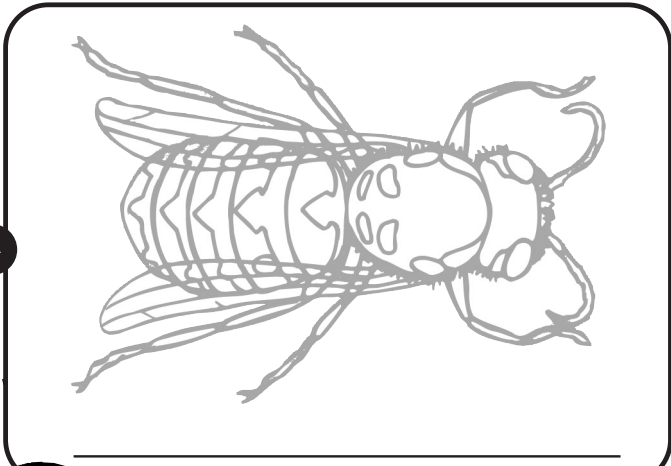
Honeybees and wasps sting to defend themselves, NOT to attack. For bees and wasps, stings are a good way to keep people from bugging them. Bee stings hurt. They can even be deadly if someone is allergic.



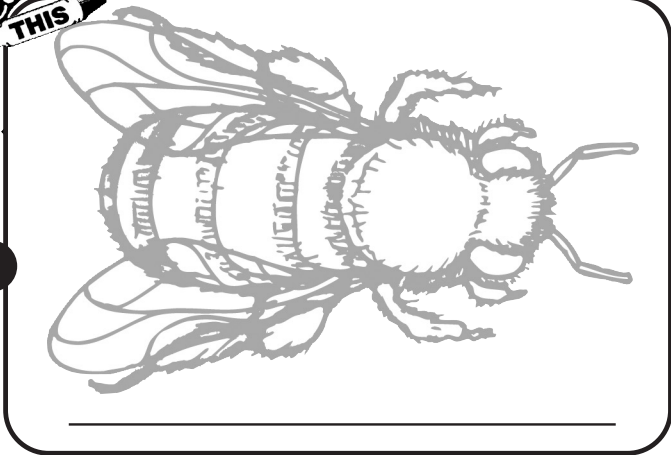
Did You Know?

- Honeybees collect pollen and carry it in a basket of stiff hairs on each hind-leg. When they rest, their wings are flat.
- Wasps do not have "pollen baskets" and do not collect pollen. When they rest, their wings are folded back and look narrower than a bee's wings.

Which is which? Label and color the wasp and the honeybee. Circle the pollen baskets on the honeybee.



COLOR THIS



Tips

Prevent Stings!

Try not to attract bees. If they come around, **don't frighten them**. Check what you should do in areas with bees:

- Avoid using scented products. This means hair spray, scented soaps, perfume, and lotions.
- Avoid brightly colored clothes, especially flowered patterns.
- Keep food and soda cans covered.
- Wear hats, shoes, and long pants.
- If a bee comes around, hold very still.
- If a bee lands on you, don't swat at it. Don't panic! Just blow at it gently. It will move.

First Aid

If you get stung, have an adult remove the stinger as soon as possible.

- Wash the sting with soap and water.
- Put ice or cool water on it for 10 to 30 minutes.
- To ease the pain and itching, try putting one of these on the sting: alcohol wipes, or a paste made of baking soda and water or meat tenderizer and water.

Tip for Grown-ups:

Keep a bee sting kit handy at home and in the car. If you or a family member is allergic to bee stings, ask your doctor what you need to have on hand.

A. A bee flying backwards.

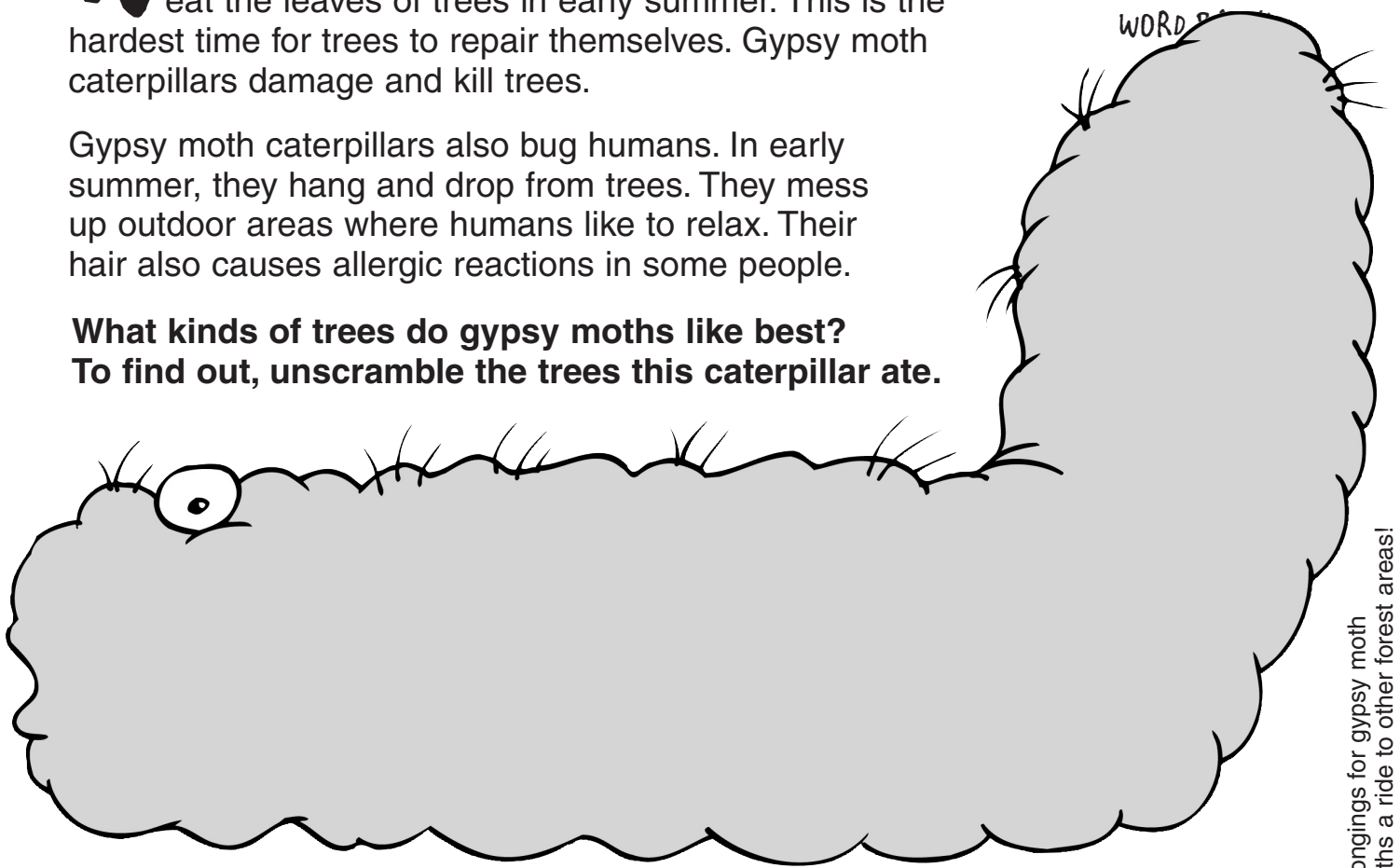
Without pollinators, we wouldn't have agriculture!

Monster caterpillar

What's the number one tree pest in the USA? It's the gypsy moth caterpillar. These large, hungry pests eat the leaves of trees in early summer. This is the hardest time for trees to repair themselves. Gypsy moth caterpillars damage and kill trees.

Gypsy moth caterpillars also bug humans. In early summer, they hang and drop from trees. They mess up outdoor areas where humans like to relax. Their hair also causes allergic reactions in some people.

**What kinds of trees do gypsy moths like best?
To find out, unscramble the trees this caterpillar ate.**



**Learn to identify the gypsy moth in every stage of development.
Number the life cycle stages in right order, from egg to adult.**

#

#

#

#



<http://www.fs.fed.us/ne/morgantown/4557/gmoth/>

Tip for Grown-ups:

When planting trees, choose species that gypsy moths don't eat. Try Ash, Dogwood, Juniper, Lilac, Sycamore, Arborvitae, Honeylocust, or Northern Catalpa.

Travelers and campers beware! Check your belongings for gypsy moth caterpillars and pupal cases. Don't give gypsy moths a ride to other forest areas!

Wise up to WORMS



EXCUSE ME,
you're standing on
20 nematodes (microscopic parasites and predators),
200,000 algae (microscopic plants),
yards of fungi,
thousands of protozoa,
and up to a billion bacteria...
in 1 teaspoon of soil!



Healthy plants more easily resist pests. Good soil grows healthy plants. And earthworms help make good soil.

Earthworms are little "soil plows." They move bits of soil and make tunnels. This lets in air and water for animals and plants in the ground. Worms carry leaf bits and other materials into the soil, making it richer for plants. Earthworms eat soil and leave castings, little piles or pellets ("worm poop"). Castings hold nutrients that passed through the worm, and they improve the soil. Way to go, worms!

Why do you think robins tug so hard to pull earthworms from the soil?



Try This!

Worm - a - rama

A cool, moist day or evening is a great time to find earthworms. Look in garden soil, vacant lots, lawns, parks, or pastures.

1. Look at the soil surface. Castings are clues.
2. Dig a spadeful of soil. Sort through it for earthworms. Look at them through a hand lens. Look for:

- Setae** (bristles that help worms grip soil and crawl)
- Slime coating** (keeps skin moist so worms can breathe)
- Front end** (usually goes forward first)
- Clitellum** ("collar" or band that's only on adult worms)

3. After you study the worms, put them back on the soil, please.

Label the clitellum, setae, and front end.



Worms can turn your old food into plant food. Try vermicomposting (composting with worms). For tips on how to vermicompost, see:

<http://www.niehhs.nih.gov/kids/worms.htm>

Tip for Grown-ups:

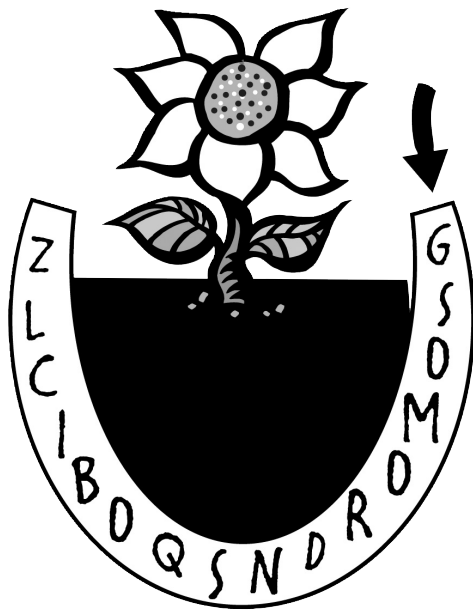
A healthy lawn always has critters that help keep pests under control!
Remember: Pesticides can kill the helpful critters that keep your soil healthy.

A baby robin will eat 14 feet of earthworms before it leaves the nest!

Crazy about Compost

Composting saves landfill space and turns garbage to goodness. Try it at home or at school!

What do you get from compost? To find out, start at the arrow and write down every other letter in the space below.



Loose soil makes it easier for plant roots to spread out.

Tip for Grown-ups:




Use compost instead of chemical fertilizers. It's earth-friendly, effective, and free. Spread compost over the ground at the base of plants to give them needed nutrients.

For an informative slideshow about composting for kids, see: <http://aggie-horticulture.tamu.edu/sustainable/slidesets/kidscompost/cover.html>

Try This!

Make your own compost.

You need:

- Garbage , OR , at least 3 feet wide and 3 feet deep
- Big plastic garbage bags to line the  or 
- Soil (with earthworms and bugs)
- Twigs or wood chips
- Compost ingredients
- A long stick or shovel to stir the compost

Before you start:

Ask an adult to help you poke 25–30 small holes in the lid, sides, and bottom of the can for air and water.

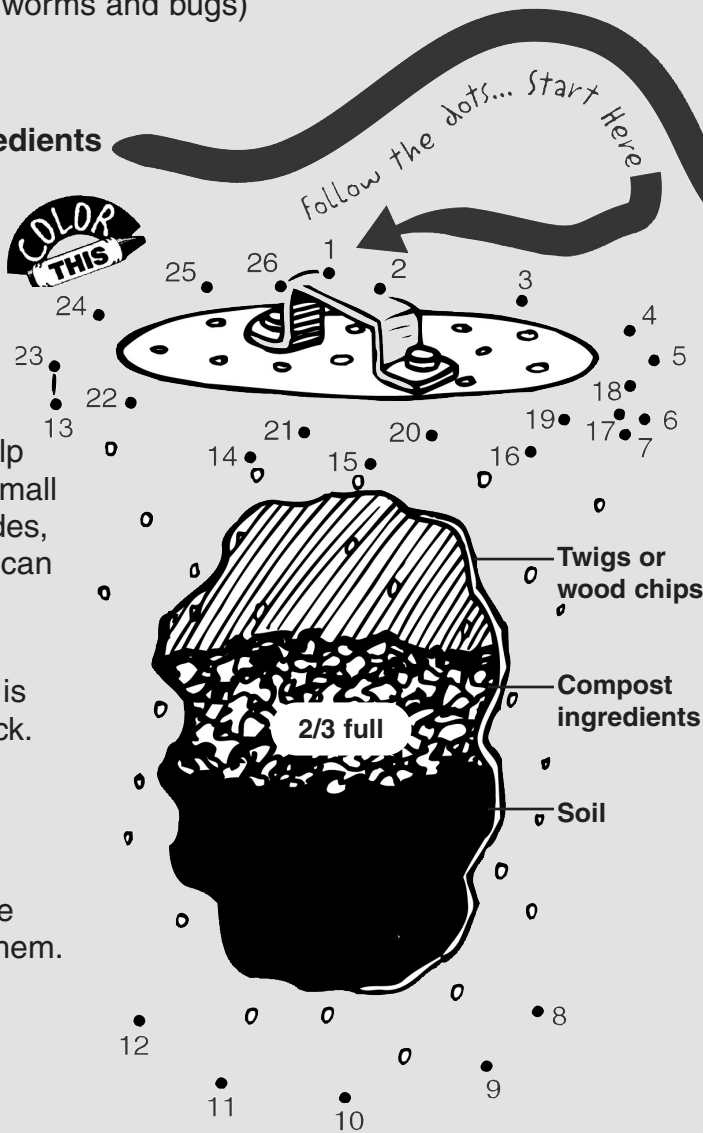
Step 1. Build up layers. Each layer is about 8 inches thick.

Step 2. Pour on enough water to moisten the pile.

Step 3. Make more layers and water them.

Step 4. Each time you add compost ingredients add a little soil.

COLOR THIS



Let nature's recyclers go to work!

Use the stick or shovel to mix the pile every two to four days. In one or two months, your compost will become dark brown and crumbly. It is ready to use on your lawn, houseplants, or garden!



Don't put meat, dairy products, or animal poop in your compost. They will make it smell bad—and attract pests!!

Don't miss Mulch

MULCH is a layer of nonliving materials. People can spread it on top of the soil around plants. Why use mulch? Mulch shades and cools the soil. It keeps moisture in the soil. Mulch protects the soil from packing down. Best of all, it stops pesty weeds from growing. Mulch can be:

- Wood chips
- Dry leaves
- Grass clippings
(with NO weeds or chemical weed killers)
- Rocks
- Compost

Compost ingredients:

Fill in the missing vowels.

A c _ ff _ _

gr _ _ nds)

B gr _ ss

cl _ pp _ ngs

C f _ _ d scr _ ps

D d _ c _ y _ ng

l _ _ v _ s

E v _ gg _ _

p _ _ ls

G

fr _ _ t
c _ r _ s

Try This!

How thick should a mulch layer be? See for yourself!

First, choose two plants growing in your garden, yard, schoolyard, or nearby park. Then...

1. Put 1 inch of mulch around the base of plant #1.
2. Put 3 inches of mulch around plant #2.
3. Check in one month.

I predict _____.

This is what happened: _____

What I want to know now: _____

Go on a Mulch Hunt!

How many places can you find mulch around plants?

- | | | |
|-------------------------------------|--|-------------------------------------|
| <input type="checkbox"/> Gardens | <input type="checkbox"/> At home | <input type="checkbox"/> Parks |
| <input type="checkbox"/> Schoolyard | <input type="checkbox"/> Neighbor's yard | <input type="checkbox"/> Boulevards |

Place	Kind of mulch	Any Weeds?	
		Yes	No

Tip for Grown-ups:

Avoid "beaver lodge" mulching around trees. Spread the mulch evenly and leave a 3-4 inch air space around the base of your tree.

THE WEB OF LIFE

Did you know that there are many more kinds of insects on earth than any other kind of living creature? It's hard to imagine, but 95% of all the animal species on the earth are insects! Millions of insects can exist in a single acre of land! Over one million species have been discovered by scientists, and they think that there might be ten times that many that have not been named yet! All of these insects are part of what is called the "web of life."

Draw and color a picture with a critter you read about in this book.

Show: what it eats
what eats it
if it helps something grow

Add other organisms to your picture to make a web of life.



Think:

- What does it eat?
- Does it help something grow?
- Is it food for another creature?

Everything has a place
in the web of life.

**Tell a friend or parent
what this means.**



Plan for pesticide safety!

Care for Your Plants, Family, and Pets

Sometimes people buy and use pesticides. Pesticides are chemicals that get rid of pests. They are poisons. Pesticides may accidentally get into our bodies and make us sick. They can get into our bodies if we touch them, breathe them, or swallow them. Find pesticides in the picture. Underline words that warn you that they are poisons.



Tips

Be safer from pesticides!

- Either take your shoes off at the door or wipe shoes carefully on a rug-type door mat. How would this help?

- Always store pesticides in their original container. How would this help?

- Wash fruits and vegetables with water. Scrub them with a brush. Peel them if possible. How would this help?

Think Again! Talk with your family:

1. Do lawns and parks really need to be totally weed free?
2. How do some insects help your lawn and plants? Do you really need to get rid of ALL insects?
3. Can you put up with fruits and vegetables that aren't perfect—when they are grown without pesticides?

Tip for Grown-ups:

Teach your children that pesticides are poisons, something they should never touch or eat. Pesticides are only for grown-ups to use. Lock up all household, lawn, and garden chemicals. Store them in original containers with labels. Remove children, pets, and their toys from any area where pesticides are being applied, indoors or out. For more information about pesticide safety, visit our Web Site at: <http://www.epa.gov/oppfead1/Publications/catalog/> and click on "Citizen's Guide to Pest Control and Pesticide Safety" and on "Integrated Pest Management (IPM) in Schools" under "General Consumer Publications." You can obtain free copies of EPA publications by calling the National Service Center for Environmental Publications at 1-800-490-9198.



Are you Qualified for Pest Patrol?

Match each pest problem with the least toxic way to attack it.
Then try these ways when you need to pester pests!

Choosing from many ways to manage pests is called integrated pest management, or IPM.

Do you know how to prevent each of these pests from becoming a nuisance? Draw a line to connect each question with the correct answer. Need help? Look throughout this book to find the answers.

- | | |
|---|--|
| 1 You see purple loosestrife. What do you do? | A Tuck your pant legs into your socks when walking in tall grass or areas where these insects may live. |
| 2 How do you keep roaches out of your home? | B Be very still. Don't panic! Just blow at it gently. It will move. |
| 3 What should you do to avoid tick bites? | C Pull it up right away. Put the pieces in plastic bags. |
| 4 How do you keep mosquitoes from using your yard to lay eggs? | D Make sure there are no open containers with water, where these biters can breed. |
| 5 A bee lands on you. What do you do? | E Keep food in closed containers, clean up crumbs, and take the garbage out every day. |



With the right information and tools, we can solve our pest problems... **AND** be friends to Earth and nature!

That's IPM!

Starlings and some other songbirds use natural pest-killers. They line their nests with special plants that give off chemicals that help keep tiny, blood-sucking animals away from their young.



Tip for Grown-ups:
For more information on IPM see www.ipminstitute.org

Did You Know?

Glossary

Allergic reaction - Can include rash, itching, swelling, sneezing, runny nose, or trouble breathing due to contact with things a person is allergic to.

Bug - General term for insects. The term “bug” refers to insects with two pairs of wings and “beak” mouthparts for piercing and sucking plant juices or other insects.

Castings - “Worm poop” that forms pellets or small piles. Earthworm castings put nutrients back into the soil.

Caterpillar - What a moth or butterfly looks like in the larval stage of its life cycle.

Compost - A mixture of organic leftovers that may include rotted plant materials, manure, and eggshells. Added to your garden, it nourishes the soil and plants.

Insect - An organism with three body parts (head, thorax, abdomen) and three pairs of jointed legs. Most numerous type of creatures on earth.

Insecticide - A pesticide that kills insects.

Integrated Pest Management (IPM) - Choosing among various ways to treat pest problems. The goal is to cause least harm to the environment.

Larva - The second developmental stage for an insect that has a four-stage life cycle: egg, larva, pupa, adult.

Lyme Disease - A flu-like illness caused by the bite of an infected deer tick.

Mulch - A layer of material that gardeners place over the soil to reduce weeds and hold moisture.

Native - A plant or animal that is an original inhabitant of where you live.

Natural Enemy - Something existing in nature that kills or eats an organism.

Nutrients - Substances that organisms need to live and grow.

Nymph - A young insect that has not yet developed into its adult stage. Nymphs look like adults but lack fully-formed wings.

Organism - A living plant or animal.

Parasite - An organism that lives off another organism in a way that harms it.

Pathogen - Something that causes disease or death in an organism.

Pest - Something that shows up where you don't want it. Examples can include weeds, insects, mold, rodents, and bacteria.

Pesticide - A substance used for keeping pests away, killing them, or reducing their numbers. EPA registers — or licenses — pesticides.

Poison - A substance that kills, injures, or impairs an organism through chemical action.

Predator - An organism that kills and eats other organisms.

Prey - An animal that another animal hunts for food.

Spore - A single plant or animal cell that is able to grow into a new plant or animal.

Toxic - A word that means “poisonous in certain amounts.”

Weed - An unwanted plant.

Web Resources

Just for Kids

A Roach Prevention Activity Website for Kids (U.S. Environmental Protection Agency (EPA))
<http://www.epa.gov/pesticides/kids/roaches/english/>

Backyard Wildlife Habitat Program (National Wildlife Federation)
<http://www.nwf.org/backyardwildlifehabitat/>

Bugged by Bugs" (Girl Scouts Mile Hi Council)
<http://www.buggedbybugs.girlscoutsmilehi.org/>

Criteria for Successful Bat Houses (Bat Conservation International)
<http://www.batcon.org/bhra/bhcritier.html>

Composting for Kids (Texas A & M University)
<http://aggie-horticulture.tamu.edu/sustainable/slidesets/kidscompost/cover.html>

Green Squad (National Resource Defense Council)
<http://www.nrdc.org/greensquad/>

Gypsy Moth in North America (USDA Forest Service Northeastern Research Station)
<http://www.fs.fed.us/ne/morgantown/4557/gmoth/>

Kidzone (The National Wildlife Federation)
<http://www.nwf.org/kids/>

Thinking Fountain: Dandelion (Science Museum of Minnesota)
<http://www.smm.org/sln/tf/d/dandelion/dandelion.html>

Vermicomposting Kid's Page (National Institute of Environmental Health Sciences, U.S. Department of Health and Human Services)
<http://www.niehs.nih.gov/kids/worms.htm>

Who Wants to be an IPM Super Sleuth? (The IPM Institute of North America)
<http://www.ipminstitute.org/supersleuth.htm>



For Teachers, Parents, and Other Caregivers

Audubon at Home (National Audubon Society)
http://www.audubon.org/bird/at_home/index.html

Centers for Disease Control and Prevention's Lyme Disease Home Page (Centers for Disease Control, U.S. Department of Health and Human Services)
<http://www.cdc.gov/ncidod/dvbid/lyme/>

Citizen's Guide to Pest Control and Pesticide Safety (U.S. Environmental Protection Agency (EPA))
http://www.epa.gov/oppfead1/Publications/Cit_Guide/citguide.pdf

Cooperative State Research, Education, and Extension Service State Partners
(U.S. Department of Agriculture)
<http://www.reeusda.gov/1700/statepartners/usa.htm>

Green Landscaping: Green Acres (EPA)
<http://www.epa.gov/greenacres/>

Health Topics A to Z (Centers for Disease Control, U.S. Department of Health and Human Services)
<http://www.cdc.gov/health/>

How to Use Repellents Safely (EPA)
<http://www.epa.gov/pesticides/factsheets/insectrp.htm>

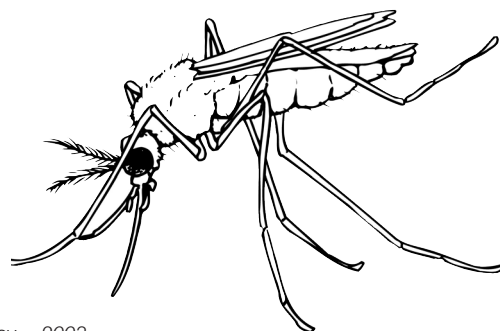
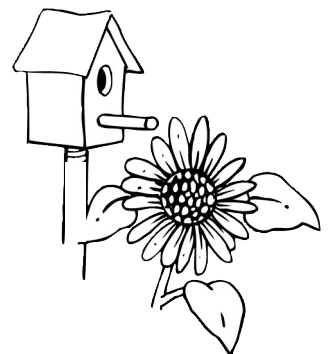
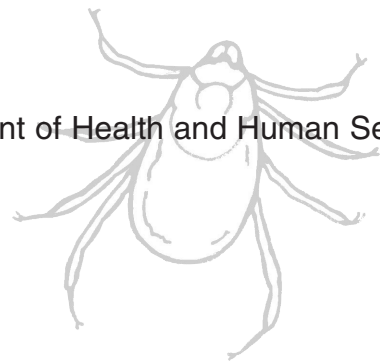
Integrated Pest Management in Schools (EPA)
<http://www.epa.gov/pesticides/ipm/brochure/index.htm>

Mid-Atlantic Region Green Landscaping (EPA - Region 3)
<http://www.epa.gov/reg3esd1/garden/index.htm>

Outsmarting Poison Ivy and Its Cousins (U.S. Food and Drug Administration)
http://www.fda.gov/fdac/features/796_ivy.html

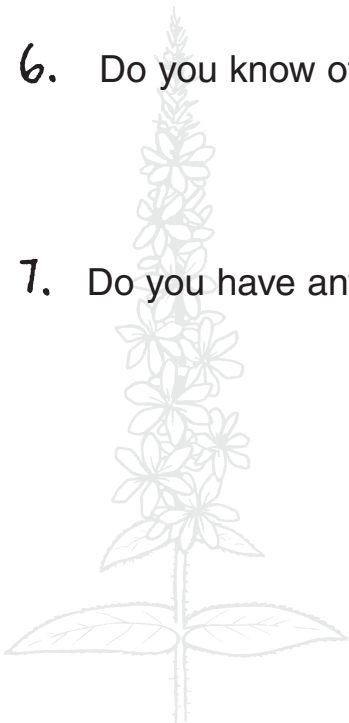
The American Lyme Disease Foundation (American Lyme Disease Association)
<http://www.aldf.com/>

Wildlife Invasive Species Team (The Nature Conservancy)
<http://tncweeds.ucdavis.edu/>



Customer Feedback Form

1. How did you find out about this activity book?
2. If you are a teacher, what grade do you teach?
3. What activities did you find most useful and why?
4. Which activities were least useful and why?
5. Do you have any suggestions for additional activities, Web links, or resources that we might include in a revised activity book?
6. Do you know other people or organizations that might find this book useful?
7. Do you have any other suggestions?



Please send, fax, or e-mail your completed form to:
Kathy Seikel, Office of Pesticide Programs
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW (7506C)
Fax: (703) 308-5558
seikel.kathy@epa.gov

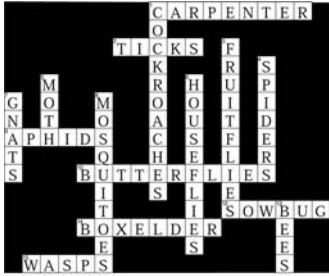
Thanks for your comments!!

Answers

PESTS OR GUESTS, p. 1

1. P, grub
2. P, worm
3. G, bee
4. P, cockroach
5. G, spider
6. P, mosquito
7. P, ants
8. P, wasp

INSECT PESTS AND PALS, p. 2



THE 3 P'S IN ACTION, p. 3

1. parasite
2. pathogen
3. predators

GREEN, GREEN GRASS, p. 6

1. Grass needs nothing.
2. fertilizer
3. nothing
4. fertilizer

PURPLE PLAGUE, p. 8

Florida, Hawaii

BEWARE, p. 9

Milfoil

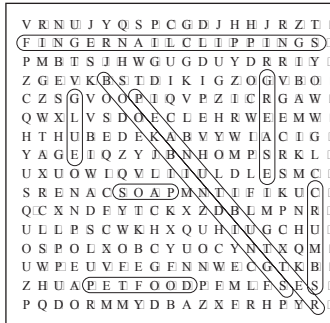
OUTSMART THOSE PESTS, p. 10

1. birdhouses, sunflowers
2. toads, slugs
3. garbage
4. crumbs
5. screens
6. tomatoes

MAZE, p. 11

Pests can get into any opened or spilled containers.

COCKROACH MENU, p. 12



MOSQUITO-EATING MACHINES, p. 15

3,000 and 7,000 mosquitoes

WHAT'S ALL THE BUZZZ?, p. 17

- A. wasp
- B. honeybee

GYPSY MOTH, p. 18

1. oak
2. aspen
3. poplar
4. apple
5. crabapple
6. birch
7. maple
8. willow
9. basswood
10. box elder

CRAZY ABOUT COMPOST, p. 20

Good soil.

COMPOST INGREDIENTS, p. 21

- A. coffee grounds
- B. grass clippings
- C. food scraps
- D. decaying leaves
- E. veggie peels
- F. eggshells
- G. fruit cores

ARE YOU QUALIFIED FOR PEST PATROL?, p. 24

1. C
2. E
3. A
4. D
5. B