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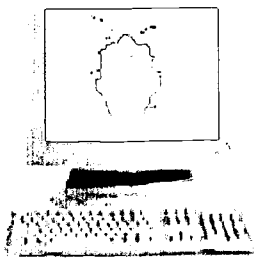
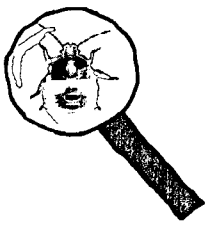
ABSTRACT

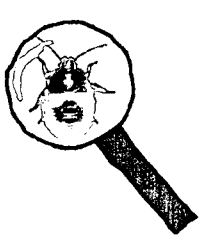
This guide presents games and activities on integrated pest management (IPM) for home targeting grades 1-7. The activities and games use a problem-solving approach based on pest knowledge to develop an understanding of pest management. Three cases are presented: (1) "Inspection is the Key to IPM Success" includes two activities--"Word Searches" targets grades 1-4, and "Inspect Our House" targets grades 1- 5; (2) "An Ounce of Prevention" includes the play "Who Wants to Be an IPM Super Sleuth?" and "IPM Crosswords" which target grades 4-7; and (3) "Tools of the IMP Trade" includes "IPM Lingo Matching Games" for grades 4-7. Appendices contain resources and IPM concentration with cut-out cards. (YDS)





Who Wants To Be An IPM Super Sleuth?

Integrated Pest Management Educational Activities & Resources for Kids of All Ages



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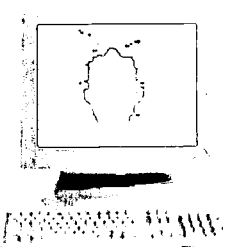

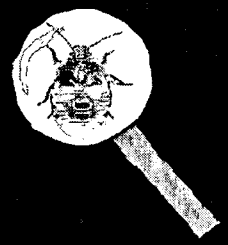

Become an IPM Super Sleuth!

Start Here!

More About IPM

IPM Institute Home

Learn about Integrated Pest Management (IPM) for your home and have fun at the same time!

Our goal is to help teachers, parents and kids of all ages learn about IPM for homes and gardens! Everyone can learn to reduce pest and pesticide risks. We hope you'll have a fun and exciting learning adventure!

Let us know what you think! Email us at ipmsupersleuth@ipminstitute.org!

What is IPM?
Integrated Pest Management, or IPM, means solving pest problems by using all we know about pests against them. IPM works for problems caused by insects, diseases, weeds, wildlife, microbes or any other pest. The goal of IPM is to prevent pests from interfering with our livelihood or enjoyment of life in a way that's affordable, effective and that protects human and environmental health.

For Teachers and Parents
Many of the materials on this site are available in print, see the Briefing Room for PDF documents. To view and print PDF documents, you'll need Adobe Acrobat Reader. Download it free here.

Acknowledgements
IPM Super Sleuth is part of the IPM Institute IPM HOMEWORK PROJECT created with support from US EPA and the National Foundation for IPM Education. Edited by Thomas A. Green, Ph.D. Contributing authors: Gina K. Walejko and Joseph L. Colon. Assistance from game testers Oona P. Mackesey-Green and Moira R. Mackesey-Green. Special thanks to EPA (home inspection graphics) and Marlin Rice (beautiful green stink bugs) for use of images.

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Questions, comments?
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Thanks to Marlin Rice, Iowa State University, for use of the green stink bug images.

Word search game software courtesy Sun Microsystems, Inc. & Eric C. Harshbarger. For more information, visit www.yorkminster.org/minstermania/wordsearch/

Home inspection graphics courtesy of US EPA. For more interactive games about chemicals in the home, visit http://epa.gov/pesticides/kids/hometour/test/

Macromedia Flash Games (Concentration, Matching) courtesy of Spellmaster.com and Frank McAfee. For more information, visit www.spellmaster.com

For more information about Macromedia Flash, visit www.macromedia.com

Crosswords created using Crossword Compiler Version 5.1, copyright Antony Lewis 2001. For more information, visit www.crosswordcompiler.com

Interactive quiz software courtesy of Jerry L. Stanbrough. For more information, visit www.venus.net/~jstanbro/AppletQuizDocs/Documentation_Index.html

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Visit www.ipminstitute.org/supersleuth.htm for the complete set of *IPM Super Sleuth* activities in interactive, on-line format!

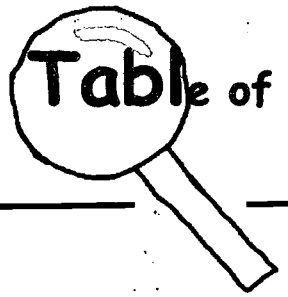
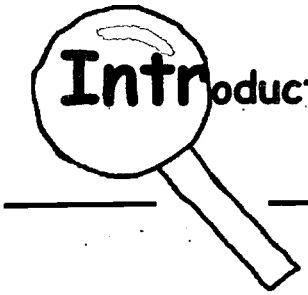


Table of Contents



Introduction to IPM Super Sleuth!

Learn about Integrated Pest Management (IPM) for your home and have fun at the same time!

Our goal for this document is to help teachers, parents and kids of all ages learn about IPM for homes and gardens! Everyone can learn to reduce pest and pesticide risks. We hope you'll have a fun and exciting learning adventure!

You will also find these materials in interactive, on-line format on the web at www.ipminstitute.org/supersleuth.htm Let us know what you think! Email us at ipmworks@ipminstitute.org!

Why be concerned?

Everyone can work towards reducing exposure to potentially harmful chemicals and pests. Children are especially at risk because of their behavior, including playing on floors and lawns were pesticides are more likely to be applied. Children have more frequent hand-to-mouth contact than adults, a faster metabolism and can have weaker defenses against both pest and pesticide dangers. Our environment can also benefit from reducing our use of potentially disruptive chemicals.

IPM is a proven system for resolving pest problems effectively while minimizing pesticide use, often at a reduced cost compared to routine application of pesticides. Yet public awareness, appreciation and support for IPM is very low. Teaching children about IPM can help reduce risks to health and the environment, and improve public support for IPM research and adoption in communities and agriculture.

What is IPM?

IPM means using what we know about pests to reduce pest and pesticide problems to people, creatures great and small, and our environment.

The goal of IPM is to prevent pests from interfering with our enjoyment of life in a way that's affordable, effective and that preserves human and environmental health.

IPM in agriculture, homes, schools and elsewhere includes these important parts:

Accurate information and training on how to recognize pests and conditions that create pest problems, on pest biology and on all the options available to deal with problem pests;

Planning and prevention to fix conditions that create pest problems;

Inspection, trapping or other ways are used to spot pests and conditions that cause pest problems.

Record keeping to keep track of pest outbreaks, record actions taken to reduce pest problems, and evaluate results; and

Action levels that describe when it's right to act to fix pest problems that threaten health or livelihood.

Pesticides are a last resort. When needed, the least-toxic choices are used in a way that minimizes dangers to humans and all other non-target organisms. Using pesticides whenever pest problems are found is not IPM!

By improving pest control, reducing use of pesticides and choosing effective options with the least danger to all, IPM reduces both pest and pesticide risks.

For Teachers and Parents: How to use this Resource
Feel free to duplicate these materials in whole or in part for educational purposes.

The grade levels listed for each activity are suggestions; some activities may be enjoyed by others outside of these grade ranges.

For additional games and interactive, on-line versions of the activities included in this document, visit our web site at www.ipminstitute.org/supersleuth.htm

Case One: Inspection is the Key to IPM Success!

Word Searches!

Level 1: Gumshoe - What kind of pests might you find in your home?

Can you find the following words? Circle them if you can!

ANT, BEE, MOUSE, RAT, SPIDER, WASP

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

Answer key on page 13.

Level 2: Rookie - Why do pests sometimes like to live with people?

Can you find the following words? Circle them if you can!

FOOD, SHELTER, WARMTH, WATER

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

Answer key on page 13.

Level 3: Agent - Which pests might you find in your yard?

Can you find the following words? Circle them if you can!

MOLE, MOSQUITO, POISON IVY, SNAKE, TICK, WEED

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

Answer key on page 13.

Level 4: Jr. Detective - What insects can help your garden grow by eating the bugs that eat your plants?

Can you find the following words? Circle them if you can!

LACEWING, LADY BUG, PRAYING MANTIS, SPIDER, WASP

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

Answer key on page 13.

Level 5: Master Detective

Find the words that match these descriptions:

1. You need me to pollinate your flowers, but if you step on me I might sting you!
2. Keep me out of reach of children!
3. My dog or cat might sometimes scratch because of these.
4. If I share my comb or hat with others, I might find these tiny pests in my hair.

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

Answer key on page 13.

Level 6: Super Sleuth

Find the words that match these descriptions:

1. Mice might leave these on the floor or in drawers or cabinets.
2. These are sticky if you walk into them. They often hang from walls and ceilings.
3. Carpenter ants are very tidy and often leave this outside their nest.
4. Scratchy noises in the walls or ceiling might be from...
5. A mouse might leave these on packages of food.
6. Rats sometimes leave these on woodwork.

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

Answer key on facing page.

Word Searches!

Answer Key:

1.

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

2.

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

3.

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

4.

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

5.

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

6.

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

Case One: Inspection is the key to IPM success!

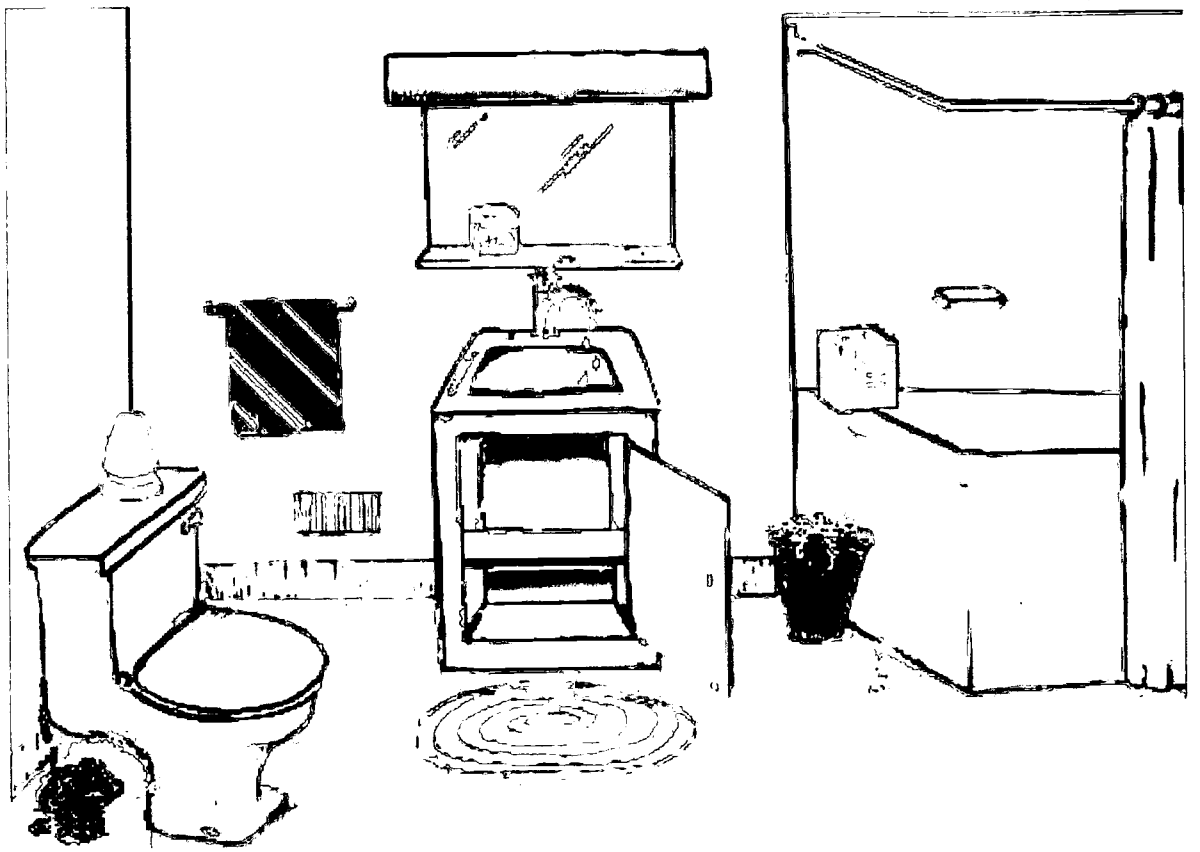
Grades 1-5

IPM Home Inspection

Welcome to the IPM House. The following pages give you a closer look at some of the rooms in the house. Each room contains a number of pest-friendly conditions. Can you identify them? Start in the bathroom on the next page.

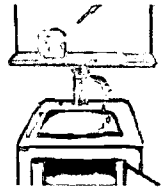
What's Wrong in the Bathroom?

Circle 4 items in the bathroom that might invite pest problems. The following page explains why these are problems and how to prevent them in your house



Leaky Toilet

In summer, cold water in the toilet can cause the toilet to "sweat," dripping onto the floor, or maybe there's a leak in the tank that needs to be fixed. Water left on the floor provides drinks to thirsty pests, encourages molds and mildew and causes floorboards to rot, inviting pests like carpenter ants to move right in!

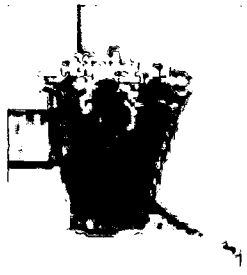


Leaky Faucet

Everyone gets thirsty, even bugs! Dripping faucets provide moisture for ants, flies and other crawling and flying insects. Fix leaky faucets to discourage pests and save on water bills!

Wall Vent

If vents aren't vacuumed regularly, dust can build up, housing dust mites which may make allergies worse. Vents and the ducts behind them can also become pest highways, allowing mice and roaches protected travel routes. A vent screen and regular cleaning can reduce problems.

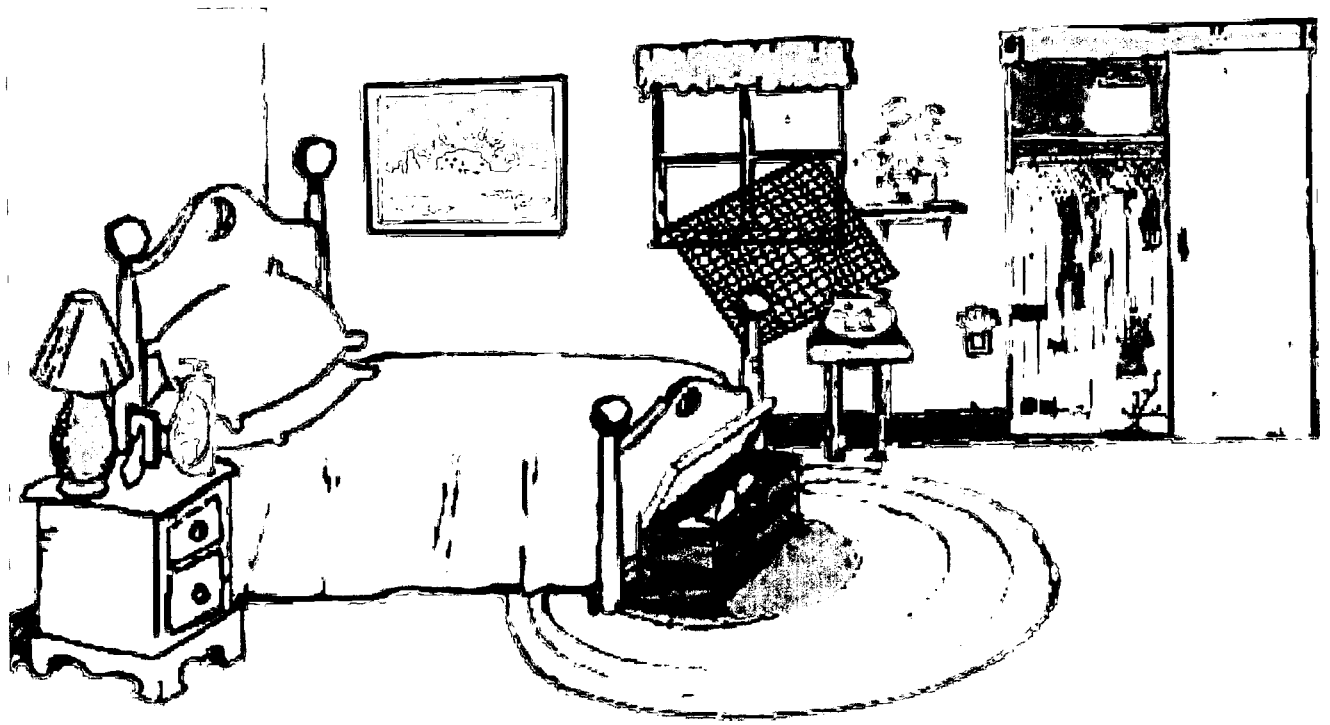


Spilling Waste Basket

Mice, cockroaches, fruit flies and ants are constantly on the lookout for things to eat including candy wrappers, apple cores, banana peels and other things we wouldn't think of as food. Emptying trash regularly removes food sources and makes your home less attractive to pests. Washing waste cans frequently or using a plastic bag as a liner are also good things to do

What's Wrong in the Bedroom?

Circle 5 items in the bedroom that might invite pest problems. The following page explains why these are problems and how to prevent them in your house.



Broken Window Screen

Broken window screens can allow all sorts of pests to get into your home. Repair or replace screens to keep flying and crawling insects out.

Clothes

Clothes moths are tiny flying insects that like to lay their eggs in wool and other natural fibers. Sometimes they'll find their way into closets, but more often you'll see them after pulling clothes out of storage in an attic or trunk. Now that would be a good place to look for clothes moths, or the tiny holes they eat in your stored fabrics.

Crack in the Wall

Cracks and holes in the walls are great places for pests to hide and travel from here to there. Patching up cracks can put a permanent stop to that problem!

Bed

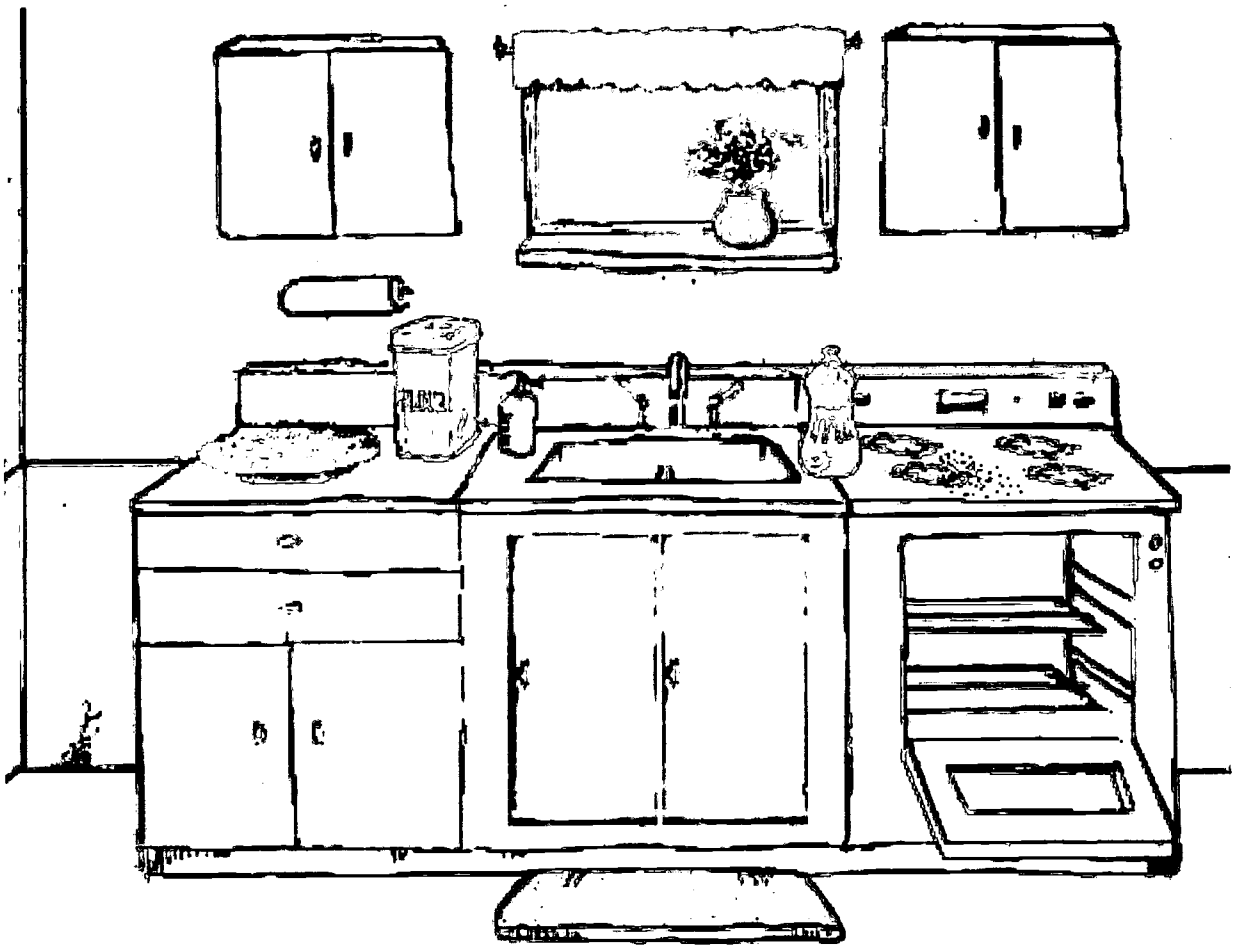
It's very unusual to find bed bugs in a home these days. When they occur, it's usually because someone brought them in accidentally on bedding after staying in a dormitory or hostel with bed bugs.

Potted Plant

Hmmm, what's a potted plant have to do with pests? Lots of insects and diseases can attack plants, but it's rare to have problems with indoor plants if they're fertilized and watered the right amounts.

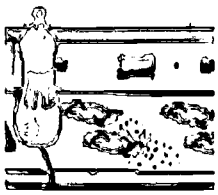
What's Wrong in the Kitchen?

Circle 3 items in the kitchen that might invite pest problems. The following page explains why these are problems and how to prevent them in your house.



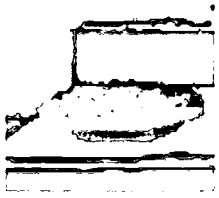
Hole in the Wall

Holes in the wall provide entryways for insects and rodents (rats and mice). Repair holes with caulk or plaster to keep pests from coming in.



Food Crumbs

Crumbs left out will attract many different pests, including ants, cockroaches, mice and rats.

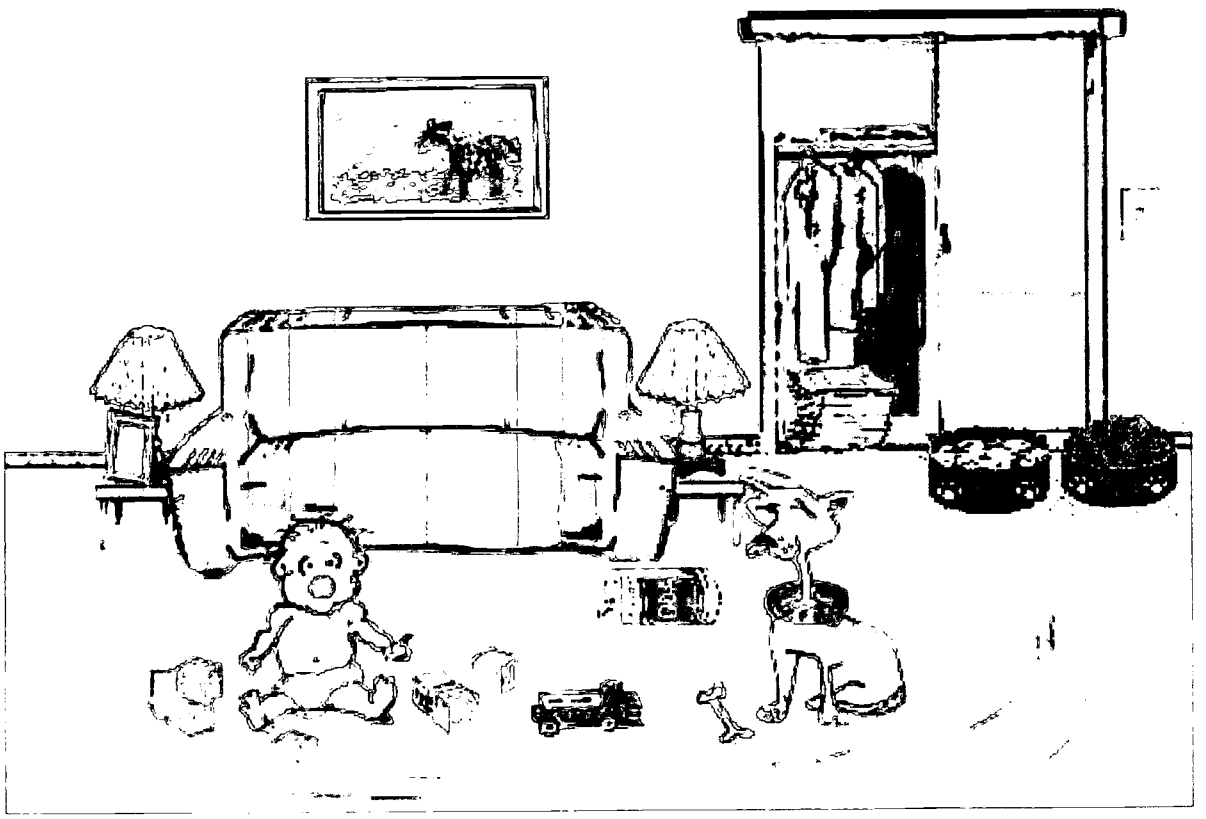


Dirty Dishes

Dirty dishes with leftover food are a great way to keep insect pests and rodents fat and happy! Putting leftovers in the fridge or freezer right away helps prevent microbes from growing. Microbes are tiny pests that can make you sick if you eat contaminated food!

What's Wrong in the Living Room?

Circle 4 items in the living room that might invite pest problems. The following page explains why these are problems and how to prevent them.

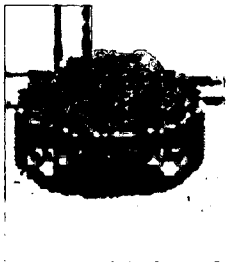


Spilled Soda

Whether you call it soda or pop, if it gets spilled you should clean it up right away. Ants, flies and even yellowjackets or wasps love the stuff.

Dog Bone

If you can, feed your dog fresh bones outside. Clean up crumbs when he's finished with milk bones.



Spilled Dog Food

Make sure to clean up food that spills out of your pets' dishes. If ants, flies or mice are a problem, the best strategy is to feed your pets only what they'll eat right away. Pick up and rinse out the dishes as soon as they finish eating.

Old Newspapers

Old news isn't always good news. Especially when it's sitting around where cockroaches might move in. Mice like to use paper for nesting material too. Take paper and cardboard out to recycling regularly.

Case Two: An Ounce of Prevention

Who wants to be an IPM Super Sleuth?

Quizzes for Grades 4 - 7

Level 1: Gumshoe - Welcome Gumshoe!

Can you answer the following questions? Write the letter for the correct answer in the space provided.

1. Pests need food, water and what else to survive and thrive? ____

   A. Money
   B. Friends
   C. Big muscles
   D. Hiding places
   E. Speed

HINT: Many pests, both large and small, fast and slow, make good food for other animals. How do they avoid being eaten? ____

2. What pest are you NOT likely to find inside a house? ____

   A. Ant
   B. Rodent
   C. Mole
   D. Cockroach
   E. Termite

HINT: He or she has very small eyes and a short tail.

3. Many kinds of spiders use their webs to trap insects for food and protect their _____.

A. Eggs and young
B. Good looks
C. Neighbors
D. Life savings

HINT: Look closely, bet you'll see egg sacs, baby spiders and/or cast skins (spiders and insects shed their exoskeletons, or skins, as they grow) in some webs!

4. Ants are social creatures, working together to keep the colony and nest mates happy and healthy. If you see an ant in your home, it can be fun and helpful to _____

A. Don't do anything, how much can one ant eat?
B. Follow it
C. Dial 911
D. Ask the zoo if you can borrow their anteater
E. Spray it with bug spray

HINT: Bet that ant has something to show you!

5. When ants find food, water or a good nesting place, they return to their nest and _____

A. Take a nap
B. Keep the good news to themselves
C. Never come back to the same spot
D. Mark their trail along the way with a special odor

HINT: Have you ever seen a trail of ants leading to food on the ground?

Level 2: Rookie - It's time to play Stump the Rookie!

Can you answer the following questions? Write the letter for the correct answer in the space provided.

1. A weed is a plant that is _____
   - A. Healthy
   - B. Big and tough
   - C. In a place where it is not wanted
   - D. Eaten by insects
   - E. Not good to eat

HINT: Dandelions were brought to North America by Europeans who ate them in salads.

2. To grow, most weeds need water, soil and _____
   - A. Birds to eat their flowers
   - B. Companion plants
   - C. Lazy gardener
   - D. Sunlight
   - E. A good time

HINT: What happens to plants if you leave a rock or board over them for a few days?

3. The best time to remove weeds is _____
   - A. Nighttime
   - B. Before they flower and produce seeds
   - C. Early in the morning
   - D. Winter
   - E. Anytime

HINT: If you wait until the weed scatters its seeds, what do you think might happen?

4. Some weeds spread by producing seeds, others sprout from _____
   - A. Spreading roots or rhizomes
   - B. Bread crumbs
   - C. Bird droppings
   - D. Nothing
   - E. Dirt

HINT: Have you ever looked closely at a vine to see how it spreads?

5. To prevent weeds from growing in your lawn, keep your grass ____

A. Cut short
B. Thick and healthy
C. Green with spray paint
D. Covered with pesticide
E. In the backyard

HINT: Weeds need room to grow.

6. When removing dandelions from your lawn, be sure to ____

A. Eat them in your salad
B. Throw them in your neighbor's yard
C. Use twice as much weed killer as the label instructs
D. Wait until all the seeds are gone
E. Get the whole root

HINT: Dandelions, like many other plants, have a "tap root" that grows straight down into the soil.

7. Mulch is ____

A. What's left after you mow the lawn
B. Material used to cover the soil to prevent weed growth
C. Good to eat
D. Stones placed around the yard
E. A nonsense word used in poems to rhyme with gulch

HINT: Stones, straw, peat moss or even plastic can be used as mulch.

8. If you have trouble keeping a problem weed out of your garden or lawn, you should ____

A. Move to a new house
B. Pour gasoline or oil on them
C. Give up
D. Find the name of the weed
E. Dig everything up and start over

HINT: "Different strokes for different folks" can also apply to weeds.

Level 3: Agent - 'Wood' you like to make IPM Agent?

Can you answer the following questions? Write the letter for the correct answer in the space provided.

1. The major reason wood in homes and other buildings begins to rot is _____
   - A. Old age
   - B. Dry weather
   - C. Moisture
   - D. Carpenter ants
   - E. Voodoo spells

HINT: Most pests need wood to soften before they can attack it.

2. Microbes, or microorganisms, are _____
   - A. Tiny organisms you need a microscope to see
   - B. Better than your crobes
   - C. Not pests
   - D. Lights that attach to microphones
   - E. Rarely found in homes

HINT: "Micro" means small.

3. What problems can microbes cause in houses and other buildings? _____
   - A. Noise
   - B. Sickness, smells, stains and wood rots
   - C. Make doors swell so they don't shut
   - D. High electricity bills
   - E. Eat all of your food

HINT: Did you know that molds and mildews are caused by microbes?

4. This type of microbe is the one most responsible for wood rots _____
   - A. Fungi
   - B. Bacteria
   - C. Viruses
   - D. Riboflavin
   - E. Prion

HINT: Did you know that mushrooms are fungi?

5. Wood rot fungi usually enter buildings through infested wood, spores in the air and _____

A. On mushrooms from the store
B. On the backs of small animals
C. Contact with soil
D. In the guts of termites
E. The back door

HINT: Which would rot first, a board buried in dirt or one balancing on a rock?

6. The growth of wood rot fungi in infested wood can usually be stopped by _____

A. Dipping the wood in vinegar
B. Brushing the wood with a toothbrush
C. Ignoring it
D. Not buying anymore mushrooms
E. Fixing the moisture problem and drying out the wood

HINT: Some like it hot, fungi like it wet.

7. An early sign of a moisture problem is _____

A. Sneezing
B. Discolored or peeling paint, or wood swelling
C. All the mice moving out
D. Dripping sounds
E. Big puddles on the floor

HINT: Does a sponge get bigger or smaller in water?

8. A solution for moisture problems in the basement, bathroom or other rooms is to use a _____

A. Mop at least once a month to clean up puddles
B. Credit card to buy a new house
C. Hose to wash away the mold
D. Exhaust fan or dehumidifier to remove moisture
E. Axe to remove the wet wood

HINT: Ventilation, or circulating air, can carry moisture out and away.

9. Wood that needs special protection against rot includes _____
   A. Outdoor furniture and open decks
   B. Rafters in the attic and floor joists in the basement
   C. Docks and bridges
   D. Fence posts
   E. All of the above

HINT: Where is wood likely to stay damp or get wet often?

10. Alternatives to arsenic treatments to preserve wood include _____
   A. Copper-treated wood
   B. Borate-treated wood
   C. Water repellents such as Thompson's Water Seal
   D. Building with non-wood materials including steel, plastic and "Trex" decking.
   E. All of the above

HINT: There are lots of alternatives to arsenic to preserve wood.

11. All fungi that attack wood look _____
   A. Different, and these differences can be used identify the fungus and choose the best control
   B. The same, seen one, you've seen 'em all
   C. Creepy
   D. Like the creature from the lost lagoon
   E. Greenish

HINT: Do all mushrooms look the same?

Level 4: Junior Detective - Keys to IPM for Yard & Garden Plants

Can you answer the following questions? Write the letter for the correct answer in the space provided.

1. What do plants need to survive and thrive? ____

   A. Air, sunlight and water
   B. Good soil with plenty of nutrients
   C. A lot or a little attention and care, depending on the plant
   D. A location that meets the plant's special needs for light, temperature, moisture, etc.
   E. All of the above

HINT: Nearly all plants share some basic needs, and many also have special needs

2. Which of the following is NOT true about plants and pests? ____

   A. Most pests "specialize," that is they attack only a few kinds of plants
   B. Most plants have ways of defending themselves against pests
   C. Healthy plants can stand up to pests better
   D. All plants get the same pests
   E. A plant can get "sick" from too much or too little water, sunlight and nutrients

HINT: Plants are similar to people in many ways. Does everyone you know get the same sicknesses?

3. What is a key plant? ____

   A. A yellow plant the same color as a key
   B. A 'fussy' plant that can have lots of pest problems
   C. A plant on the front steps that you put your house key under
   D. A plant that grows keys
   E. A plant that's bigger than the rest

HINT: In this case, key means "important to pay attention to."

4. A plant might become a key plant _____
   A. By putting it in a spot that's not right for it, e.g., on top of a radiator where it gets too hot
   B. By planting it in a climate that's too hot, too cold, too wet or too dry
   C. In one location or climate but not in another climate or location
   D. By placing it where even little pest problems get noticed
   E. All of the above

HINT: There are many reasons why plants can become key plants.

5. What's the best approach to take towards key plants? _____
   A. Plant as many as you can so you'll keep yourself busy taking care of them
   B. Learn about key plants before you buy or plant to save yourself time and work
   C. Avoid key plants and you'll need fewer or no pesticides
   D. A and B
   E. B and C

HINT: Do you really want to spend all your spare time taking care of fussy plants?

6. What are some examples of key plants? _____
   A. Grass lawn that needs lots of water in a hot, dry desert climate
   B. Birches, crabapples, dogwoods, euonymus, junipers, maples, oaks, pines, roses, flowering plums
   C. A plant that needs lots of light planted in the shade
   D. A fussy plant that's important to you because you're favorite relative gave it to you
   E. All of the above

HINT: Bet you can think of even more examples.

7. In a garden, rotating annuals (annuals are plants such as tomatoes or petunias that need to be replanted every year) means _____
   A. Turning plants every day so they get even sun
   B. Turning the leaves upside down
   C. Not planting the same kind of plants in the same spot every year
   D. Spinning around and around until you get dizzy and fall on the plants
   E. All of the above

HINT: Do you really think you can turn a plant that's already planted in the ground?

8. Rotating annuals from year to year is a good idea because ____

A. You get a nice surprise when you forget where you planted them
B. No reason
C. You can never remember where you put them last year anyway
D. Variety is the spice of life
E. Some insect, disease and weed pests get worse if you plant year after year in the same spot

HINT: What might make it easier for pests to find a plant?

9. Applying pesticides to your lawn, garden or houseplants every month to kill insects, weeds and diseases is ____

A. Not IPM
B. Like burning money
C. Not smart, pesticides should be used as a last resort only
D. Not effective, pest problems should be carefully identified before taking any action
E. All of the above

HINT: Do you take medicine every day even when you're healthy?

10. If you have house or garden plants that have pest problems that frequently require pesticide applications to fix ____

A. Buy a big bag of pesticide to save money
B. Think about replacing that plant with one that has fewer problems
C. Give it to your neighbor
D. Hire someone else to apply the pesticide
E. All of the above

HINT: What's the safest and easiest over the long term?

11. What's NOT a good solution to protect plants from feeding by deer or rabbits? ____

A. Spread black plastic netting over the plants
B. Choose plants that deer and rabbits don't like to eat
C. Spray a pesticide on the plants and hope it makes the animals sick
D. Build a fence to keep rabbits out
E. Put your dog out in the yard in early morning and evening

HINT: Pesticides should never be used for pests not listed on the pesticide label.

12. What's NOT a good solution for problems caused by moles digging in the yard or garden? _____

A. Spread poison bait all around
B. Apply castor oil-based repellents for moles
C. Find out for sure if it is a mole, gopher or groundhog that is causing the problem
D. Just press the grass back down over mole tunnels and water well
E. All of the above

HINT: Are there other animals that might eat poison bait and get sick?

13. What is biological control? _____

A. Using living organisms, or the products of living organisms, to manage pests
B. Using a biology text book to squash insect pests
C. Studying biology to learn about pests
D. Using mind control on your biology teacher
E. All of the above

HINT: Biological control is one way to manage pest problems.

14. Biological control includes _____

A. Letting natural enemies of pests (e.g., lady beetles, lacewings) do their job
B. Adding natural enemies to your yard or garden
C. Creating conditions that encourage natural enemies, e.g., putting up a bird house so the birds will stay and eat mosquitoes
D. Being sure products or practices you use don't harm the good bugs
E. All of the above

HINT: Which practices help keep natural enemies on the job in your yard or garden?

Level 5: Master Detective - Ant Antics!

Can you answer the following questions? Write the letter for the correct answer in the space provided.

1. If ants are a frequent problem _____
   - A. Keep the door shut
   - B. Eat quickly
   - C. Bring in some spiders
   - D. Identify the ant
   - E. Keep a hammer handy

HINT: There are many kinds of ants, how might it help to know which one you have?

2. If you find ants outside, you should _____
   - A. Step on as many as possible
   - B. Bring some home
   - C. Leave them alone
   - D. Pour soapy water on them
   - E. Put your foot over the nest

HINT: What harm are they doing outdoors?

3. Ants are "social" insects, which means _____
   - A. They love to party
   - B. They make great friends
   - C. They live in organized groups, or colonies
   - D. They like to make long-distance phone calls
   - E. They have wars between colonies

HINT: Did you know that bees and ants are in the same scientific "family"?

4. Do ants have wings? _____
   - A. No, never
   - B. When ants are ready to mate, the colony may have "reproductives" with wings
   - C. Only in fairy tales
   - D. All ants have wings, some are invisible
   - E. None of the above

HINT: Wings might come in handy when it's time to find a new nesting site.

5. How can you tell the difference between an ant and a termite? _____

A. Termites need a covered route back to the soil; ants don't
B. Termites have a thick waist; ants a thin waist
C. The back wings on an ant are smaller than the front; termite wings are the same size
D. Ants have a bend in their antennae; termite antennae are straight
E. All of the above

HINT: There are lots of differences.

6. Ants are _____

A. The same all over the world
B. Highly educated
C. Likely to be of different kinds in different parts of the U.S. or the world
D. Determined to rule the world
E. All of the above

HINT: All ants don't thrive in the same kinds of weather or geography.

7. How can you identify ants? _____

A. By the way they behave
B. By the kind of nest they make
C. By their looks and smell
D. By if they sting or bite, or not
E. All of the above

HINT: How many ways are ants different?

8. The Acrobat ant is known for _____

A. Singing sweet songs
B. Biting circus clowns and trapeze artists
C. Living in restaurants
D. Raising its heart-shaped abdomen (body segment furthest from the head) over its head
E. Chasing cars

HINT: Why do you think it's called the Acrobat ant?

9. You might recognize a ghost ant, the most common ant in South Florida, by _____

A. Finding it hiding in bed sheets
B. Its white legs and gaster (fat part of the abdomen)
C. The scary noise it makes
D. Hearing African drumming sounds
E. All of the above

HINT: The ghost ant is originally from Africa, but it doesn't make any noise.

10. How can you tell the diffence between an Argentine and a pharaoh ant? _____

A. The Argentine ant is light to dark brown, the pharaoh ant is red and smaller
B. The Argentine ant speaks Spanish
C. The waist, or thin part of its body has one node (or bump); a pharaoh ant has two nodes
D. A and B
E. A and C

HINT: Come on now, do you really think an ant can speak Spanish?

11. What's important to reduce ant problems? _____

A. Seal cracks and crevices with caulk; store trash in a container with a tight lid
B. Store food in glass or metal containers with tight lids, or refrigerate
C. Create a "moat" around food sources (e.g., pet food dishes) by setting in a pan of soapy water
D. Clean recyclables, floors, counters, tables and dishes with soapy water right after using
E. All of the above

HINT: How can you break the food-water-hiding place triangle for ants?

12. The pavement ant is known for _____

A. Digging up sidewalks
B. Crossing the road
C. Paving its trails
D. Nesting under cement
E. All of the above

HINT: Have you ever seen ant nests in cracks in the sidewalk?

13. Where did the odorous ant get its name from? _____

A. Frequent flatulence
B. A rotten coconut smell when squished
C. Its keen sense of smell
D. A smelly entomologist
E. The smell it makes when disturbed

HINT: It's a good thing this ant doesn't sting or bite.

14. How did the thief ant earn its name? _____

A. It will steal young queens from other colonies
B. It will steal the food right off your fork
C. It likes to make nests in banks and jails
D. It wears a bandana
E. It steals food from refrigerators

HINT: Someone must have watched thief ants very closely to figure this one out.

15. How can you tell if an ant will bite or sting? _____

A. Pick it up and see what happens
B. Identify it accurately and look up the behavior of that ant in a book or on line
C. There is no way to tell
D. Ask someone else to pick it up
E. All of the above

HINT: You don't really want to find out the hard way do you?

16. Ants within a colony cooperate in interesting ways including _____

A. Specialized 'soldiers' armed with enlarged mouthparts
B. Farmer ants tending underground fields of fungus for food
C. Herder ants tending aphids on plants, 'milking' them for their 'honeydew' excrement
D. Queens may lay extra eggs for ant workers to use as food
E. All of the above

HINT: It would take pages to list all the interesting arrangements found in ant colonies!

Level 6: IPM Super Sleuth - What's Bugging You?

Can you answer the following questions? Write the letter for the correct answer in the space provided.

1. Diseases carried by pests include _____
   - A. Lyme Disease
   - B. West Nile Virus
   - C. Hantavirus
   - D. Bubonic Plague
   - E. All of the above

HINT: There are many diseases carried by pests including rodents, mosquitoes and ticks.

2. Lyme disease is vectored (meaning carried or transmitted) to humans by _____
   - A. Ticks from the genus *Ixodes* (genus means Latin family name)
   - B. Mice with white feet
   - C. Deer with red noses
   - D. Mosquitoes
   - E. Rats with long whiskers

HINT: Think eight legs.

3. What type of environment are you LEAST likely to find ticks that transmit Lyme disease? _____
   - A. Woods with lots of deer and mice
   - B. Mowed grassy lawn
   - C. Brush piles near woods
   - D. Narrow hiking trails where you frequently brush up against vegetation
   - E. Fields near woods

HINT: Ticks plus animals such as deer and mice are necessary for Lyme disease to spread.

4. What do *Ixodes* ticks look like? ____

A. Nymphs can be as small as this period (.)
B. After they've fed, nymphs are about the size of a poppy seed
C. Adult ticks are slightly larger than a poppy seed
D. Nymphs and adults have eight legs, an oval-shaped body and small head
E. All of the above

HINT: Ticks are much smaller than a bread box, and *Ixodes* ticks are among the smallest of the ticks you're likely to encounter.

5. What can you do to avoid getting Lyme disease when you're out in fields or woods? ____

A. Learn what *Ixodes* ticks look like
B. Wear light-colored clothing and tuck your pants into your socks
C. Check your clothing every hour for ticks and remove them
D. At the end of the day, check yourself all over for ticks
E. All of the above

HINT: If you're out in tick country, it's best to prevent ticks from attaching to your skin.

6. What should you do if you find a tick has bitten you? ____

A. Run around in circles and yell loudly
B. Tell an adult and have them help you remove the tick
C. Remove the tick yourself and keep it a secret
D. Take a bath
E. All of the above

HINT: How can you be sure it's a tick that might carry Lyme disease?

7. This insect vectors (transmits or carries) West Nile Virus to humans ____

A. Greenhead fly
B. Black fly
C. Gnat
D. Mosquito
E. Horse fly

HINT: This insect makes an annoying high-pitched buzz when it flies.

8. What animals can be infected with West Nile Virus in addition to humans? ____

A. Horses
B. Cows
C. Chickens
D. Birds
E. All of the above

HINT: Mosquitoes bite many different kinds of animals and birds.

9. What's the best way to manage West Nile Virus? ____

A. Stay inside all summer
B. Carry a fly swatter wherever you go
C. Manage mosquito larvae before they become adults
D. Buy an electric bug zapper
E. Move to a place where West Nile Virus has not been found yet

HINT: The more infected adult mosquitoes there are, the greater the chance the disease will spread.

10. What's NOT an important action to take to reduce mosquito numbers? ____

A. Spray pesticide throughout your yard
B. Remove any containers that might collect and hold water (tires, cans, other trash)
C. Add mosquito-eating fish to artificial ponds
D. Use *Bacillus thuringiensis* or Bt, a natural insecticide, to artificial ponds
E. Keep rain gutters clean and unclogged

HINT: Where do mosquitoes breed?

11. West Nile Virus is most dangerous for ____

A. Horses
B. Mosquitoes
C. Farmers
D. Birds, older people, very young children or people with weakened immune systems
E. All of the above

HINT: Who might have a harder time fighting any infection?

12. When is it especially important to take special precautions against mosquito bites?

____

A. All the time
B. Early morning, late afternoon and night and when it's cloudy and rainy
C. Nighttime
D. Lunchtime
E. After lunch

HINT: When are you most likely to find mosquitoes out and about?

13. What special precautions should you take when you're outside in mosquito season?

____

A. Wear repellent containing no more than 10% DEET, long pants and long sleeves
B. Run fast
C. Carry bug spray
D. Stay out of the woods
E. All of the above

HINT: What's a good way to keep mosquitoes from finding a spot to bite you?

14. What should you do if you're bitten by a mosquito? ____

A. Tell an adult
B. Tell your friends
C. Nothing
D. Put peanut butter on the bite
E. All of the above

HINT: Who can best help you find out if West Nile Virus is a problem in your area?

15. Hantavirus is a disease transmitted to humans by ____

A. Horses
B. Cows
C. Ducks
D. Aliens
E. Rodents

HINT: Smaller than a breadbox.

16. Humans can catch Hantavirus by ____
    A. Being bitten by rodents
    B. Looking at rodents
    C. Inhaling infectious particles from rodent saliva, urine or excrement
    D. A and C
    E. A and B

HINT: You don't need to be bitten by a rodent to become infected.

17. What's the best way to avoid Hantavirus? ____
    A. Avoid places infested with rodents
    B. Seal entry holes in your house greater than pencil size with caulk or wire mesh
    C. Clean up trash where rodents might nest
    D. Store bird seed and other rodent food in rodent-proof containers
    E. All of the above

HINT: What's the best way to avoid rodents?

18. What should you do if you see rodent excrement or nests? ____
    A. Clean it up immediately
    B. Tell an adult right away
    C. Put something over it and run away
    D. Show all your friends
    E. All of the above

HINT: Who can help make sure any virus particles don't spread?

19. Should I worry about getting a pest-transmitted disease? ____
    A. No, just learn about them and take reasonable precautions
    B. Some parts of the U.S. and the world have more problems than others
    C. Hantavirus is rare but everyone should still take precautions
    D. All of the above

HINT: Will worrying help?

Answer Key:

Level 1. Gumshoe

1. D. WHY: Hiding places provide shelter from predators that might eat them, or from temperature or moisture conditions that might be harmful to their health.

2. C. WHY: Moles live underground; you usually won't find them in buildings made of wood or masonry.

3. A. WHY: Removing webs deprives spiders of food and a hiding place. Break the pest triangle!

4. B. WHY: Following the ant could lead you to spilled food or drink that needs cleaning up, cracks or crevices that need to be sealed, or even back to their home colony which can be removed or destroyed.

5. D. WHY: Ants within a nest, or colony, depend on each other for food. The odor trail helps "recruit" nest mates to return to the new resource.

Level 2. Rookie

1. C. WHY: Grass can be a weed in a garden; a tomato plant can be a weed in a lawn.

2. D. WHY: Sunlight provides the energy plants need to make plant food from carbon dioxide in the air and water.

3. B. WHY: Plants that we consider weeds often produce lots of seeds that grow quickly. Stop a seed, stop a weed!

4. A. WHY: A rhizome is a special type of plant stem that grows along the ground and can sprout roots and upright stems.

5. B. WHY: Thick turf (grass) crowds out weeds, outcompeting young weed sprouts for sunlight and water.

6. E. WHY: If you don't remove the root, the dandelion may regrow.

7. B. WHY: Mulch covers the soil, keeping moisture in and sunlight and weed seeds out.

8. D. WHY: If you find out the name of the weed, you can find out more about its habits and the best strategies to control it.

Level 3. Agent

1. C. WHY: Wet wood is softer, inviting carpenter ants, termites and microbes in.

2. A. WHY: Microbes are living organisms but very small. They include viruses, bacteria and fungi.

3. B. WHY: Mold and mildew are "colonies" or groups of microbes growing together and can cause allergies, nasty smells, fabric stains and wood decay.

4. A. WHY: Fungal spores, the "seeds" produced by fungi, are all around us in the air and soil just waiting for the right conditions to grow.

5. C. WHY: Without wood rot fungi in the soil, the earth might be covered with dead trees!

6. E. WHY: Lumber is usually too dry to support wood rot fungi unless poor construction or damage has created a moisture problem.

7. B. WHY: Wood soaks up water like a sponge, swelling and stretching paint until it cracks.

8. D. WHY: Dehumidifiers remove moisture from the air and collect it for disposal down the drain.

9. E. WHY: Any wood that's exposed to moisture from rain, condensation or evaporation is especially prone to rot.

10. E. WHY: There's no longer any reason to use arsenic treated wood. There are many effective alternatives to choose from.

11. A. WHY: There are five general types of wood rot fungi: surface molds, blue stain fungi, and brown, dry and white rot. You can tell the type from the way they look.

Level 4. Junior Detective

1. E. WHY: Plants are like people; they come in all shapes and sizes and have differences and similarities. Learning what they like and don't like is the key to getting along!

2. D. WHY: If healthy plants weren't able to defend themselves, would the world be full of plants or pests or neither? Most pests can only attack a few kinds of plants, the rest are "resistant" (not bothered) by that pest.

3. B. WHY: Key plants are those plants that take the most time and attention to prevent pest problems. They may have lots of pests that need to be dealt with, or have one or two pests that are very difficult to manage.

4. E. WHY: A key plant results from a combination of reasons, not just one.

5. E. WHY: By choosing plants that naturally do well in your climate, and by putting them in an ideal spot, you can have beautiful plants without a lot of work!

6. E. WHY: There are many examples of key plants. By learning as much as you can before you buy or plant, you'll know just what you're getting into.

7. C. WHY: Rotating annuals means planting the same plants in different spots each year.

8. E. WHY: Many pests spend the winter in plant debris or soil as insect eggs or disease spores. If you move the plants, sometimes the pest can't find them!

9. E. WHY: Pesticides are powerful chemicals that should only be used by an adult and only after you're sure you fully understand the pest problem and nothing else will work.

10. B. WHY: Why bother with pesticides when another plant might be just as attractive and useful and require no pesticides?

11. C. WHY: The best solutions for wildlife problems include repellents (plants that don't taste good to wildlife), exclusion (fences, netting) or harassment (dogs, noisemakers, foil tape).

12. A. WHY: Moles usually don't stay in one place for too long. Grass will recover if put back in place and watered right away.

13. A. WHY: Biological control often happens naturally, like when aphids are eaten by syrphid fly, lacewing or lady beetle larvae.

14. E. WHY: Biological control includes making conditions the best possible to keep natural enemies working and adding natural enemies if necessary and practical.

Level 5. Master Detective

1. D. WHY: Each type of ant has its own special needs and habits, and may require a special solution.

2. C. WHY: Many ants are beneficial, improving the soil and eating pest insects that eat garden plants.

3. C. WHY: Ants within the colony have special jobs such as queen, worker or soldier to keep the colony growing.

4. B. WHY: Many ants develop special jobs and have special "equipment" like wings that help them do their job better.

5. E. WHY: Ants are more closely related to bees than to termites, so there are many differences between ants and termites.

6. C. WHY: There are more than 18 kinds, or species, of ants that can cause problems indoors and outside in the US alone. Only a few are likely to be found in any one area.

7. E. WHY: Ants differ in many ways and most do not sting or bite. Keep going to learn more.

8. D. WHY: Yes, it's named after the trick it does with its abdomen.

9. B. WHY: It's named after its white body parts.

10. E. WHY: Argentine ants, the most common problem ant in California, are a different size and color and have only one node.

11. E. WHY: Sanitation and exclusion are the best solutions for reducing ant problems.

12. D. WHY: Pavement ants nest in cracks in driveways, patios and sidewalks and are frequently found in the Northeastern and Midwestern US.

13. B. WHY: It's true. If you crush this ant between your fingers, you'll smell rotten coconut.

14. A. WHY: Yes. Although this ant prefers meat and cheese, it doesn't usually get into refrigerators.

15. B. WHY: Many ants bite but only a few sting. Some people may have an allergic reaction, so picking up an unknown ant with bare hands is not a good idea.

16. E. WHY: Evolution has crafted many specializations to ensure survival of the colony.

Level 6. IPM Super Sleuth!

1. E. WHY: Finish the quiz to learn more!

2. A. WHY: Tick larvae become infected by feeding on infected mammals, birds or reptiles. Older ticks (nymphs and adults) can pass the infection on to humans.

3. B. WHY: When ready to find an animal or human host for a blood meal, tick nymphs and adults wait at the top of tall grass or brushy vegetation.

4. E. WHY: Both nymphs and adults can transmit Lyme disease to humans.

5. E. WHY: If you can prevent ticks from biting, you can avoid getting the disease.

6. B. WHY: An adult can help you decide if it's an *Ixodes* tick and help you remove it carefully to reduce the chance of infection.

7. D. WHY: Mosquitoes in three families, *Culex, Ochlerotatus* and *Aedes,* have been shown to be the primary vectors of West Nile Virus.

8. E. WHY: Any animal bitten by a mosquito can become infected.

9. C. WHY: To breed, the mosquitoes that transmit West Nile Virus need stagnant (slow moving) water and these sites can be controlled.

10. A. WHY: Spraying everywhere can kill many beneficial insects as well as pests.

11. D. WHY: The virus kills birds and can be fatal to people who don't have strong immune systems.

12. B. WHY: Mosquitoes need high humidity to protect them from dehydration. Humidity is highest around dawn, sunset, at night and when it rains.

13. A. WHY: Reducing the amount of exposed skin, and protecting that with repellent, will reduce the chance of mosquito bites.

14. A. WHY: Adults can help you learn more about West Nile Virus and what symptoms to watch for if it's a problem in your area.

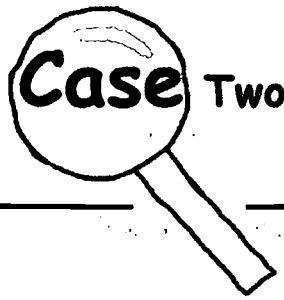
15. E. WHY: Rodents such as rats and mice transmit Hantavirus to humans but show no symptoms themselves.

16. D. WHY: The virus is found in rodent saliva, urine and excrement and can become airborne (float in the air).

17. E. WHY: Break the rodent triangle by removing food, water and hiding places.

18. B. WHY: Disturbing rodent excrement can spread the virus particles. An adult can get the problem resolved correctly.

19. D. WHY: The key to IPM is knowing about pests and using your knowledge to prevent problems!



Case Two: An Ounce of Prevention, Continued

IPM Crosswords!

Level 1: Gumshoe

Can You Complete this Crossword with Basic IPM Facts?

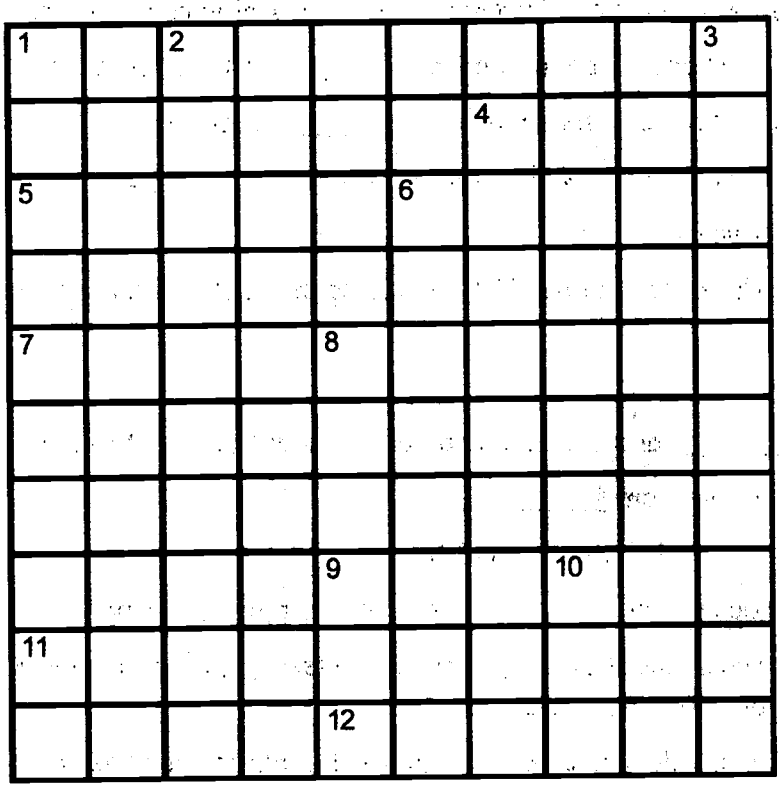
Across

1. Some pests are active during the day; others prefer the cover of darkness at _____.
5. Hungry pests sometimes enter houses looking for _____.
6. Cockroaches love to live in stacks of cardboard or _____.
7. This insect pollinates flowers and makes a sweet treat, but if you step on one barefoot, you'll get a nasty sting!
9. Lice is the plural of this word.
11. You might think pesky parents just like to ____, but making sure your room is clean and free of food trash is one of the best ways to prevent pest problems.
12. Carpenter ants and termites need this to live.

Down

2. This furry pest gets lots of attention in February, but if he sees his shadow in your garden, better put up a fence because he's a big eater!
3. Vacuuming pet beds, floors, rugs and _____ is a great way to reduce flea problems.
4. Just like us, pests need food, _____ and shelter.
7. Piles of trash make great _____ places for rats, mice, ants and other pests.
8. This stinging pest wears a _____ jacket.
10. Without IPM, we might all be very ____.

Answer key on page 60.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Level 2: Rookie

More IPM Basics

Across

1. Fleas are not fun for you or your ___.

4. With IPM, you have many _____ to handle pest problems, including cleaning up spills and keeping window screens in good repair to prevent problems before they occur.

6. Pesticide containers are often marked with a _____ and crossbones.

8. Pesticides should never be stored in food or _____ containers.

11. Pesticides should never be used by children, just by _____-ups.

12. IPM is the best solution for ___.

14. _____ needs to learn about IPM, including students, teachers and parents.

Down

1. Pesticides are _____ and should not be used except as a last resort.

2. Keep pesticides away from _____.

3. Put this on your mosquito bites to cool the itch.

5. Never touch a mouse trap, if it's ___, it might snap on your finger!

7. Always tell a grownup about any _____ from an insect, spider, tick or animal. If not treated properly, you might get sick.

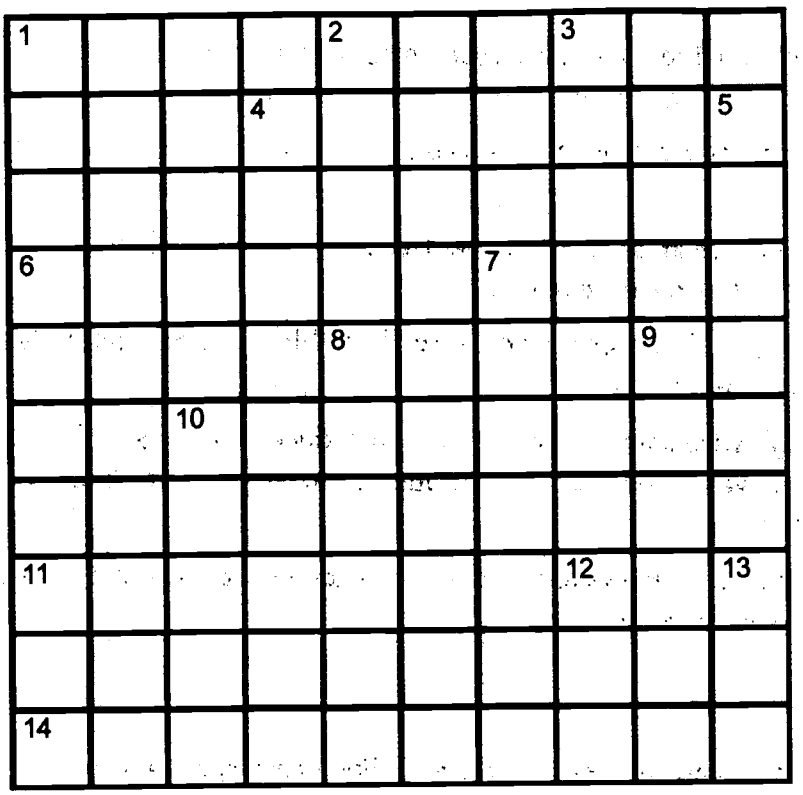
9. Not all pesticides are designed to _____ pests. Repellants are pesticides that keep pests away.

10. _____ pesticides in a safe place out or reach of chidren and pets.

12. If you or your pet ___ or drank a pesticide accidentally, you could become sick or die.

13. All pesticide containers should have a child-proof ___.

Answer key on page 60.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Level 3: Agent

Become an IPM Agent!

Across

1. Stop this kind of ant from entering your home by repairing or replacing damaged or rotten wood, and by storing firewood away from your house.

4. Keeping bathrooms and basements clean and ___ can prevent mold and mildew from growing.

5. To start an IPM program at home, inspect each _____ in your house for pests, signs of pests and conditions that encourage pests.

7. Recycle old _____. If left around outside these black rubber discards make great breeding places for mosquitoes.

8. Regular, thorough vacuuming is a great way to reduce problems with _____ because although the adults live on animals, their larvae live in carpets, pet bedding or cracks and crevices in the floor.

9. Making sure screens, windows and doors are in good repair is a great way to keep this two-winged flying pest outside.

Down

1. Cleaning up food crumbs and spills, and recycling newspaper and cardboard can reduce food and hiding places for this six-legged pest.

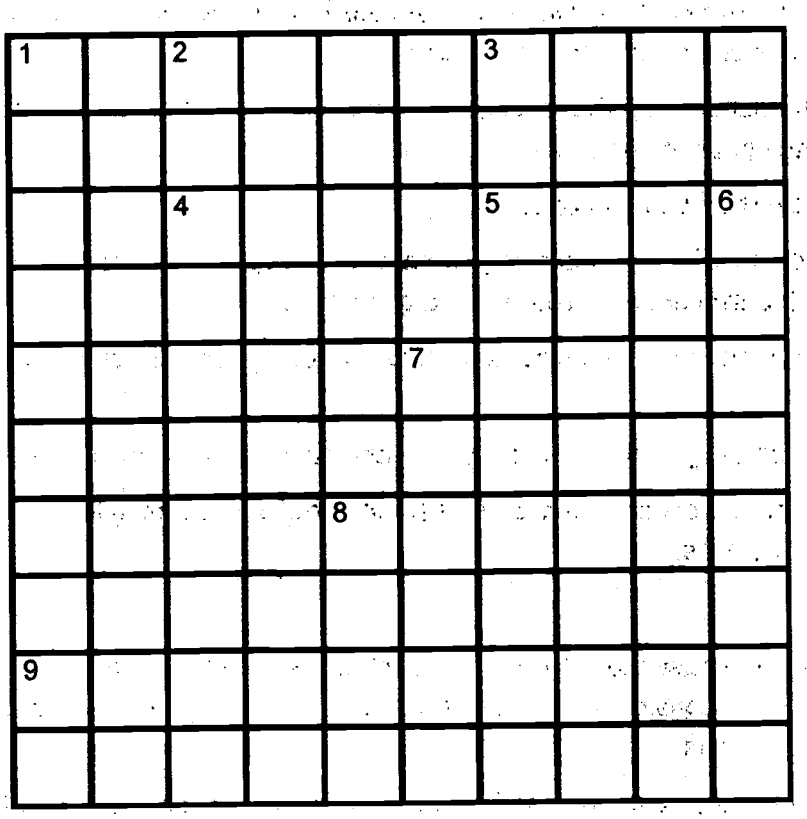
2. Keep these four-legged furry pests out by sealing cracks and crevices with caulk, or stuffing them with copper mesh.

3. This ant-like insect lives in the soil and eats wood. Keeping wood out of contact with the soil can help prevent problems with this pest.

6. Avoid getting bitten by these pesky flying insects by wearing light colored, loose fitting clothing and using a good repellant.

8. Fleas, mosquitoes, bed bugs and ticks are all pests that need to _____ on blood to reproduce.

Answer key on page 60.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Level 4: Jr. Detective

So You Want to Be a Junior Detective?

Across

3. Avoid attracting some insects to outdoor lighting by using a fluorescent light _____ instead of an incandescent one.

5. This space under the roof of your house should have screens on vents, windows or other openings to keep out squirrels, birds and bats.

7. Reduce feeding damage by these large four-legged animal pests by selecting plants for your yard that they prefer not to eat.

8. A plant that is out of place is called a _____.

9. Watch for nest building by this stinging pest in the spring. Remove any from the eaves of your house with a stream of water from a garden hose.

12. After you've been out in the woods or grass, check yourself carefully for this eight-legged pest.

13. Be sure to clean up ____ waste from your yard to avoid attracting flies.

14. These eight-legged creatures are good friends outdoors because they can eat insects that attack garden plants.

Down

1. Some people think these plants with yellow flowers are pretty, or even good in salads. In most lawns, they're considered weeds and should be dug up and removed before they flower and produce seeds.

2. This fine-feathered friend can eat lots of mosquitoes, caterpillars or other pesky insects.

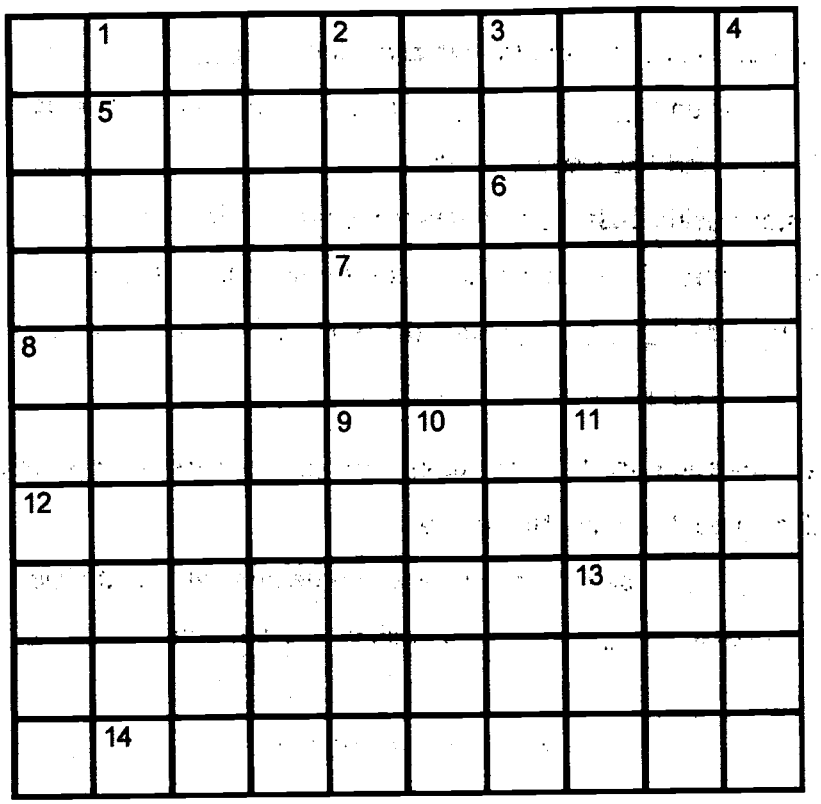
4. To avoid harm from stinging insects, it's best to wear shoes and not go _____.

6. These flying insects are needed to pollinate flowering fruits and vegetables, but can give a nasty stick if stepped on.

10. Clean up food waste indoors and out to avoid seeing trails of these crawling insects at your house.

11. Leaky _____ can provide water for thirsty insects and can lead to rotting wood and mold growth.

Answer key on page 60.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Level 5: Master Detective

Go for it Master Detective!

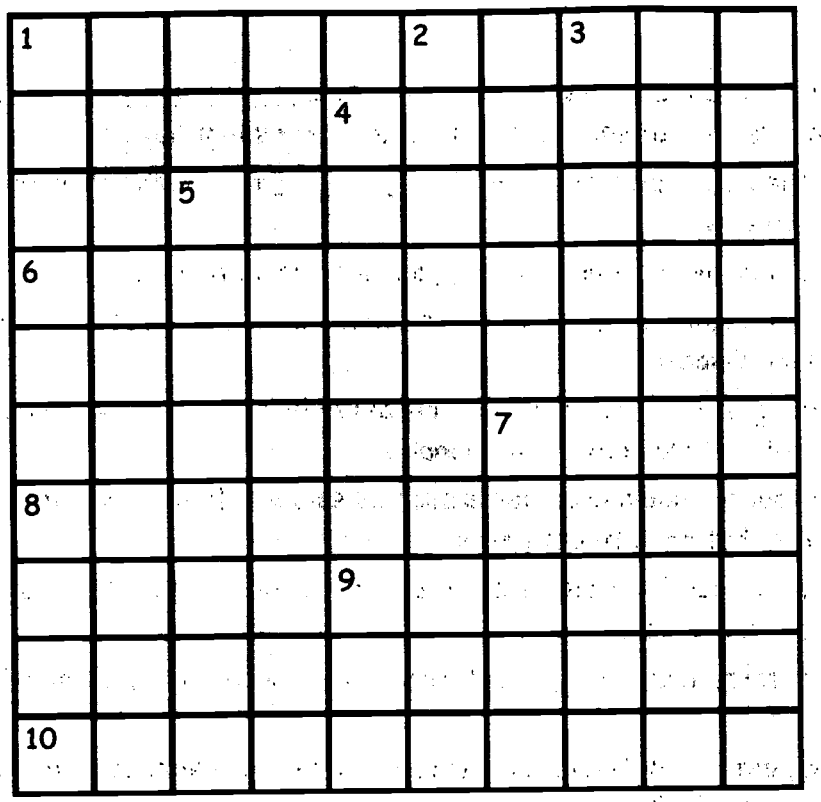
Across

4. In IPM, when action is needed, pesticides are a last _____.
6. IPM includes planning and _____ to fix conditions that cause pest problems.
7. IPM is _____ for you and the environment!
8. IPM does ____ mean using pesticides whenever pest problems occur.
9. _____ levels describe when something needs to be done to fix pest problems.
10. IPM means using our _____ about pests to reduce pest and pesticide risks.

Down

1. _____ is one method used to spot pests such as rodents and insects.
2. IPM _____ reducing pest and pesticide risks.
3. By regularly _____ pest numbers, you can decide when it's time to act.
5. When action is needed, the _____-toxic choices are the best.

Answer key on page 60.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Level 6: Super Sleuth On the Case!

Across

2. Trees are great for shade and wildlife. Make sure _____ _____ are at least 6 feet away from your house so that squirrels don't use them as highways to your home.

7. IPM requires the active participation of _____ to prevent conditions that encourage pest problems.

8. Food crumbs and drink spills are like ___ and ice cream to ants.

9. These large, four-legged animals can eat garden and landscape plants, and carry the ticks that cause lime disease.

10. It's a good thing our ___ can repair itself after bites from mosquitoes, flies and ticks, or we'd be full of holes before too long!

12. A great IPM tool for sucking up pests such as spiders, flea larvae, ants and flies, as well as food crumbs that can attract pests.

14. The "I" in IPM stands for this word, which means considering all of our options, not just pesticides, to manage pests.

17. Spiders and caterpillars can _____ silk threads and webs to build their homes and move about.

18. The ___ of a pest often determines where it lives. For example, young flea larvae live in rugs and carpets. Adult fleas live on animals.

20. Habitat _____ is a great IPM approach and means changing things to make our homes less livable for pests.

23. Spraying pesticides on a routine basis or regular schedule according to the _____ is not necessary or effective. Any action to manage pests should follow careful inspection and identification of a problem.

24. If you're considering using a professional to treat pest problems in your home or lawn, be sure to verify that they use an IPM approach before you _____ them.

25. ___! A mouse!

Down

1. This IPM tool doesn't require electricity, just elbow grease to sweep up pests and food crumbs.

2. If you leave these in the ground when you cut down a tree near your house, you invite carpenter ants which don't make great neighbors!

3. A nice smooth and ___ coat of paint can protect wood from rot and insects.

4. Flea larvae can live in carpets and in _____ and crevices in tile or wood floors.

5. Ancient IPM proverb: "One window _____ in good repair is worth one thousand fly swatters."

6. This cold spot is an excellent place to store flour and grains to prevent problems with beetle or moth pests.

11. This word means baby fox.

12. You'll find these in attics and also where air from clothes dryers and oven fans passes through the walls of your house. A screened _____ can prevent birds, bats and rodents from entering your house.

13. IPM maximizes the effectiveness of pest management and _____ the risks to health and the environment.

15. Regular vacuuming helps remove food crumbs and insects from this small, removable carpet-like floor covering.

16. Don't leave this leafless giant standing near your house; termites and carpenter ants are likely to breed there.

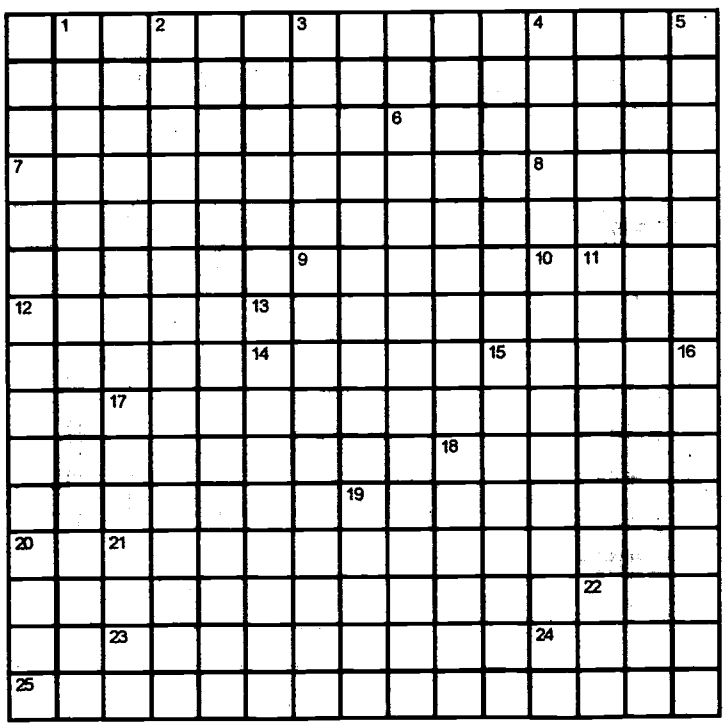
19. If you leave this sweet treat in your dresser drawer, you might find ant or rodent visitors dropping by.

20. When cleaning, be sure to _____ furniture and appliances to clean dust and dirt that accumulates under and behind them.

21. This wooden structure can be a great place to sit and enjoy the outdoors. If you're going to build one, use rot and insect-resistant materials but avoid wood treated with arsenic.

22. The egg stage of the head louse is called a ____.

Answer key on page 60.



IPM Crosswords Answer Key:

Level 1: Gumshoe

N	I	G	H	T					C
		R				W			A
F	O	O	D		P	A	P	E	R
		U				T			P
H	O	N	E	Y	B	E	E		E
I		D		E		R			T
D		H		L					S
I		O		L	O	U	S	E	
N	A	G		O			A		
G				W	O	O	D		

Level 2: Rookie

P	E	T		C			I		
O			C	H	O	I	C	E	S
I				I			E		E
S	K	U	L	L		B			T
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N		S		R		T		I	
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G	R	O	W	N			A	L	L
		R					T		I
E	V	E	R	Y	O	N	E		D

Level 3: Agent

C	A	R	P	E	N	T	E	R	
O		O				E			
C		D	R	Y		R	0	0	M
K		E				M			O
R		N			T	I	R	E	S
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A		S		F	L	E	A		U
C				E					I
H	O	U	S	E	F	L	Y		T
				D					O

Level 4. Jr. Detective

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	A	T	T	I	C				A
	N			R		B			R
	D			D	E	E	R		E
W	E	E	D			E			F
	L			W	A	S	P		O
T	I	C	K		N		I		O
	O				T		P	E	T
	N						E		
	S	P	I	D	E	R	S		

Level 5. Master Detective

T					M		M		
R				R	E	S	O	R	T
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Level 6. Super Sleuth

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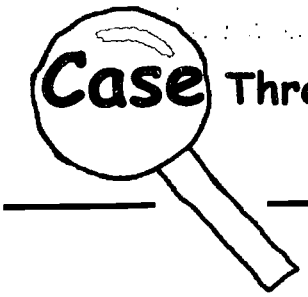


Case Three: Tools of the IPM Trade

IPM Lingo Matching Game

Level 1: Gumshoe

Instructions: Draw a line to connect the word on the left with the phrase on the right that most closely matches it.

A. BAIT	1. A paste used to seal cracks and prevent pest entry
B. IPM	2. A food used to attract pests to a trap or pesticide
C. PESTICIDE	3. A pesticide used to control insect pests
D. INSECTICIDE	4. Taking action to fix conditions that encourage pests
E. CAULK	5. A chemical used to prevent, destroy or repel pests
F. PREVENTION	6. Integrated Pest Management

Answer key on page 67.

Level 2: Rookie

Instructions: Draw a line to connect the word on the left with the phrase on the right that most closely matches it.

A. RECORD KEEPING	1. Keeping pest numbers low so that they don't cause problems, using least risk methods
B. MONITORING	2. Keeping an area clean, e.g., vacuuming and washing dishes
C. IPM	3. Blocking pest entry into a house or building, e.g., fixing screens, caulking holes
D. COMPETITION	4. Keeping an eye on pest populations, e.g., setting traps to see if any are around
E. SANITATION	5. The struggle between living organisms for the same water, food, space or light
F. ENVIRONMENT	6. All of the living organisms and non-living features of a certain area
G. PEST TRIANGLE	7. Writing things down in an organized way, e.g., keeping notes on pest trap catches
H. EXCLUSION	8. Three things pests need: food, water and shelter

Answer key on page 67.

Level 3: Agent

Instructions: Draw a line to connect the word on the left with the phrase on the right that most closely matches it.

A. PESTICIDE LABEL	1. When the cells and tissues in an organism stop working right because of a pathogen
B. LABELED PESTS	2. A pesticide used to manage diseases
C. MILDEW	3. A pesticide used to manage diseases caused by bacteria
D. HERBICIDE	4. A pesticide used to control the growth of weeds
E. DISEASE	5. A staining on fabrics or walls, or a plant disease, caused by a fungus
F. PATHOGEN	6. A living organism that causes disease, e.g., bacterium, fungus, virus
G. FUNGICIDE	7. A chemical substance or process that prevents or eliminates infection or pathogens
H. BACTERICIDE	8. Information on pesticide containers that tells how the pesticide must be used
I. DISINFECTANT	9. Pests listed on the pesticide label for which the pesticide may be used

Answer key on page 67.

Level 4: Jr. Detective

Instructions: Draw a line to connect the word on the left with the phrase on the right that most closely matches it.

A. BIODEGRADABLE	1. Using living things or the products of living things to manage pests
B. PREDATOR	2. A substance that can be broken down naturally causing less environmental problems
C. PREY	3. Changing the environment to reduce pest problems, e.g., fix moisture problem
D. PARASITE	4. A living organism that kills another for food, e.g., lady beetle feeding on an aphid
E. HOST	5. A living organism that is killed by another for food, e.g., an aphid for a lady beetle
F. RESISTANCE	6. An organism living on or in another and using it for food, e.g., head lice on a human
G. HABITAT MODIFICATION	7. A living organism on or within which another lives and feeds, e.g., human for a head louse
H. SECONDARY PEST	8. The ability of pests to avoid the effects of a pesticide or pest control method
I. BIOLOGICAL CONTROL	9. A pest that becomes a problem because of actions taken to manage another pest

Answer key on page 68.

Level 5: Master Detective

Instructions: Draw a line to connect the word on the left with the phrase on the right that most closely matches it.

A. SUPPRESS	1. An organism not hurt by a specific disease or parasite, e.g., head lice don't feed on dogs
B. ACTION THRESHOLD	2. A substance that kills or suppresses microorganism, e.g., penicillin
C. NONHOST	3. Number of pests where action should be taken to prevent noticeable problems
D. ANTIBIOTIC	4. The study of insects
E. NOXIOUS WEED	5. The study of plant diseases
F. PLANT PATHOLOGY	6. The study of weeds
G. INVASIVE SPECIES	7. A substance that draws a specific type of insect or other organism to it
H. ENTOMOLOGY	8. To lower the level of a pest population
I. WEED SCIENCE	9. A weed that is especially troublesome or hard to control
J. ATTRACTANT	10. A living organism that enters a new environment and spreads quickly

Answer key on page 68.

Level 6: IPM Super Sleuth

Instructions: Draw a line to connect the word on the left with the phrase on the right that most closely matches it.

A. MUTAGEN	1. A book written by Rachel Carson in 1960 that warned of the dangers of pesticides
B. AUGMENTATION	2. An insecticide now banned in the US that poisoned many birds of prey, including eagles
C. BIOLOGICAL MAGNIFICATION	3. Greater levels of pesticide contamination higher up the food chain
D. SILENT SPRING	4. E.g., small insect which is eaten by larger insect which is eaten by a bird
E. DDT	5. Animal high up the food chain not usually eaten by another, e.g., human, lion
F. FOOD CHAIN	6. An amount of pesticide that contaminates food or the environment after use
G. TOP PREDATOR	7. A substance that can cause cancer
H. PESTICIDE RESIDUE	8. A substance that can cause genetic mutations
I. FOOD WEB	9. Release of natural enemies to manage pests
J. CARCINOGEN	10. A diagram of the many interlinked food chains in one area or linked to one food source

Answer key on page 69.

Answer Key:

Level 1: Gumshoe

E. CAULK	1. A paste used to seal cracks and prevent pest entry
A. BAIT	2. A food used to attract pests to a trap or pesticide
D. INSECTICIDE	3. A pesticide used to control insect pests
F. PREVENTION	4. Taking action to fix conditions that encourage pests
C. PESTICIDE	5. A chemical used to prevent, destroy or repel pests
B. IPM	6. Integrated Pest Management

Level 2: Rookie

C. IPM	1. Keeping pest numbers low so that they don't cause problems, using least risk methods
E. SANITATION	2. Keeping an area clean, e.g., vacuuming and washing dishes
H. EXCLUSION	3. Blocking pest entry into a house or building, e.g., fixing screens, caulking holes
B. MONITORING	4. Keeping an eye on pest populations, e.g., setting traps to see if any are around
D. COMPETITION	5. The struggle between living organisms for the same water, food, space or light
F. ENVIRONMENT	6. All of the living organisms and non-living features of a certain area
A. RECORD KEEPING	7. Writing things down in an organized way, e.g., keeping notes on pest trap catches
G. PEST TRIANGLE	8. Three things pests need: food, water and shelter

Level 3: Agent

E. DISEASE	1. When the cells and tissues in an organism stop working right because of a pathogen
G. FUNGICIDE	2. A pesticide used to manage diseases
H. BACTERICIDE	3. A pesticide used to manage diseases caused by bacteria
D. HERBICIDE	4. A pesticide used to control the growth of weeds
C. MILDEW	5. A staining on fabrics or walls, or a plant disease, caused by a fungus
F. PATHOGEN	6. A living organism that causes disease, e.g., bacterium, fungus, virus
I. DISINFECTANT	7. A chemical substance or process that prevents or eliminates infection or pathogens
B. PESTICIDE LABEL	8. Information on pesticide containers that tells how the pesticide must be used
A. LABELED PESTS	9. Pests listed on the pesticide label for which the pesticide may be used

Level 4: Jr. Detective

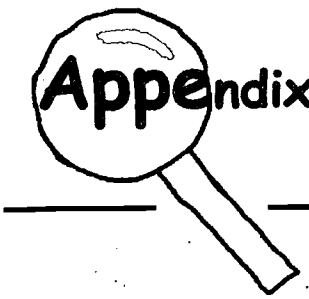
I. BIOLOGICAL CONTROL	1. Using living things or the products of living things to manage pests
A. BIODEGRADABLE	2. A substance that can be broken down naturally causing less environmental problems
G. HABITAT MODIFICATION	3. Changing the environment to reduce pest problems, e.g., fix moisture problem
B. PREDATOR	4. A living organism that kills another for food, e.g., lady beetle feeding on an aphid
C. PREY	5. A living organism that is killed by another for food, e.g., an aphid for a lady beetle
D. PARASITE	6. An organism living on or in another and using it for food, e.g., head lice on a human
E. HOST	7. A living organism on or within which another lives and feeds, e.g., human for a head louse
F. RESISTANCE	8. The ability of pests to avoid the effects of a pesticide or pest control method
H. SECONDARY PEST	9. A pest that becomes a problem because of actions taken to manage another pest

Level 5: Master Detective

C. NONHOST	1. An organism not hurt by a specific disease or parasite, e.g., head lice don't feed on dogs
D. ANTIBIOTIC	2. A substance that kills or suppresses microorganism, e.g., penicillin
B. ACTION THRESHOLD	3. Number of pests where action should be taken to prevent noticeable problems
H. ENTOMOLOGY	4. The study of insects
F. PLANT PATHOLOGY	5. The study of plant diseases
I. WEED SCIENCE	6. The study of weeds
J. ATTRACTANT	7. A substance that draws a specific type of insect or other organism to it
A. SUPPRESS	8. To lower the level of a pest population
E. NOXIOUS WEED	9. A weed that is especially troublesome or hard to control
G. INVASIVE SPECIES	10. A living organism that enters a new environment and spreads quickly

Level 6: Super Sleuth

D. SILENT SPRING	1. A book written by Rachel Carson in 1960 that warned of the dangers of pesticides
E. DDT	2. An insecticide now banned in the US that poisoned many birds of prey, including eagles
C. BIOLOGICAL MAGNIFICATION	3. Greater levels of pesticide contamination higher up the food chain
F. FOOD CHAIN	4. E.g., small insect which is eaten by larger insect which is eaten by a bird
G. TOP PREDATOR	5. Animal high up the food chain not usually eaten by another, e.g., human, lion
H. PESTICIDE RESIDUE	6. An amount of pesticide that contaminates food or the environment after use
J. CARCINOGEN	7. A substance that can cause cancer
A. MUTAGEN	8. A substance that can cause genetic mutations
B. AUGMENTATION	9. Release of natural enemies to manage pests
I. FOOD WEB	10. A diagram of the many interlinked food chains in one area or linked to one food source



Appendix I. Resources

More IPM Activities for Kids of All Ages

Read a comic book! *The Pest Invasion* is just one of three Safer Pest Control Project comic books that teach least hazardous pest control in a variety of settings. To order *The Pest Invasion*, *The Pest Invasion II*, and *La Invasion de los Insectos II* for $1.00 each, call The Safer Pest Control Project at 312/641-5575 or e-mail at msaito@bpichicago.org

Get This Bug Off of Me! The University of Kentucky Department of Entomology's website contains color a photo guide to more than 30 dangerous and harmless arthropods. Find it at http://www.uky.edu/agriculture/entomology/ythfacts/stories/hurtrnot.htm

Check out the Entomological Society of America! Their website contains educational resources including *Beeswax*, an entomological newsletter for kids, and seasonal lesson plans including handouts and activities, project ideas, and books. Find it at http://www.entsoc.org/education/educ_intro.htm

Head lice! A truly unique website all about head lice from the National Pediculosis Association, includes an interactive quiz and games, animations of the lice life cycle, frequently asked questions, books and poetry, coloring page and word. Find it at http://www.headlice.org/kids/index.htm

Play bingo! The Environmental Protection Agency's Pesticide Safety Bingo Game is a downloadable 49 pages plus cards and contains both beginner and advanced level games for K-6 grades about pest management and pesticides. It includes instructions, background information for teachers, discussion questions, and picture and text cards in English and Spanish. Find it at http://www.epa.gov/region6/6pd/bingo/index.htm

Play Bug-GO! This bingo-like game will help you learn about beneficial insects. Match beneficials with their pests. It includes player game cards, templates, for

overhead transparencies or display sheets, information about each insect and instructions. Find it at http://www.uky.edu/Agriculture/IPM/teachers/bug-go/bug-go.htm

A "Journey to Understanding Weeds!" A Kid's Journey to Understanding Weeds website created by Wyoming Agriculture in the Classroom includes activities organized around 10 noxious weeds. Find it at http://www.wyoagcenter.com/waic/weeds.html

"Join Our Pest Patrol" and go on an "IPM Adventure!" *Join Our Pest Patrol- A Backyard Activity Book for Kids- Adventure in IPM* is a book with companion teacher's guide that includes many educational activities designed for 3rd and 4th graders. Find a downloadable version at http://www.mda.state.mn.us/IPM/IPMPubs.html#PestPatrol

Play "Help! It's a Roach" on the web! A pest prevention website full of activities provides a fun way to learn about managing indoor insect pests. The web version is available at http://www.epa.gov/opp00001/kids/roaches/english/, and the paper version is available from EPA's publication center http://www.epa.gov/ncepihom/ordering.htm

It's a kid's guide to pesticides! This two-page fact sheet in PDF format includes discussion of pests, pesticides, risks, and pesticide safety. Find it at http://www.spcpweb.org/ (go to School IPM page and follow link).

The following resources do not specifically address IPM but are great for teaching and learning IPM principles:

Check out this list of buggy websites! Florida State's "Best of the Bugs" Web Site is available at: http://pests.ifas.ufl.edu/bestbugs

Insects in history! The website entitled "Insects and Society: How insects have changed major battles, altered governments, and shaped human history" contains color images and a virtual presentation about early insect misconceptions and the impacts of insect-vectored diseases on human history. Find it at http://www.ento.vt.edu/IHS/

Check out careers in entomology! The Entomological Society of America keeps a page called "Educational and Career Information for High School and Undergraduate Students." Check it out with interested high school students at http://www.entsoc.org/education/educ_career/educ_career.htm

Explore grasshoppers! Canadian Geographic's grasshopper facts website, "A grand look a grasshoppers," includes interactive games, fun facts and scientific knowledge about grasshoppers. Find it at http://www.canadiangeographic.ca/Magazine/Mj02/etcetera/index.htm.

Get artistic with insect models! Downloadable PDF formats include fly, butterfly, dragonfly and cockroach models for kids to cut, decorate and fold. Find it at http://paipm.cas.psu.edu/pdf/insectmodels.pdf

Go to the museum! The museum of Natural Science and History has seven entertaining modules on microbes including Meet the Microbes, Bacteria in the Cafeteria, How Lou Got the Flu, and Prevention Convention." Find it at http://www.amnh.org/explore/infection/index.html

Go on a field trip! The Entomological Society of America keeps a list of insect zoos, insect museums and butterfly gardens in the United States. Find it at http://www.entsoc.org/education/links/insect_zoos.htm

Alien Empire! PBS supplements a Nature program entitled *Alien Empire* with a website containing interactive puzzles, animated presentations, video clips, templates for insect masks and a teacher's guide. Find it at http://www.pbs.org/wnet/nature/alienempire/. To purchase the video, please contact WNET Video Distribution by calling (800) 336-1917, or by writing to WNET Video Distribution, P.O. Box 2284, South Burlington, VT 05407.

Get active! The Northwest Coalition for Alternatives to Pesticides' School Pesticide Use Reduction program works to get Northwest (and other) schools to reduce their use of toxic pesticides on school grounds and in school buildings. Start your own club related to pesticides, IPM or bugs or look specifically into NCAP's School Pesticide Use Reduction program at http://www.pesticide.org/schools01.html

IPM Curricula and Education Programs

MSU's Elementary Urban IPM Curriculum Web Page:
http://www.pested.msu.edu/CommunitySchoolIpm/curriculum.htm

Pennsylvania IPM's List of Educational Sites:
http://paipm.cas.psu.edu/schools/schoolEduc.htm

University of Florida's School IPM Web Site:
http://schoolipm.ifas.ufl.edu/teach.htm

Iowa State Entomology Index: K-12 Educators' Recommended Sites:
http://www.ent.iastate.edu/list/k-12_educator_resources.html

Academic Standards for Environment and Ecology, Section 4.5., Integrated Pest Management:
Includes a detailed list of IPM topic areas to be included in curricula for students in Pennsylvania Public Schools through grade 12:
http://paipm.cas.psu.edu/schools/schoolEduc.htm

Bio-Integral Resource Center: IPM Curriculum for Grades 9-12. A 200-page book including IPM basics including monitoring and cultural, physical, biological and least-toxic chemical controls; insect profiles, study programs, case studies, lab experiments, resource list, glossary; designed to be part of a science, chemistry or biology course; emphasis on agricultural, horticultural and garden pests. BIRC, P.O. Box 7414, Berkeley CA 94707, (510) 524-2567, FAX (510) 524-1758, E-mail ebirc@igc.org, Web site http://www.birc.org.

University of Minnesota: ***Radcliffe's IPM World Textbook***: An electronic textbook including line drawings, color and B&W photos, chapters on biological and cultural control, computers in IPM, crop and commodity-specific IPM, ecology, IPM policy, medical and veterinary IPM, pesticides, stored product IPM, links to IPM resources including photographs and decision-support software:
http://www.ipmworld.umn.edu/ipmsite.htm

The following resources do not specifically address IPM but are great for teaching and learning IPM principles:

Advanced Arthropod Studies Curriculum:
http://www.uni.uiuc.edu/~dstone/advancedarthropodstudies.html

American Phytopathological Society: Plant pathology curricula for K through higher education including plant disease lessons, laboratory exercises, illustrated glossary, resource catalogs and links to additional materials:
http://www.apsnet.org/education/top.html

Center for Environmental Education Curriculum Resources:
http://www.cee-ane.org/topics/index.html

Help Yourself to a Healthy Home Web Site:
http://www.uwex.edu/homeasyst/

National 4-H Council: Food production and pesticides curriculum includes food production and environmental and health effects of pesticide use in agriculture; food webs and biological diversity; analysis of agriculture and pesticide use in the U.S.; global demand for food and population trends. Available in print from National 4-H Council, 7100 Connecticut Ave, Chevy Chase MD 20815. (301) 961-2908, FAX (301) 961-2894, E-mail: envstew%smtpgate@fourhcouncil.edu, and for more information including comments from reviewers available at http://www.reeusda.gov/4h/curricul/da2.htm

Texas A&M Insects in the Classroom Web Site:
http://entowww.tamu.edu/academic/ucourses/ento489

University of Arizona's Using Live Insects in Elementary Classrooms for Early Lessons in Life Web Site:
http://insected.arizona.edu/uli.htm

University of Illinois Bugscope project is an educational outreach program for K-12 classrooms that enables students to remotely operate a scanning electron microscope to image "bugs" at high magnification. Check out this free resource at http://bugscope.beckman.uiuc.edu/

Center for Environmental Education website includes a page with resources dedicated to learning outside of the classroom and in the schoolyard. Find it at http://www.cee-ane.org/topics/schlyds.html

Entomological Society of America lists and explains five projects that kids can perform: Scouting for Insects Outdoors, Build an Ant Habitat, Create a Butterfly Garden, and Rearing and Tagging Monarch Butterflies for Migration and Collect Insects from Your Lawn. Find them at http://www.entsoc.org/education/elem_mid/projects.htm

IPM Resources in Spanish and other Languages

IPM fact sheets! Spanish IPM fact sheets that include Argentine ants and cockroaches. Available from the Bio-Integral Resource Center (BIRC), P.O. Box 7414, Berkeley CA 94707, (510) 524-2567, FAX (510) 524-1758, E-mail mailto:birc@igc.org, Web site http://www.birc.org

Learn pest management! The National Pest Management Associate has pest management materials available including the biology and management of bumblebees, carpenter ants, fruit flies, German cockroaches, head and body lice, and pavement ants, plus diseases transmitted by pests. Find it at http://www.pestworld.org/spanish/

Brochures available! The New York State Department of Health provides brochures on the management of mosquitoes, mice, West Nile virus plus tick and insect repellents. Find them at http://www.health.state.ny.us/nysdoh/pest/pesticid.htm

Comic book about insects! The Safer Pest Control Project provides a comic-style book entitled *La Invasion de los Insectos* that addresses cockroach IPM in public housing. Available from Safer Pest Control Project, 25 E. Washington St, Suite 1515, Chicago, IL 60602, (312) 641-5575, Fax (312) 641-5454, E-mail: spcp@iname.com, Web site http://www.spcpweb.org/

IPM Book! Texas Agricultural Extension Service provides Entomology Spanish language publications that includes sections entitled Cockroaches, How to Control Cockroaches at Home, Control of Rats And Mice, Fleas, Flea Control, House Infesting Ants, How to Control Ants at Home, Subterranean Termites, The Two Step Fire Ant Control, Ticks, and Tick Control. Available at http://agpublications.tamu.edu/pubs/sentom/

Materials in many languages! The University of Minnesota Extension Service provides Materials in Spanish that include "Cockroaches - Your Safe Home," (also in English, Laotian, Cambodian and Hmong) and "Molds - Your Safe Home" (English, Laotian, Cambodian, Hmong and Somali). Find it at: http://www.extension.umn.edu/pesticides/IPM/pubstruct.htm

Handle head lice! The University of Nebraska Cooperative Extension provides a downloadable PDF resource entitled "Head Lice Resources You Can Trust," a family guide with practical, simple directions on head lice control available in Spanish and English. The site also includes an online "Removing Head Lice Safely" video in Spanish, Arabic or English. Find it at: http://lancaster.unl.edu/enviro/HeadLice/Resources.htm

Informative pest management materials! The US EPA has Pest management materials available in Spanish that include "Ten Tips to Protect Children from Pesticides and Lead Poisonings around the Home" (a tri-fold brochure), "Pesticides and Child Safety" (a3-page tip sheet), "How to Protect Children from Environmental Threats" (brochure, IPM plus other issues, very attractive presentation and practical tips) and "Pesticides and Food: What Your Family Needs to Know." Request in print by phone to 703-305-7666 or Fax: 703 308-2962.

The following resources do not specifically address IPM but are great for teaching and learning IPM principles:

Informational book about pesticides! *Recognition and Management of Pesticide Poisonings*, 5th edition available in Spanish. This 236 page resource includes toxicology and signs and symptoms of poisoning and treatment for more than 1500 products. It also covers new pesticide products that have come on the market since 1989, includes a new chapter on disinfectants and reviews of clinical experiences with pesticide poisonings. Find it at http://www.epa.gov/oppfead1/safety/spanish/healthcare/handbook/handbook.htm in electronic format or request in print by phone to 703-305-7666 or Fax: 703 308-2962 from the US EPA.

Public service announcements! The US EPA, Region 2 has materials in Spanish that include a brochure plus public service announcements on illegal pesticides. Find it at: http://www.epa.gov/region02/health/chalk.htm

Appendix II. IPM Concentration Cut-Out Cards

Grades 1-3

Concentration for One or More Players!

Directions: Cut out the cards. Mix the cards up, and put them in a pattern face down. With others or by yourself, take turns flipping over two cards at a time. Each time you match two cards you get to keep them. The person with the most pairs of matched cards at the end of the game wins! If you need help with the matching, look in the top corners of each card. Matching cards will display the same number. There are six different games in all, Gumshoe through Super Sleuth!

Level 1: Gumshoe

1 **Six Legs** Level 1: Gumshoe	2 **Eight Legs** Level 1: Gumshoe
3 **Mold** Level 1: Gumshoe	4 **Head** Level 1: Gumshoe

5 **Pest** Level 1: Gumshoe	6 **Pesticide** Level 1: Gumshoe
7 **Ladybeetle** Level 1: Gumshoe	8 **Grasshopper** Level 1: Gumshoe
9 **Weed** Level 1: Gumshoe	10 **Bat** Level 1: Gumshoe
1 **Insect** Level 1: Gumshoe	2 **Spider** Level 1: Gumshoe

3 **Fungus** Level 1: Gumshoe	4 **Lice** Level 1: Gumshoe
5 **Management** Level 1: Gumshoe	6 **Poison** Level 1: Gumshoe
7 **Eats Aphids** Level 1: Gumshoe	8 **Eats Plants** Level 1: Gumshoe
9 **Unwanted Plant** Level 1: Gumshoe	10 **Eats Mosquitoes** Level 1: Gumshoe

Level 2: Rookie

1 **Mosquitoes May** Level 2: Rookie	2 **Cockroaches May** Level 2: Rookie
3 **Fruitflies Lay** Level 2: Rookie	4 **Poison Ivy Has** Level 2: Rookie
5 **Dandelions Have** Level 2: Rookie	6 **Frogs** Level 2: Rookie

7 **Weed Seeds** Level 2: Rookie	8 **Ticks Have** Level 2: Rookie
9 **Wasps Eat** Level 2: Rookie	10 **Earthworms** Level 2: Rookie
1 **Carry Heartworm** Level 2: Rookie	2 **Cause Asthma** Level 2: Rookie
3 **Eggs in Fruit** Level 2: Rookie	4 **Three Shiny Leaves** Level 2: Rookie

5 **Deep Roots** Level 2: Rookie	6 **Eat Flies** Level 2: Rookie
7 **Make More Weeds** Level 2: Rookie	8 **Eight Legs** Level 2: Rookie
9 **Caterpillars** Level 2: Rookie	10 **Are Good for Soil** Level 2: Rookie

Level 3: Agent

1 **Fly** Level 3: Agent	2 **Mouse** Level 3: Agent
3 **Cockroach** Level 3: Agent	4 **Weeds** Level 3: Agent
5 **Fleas** Level 3: Agent	6 **Rabbits** Level 3: Agent

7 **Ants** Level 3: Agent	8 **Carpenter Ants** Level 3: Agent
9 **Bee Stings** Level 3: Agent	10 **Mosquitoes** Level 3: Agent
1 **Swatter** Level 3: Agent	2 **Trap** Level 3: Agent
3 **Bait** Level 3: Agent	4 **Pull Them Out** Level 3: Agent

5 **Vacuum Carpet** Level 3: Agent	6 **Fence Garden** Level 3: Agent
7 **Clean Up Spills** Level 3: Agent	8 **Repair Wet Wood** Level 3: Agent
9 **Wear Shoes** Level 3: Agent	10 **Wear Repellent** Level 3: Agent

Level 4: Jr. Detective

1 **Ticks** Level 4: Junior Detective	2 **Rat** Level 4: Junior Detective
3 **Ants** Level 4: Junior Detective	4 **Clothes Moths** Level 4: Junior Detective
5 **Bats** Level 4: Junior Detective	6 **Mosquitoes** Level 4: Junior Detective

7 **Sick Houseplant** Level 4: Junior Detective	8 **Termites** Level 4: Junior Detective
9 **Tick Bite** Level 4: Junior Detective	10 **Flour Moths** Level 4: Junior Detective
1 **Pants in Socks** Level 4: Junior Detective	2 **Trap** Level 4: Junior Detective
3 **Seal Cracks** Level 4: Junior Detective	4 **Cedar Chips** Level 4: Junior Detective

5 **Screen Vents** Level 4: Junior Detective	6 **Dump Water Out** Level 4: Junior Detective
7 **H2O & Fertilizer** Level 4: Junior Detective	8 **Repair Wet Wood** Level 4: Junior Detective
9 **Tell an Adult** Level 4: Junior Detective	10 **Flour in Fridge** Level 4: Junior Detective

Level 5: Master Detective

1 **Spiders** Level 5: Master Detective	2 **Ants** Level 5: Master Detective
3 **Mice** Level 5: Master Detective	4 **Snakes** Level 5: Master Detective
5 **Scorpion** Level 5: Master Detective	6 **Mouse Droppings** Level 5: Master Detective

7 **Mosquitoes** Level 5: Master Detective	8 **Fruit Flies** Level 5: Master Detective
9 **Weeds Pull Easy** Level 5: Master Detective	10 **Poison Ivy** Level 5: Master Detective
1 **Remove Webs** Level 5: Master Detective	2 **Wipe Up Trails** Level 5: Master Detective
3 **Seal Holes** Level 5: Master Detective	4 **Mow Grass** Level 5: Master Detective

5 **Shake Out Shoes** Level 5: Master Detective	6 **Tell an Adult** Level 5: Master Detective
7 **Bird/Bat Houses** Level 5: Master Detective	8 **Fruit in Fridge** Level 5: Master Detective
9 **From Moist Soil** Level 5: Master Detective	10 **Don't Touch** Level 5: Master Detective

Level 6: Super Sleuth

1 **Sanitation** Level 6: Super Sleuth	2 **Exclusion** Level 6: Super Sleuth
3 **Inspection** Level 6: Super Sleuth	4 **Monitors** Level 6: Super Sleuth
5 **Record Keeping** Level 6: Super Sleuth	6 **Prevention** Level 6: Super Sleuth

7 **Pest Triangle** Level 6: Super Sleuth	8 **Pesticides** Level 6: Super Sleuth
9 **Know** Level 6: Super Sleuth	10 **Choose** Level 6: Super Sleuth
1 **Clean** Level 6: Super Sleuth	2 **Block Entry** Level 6: Super Sleuth
3 **Check Carefully** Level 6: Super Sleuth	4 **Inspects Often** Level 6: Super Sleuth

5 **Writing Results** Level 6: Super Sleuth	6 **Break Triangle** Level 6: Super Sleuth
7 **Food-Water-Shelter** Level 6: Super Sleuth	8 **Last Resort** Level 6: Super Sleuth
9 **Your Pests** Level 6: Super Sleuth	10 **Low-Risk Options** Level 6: Super Sleuth

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