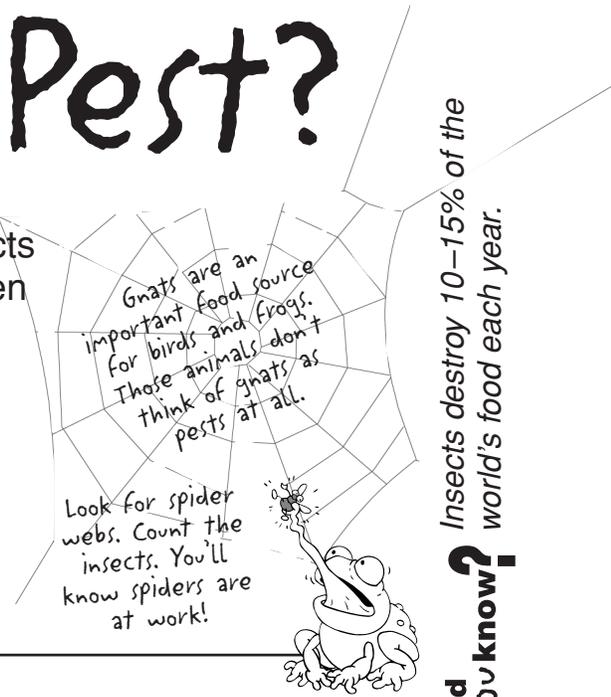


# Insects: What's a Pest?

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.

Sometimes insects do no harm, but they are a nuisance. And some insects harm plants, animals, and people. Insects are true 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?**

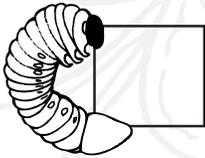
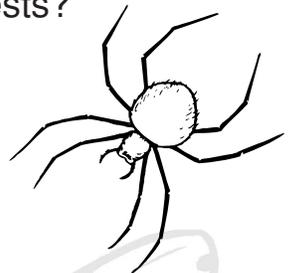
## Pests or Guests

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 to name each picture.

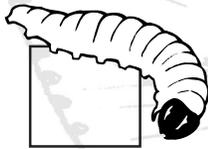
Ant, bee, cockroach, grub, mosquito, spider, wasp, worm



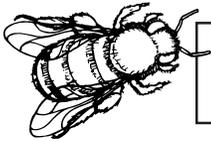
**1** It chews and kills corn plants. No corn for us!

**5** It preys on other insects that may harm plants.

**2** It bites into apples and makes them look bad.

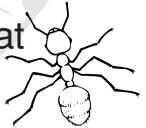


**6** Its bite can give your dog or cat heartworm disease.

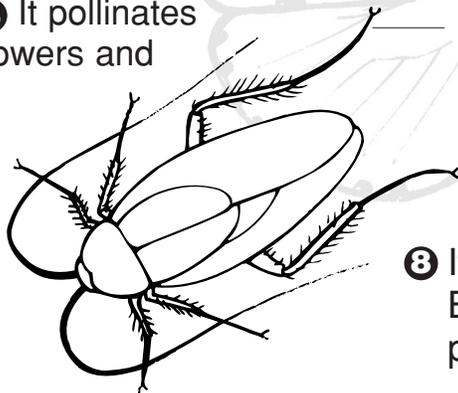


**3** It pollinates flowers and

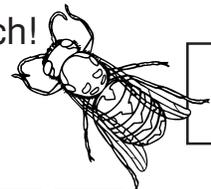
**7** It shows up at your picnic




**4** It can cause asthma in allergic kids.



**8** It may sting. Ouch! But it's a helpful pollinator, too.




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

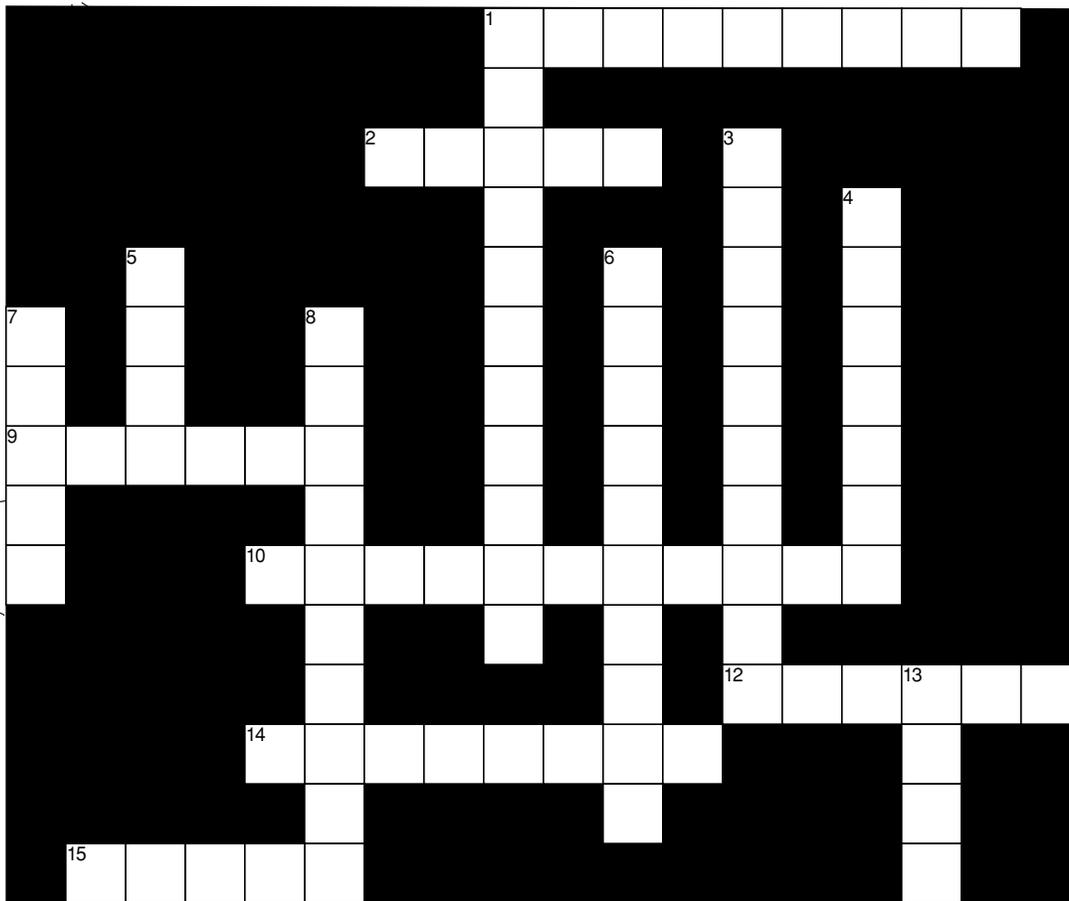


# Insect Pests and Pals

Do you think all insects 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 insect 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. Eat almost anything. Like the dark. Hard to get rid of.
3. Tiny, flying insects that breed in fruits and vegetables.
4. Eat aphids and insects. Have eight legs.
5. Eats holes in wool and fur clothing.
6. Spread germs with their feet. Frogs eat them.
7. Harmless, flying bugs. The female's bite is itchy.
8. 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 P's

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

**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 P's in Action

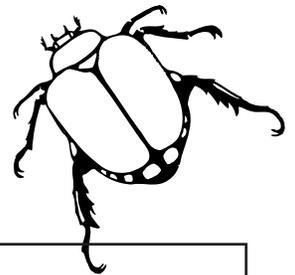
In the examples below, which of the 3 P's is fighting pests?

**1** In Pennsylvania, whiteflies in greenhouses harm the plants. Poison insect killers (insecticides) could harm the good insects in the greenhouse and could make people sick. A tiny, stingless wasp the size of a pin head is put to work to control the pesty whiteflies. It lays its eggs on the whiteflies, so the larvae hatch and grow inside and kill the pests.



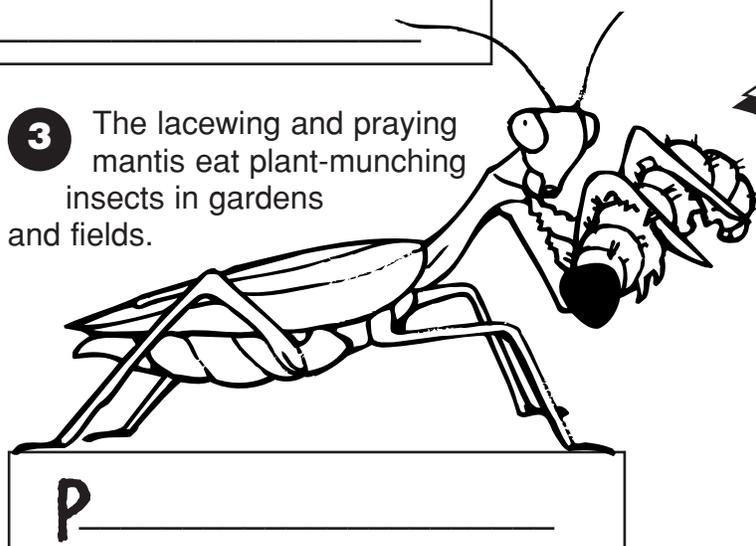
P \_\_\_\_\_

**2** Japanese beetles have invaded the U.S.. They eat plant roots and leaves. 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 \_\_\_\_\_

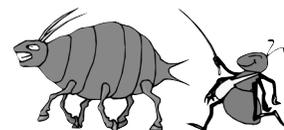
**3** The lacewing and praying mantis eat plant-munching insects in gardens and fields.



P \_\_\_\_\_



Imagine you are one of the 3 P's. 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

**COLOR THIS**



Poison ivy is a pest when it grows where we hike or play. It gives you 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](http://www.fda.gov/fdac/features/796_ivy.html)

*"Leaves of three, let it be."*



## 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.

## 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?

If you ate and grew as much as a baby monarch caterpillar does during its first weeks of life, you'd weigh as much as a school bus just 15 to 20 days after you were born! Wow!



# 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 some uses for each of its parts.

## Dig THIS!

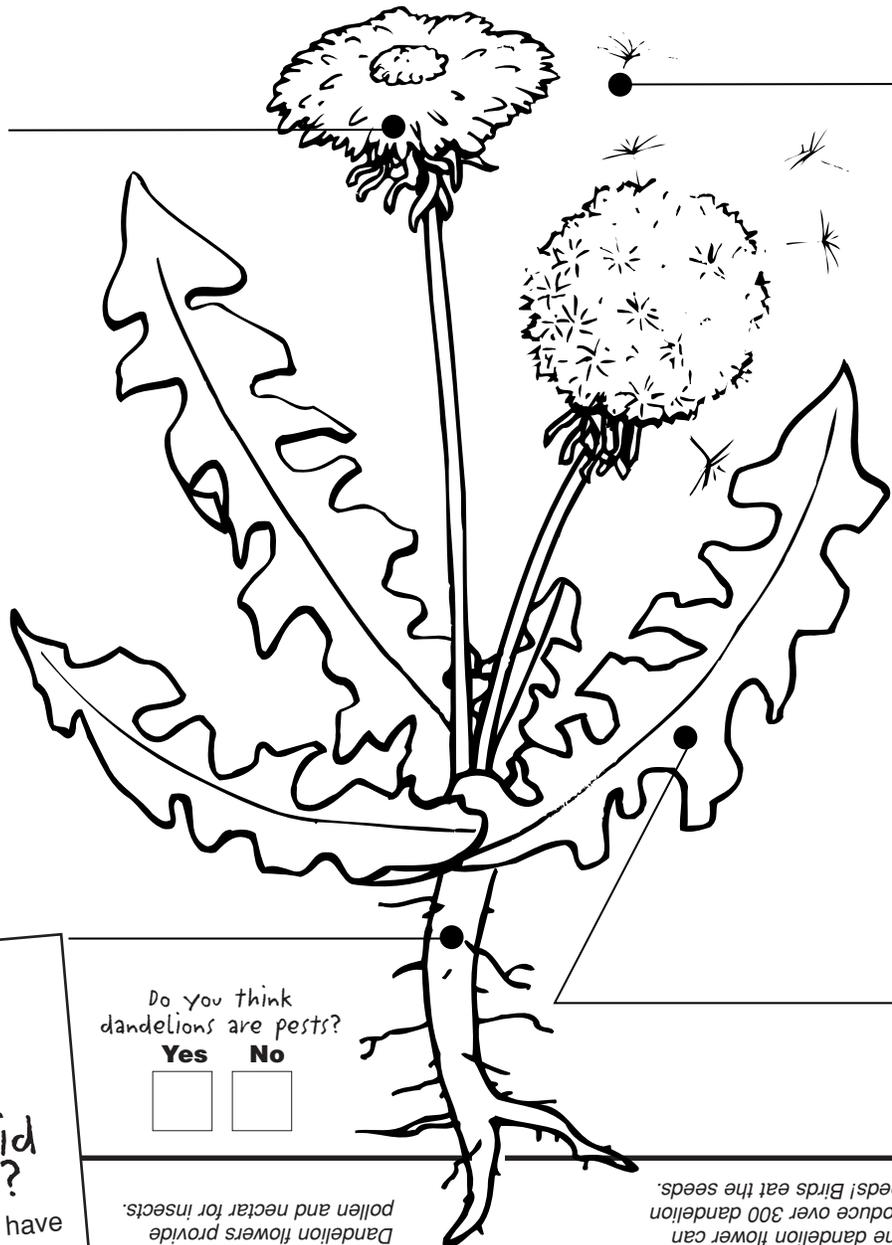
What can you do with dandelions?

- Make a bouquet.
- Make a snack!  
Gather dandelion leaves. Choose leaves from young plants that have not yet blossomed. Wash, dry, and chill until you have 1 cup of leaves. Whirl in a blender until smooth:

1 cup dandelion leaves  
1/4 cup chopped nuts  
1/2 cup cottage cheese  
1-2 tablespoons mayonnaise

Spread on crackers and eat!

- 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



## TIP

Want to get rid of dandelions?

Pull them out while they still have yellow flowers—**BEFORE** they can spread seeds.

Dandelion flowers provide pollen and nectar for insects.

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

Weeds move in many ways. Mr. and Mrs. Ard Godfrey moved from Maine to Minnesota around 1850. Mrs. Godfrey missed dandelions for making wine and salads. She had seeds sent from Maine to Minnesota there. That's how dandelions got to Minnesota!

**Did You Know?**



# Green, Green Grass

It's hard for crabgrass and weeds to take over healthy grass. Grass that is healthy shouldn't need 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 1.5 to 3.5 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.



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



# The Right Plants in the Right Places

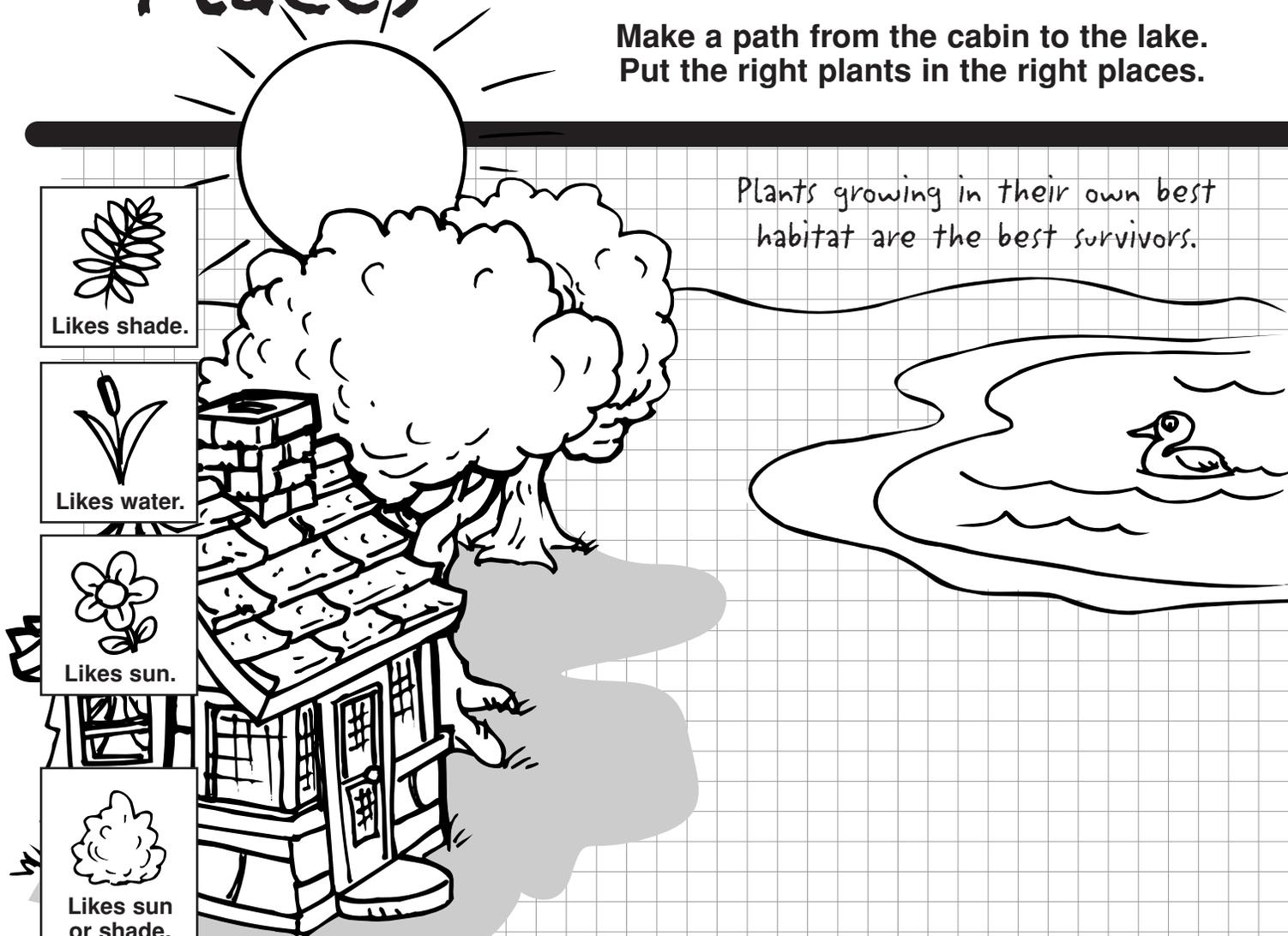
You do best in a certain kind of habitat. So do plants! To grow and thrive, it's important to have the right conditions. Be a friend to plants. Notice where each grows best. Then let it grow there!

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.



Likes shade.

Likes water.

Likes sun.

Likes sun or shade.

Did you see any Creeping Charlie on your walk? Yes, also known as ground ivy (*Glechoma hederacea*). It grows well in shady, moist places. It is a member of the mint family and makes pretty hanging baskets.

**Did You Know?**

### Tips for Grown-ups:

Landscaping with Native Plants in Pennsylvania brochure: DCNR, Bureau of Forestry, P.O. Box 8552, Harrisburg, PA 17105-8552, Ph: 717-787-34444 <http://www.dcnr.state.pa.us/forestry>

"Landscape Design with Native Plants" <http://www.dnr.state.mn.us/backyard/landscape/>



# Purple Plague!

## One of Pennsylvania's Most WANTED

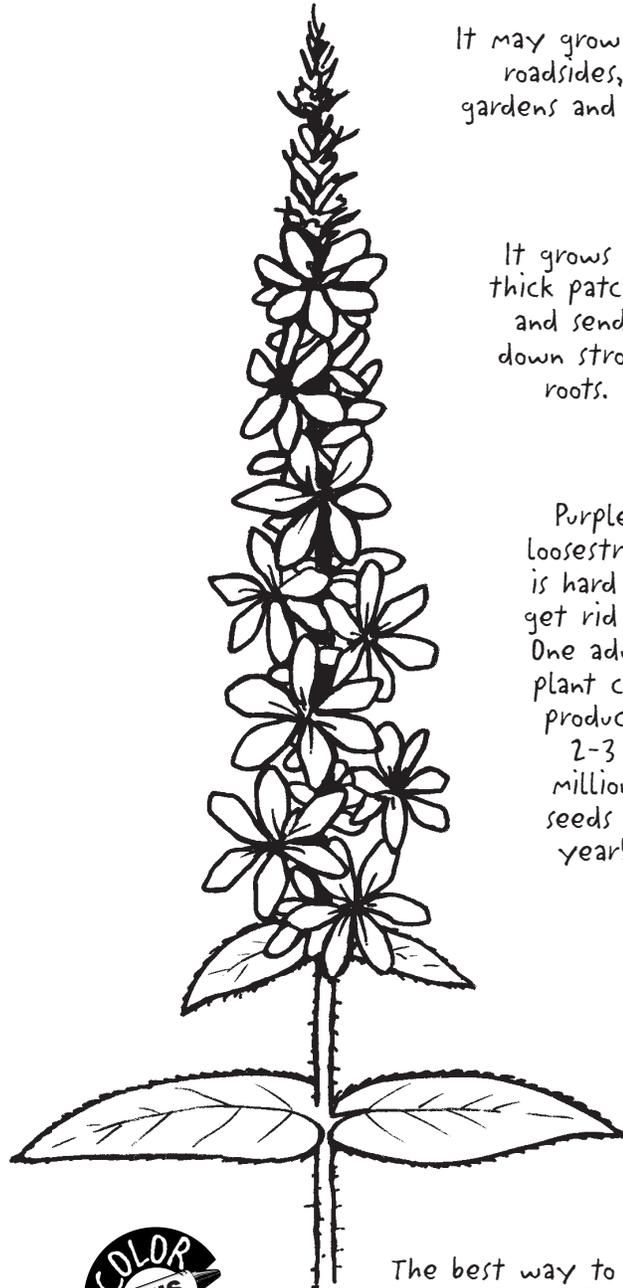
**P**urple loosestrife is pretty—and pretty dangerous. Why? This weed hogs the land and crowds out native plants and wildlife. It causes trouble when it grows in wetlands. The stems and roots are so tough that boats and wildlife can't get through. Other plant life can't survive where purple loosestrife 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 and weevils can slow purple loosestrife's spread.



The best time to control purple loosestrife is when it flowers. That's in late June, July, and early August. Plants are easy to spot, and they have not yet gone to seed.

**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 fight purple loosestrife is with the right insects.

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 plants or seed packages. You'll find purple loosestrife seeds in some wildflower seed mixes. Don't buy them!

## Kids Bug Purple Loosestrife

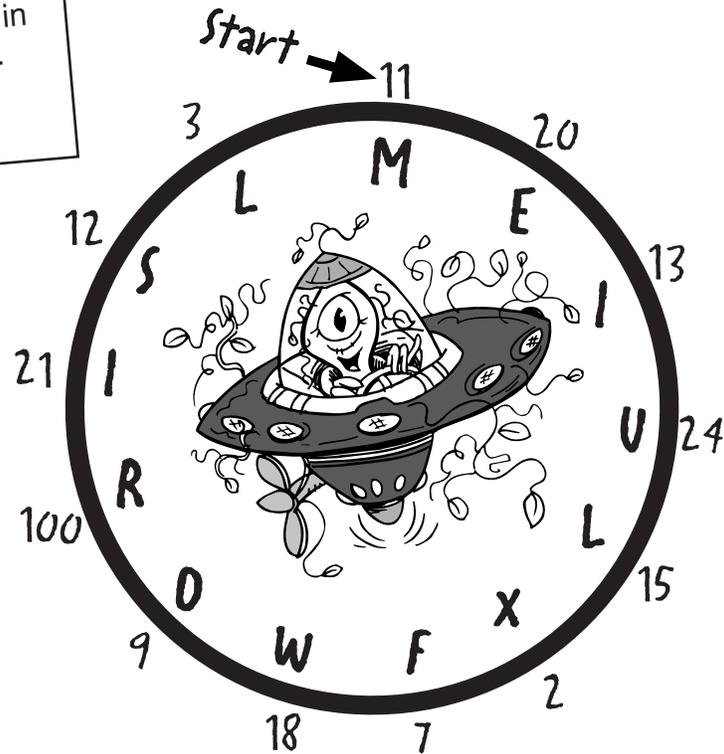
Kids in Woodbury's Gordon Bailey Elementary School's Omnibus program had a great idea. They raised a tiny beetle (*Galerucella pusilla*) that only eats purple loosestrife. They put ten beetles in netting around each of 22 potted loosestrife plants. The beetles had babies. Soon there were hundreds of loosestrife munchers. The kids let the beetles loose in wetlands near the school. Plants that will attract beneficial insects include the carrot family (dill, fennel, queen's lace and caraway) and the astor family (sunflower, cosmos, tansy, yarrow and coneflower).

<http://www.msue.msu.edu/seagrant/ppl>

# BEWARE

Another alien weed grows under water! You can accidentally spread it when you move boats from one waterway to another.

- clogs rivers and lakes.
- crowds out native plants.
- grows into mats so thick that boats and swimmers can't get through.
- 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!

Check boats for milfoil!



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.



# Outsmart those pests!

Do pests bug you? Keep them from getting into your home, yard, or garden in the first place.

Use the code to fill in the blanks. You'll see ways to outsmart pesty insects, weeds, and diseases.



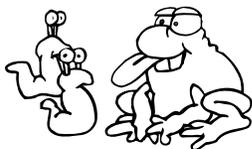
**1**

Put up \_\_\_\_\_  
25 15 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

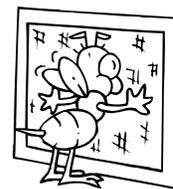
\_\_\_\_\_  
24 9 6 14 25 8

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

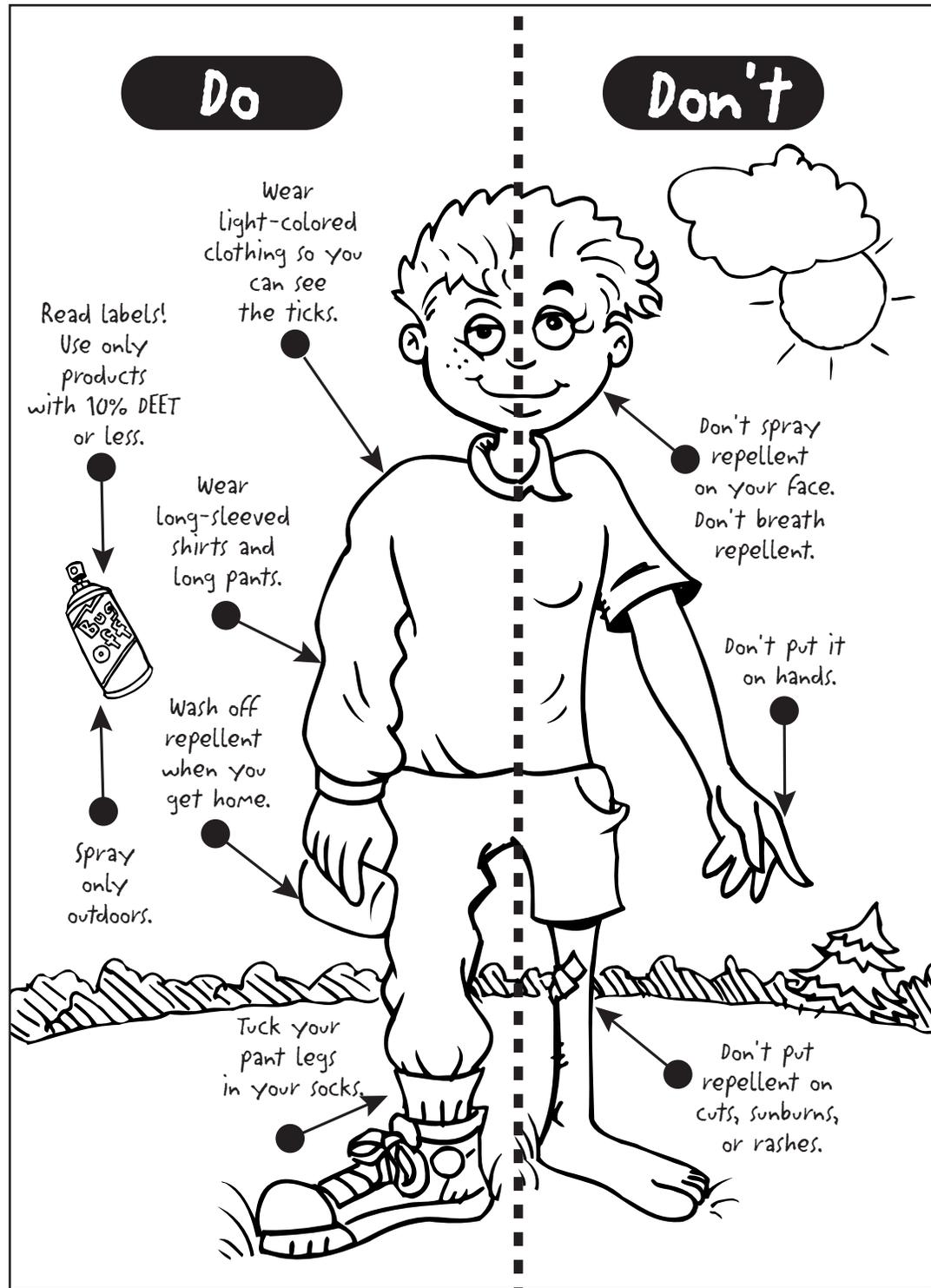
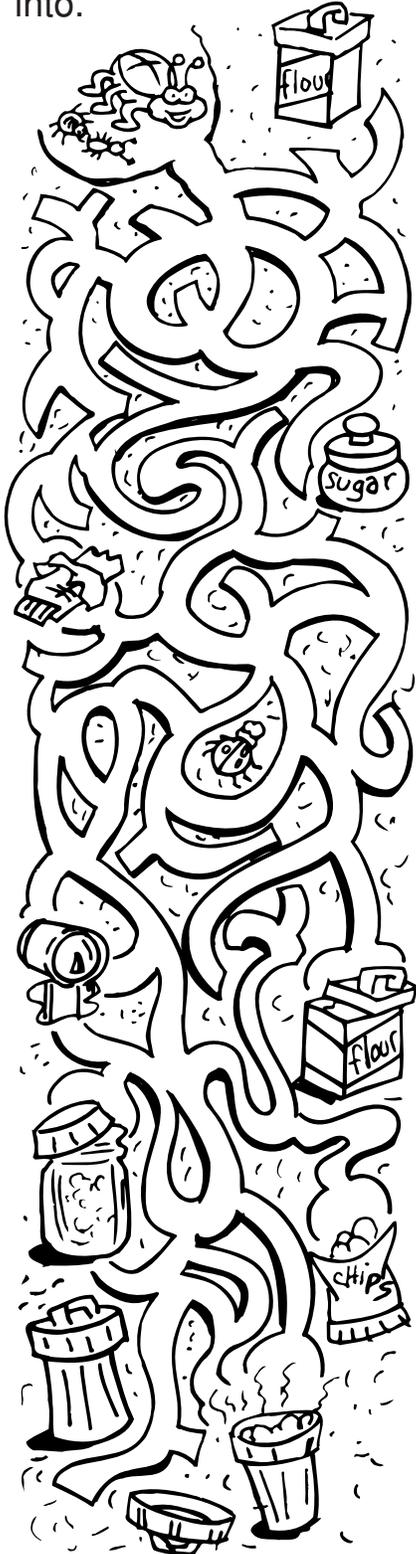
their leaves off the ground. Water them with a can or bucket, not a spray. Then spores that live in the soil won't splash up on the plants and make them sick.



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

# Keep Pests from Pestering YOU!

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. Use free sources (the library, local nurseries, or Info-U) to help identify your pest and learn the most effective ways to control it. Questions? Call your County Extension Cooperative/Master Gardener Program or check out the PA IPM Problem Solver @ <http://www.paipm.cas.psu.edu>



# 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 Roach World at  
[www.yucky.com](http://www.yucky.com)



## Tips

### Raid the Roaches

#### Check things to do:

- Fix leaky pipes and faucets. (Cockroaches need water.)
- Take out the garbage every day.
- Keep food in closed containers.
- Rinse out pet dishes after pets eat.
- Wash food from cans for recycling.
- Plug up cracks and holes. Young roaches can squeeze through a crack as thin as a dime.
- Clear out warm, dark places so

## 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;

- 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, some ticks can pass along sicknesses like Lyme Disease.

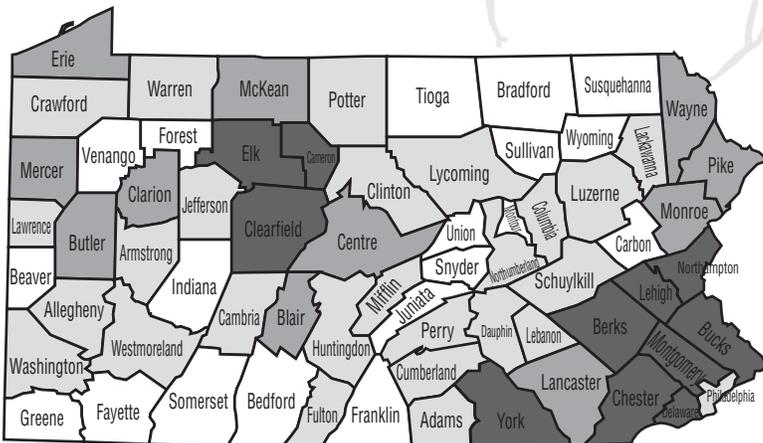
Ticks wait for their food to come to them. Ticks can sense body heat and carbon dioxide—a gas people and animals breathe out—to find prey. When blood sources like humans brush against them, ticks grab a hold.

## Uck, a Tick!

Ticks can be found all over Pennsylvania. People in the shaded areas have a higher risk of being bitten by deer ticks carrying the bacteria that causes Lyme Disease. Mark an "X" on the area YOU live in.



### Lyme Disease Risk by County



Lyme Disease Risk

None Low Moderate High

Pa. Department of Health. 1998

Check and protect your pets, too.



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

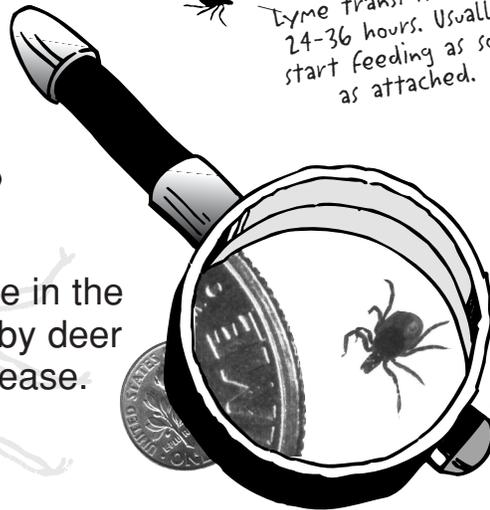
PA IPM Program 2001

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



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

Attached within hours, Lyme transmits after 24-36 hours. Usually start feeding as soon as attached.



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

Photo Courtesy Minnesota Department of Health - Disease Prevention and Control



## 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.

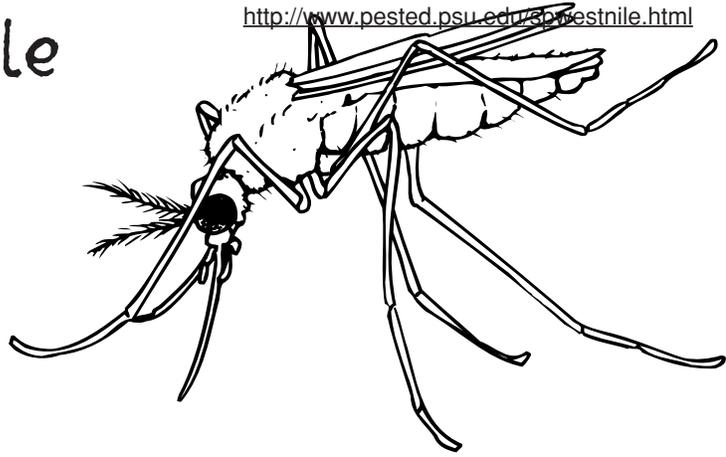
### Tip for Grown-ups:

Ticks use sticky stuff to cement themselves to your body. After they are glued on, they stick until they are full. That takes about a 3-5 days. Touching ticks with a match or Vaseline doesn't loosen them. Use tweezers!

PA E&E Academic Standards 4.5.4A, B

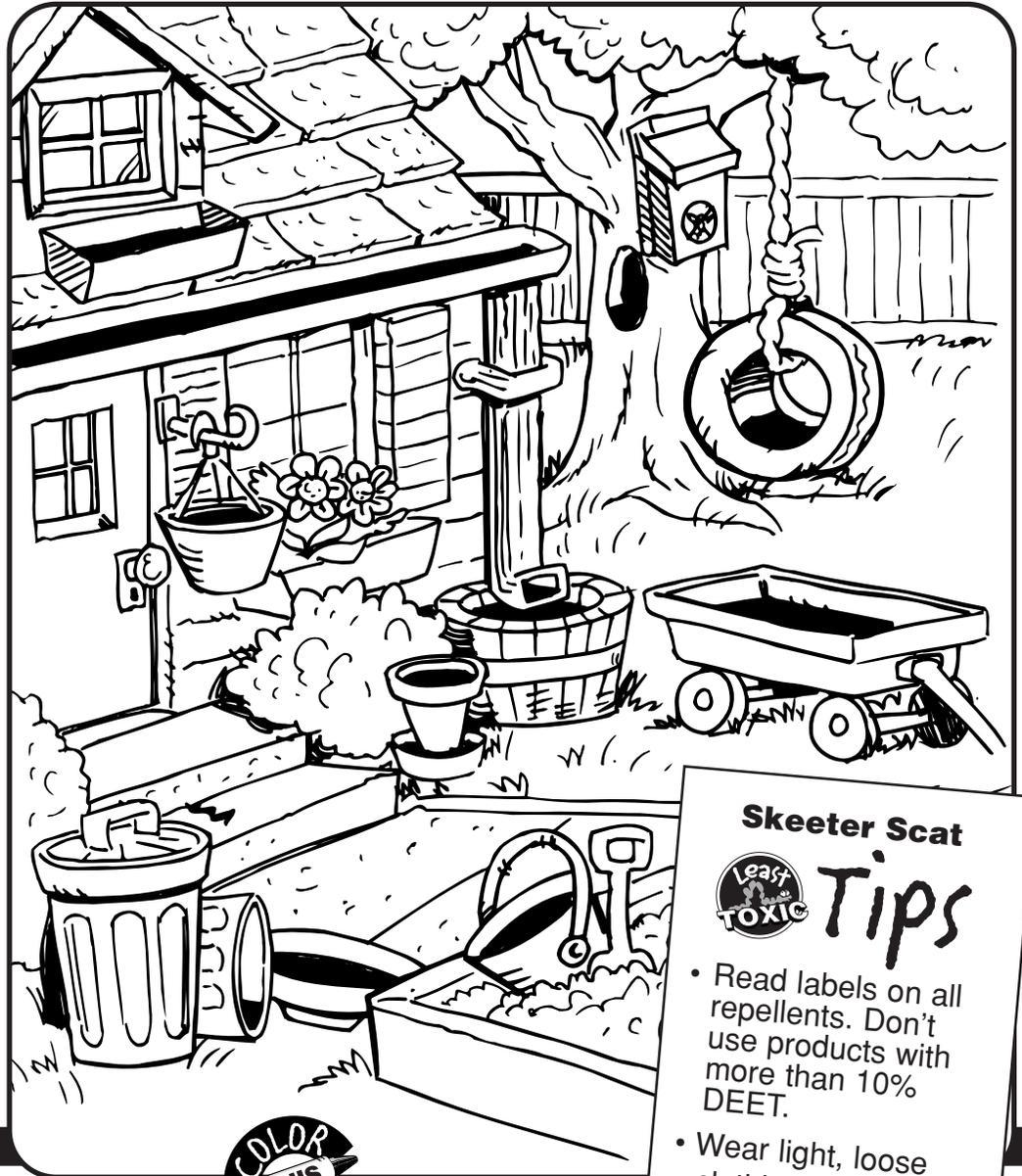


# Join the Tree Hole Mosquito Patrol!



**M**osquitoes 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!



## Skeeter Scat



## Tips

- Read labels on all repellents. Don't use products with more than 10% DEET.
- Wear light, loose clothing to cover your skin.
- Go inside two hours after sunset when mosquitoes are most active.



### Did You know?

The Northern House mosquito can carry the virus for West Nile Virus. Very few Northern House mosquitoes carry the virus. But children can get sick if bitten by one that does.

# Mosquito-Eating Machines

**M**osquitoes 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!

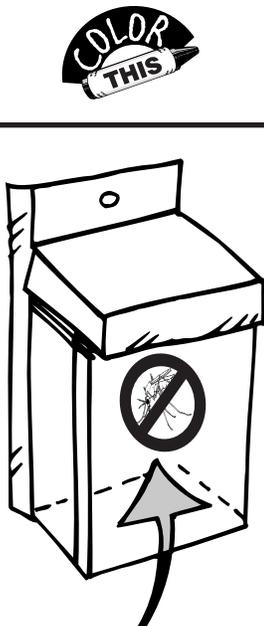
**Try This!**

## 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/bhcritter.html>



- I'm super clean and gentle.
- If I swoop and zigzag overhead, I am simply catching insects using **echolocation**.

Echolocation is a bat's way to navigate using echoes of its own signals.



**W**hat 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!

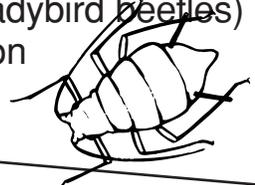


## Aphids and Ladybugs

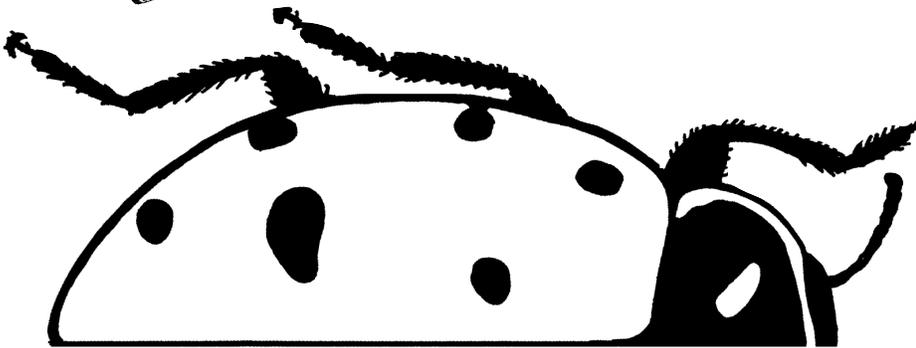
**A**phids are tiny insect pests. They suck the sap from plants—vegetables, crops, flowers, and trees. They take away the plant's nutrients, and they can give the plant viruses. Aphids attract even more pests to the plant with the sweet, sticky juices they make.

Natural enemies that gobble up aphids are lacewings, assassin bugs, wasps, spiders, and chickadees.

But ladybugs (ladybird beetles) are the champion



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



### 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.
- Make aphid traps to put outside.

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

#### 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 and praying mantis egg cases at nurseries.

You can also spray the undersides of leaves with safe sprays. For an all-purpose garlic garden pest spray, peel and mash 1 head of garlic. Place it in a pint glass jar and cover with 2 cups boiling water. Screw on the lid and let set overnight. Strain. Freeze 1 cup for use later. Place the other cup in a spray bottle and add one more cup of water. Spray infested areas.

### Try This!

#### Aphid Traps

The secret is to make your trap **YELLOW**, since that is the aphids' favorite color!

**Trap 1:** Find a yellow index card. Spread petroleum jelly over it. Place near aphid-infested plants.

**Trap 2:** Find a yellow dish. Fill it with soapy water. Place near aphid-infested plants.

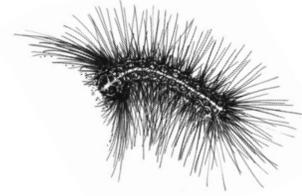


When it hatches, a ladybug larva will eat about 400 aphids. As an adult, it may eat up to 5,000 more aphids! Insect sprays are the ladybug's number one danger!





# Monster Caterpillar



**W**hat'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 sometimes even 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.**

## WORD BANK

apple  
aspen  
basswood  
birch  
blue spruce  
crabapple  
oak  
poplar  
white pine  
willow

- |                 |                     |                       |
|-----------------|---------------------|-----------------------|
| 1. kao _____    | 5. braplace _____   | 9. dowosab _____      |
| 2. pasen _____  | 6. crihb _____      | _____                 |
| 3. loprap _____ | 7. etwhi nepi _____ | 10. elub scepur _____ |
| 4. plape _____  | 8. wloliw _____     | _____                 |



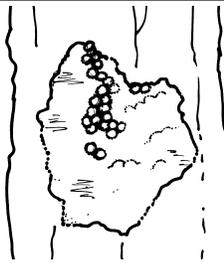
**Learn to identify the gypsy moth in every stage of development.  
Number the life cycle stages in right order, from egg to adult.**



**A** # \_\_\_\_\_



**B** # \_\_\_\_\_



**C** # \_\_\_\_\_



**D** # \_\_\_\_\_

<http://www.dcnr.state.pa.us/forestry/pests/intro.htm>

**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!

### Tip for Grown-ups:

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



18

PA E&E Academic Standards 4.5.4A

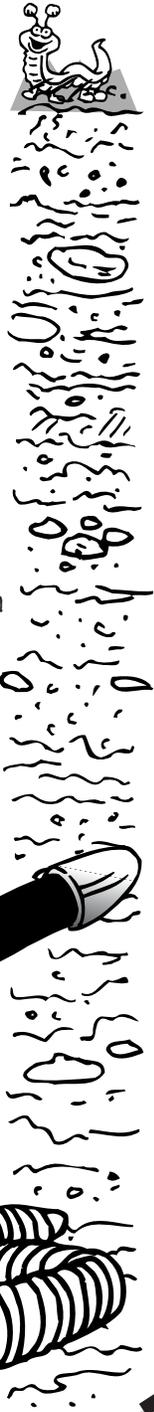


PA IPM Program 2001

# 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!



**H**ealthy 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?



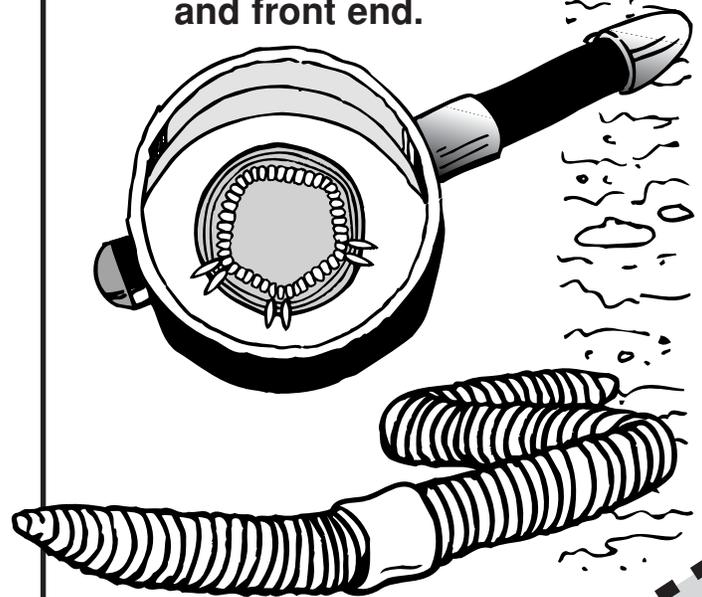
## Try This!

### 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.



Check out  
Worm World at  
[www.Yucky.com](http://www.Yucky.com)

### Tip for Grow-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!

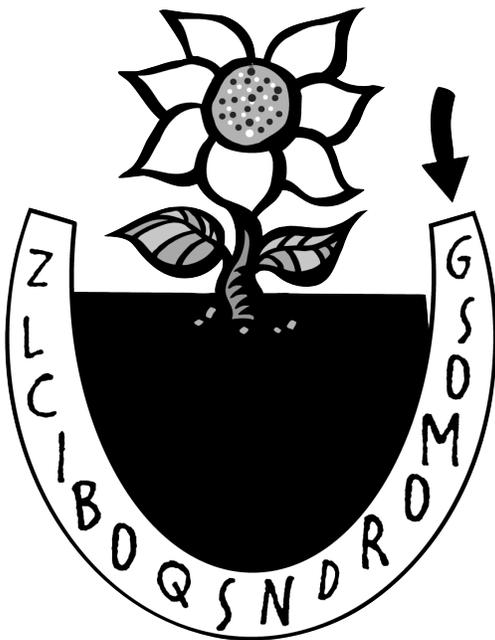


# Crazy about Compost

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.

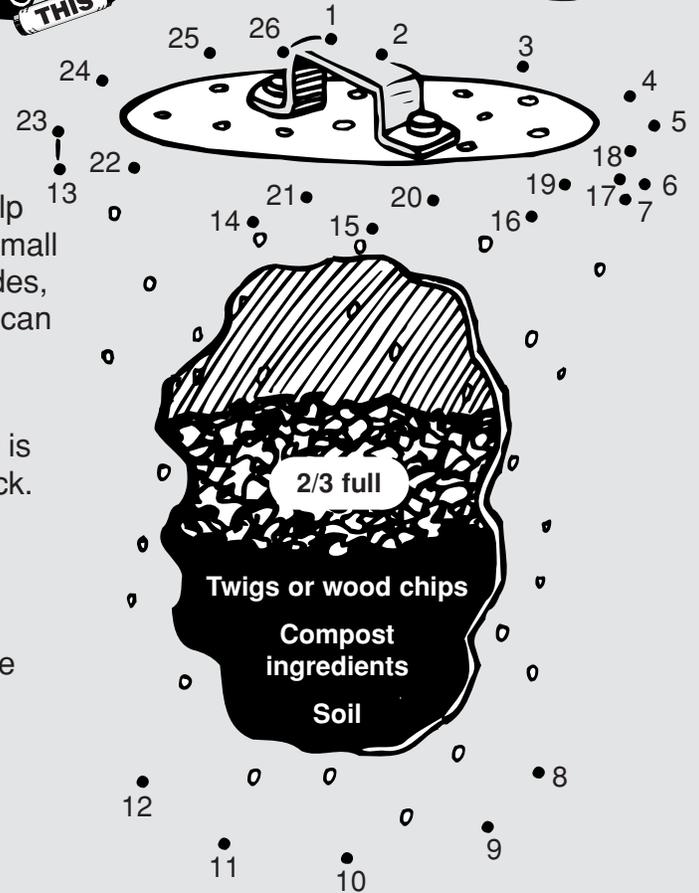
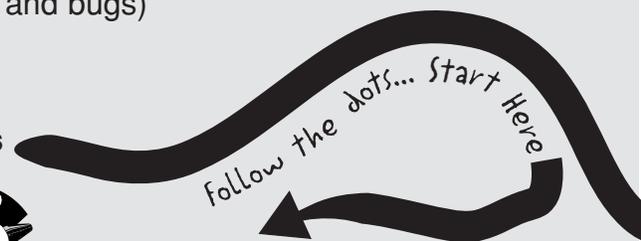
**Try This!**

## 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

**COLOR THIS**



### 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

*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!

### Tip for Grown-ups:

Over-fertilizing lawns and improper use of pesticides can upset the soil's natural community. 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 more helpful tips about composting, go to this website:  
[http://www.dep.state.pa.us/dep/deputate/airwaste/wm/RECYCLE/Compost\\_SUM/Home.htm](http://www.dep.state.pa.us/dep/deputate/airwaste/wm/RECYCLE/Compost_SUM/Home.htm)





Don't use meat or bones. They will make your compost 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 pesky 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

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.

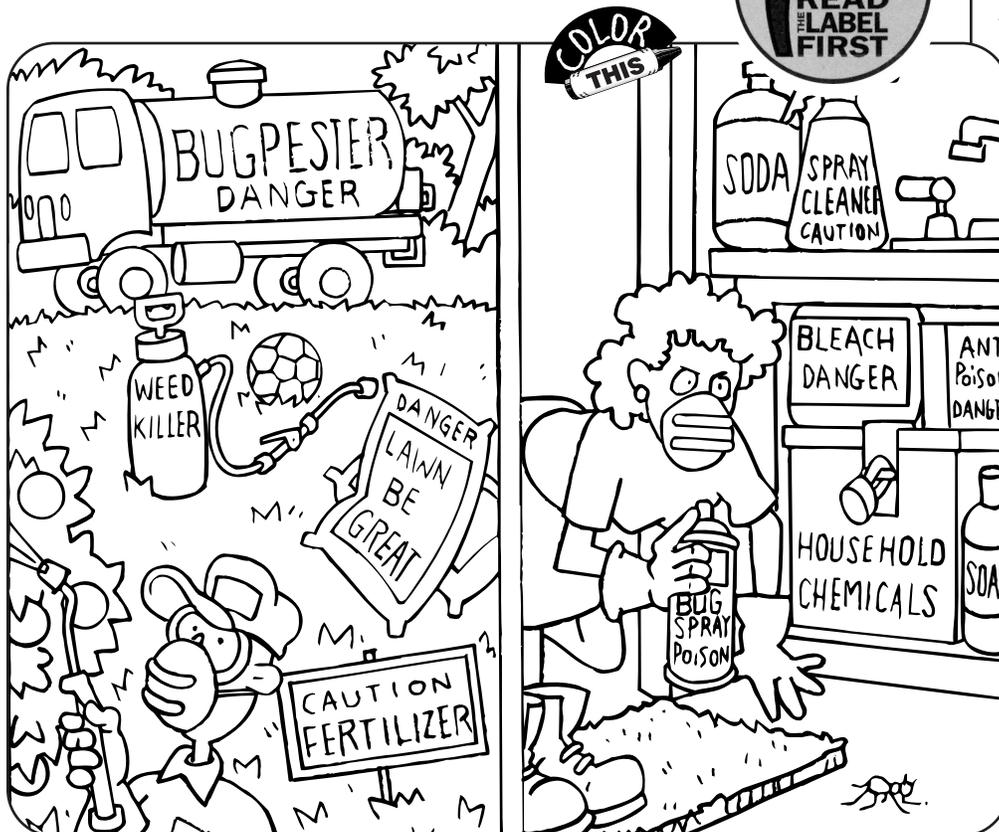
Tell a partner or parent  
what this means.



# 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.



### 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 your copy of the *Citizen's Guide to Pest Control and Pesticide Safety* by the EPA, see Resources in Teacher Guide. See also Penn State Pesticide Education website at <http://www.pested.psu.edu>



## Tips

### Be safer from pesticides!

- Take your shoes off at the door. How would this help?

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- Wipe shoes carefully on a rug-type door mat. How would this help?

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

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# Modern Pest Patrol

IPM uses different ways of managing pests while causing the least harm to people and the environment.

Match each description with the type of pest control used in IPM.

**1** Pull or hoe weeds out. Be sure to get every tiny bit of root so the weed doesn't grow back.

**2** The best way to fight purple loosestrife is with beneficial insects.

**3** Put screens on doors and windows. Keep insects out!

**4** Read labels! If using an insect repellent, use only products with 10% Deet or less.

**5** Use many tactics to manage pests safely.

**A** Biological Control — predators and parasites

**B** Cultural Control — good sanitation and changes to habitat

**C** Chemical Controls — insect repellents

**D** Physical Controls — proper clothing, screens

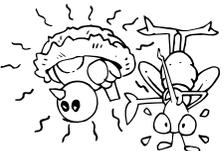
**E** Integrated Pest Management = IPM



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.*



# 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.

**DEET** - A chemical in insect repellent that fools biting insects by masking our odors.

**Insect** - An organism with 3 body parts (head, thorax, abdomen) and 3 pairs of jointed legs. Most numerous type of creatures on earth.

**Insecticide** - A pesticide that kills insects.

**Integrated Pest Management (IPM)** - The goal of IPM is to control pests such as insects, weeds and diseases effectively while causing the least harm to people and the environment. This is accomplished by using multiple tactics and stressing least toxic methods.

**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** - Originating from a certain geographical area.

**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** - Organisms that show up where you don't want them. Examples can include weeds, insects, fungi, rodents, bacteria, and others.

**Pesticide** - A chemical poison that kills pests.

**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.

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## Pennsylvania Academic Standards in Environment and Ecology

"Join Our Pest Patrol" serves as a resource for PA teachers of grades 3-4 in addressing the standards in environment and ecology, section 4.5.4 "Integrated Pest Management (IPM)". See the enclosed teacher's guide for more information on IPM and the Academic Standards, or visit <http://pde.state.pa.us>.

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## PA IPM Collaborators in Education

The PA IPM Program is a collaboration

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Copies of this publication are available from The Pennsylvania IPM Program, 501 ASI Building, University Park, PA 16828, (814) 865-2839.

PENNSTATE



College of  
Agricultural Sciences



# 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. G, 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. white pine
8. willow
9. basswood
10. blue spruce

## 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