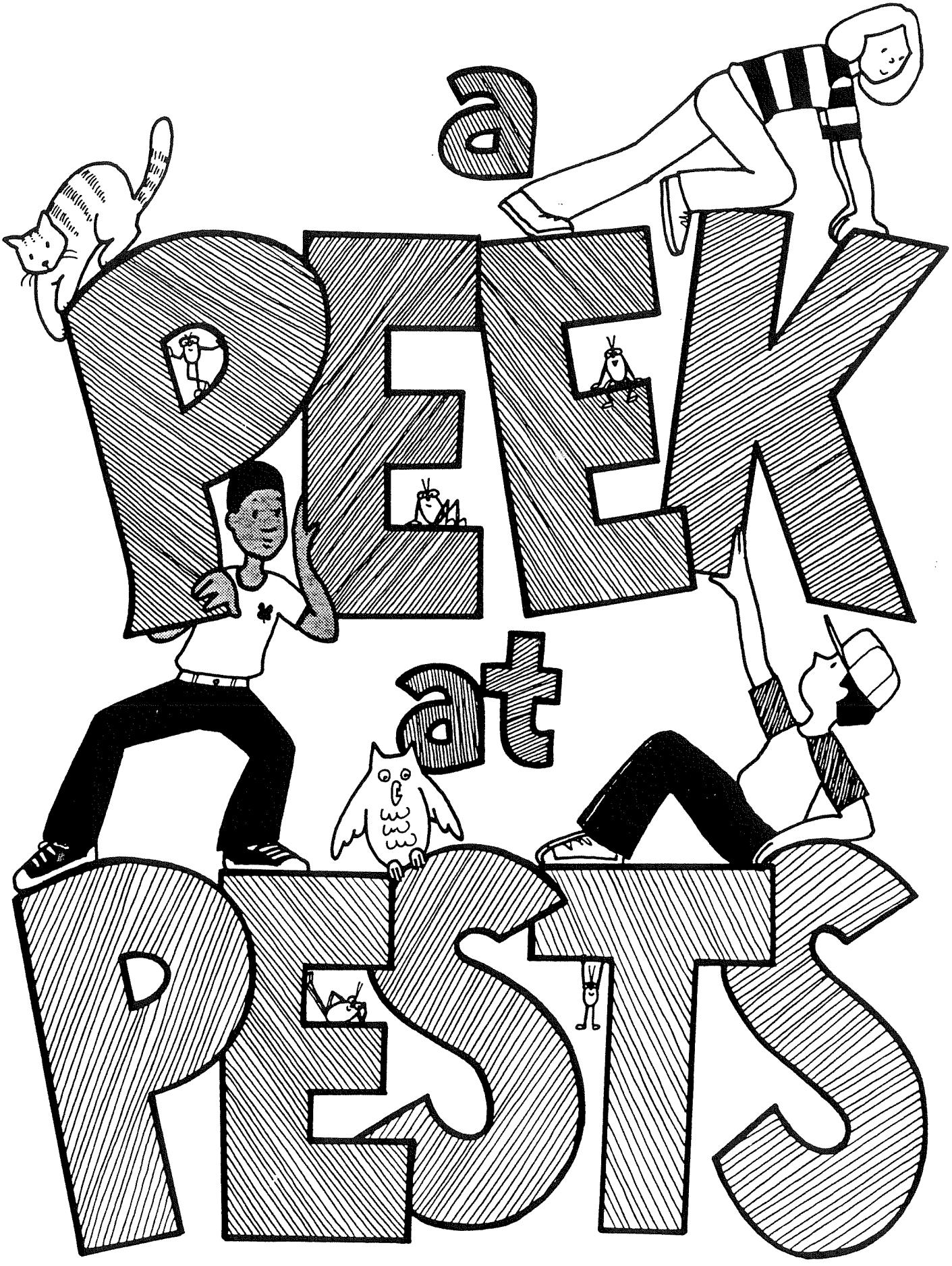
a
PEEK
at
PESTS

A Peek at Pests

C. A. Boyles and P. G. Koehler*

Statement of Purpose

In the 1960 s and 1970 s, people began to worry about the harmful effects of pesticides and other poisons. Pesticides are needed to manage many pests of man, his crops and animals. To help protect soil, water and air (the environment), man no longer uses some pesticides.

Integrated Pest Management, (IPM), is an effective, but less harmful way of managing pests of all kinds. An IPM user looks at the whole picture — the pest, the host, and the environment. Then following IPM methods, the user chooses one or several ways to manage the pest.

Most pesticides are made from the same materials as gas and oil. Gas and oil are also used to apply pesticides. Through IPM, wiser use of pesticides helps to save energy.

The purpose of this project is for you to learn the basic ideas of IPM. You should be able to manage pests safely, using less energy and at a lower cost.

This book, **A Peek at Pests,** should explain how IPM works. Other 4-H IPM books you may get from the county Extension office are listed on page 28 of this book.

To Help You

As you read this publication, watch for words written in ***italics.*** Look in the section "To Help You" in the back for an explanation of these words.

Acknowledgements

This publication was developed through educational grants provided by the United States Department of Agriculture, Florida Power and Light and the Center for Environmental and Natural Resources, IFAS.

We gratefully acknowledge the assistance of Dr. John R. Strayer, Professor of Entomology, and various Extension Specialists, IFAS, for reviewing this publication.

Jane Wells provided the illustrations for this publication. Other artistic input was provided by Susan Foti.

Sections of this unit were adapted from *Apply Pesticides Properly: A Guide for Pesticide Applicators,* Florida Cooperative Extension Service.

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Revised and edited by Cheri Anne Gregory, an Adjunct Extension Agent I, Florida 4-H Department, IFAS, University of Florida, Gainesville.

Date _____

Before You Begin

Please complete the questions below before you begin ***A Peek at Pests.***

Some of the questions will tell your leader something about you. Other questions will help your leader find out what you already know about pest management. Answer each question as well as you can, but don't worry if you can only answer a few. This is not a test, and you will not receive a grade for it. Take about ten minutes to work on these questions. When you finish this book complete the questions at the end. Your leader will be able to compare the two and show you how much you have learned.

I. Questions About You

1. What is your name? _____
2. How old are you? _____
3. What grade are you in? _____
4. How many years have you been in 4-H? _____
5. In what county? _____
6. Are you in a community 4-H Club, or are you in a school 4-H Club? _____
7. List the 4-H projects you are taking this year: _____

_____

_____

_____

_____

_____

II. Questions about what you know

Beside each of these statements write whether you think it is true or false.

_____1. All of man's pests are insects.

_____2. "Pest management" means killing all pests.

_____3. Misuse of pesticides can cause damage to people, animals, and the environment.

Choose the *best* answer or completion to each of these questions.

_____4. Which one of these is not a tool of a pest management program? (a) Pesticides (b) Laws and regulations (c) Pollution (d) Cultural methods

_____5. Tiny wormlike animals in the soil are called (a) Roaches (b) Nematodes (c) Weeds (d) Diseases

_____6. Which one of these is not a reason for using a pest management program?
(a) Pesticide management (b) Kill all pests (c) Acceptable control
(d) Money saving crop protection (e) Reduced danger to people

_____7. Which of these do *not* benefit from a pest management program? (a) Wildlife
(b) Society (c) Pests (d) Environment (e) People

Write a word from the list in each blank space to complete each statement below. You will not use all of the words on the list.

Pollution	Pesticides
Pests	Integrated
Identification	Insects
Diseases	

8. The first step in a pest management program is _____ of the pests.

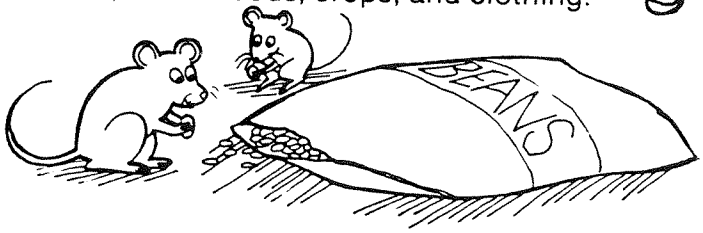
9. Chemical _____ are a valuable tool of a pest management program.

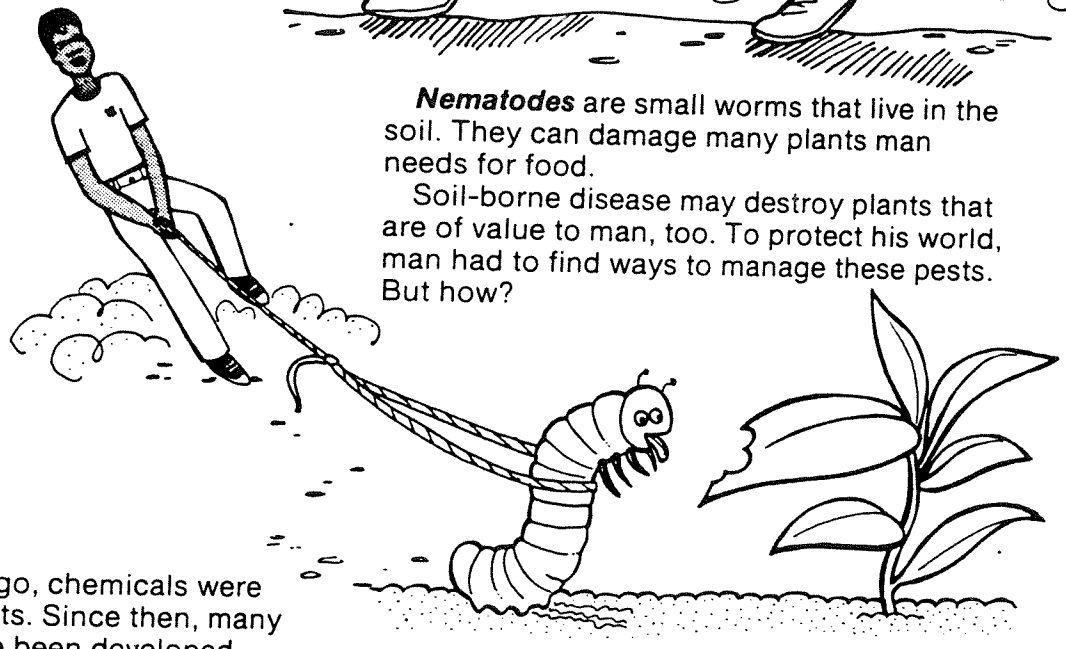
10. Many methods of pest management used together make an _____ program.

A Peek at Pests

To survive, man has to depend on air, soil, water, and green plants. They supply man with food, a home, and clothing. Other living things require food. Sometimes this means man and other living things must **compete** for the same resources.

When these living things compete with man, they are called pests. For example, weeds use the same space and soil that crop plants need. Animals such as insects may damage man's home, stored foods, crops, and clothing.



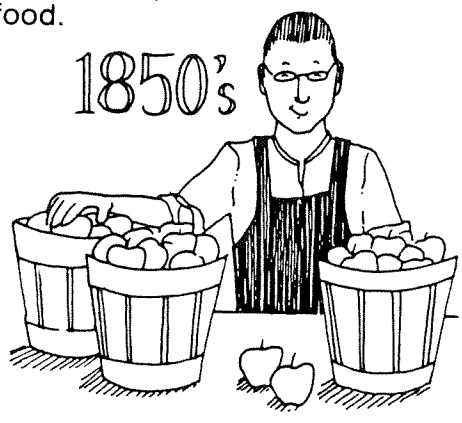


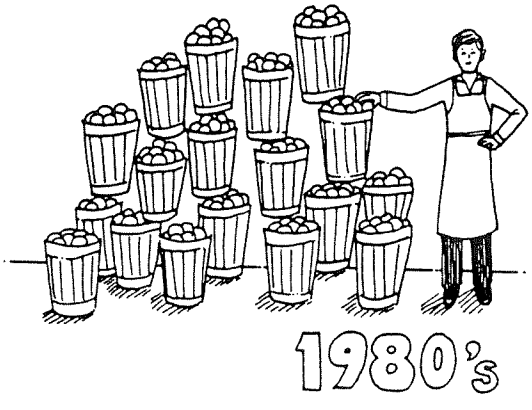
Nematodes are small worms that live in the soil. They can damage many plants man needs for food.

Soil-borne disease may destroy plants that are of value to man, too. To protect his world, man had to find ways to manage these pests. But how?

More than 100 years ago, chemicals were found that would kill pests. Since then, many **chemical *pesticides*** have been developed.

These pesticides have hundreds of uses. They are used to manage farm pests. This lets farmers grow more food.

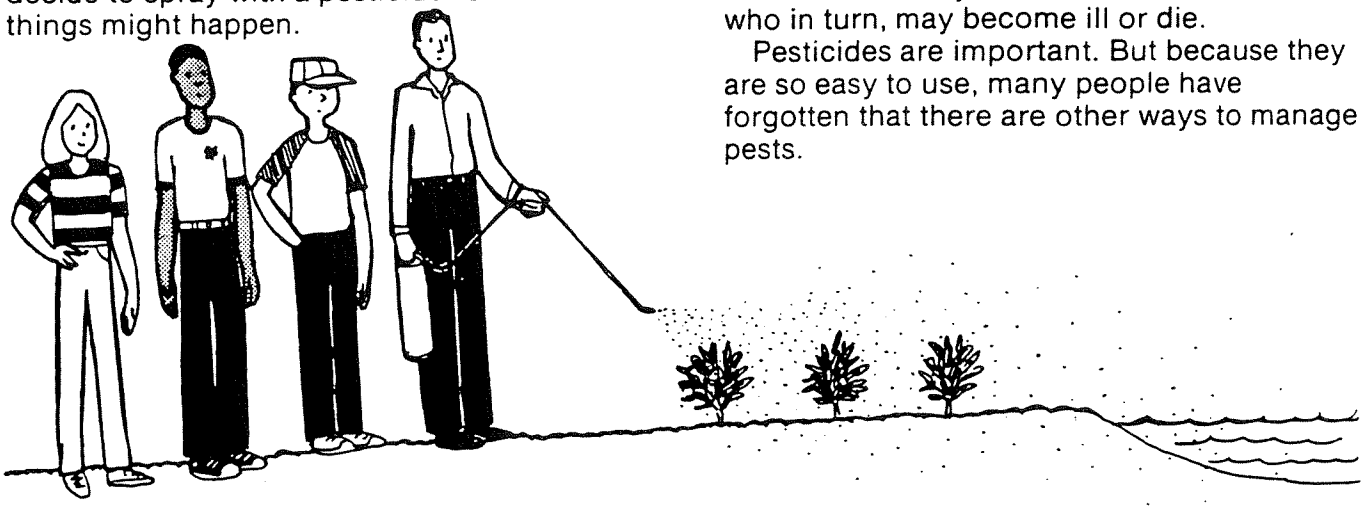




Pesticides are used to kill insects that carry disease. This helps reduce the number of people who become ill or die from these diseases. Damage to our homes and clothing caused by insects and animals has also been reduced.

Pesticides are easy to get and use. But problems can occur when they are misused.

Suppose you have an insect problem in your 4-H vegetable garden project. You decide to spray with a pesticide. One of three things might happen.



Some of the pesticide will be sprayed on the vegetable plants. This is what you want. Some of the pesticide may be blown where you don't want it. It may affect beneficial insects that control pests. It may kill bees in a nearby hive that pollinate your garden. Some of the pesticide could also settle on the soil and be washed into the ground by rain. It could then end up in a lake or stream. Fish and other wildlife may take in the pesticides. They could die or be eaten by another animal or man, who in turn, may become ill or die.

Pesticides are important. But because they are so easy to use, many people have forgotten that there are other ways to manage pests.

Activities

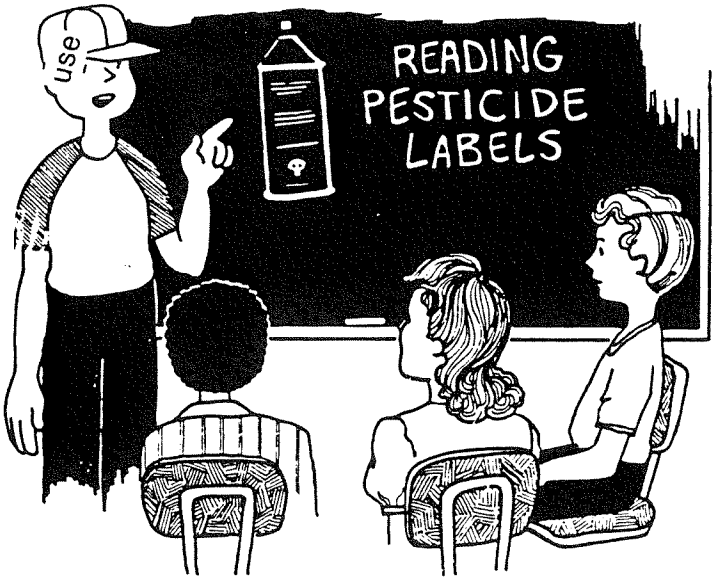
1. Word Hunt. The "word-hunt" below contains words and terms about man, the resources he uses, and the pests of those resources. Each clue describes one or more of the hidden words. They are written across, up and down, and diagonally. Find as many as you can and draw a box around each word as shown. Some of the boxes will overlap. You may find some words not listed.

Example: Common kitchen pests — roaches

- An easy way to kill pests
- Tiny animals in the soil
- Organisms that damage man's resources
- When more than one organism uses a resource
- Surroundings
- Things that plants or animals need
- _____ damage and destroy
- _____ of pesticides has led to problems
- _____ and _____ eat man's products

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

2. Go to a store that sells chemical pesticides. This could be a hardware store, feed store, or a garden shop. Choose several pesticides that might be used in your 4-H project (**insecticides**—to kill insects, **herbicides** to kill weeds, **fungicides**—to kill fungus, etc.) Look at the labels on several packages. what kind of pesticide is in each? (herbicide, insecticide, fungicide, etc.) What are the ingredients? What kinds of pests does it kill? How is the pesticide to be applied? What safety precautions (cautions) must be followed? Share the facts you learned with your 4-H club members and your parents.



3. List two pesticides and what you found out about them.

First Pesticide: Kind of pesticide? _____

Ingredients: _____

Pests: _____

How is it applied? (sprayed, dusted, etc.) _____

_____

Safety precautions: _____

Dangers: _____

Second Pesticide: Kind of pesticide? _____

Ingredients: _____

Pests: _____

How is it applied? (sprayed, dusted, etc.) _____

_____

Safety precautions: _____

Dangers: _____

What did you share your information with? Club members _____

Leader _____

Parents _____

Other _____

There are many ways to manage pests. One way that works well is called **IPM** or **Integrated Pest Management**. This term is easy to understand if we take the words apart.

"Integrated" means that more than one method of pest management can be used at the same time.

"Pest" includes any insect, animal, weed, or organism that is harmful, annoying, or causes damage.

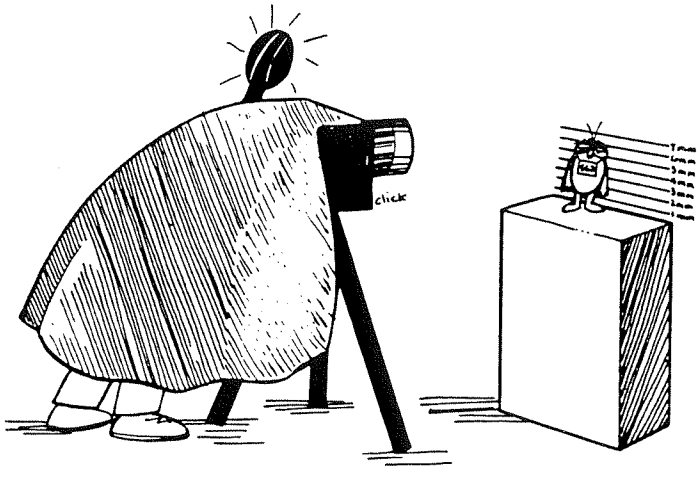
"Management" means reducing the number of pests. This also reduces the amount of damage they cause.

REASONS FOR USING AN IPM PROGRAM

Why Should We Use IPM?

There are many reasons:

1. Acceptable management — **IPM** does a good job of managing pests. It does this by using more than one method of treatment.
2. Pesticide management — **IPM** is a "good-sense" way to use pesticides.
3. Money-saving Crop Protection — The **IPM** Program uses treatment only as it is needed. This saves money and still provides protection from pest damage.
4. Reduced Danger and Damage — **IPM** means pesticides are less likely to come in contact with people and the ***environment***. This reduces the chance of harmful side effects.
5. Energy Saved — **IPM** can help with our energy needs. Much of the energy used to manage pests comes from fossil fuels. Many pesticides are made from these fuels. Machines used to apply pesticides also need fossil fuels to operate. By using other methods that need less energy, **IPM** helps reduce energy use.



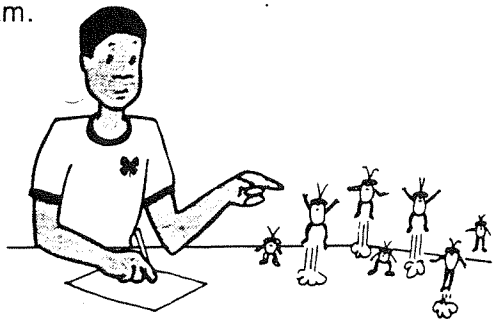
Six Steps to Success

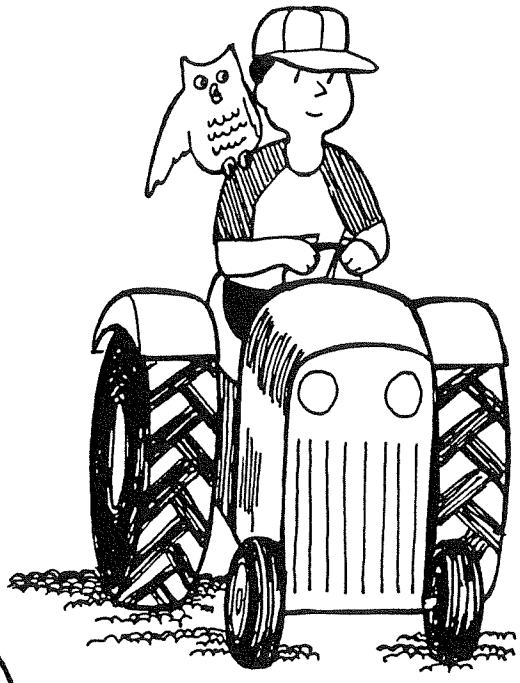
An **IPM** program has six steps. Using these six steps will give you a chance for success with your pest problem.

Step 1. Identification. This means studying the pest. We also need to identify other living things that can help us manage these parts. Some of these may be predators and parasites. The needs of the pest should also be studied.

Step 2. Prevention. Sometimes we can stop pests from becoming a problem by using cultural "tools." These tools include proper preparing of land. Timing of treatments and making sure we don't hurt parasites are some other ways to prevent pest buildup.

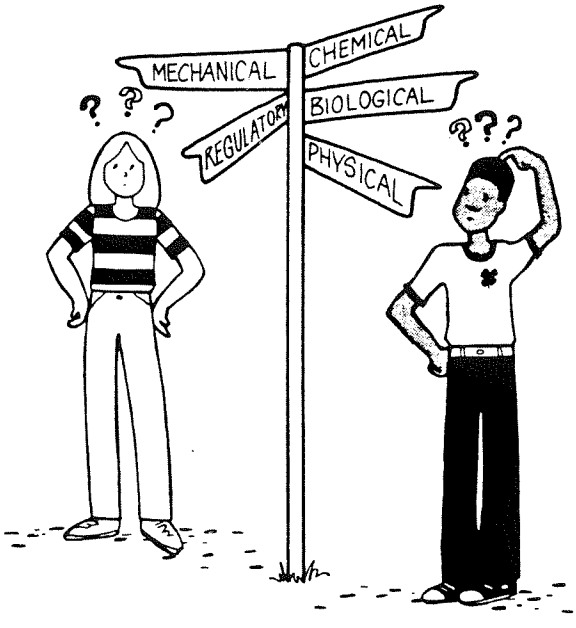
Step 3. Monitoring or Scouting. Scouting is done by counting. You count the number of pests in a given area. This is done several times. Scouting helps you tell if you have enough pests in an area to need a treatment program.





Step 4. Prediction. The facts we get from scouting are important. They can be used to predict damage by pests. An **IPM** Specialist can look at these facts and tell us what our losses and risks might be. Your leader or agent can help you with this step.

Step 5. Decisions. Using facts from the first four steps, a decision may be made to start treatment or continue to check for pests. In other words, you are able to decide what you need to do based on facts.



Step 6. Evaluation. Evaluating the IPM program as you use it, lets you see how well your treatment methods are working. You can also figure losses and risks.

Six Steps to IPM

The six step process to an IPM program is contained in the scrambled word-steps below. Can you unscramble them and put them in their proper order?

Step 1. _____

Step 2. _____

Step 3. _____

Step 4. _____

Step 5. _____

Step 6. _____

6	U	V	L	A	E	I	T	N	A	O	
5	I	E	S	D	I	N	C	O			
4	T	C	I	I	P	O	R	N	E	D	
3	G	N	O	N	M	I	R	T	O	I	
2	N	E	R	N	P	V	E	T	O	I	
1	I	T	O	D	E	I	C	N	F	A	T	N	I	I

IPM Tools

An **IPM** program uses a number of methods to manage pests. We call these the "tools" of **IPM**. We may use one "tool" or we may use several at a time to solve our pest problems. There are seven methods or tools.

GO TO MECHANICAL METHODS EXAMPLE: PUTTING UP SCREENS TO KEEP OUT MOSQUITOES AND FLIES.	GO TO PHYSICAL METHODS EXAMPLE: HEATING SOIL TO KILL DISEASE ORGANISMS	GO TO BIOLOGICAL METHODS EXAMPLE: PROTECTING LADYBUGS WHICH KILL SUCKING INSECTS	GO TO CHEMICAL METHODS EXAMPLE: USING A FUNGICIDE SAFELY TO KILL FUNGUS ON FLOWERS	GO TO HOST RESISTANT METHODS EXAMPLE: PLANTING TOMATOES WHICH DON'T GET SOME PLANT DISEASES
GO TO MECHANICAL METHODS EXAMPLE: PULLING WEEDS OUT OF A GARDEN	GO TO PHYSICAL METHODS EXAMPLE: WATERING PLANTS IN THE MORNING SO THAT THEY CAN DRY IN THE SUNLIGHT	GO TO BIOLOGICAL METHODS EXAMPLE: PROTECTING FROGS AND LIZARDS BECAUSE THEY EAT FLIES AND MOSQUITOES	GO TO GOVERNING METHODS EXAMPLE: HAVING A VETERINARIAN TEST A HORSE FOR COGGIN'S DISEASE BEFORE TAKING IT TO A HORSE SHOW	GO TO HOST RESISTANT METHODS EXAMPLE: PLANTING A KIND OF GRASS THAT CHINCH BUGS DON'T LIKE
	GO TO DECISION-MAKING USING INFORMATION FROM THE FIRST FOUR STEPS, AN IPM SPECIALIST OR COUNTY EXTENSION AGENT CAN RECOMMEND WHAT METHOD TO USE.	GO TO CHEMICAL METHODS EXAMPLE: USING INSECTICIDES TO KILL CHINCH BUGS IN THE LAWN	GO TO GOVERNING METHODS EXAMPLE: BUYING PLANTS THAT WERE INSPECTED FOR PESTS	GO TO CULTURAL METHODS EXAMPLE: PLOWING PLANTS INTO THE GROUND AFTER THE CROP IS HARVESTED

TOOL CARD
METHOD

TOOL CARD
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TOOL CARD
PROCESS

TOOL CARD
METHOD

TOOL CARD
METHOD

Instructions for cutting out the cards and removing the center pages, as well as directions for playing the IPM Game, can be found on the inside back cover of this publication.

MOVE **1** SPACE FORWARD, BACKWARD, SIDEWAYS <u>NOT</u> DIAGONALLY	MOVE **2** SPACES FORWARD, BACKWARD, SIDEWAYS <u>NOT</u> DIAGONALLY	MOVE **3** SPACES FORWARD, BACKWARD, SIDEWAYS <u>NOT</u> DIAGONALLY	MOVE **4** SPACES FORWARD, BACKWARD, SIDEWAYS <u>NOT</u> DIAGONALLY	DRAW ONE TOOL CARD
MOVE **1** SPACE FORWARD, BACKWARD, SIDEWAYS <u>NOT</u> DIAGONALLY	MOVE **2** SPACES FORWARD, BACKWARD, SIDEWAYS <u>NOT</u> DIAGONALLY	MOVE **3** SPACES FORWARD, BACKWARD, SIDEWAYS <u>NOT</u> DIAGONALLY	MOVE **4** SPACES FORWARD, BACKWARD, SIDEWAYS <u>NOT</u> DIAGONALLY	DRAW ONE TOOL CARD
MOVE **1** SPACE FORWARD, BACKWARD, SIDEWAYS <u>NOT</u> DIAGONALLY	MOVE **2** SPACES FORWARD, BACKWARD, SIDEWAYS <u>NOT</u> DIAGONALLY	MOVE **3** SPACES FORWARD, BACKWARD, SIDEWAYS <u>NOT</u> DIAGONALLY	MOVE **4** SPACES FORWARD, BACKWARD, SIDEWAYS <u>NOT</u> DIAGONALLY	DRAW ONE TOOL CARD
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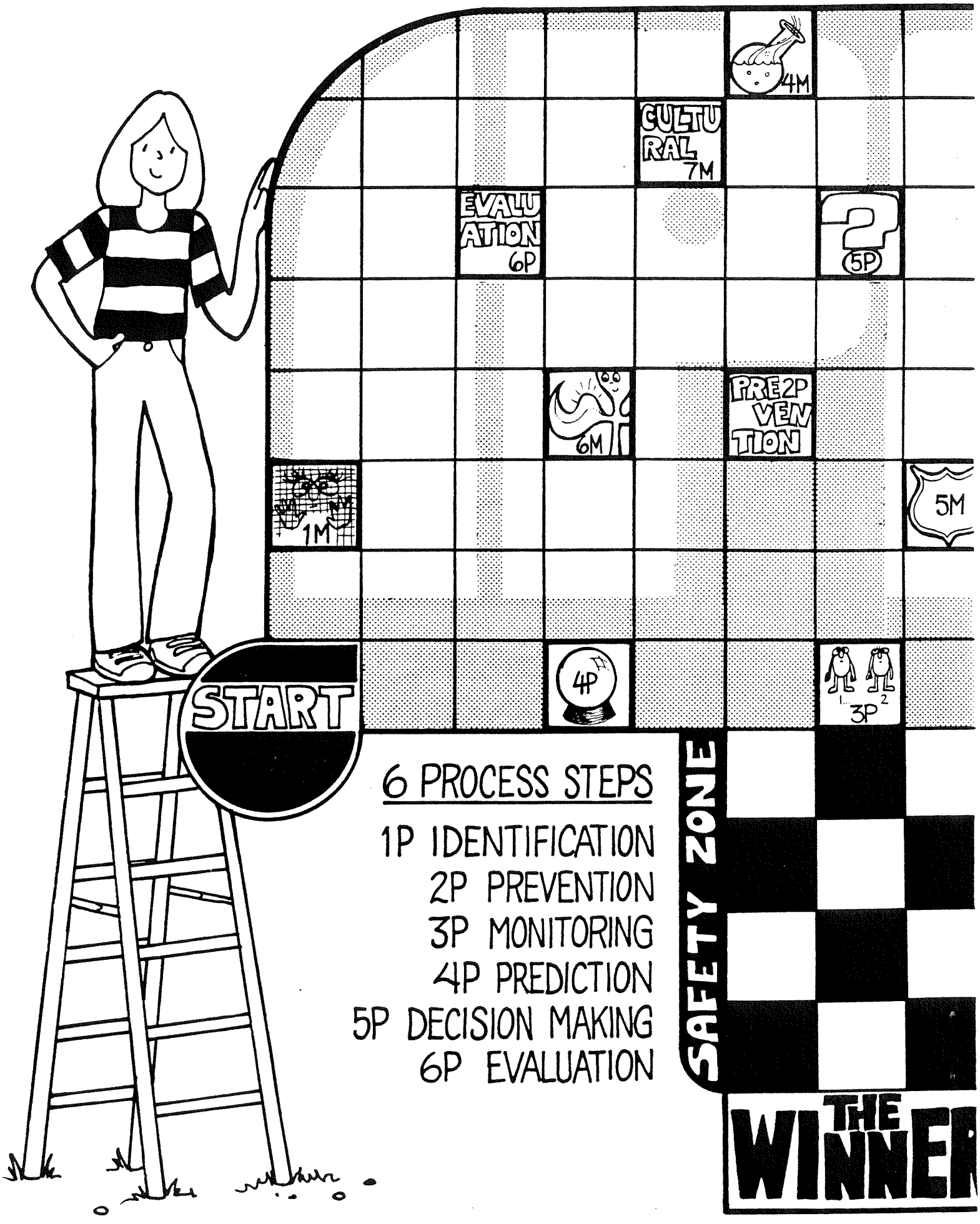
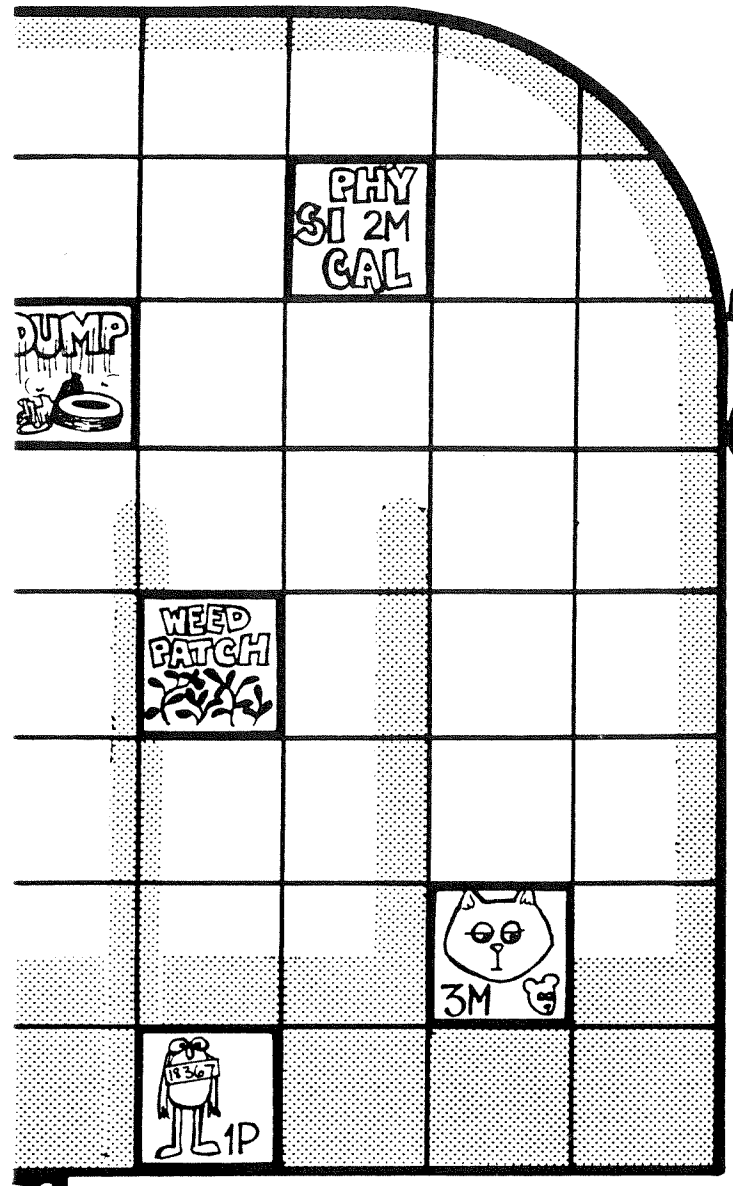
THE

GAME BOARD



6 PROCESS STEPS

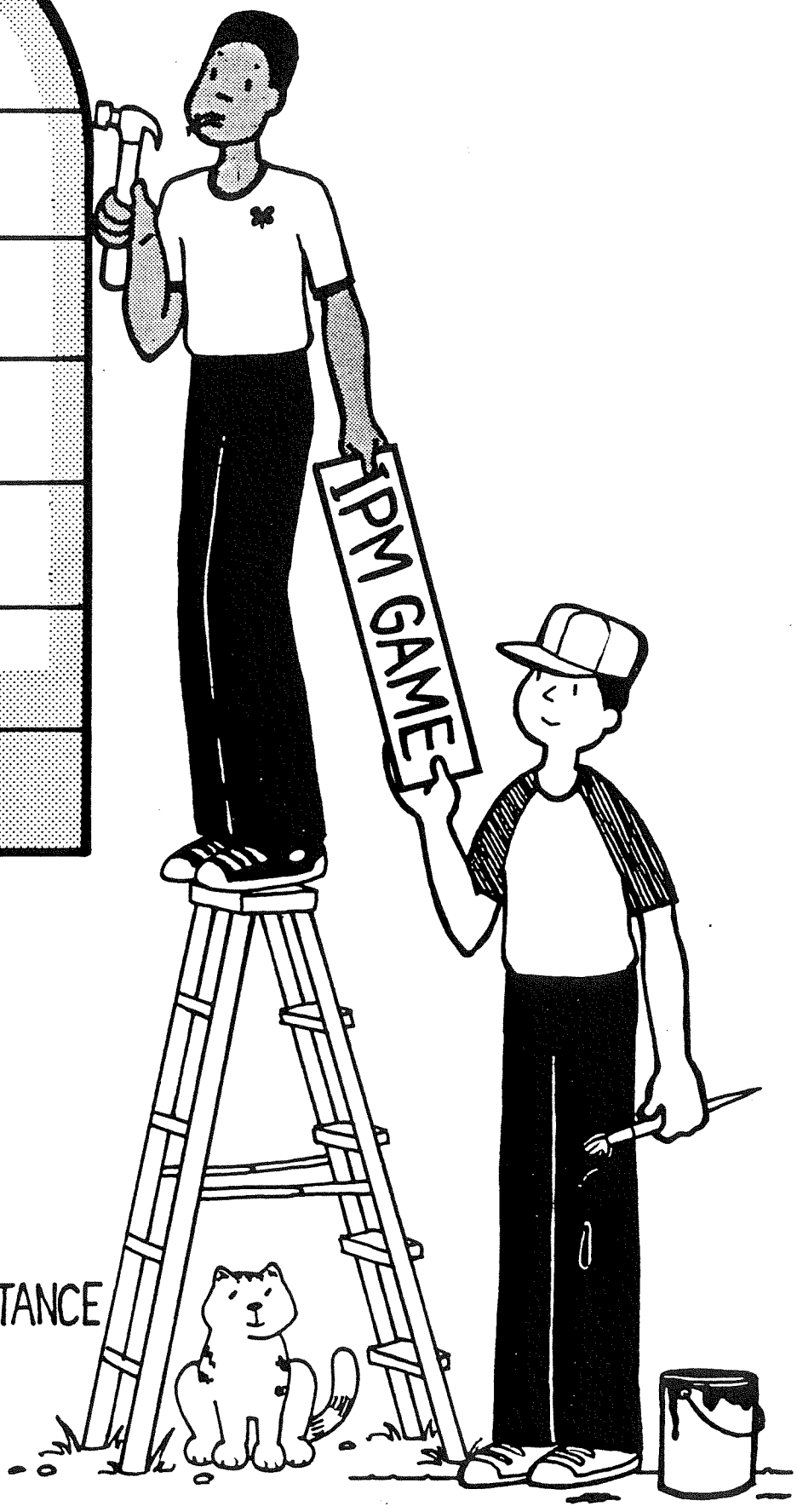
1P IDENTIFICATION
2P PREVENTION
3P MONITORING
4P PREDICTION
5P DECISION MAKING
6P EVALUATION



SAFETY ZONE

7 METHODS

1 M MECHANICAL
2M PHYSICAL
3M BIOLOGICAL
4M CHEMICAL
5M GOVERNING
6M HOST PLANT RESISTANCE
7M CULTURAL



THE

GAME BOARD

	YOU STORED ALL YOUR PESTICIDES IN A CABINET MARKED "POISON". TAKE AN EXTRA TURN.	YOU OVER-WATERED YOUR GARDEN WHICH HELPS DISEASES GROW. LOSE ONE TURN.	YOU SPRAYED INSECTICIDE ON YOUR GARDEN WITHOUT WEARING PROTECTIVE CLOTHING. GO BACK TO START.	YOU DID NOT TAKE TIME TO IDENTIFY A PEST AND SPRAYED THE FIRST PESTICIDE YOU FOUND. GO BACK TO START.
	YOU HAD YOUR COW TREATED FOR BANG'S DISEASE. GO TO THE METHOD OF YOUR CHOICE.	YOU DROVE A LOADED PICKUP TRUCK PAST AN INSPECTION STATION. GO BACK TO START.	YOU CAREFULLY COUNTED THE NUMBER OF FLEAS ON YOUR DOG WHEN YOU WASHED HIM IN ORDER TO SEE IF THERE WERE ENOUGH TO CAUSE A PROBLEM. GO TO THE PROCESS OF YOUR CHOICE.	YOU STARTED A COMPOST PILE NEXT TO YOUR GARDEN. USE IT TO IMPROVE THE SOIL. GO TO THE METHOD OF YOUR CHOICE.
	YOU PUT A POISON PESTICIDE IN A JAR WITHOUT A LABEL. GO TO THE DUMP.	YOU PUT MULCH AROUND THE PLANTS IN YOUR GARDEN TO HELP PREVENT WEEDS FROM GROWING. TAKE AN EXTRA TURN.	YOUR GARDEN IS OVERRUN WITH WEEDS — GO TO THE WEED PATCH AND MISS ONE TURN.	YOU PUT SCREENS ON YOUR WINDOWS TO KEEP INSECTS OUT OF THE HOUSE. MOVE TO THE METHOD OF YOUR CHOICE.
BY PUTTING FOOD IN THE REFRIGERATOR, YOU STOPPED THE GROWTH OF BACTERIA THAT COULD HAVE MADE YOU SICK. GO TO THE METHOD OF YOUR CHOICE.	BY USING A PROPER IPM PROGRAM, YOU WERE ABLE TO USE LESS PESTICIDES AND STILL MANAGE PESTS. TAKE AN EXTRA TURN.	BY USING PROPER IPM TOOLS, YOU WERE ABLE TO SAVE ENERGY. SAVE THIS CARD. IT WILL KEEP YOU OUT OF THE DUMP OR THE WEED PATCH BY ALLOWING YOU TO MOVE ONE SPACE BEYOND IT.	YOUR KITCHEN IS OVERRUN WITH ROACHES BECAUSE YOU DON'T TAKE PROPER CARE OF THE GARBAGE IN THE KITCHEN. GO TO THE DUMP AND MISS ONE TURN.	BY TAKING THE GARBAGE OUT, YOU KEPT YOUR KITCHEN CLEANER AND DIDN'T ATTRACT ROACHES. MOVE TO THE METHOD OF YOUR CHOICE.
YOU DIDN'T GIVE THE IPM PROGRAM A CHANCE. GO BACK TO START.	YOU BOUGHT GRAPE PLANTS WHICH WERE RESISTANT TO DISEASES. GO TO THE PROCESS OF YOUR CHOICE.	YOU SPRAYED EARWIGS, A BENEFICIAL INSECT. GO TO THE WEED PATCH.	BY PROPER MONITORING IN YOUR LAWN, YOU DISCOVERED A BUG PROBLEM IN TIME TO STOP DAMAGE. GO TO THE PROCESS OF YOUR CHOICE.	YOU GAVE YOUR CAT AWAY. NOW RATS HAVE BECOME A PROBLEM. LOSE ONE TURN.

GAME CARD
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IPM

TOOL CARD *PROCESS*	**TOOL CARD** *PROCESS*	**TOOL CARD** *PROCESS*	**TOOL CARD** *PROCESS*	**TOOL CARD** *PROCESS*
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GO TO EVALUATION RESULTS OF PEST POPULATIONS, MANAGEMENT PROGRAMS, LOSSES AND RISKS ARE EVALUATED AND STUDIED THROUGHOUT THE ENTIRE IPM PROGRAM	GO TO IDENTIFICATION PESTS AND BENEFICIAL ORGANISMS MUST BE IDENTIFIED BEFORE ANY PEST CONTROL IS STARTED	GO TO PREVENTION PREVENTATIVE CULTURAL PRACTICES ARE USED TO KEEP PEST POPULATIONS FROM DEVELOPING	GO TO MONITORING KEEPING TRACK OF PEST POPULATIONS BY SCOUTING	GO TO PREDICTION IPM SPECIALISTS USE INFORMATION DEVELOPED FROM SCOUTING TO PREDICT DAMAGE BY PESTS
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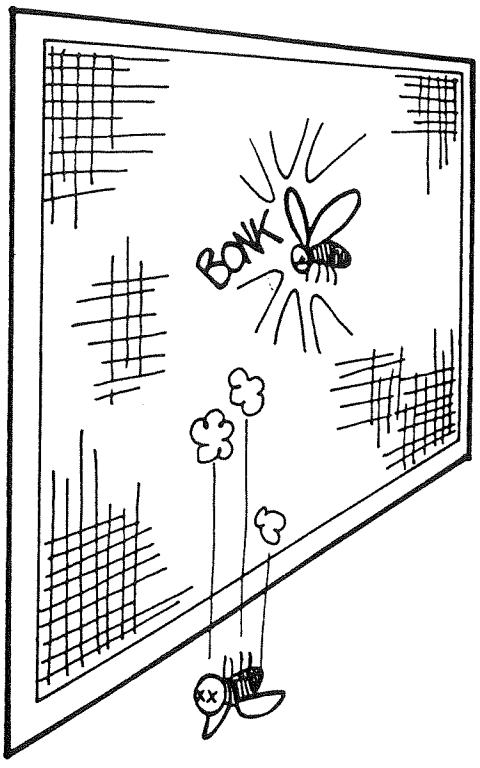
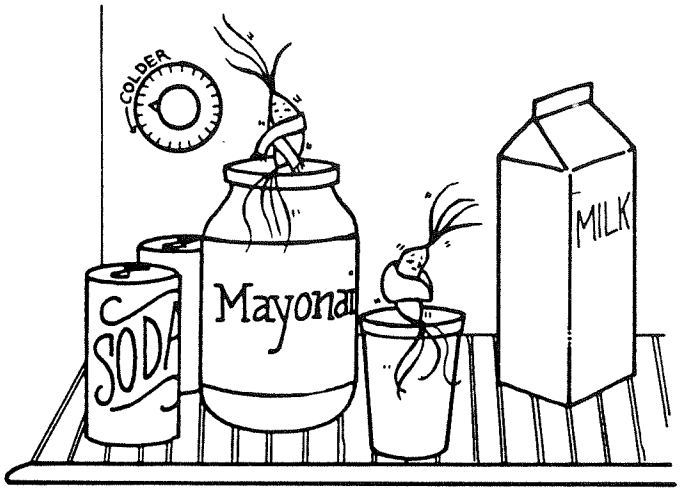
GO TO DECISION-MAKING USING INFORMATION FROM THE FIRST FOUR STEPS, AN IPM SPECIALIST OR COUNTY EXTENSION AGENT CAN RECOMMEND WHAT METHOD TO USE	GO TO DECISION-MAKING USING INFORMATION FROM THE FIRST FOUR STEPS, AN IPM SPECIALIST OR COUNTY EXTENSION AGENT CAN RECOMMEND WHAT METHOD TO USE	GO TO PHYSICAL METHODS EXAMPLE KEEPING YOUR FOOD IN A REFRIGERATOR	GO TO CHEMICAL METHODS EXAMPLE USING REPELLENT PESTICIDES SAFELY TO KEEP PESTS OFF	GO TO GOVERNING METHODS EXAMPLE AGRICULTURE INSPECTION STATIONS THAT CONTROL MOVEMENT OF PESTS BY CHECKING PLANTS, ANIMALS AND PRODUCE
GO TO CULTURAL METHODS EXAMPLE MULCHING AROUND PLANTS TO PREVENT WEEDS FROM GROWING	GO TO MECHANICAL METHODS EXAMPLE PICKING A TICK OFF A DOG	GO TO BIOLOGICAL METHODS EXAMPLE USING CATS TO MANAGE RATS	GO TO HOST RESISTANT METHODS EXAMPLE PLANTING VARIETIES OF PLANTS WHICH REJECT PESTS	GO TO CULTURAL METHODS EXAMPLE PLANTING EARLY BEFORE MANY INSECTS APPEAR.

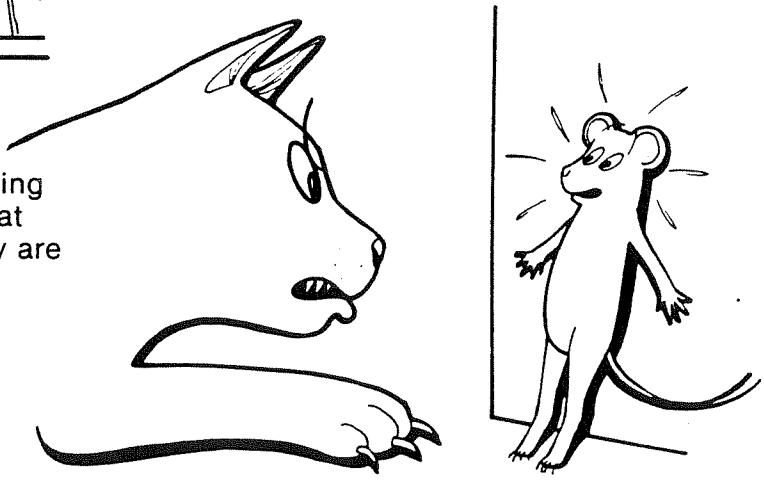
1. **Mechanical tools**—These are the simplest means of pest management. When you pick a tick off your dog or slap a mosquito, you are using mechanical methods. Other ways are using window screens to keep flies out of the house, or pulling weeds out of the garden.

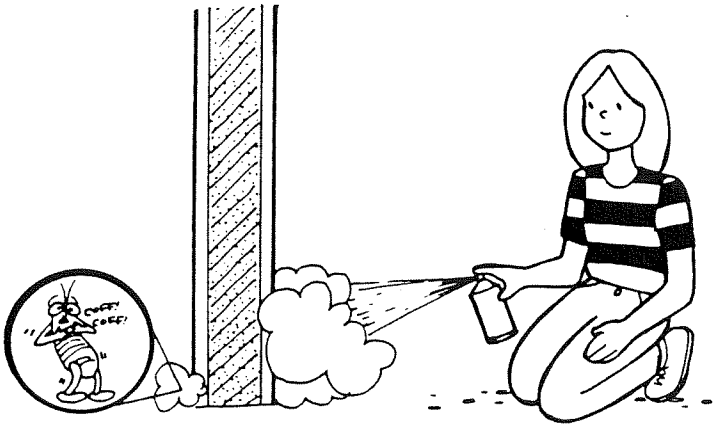
2. **Physical tools** include the use of heat, cold, humidity (wetness or dryness), light or sound to manage pests. You can keep food in the freezer. This prevents the growth of pests that can make you sick. Or, you can heat soil to kill disease **organisms.** This helps stop the growth of soil disease in your potted plants.





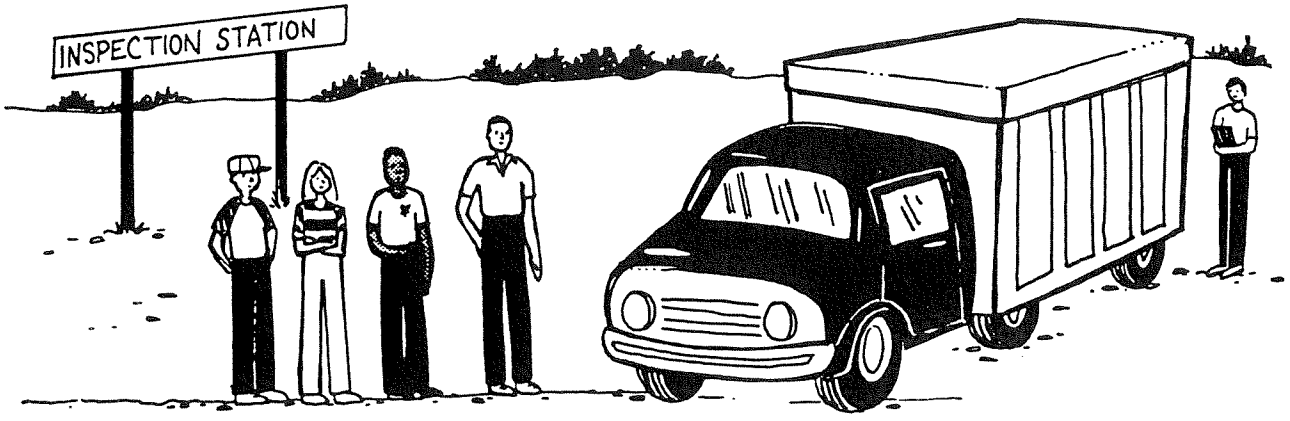
3. **Biological tools** include using something that is not a pest to manage something that is. Cats and owls are biological tools. They are used to catch mice.



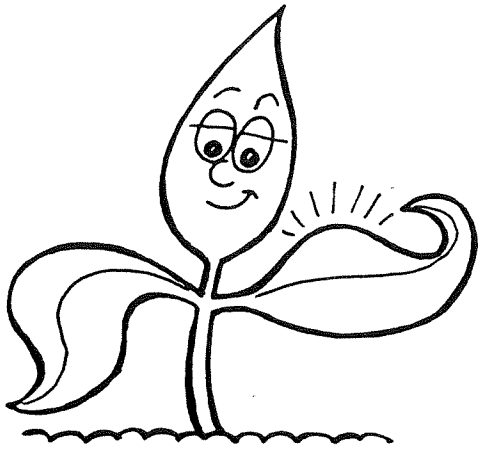


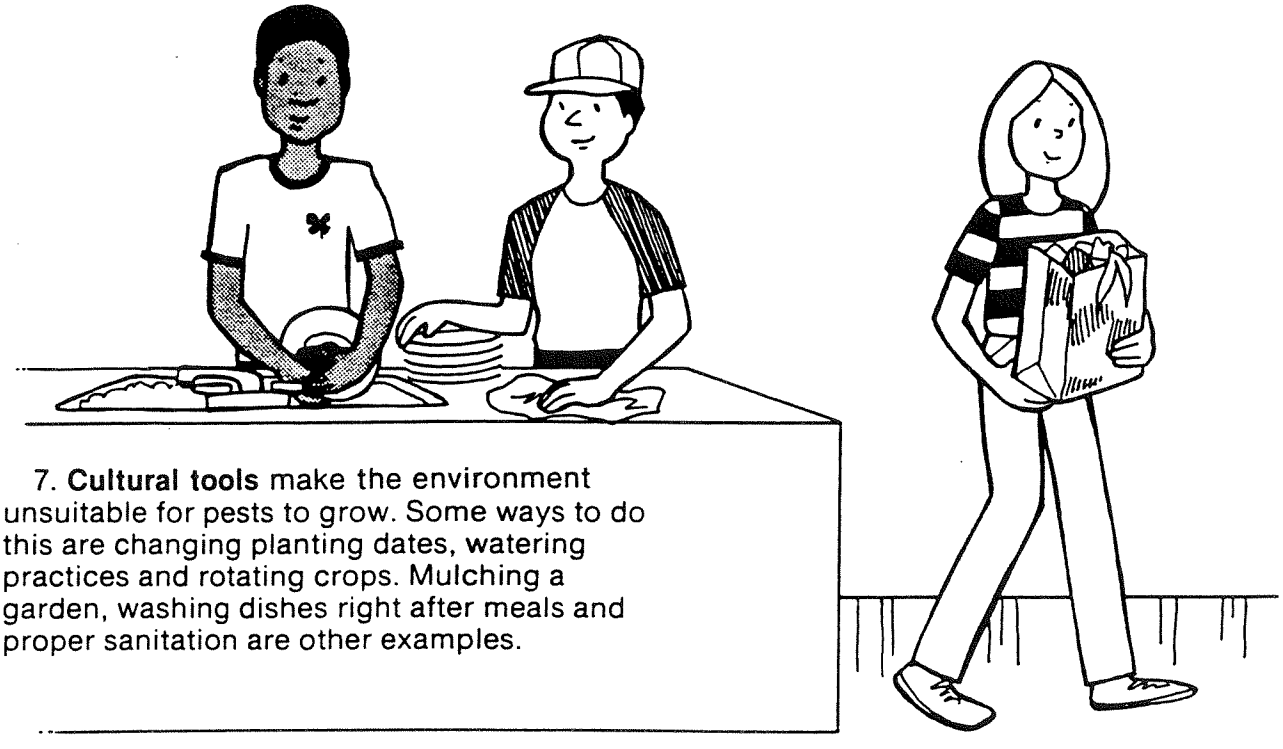
4. **Chemical tools** include pesticides. Pesticides are used to kill pests. Chemical tools may also be used to repel or attract insects.

5. **Governing tools** are laws that control the movement of pests by checking plants, animals, and products. This is done to stop the spread of pests to new areas. Agricultural inspection stations on major highways help enforce these laws.



6. **Host resistant tools** include the use of plants or animals that are not severely damaged by a certain pest.



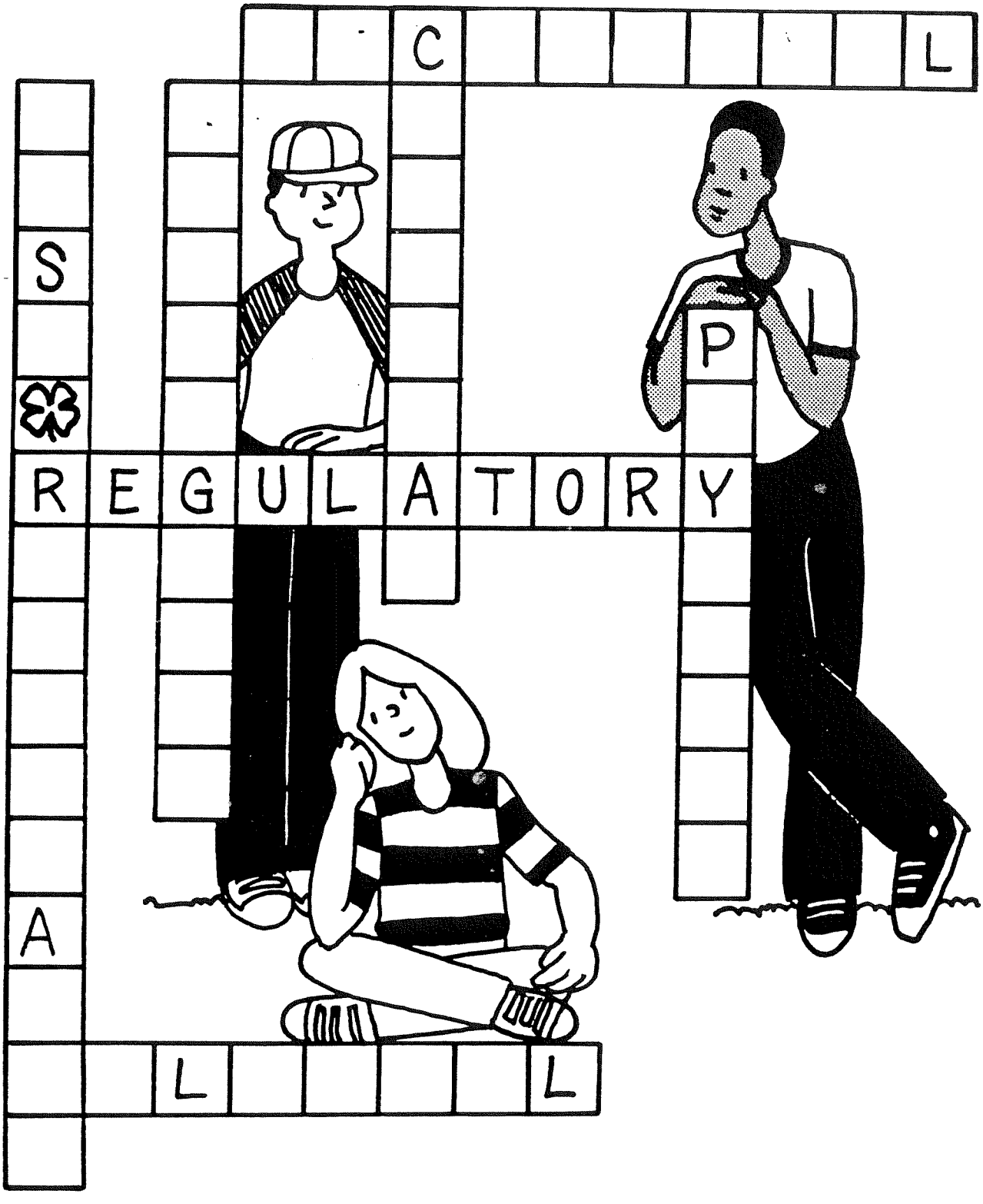


7. **Cultural tools** make the environment unsuitable for pests to grow. Some ways to do this are changing planting dates, watering practices and rotating crops. Mulching a garden, washing dishes right after meals and proper sanitation are other examples.

Activities

Fill-in-the-Boxes

1. Seven pest management methods will fit into the boxes below. One word and several letters have been written in to help you. Can you finish the rest?



2. Look at the seven methods to manage pests. Now think about your 4-H project. Your 4-H project may be home improvement, citrus, dairy cows, etc. Think about pest problems you might have in your project. Maybe you are doing a project in home improvement and you have cockroaches in your kitchen.

Now try to think of ways to use the seven methods that could help you manage your pest problem. For example, if cockroaches are a problem in the kitchen, a MECHANICAL METHOD you might use to kill a cockroach is to step on it. If you have problems with this activity, ask your leader or parents for help.

My 4-H project is _____

A pest problem I might have is _____

_____

_____

_____

Tools for Controlling Pests:

1. Mechanical _____
2. Physical _____
3. Biological _____
4. Chemical _____
5. Governing _____
6. Host resistance _____
7. Cultural _____

Remember that IPM often uses more than one method or tool at the same time. Which examples that you listed could be used together? _____

_____

_____

Here is an idea you might want to use. Do a demonstration on IPM's seven tools of pest management. Or, tell how you used IPM tools to manage pest problems in your project.

Did you do a demonstration? _____ yes _____ no

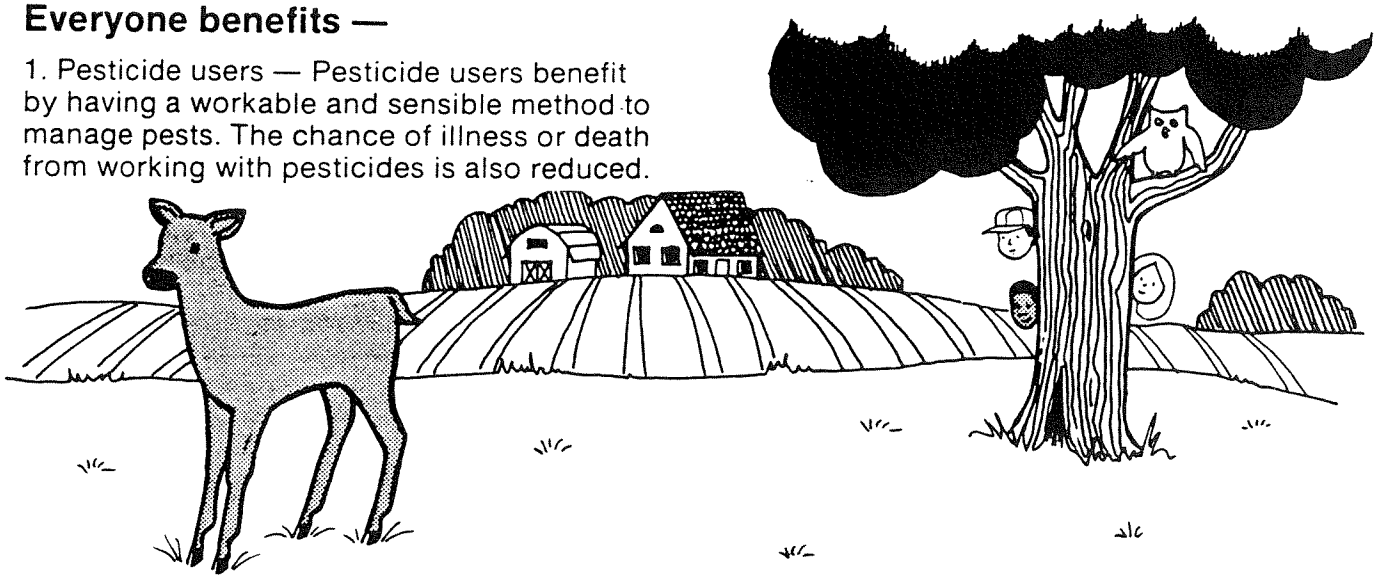
If yes, what did you call your demonstration? _____

_____

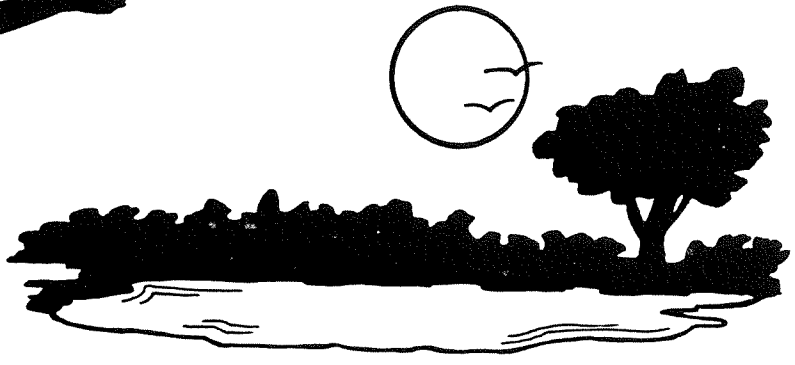
Who Benefits from IPM?

Everyone benefits —

1. Pesticide users — Pesticide users benefit by having a workable and sensible method to manage pests. The chance of illness or death from working with pesticides is also reduced.

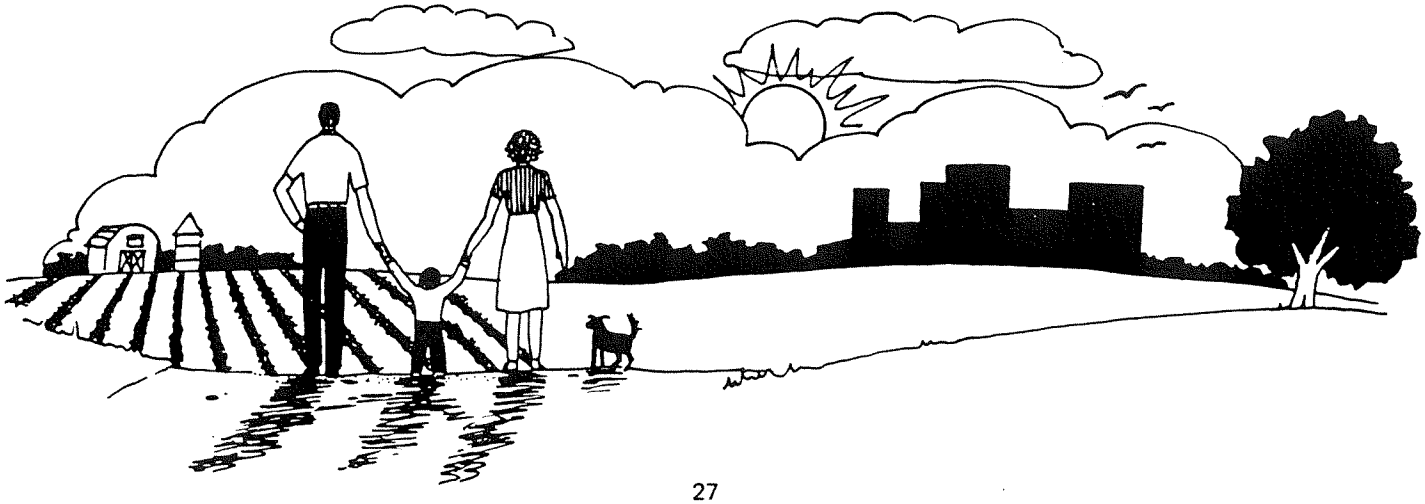


2. Fish and Wildlife — Wild creatures benefit by reduced contact with pesticides.



3. Environment — Water, Air and Soil will be less polluted with pesticides.

4. Society — People will benefit from a cleaner environment.



What Would I Do in a 4-H — IPM Project?

After reading **OPERATION: IPM — A Peek at Pests** and completing the activities in it, you may want to continue a 4-H **IPM** project in one of two ways.

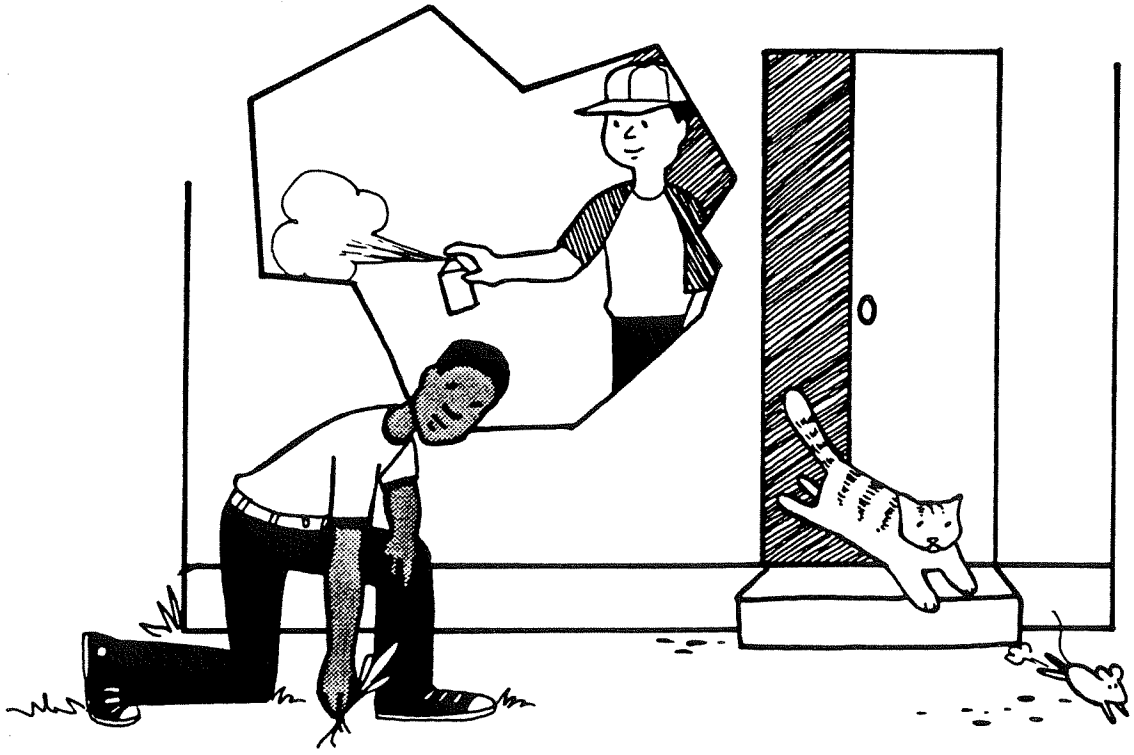
You may request from your leader or 4-H Agent the supporting materials that accompany **OPERATION: IPM — A Peek at Pests.** You will have an opportunity to learn more about **IPM** in general, and complete activities such as a pesticide survey and field trips.

You may also choose to complete an **IPM** Project that is related to one of your other 4-H Projects. For example, you can apply **IPM** to your Gardening or Beef Project, or even to a Home Environment or Foods and Nutrition Project. You will learn to identify specific pests that affect your project and how to manage them, using the principles of **IPM**.

As a 4-H **IPM** member, you will contribute not only to the success of **IPM,** but to improving the quality of the water we drink and the air we breathe. You will also help conserve another necessary resource — energy.

You have now covered the basic information needed to carry out an **IPM** program. If you are interested in learning more about this process and how to use it, you can obtain the following supporting material for **A Peek at Pests** from your leader or county Extension agent. These include:

4-H 369 Spray Away?
4-H 371 Not to Me, You Don't or Plants That are Protected from Pests
4-H 373 Pests on Stage
4-H 374 ABC's of IPM or Putting It All Together
4-H 372 Cultural Controls to Manage Pests or Changing the Pests' World
4-H 370 Using Natural Enemies to Manage Pests



Name _____ Date _____

Now That You Are Finished

Now that you are finished with this book, answer the following questions. They are the same questions that you answered before you began. You are not going to receive a grade on your answers. Comparing these answers with your first answers should show you how much you have learned.

Beside each of these statements, write whether you think it is true or false.

_____ 1. All of man's pests are insects.

_____ 2. "Pest management" means killing all pests.

_____ 3. Misuse of pesticides can cause damage to people, animals, and the environment.

Choose the *best* answer or completion to each of these questions.

_____ 4. Which one of these is not a tool of a pest management program?
(a) Pesticides (b) Laws and regulations
(c) Pollution (d) Cultural methods

_____ 5. Tiny wormlike animals in the soil are called
(a) Roaches (b) Nematodes
(c) Weeds (d) Diseases

_____ 6. Which of these is not a reason for using a pest management program?
(a) Pesticide management (b) Laws and regulations
(c) Acceptable control (d) Money-saving crop protection
(e) Reduced danger to people

_____ 7. Which of these do *not* benefit from a pest management program?
(a) Wildlife (b) Society (c) Pests
(d) Environment (e) People

Write a word from the list in each blank space to complete each statement below. You will not use all of the words on the list.

Pests	Pesticides
Identification	integrated
Diseases	Insects

8. The first step in a pest management program is _____ of the pests.

9. Chemical _____ are a valuable tool of a pest management program.

10. Many methods of pest management used together make an _____ program.

Remove this page and hand in to your leader

How to Set Up Your IPM Game

First, open the book to the middle pages (the IPM Game Board) and spread it out flat on a table. Look in the fold down the center of the Game Board and find the two staples that hold the book and the game together. Using a nail file or a dull butter knife, carefully lift the points of the staples. Ask your parent or 4H leader for help if you need it. Lift out the yellow, blue and pink game pages, being sure you do not pull the green book pages up off the staples. After you have removed the game pages, push the staple points back down into place. A rubber pencil eraser works well for this. Now you are ready to cut out the Game Cards and Tool Cards (the blue page and the pink page). Using scissors and cutting along the solid lines, cut out the 46 Game Cards and 39 Tool Cards and separate them into two piles. You can wrap a rubber band around each pile to hold it together until you are ready to play. You will not need to cut the yellow Game Board.

DIRECTIONS FOR THE IPM GAME

* The IPM Game Requires 2 or more players
* Each player needs 3 buttons of the same color (3 blue for player #1, 3 green for player #2, etc.)
* There will be 2 piles of cards to draw from: A game card pile and a tool card pile. All the game cards should be shuffled and placed in one pile. All the tool cards should be shuffled and placed in another pile.

The object of this game is to obtain one method card and one process card for each button and to move all three buttons through the safety zone and into the winner's square. The first player to get all three of his buttons into the winner's square is the winner.

Directions

Each player places all three of his buttons in the "start" box. At his turn, each player draws a game card. There are three kinds of game cards. Each type is described below.

1. Number cards tell the player to move one of his buttons a certain number of spaces. Buttons can be moved forward, backward, or sideways, but not diagonally, and only one direction each turn.
2. IPM cards give the player instructions such as "Lose one turn".
3. Draw cards tell the player to draw from the tool card pile.

Tool cards tell the player to go to either a process or method box (look on the game board for a list of the 6 process steps and the 7 methods).

The player must keep the tool cards. Each of his buttons must have one process card and one method card as a "pass" into the safety zone when it moves there.

Players do not draw from the tool card pile when they land on a process or methods box during normal play. In this case, these boxes are used as normal spaces.

If an player's button lands on a space already occupied by another player's button, he may send the other player's button back to "start".

When a player has both a process and a method card for a button, he should try to move it toward the safety zone. When a button is finally in the safety zone, it cannot be returned to "start" by a card that instructs him to do so, or by another player who lands in his space. In the safety zone, two buttons may occupy the same space.

The player must be cautious in the safety zone if he lands on a black space, he must return to the beginning of the safety zone.

The first player to get all three buttons through the safety zone and into the winner's square wins the game.

Glossary — To Help You

1. ***Compete, Competitors*** — Two or more plants or animals trying to use the same resource, and each one reduces the amount of the resource that the other one can use.
2. ***Density*** — The population in a known area.
3. ***Economical, economically*** — Avoiding waste; thrifty; money-saving.
4. ***Environment*** — Surroundings, including anything that affects man, other animals or plants.
5. ***Germinate*** (germinating) — The sprouting of a seed, and early growth of the tiny plant below the soil.
6. ***Host*** — Any plant or animal that shelters or gives a home to a parasite or other natural enemy.
7. ***Mildew*** — a soft, fuzzy growth, usually whitish or gray.
8. ***Mold*** — a soft, fuzzy growth. Molds come in many colors.
9. ***Natural enemy*** — An organism that kills and eats, or lives on another organism.
10. ***Nematode*** — A tiny worm-like organism that lives in the soil and damages the roots of plants. Nematodes may live in the soil, in water, in animals, or in plants.
11. ***Nutrients*** — Food; substance that promote growth and development in plants and animals.
12. ***Pathogen*** — Very tiny organism that causes a disease. The three types of pathogens are fungi, bacteria, and viruses.
13. ***Pest*** — An organism that hurts something or is bad for something that belongs to man. A pest may be an insect, a plant, an animal, a disease, or any other kind of organism.
14. ***Pesticides*** — Poisons that are used to kill organisms that man regards as pests. Insecticides kill insects. Herbicides kill plants. Fungicides kill fungi, etc.
15. ***Population*** — A group of organisms, all of the same species, that lives in an area. They are capable of reproducing.
16. ***Repellant*** — A chemical that an organism does not like, and that drives the organism away.
17. ***Resistant, Resistance*** — Withstanding attack; offering opposition to pests. Able to withstand infection or contamination. Resistance — the ability of a pest population to stay alive after it has been treated with a pesticide.
18. ***Species*** — One kind of plant or animal; a group of plants or animals that are alike. Man is one species. Dogs are one species. One species may have different varieties. For instance, German Shepherd and Doberman are varieties of dogs.
19. ***Vertebrates*** — Animals that have a backbone. Such as, a fish, bird or mammal.

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