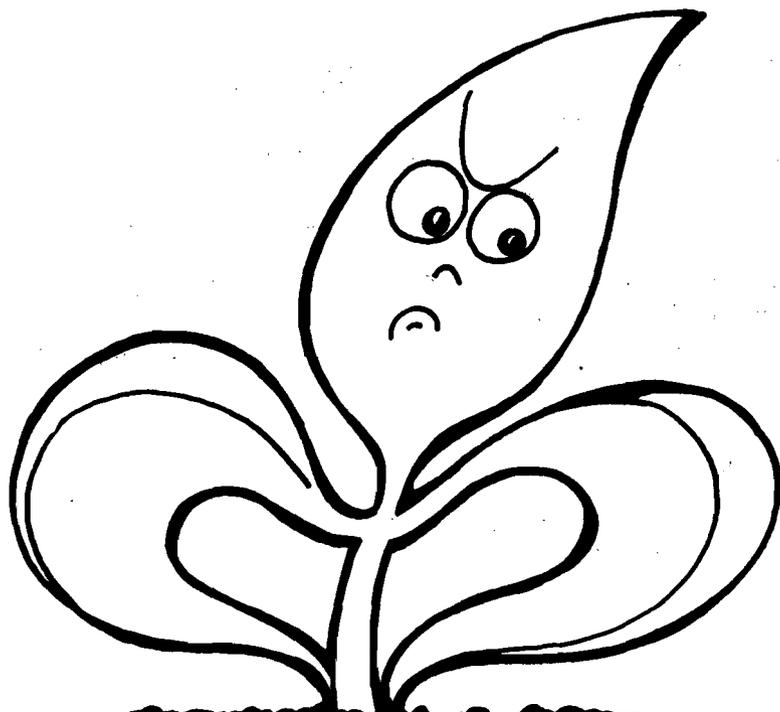


**NOT TO ME,  
YOU DON'T**



or

**PLANTS THAT ARE  
PROTECTED FROM PESTS**

# Plants That Are Protected from 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, **Not to Me, You Don't** or **Plants that are Protected from Pests**, is designed to explain the advantage of using resistant varieties of plants in pest management.

Other 4-H IPM books you may get from your county Extension office are listed on the last page of this book.

## To Help You

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

## Acknowledgements

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# Before You Begin

Please complete the questions below before you begin **Plants that are Protected from 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 in a school or other 4-H group? What kind? \_\_\_\_\_
7. List the 4-H projects you are taking this year:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## II. Questions about what you know

1. Do you know a crop plant is? \_\_\_\_\_  
Can you give three examples of crop plants?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

In just a few words, describe what a crop plant is: \_\_\_\_\_  
\_\_\_\_\_

Remove this page and hand in to your leader

2. Draw a *simple* picture of a plant. Put an "X" in places where pests might hide.

2.

List what pests you were thinking of:

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3. Draw a *simple* picture of a way that a plant might protect itself. Label the drawing.

3.

4. Draw something that affects the way resistance works.

4.

Can you write three ways that a pest can do damage?

1. \_\_\_\_\_

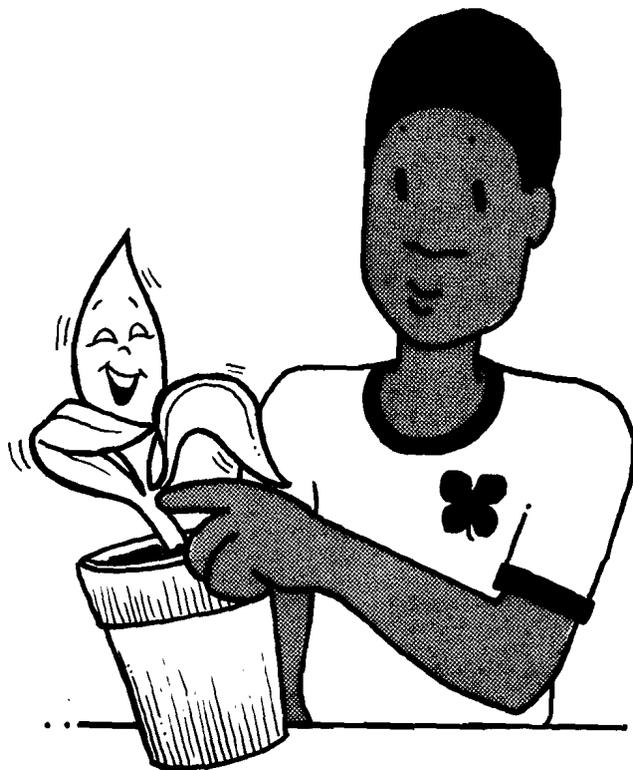
2. \_\_\_\_\_

3. \_\_\_\_\_

## Who Lives in the Plants?

Think about PLANTS. They are all around. Almost everywhere you look, you can see many kinds.

Select a plant. Study it carefully. Look on the undersides of leaves. Look at the parts of



the plant where branches and stems are joined in a "Y."

Do you see any **pests**?

Look around the plant. Many different **organisms** live around plants.

You may see insects, lizards, frogs, birds, or other animals.

# Take a Walk

Take a walk in a yard or park. Look again at the plants around you. Look at the underside of leaves, the growing tips of branches, the "V" where a leaf joins a stem (see picture), and under the plant.

Do you see anything living around the plants? \_\_\_\_\_

Can you tell what kinds of organisms they are? Make a list: (for example, "lizard.")

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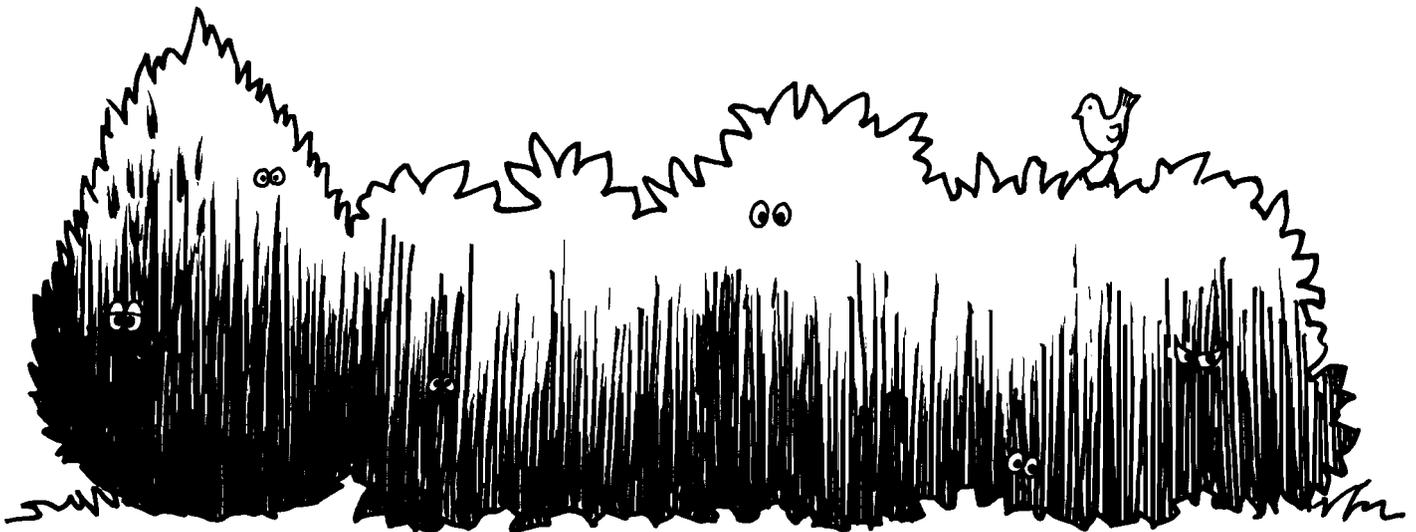
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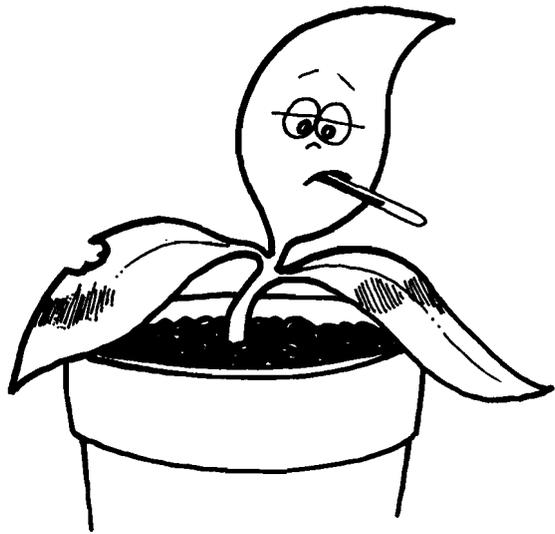
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## Who Eats the Plants?

Some of the organisms that live on plants do more than just walk around on the plants.

They may also feed on the plants.  
Insects chew on plant parts.  
Some birds eat berries and fruits.





Animals such as rabbits and deer graze on leaves.

Tiny worms called **nematodes** feed on the roots of plants and cause them to wilt, turn brown and die.

Organisms called **pathogens** live in plants and cause plant diseases.

Man grows some kinds of plants for food and other uses. These plants are called **crop plants**. Crop plants are plants like oranges, corn, lettuce, and pine trees.

Every crop plant has some kind of pest that eats it. Some plants are eaten by just a few kinds of organisms. Other plants are eaten by many types of organisms.

Some pests harm only one kind of crop plant. Others may damage many kinds of crop plants.

Because we depend on plants for many of our needs, we must find ways to manage pests.

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## Can You Find Some Pests?

Take another walk. Try to find a vegetable garden or field of some kind of crop. Ask the owner if you can walk in it and look for pests. Maybe the owner will go with you. If you can't find a vegetable garden or a field, go back where you took your first walk.



Look at the leaves and fruit of plants. Do you see any leaves or fruit that are damaged? \_\_\_\_\_

Do any look like something has eaten them or sucked the juices out of them? \_\_\_\_\_

Do you see any organisms that might eat plants or suck plant juices? \_\_\_\_\_

What kinds of organisms: Where are they?  
(for example: Caterpillar — on tomato leaf.)

_____	where? _____

Look for damage on plants that might be caused by diseases. Look for oddly shaped or discolored leaves, rotting fruit, or wilted plants.



What kinds of plants  
are damaged?

What do they look  
like?

Example: Squash

Rotten Fruit

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Can you think of anything else that might damage plants in this way? \_\_\_\_\_

Call your county **agriculture** agent. Tell him what kinds of plants you looked at, and ask him to send you bulletins about pests of those plants. When you receive information on plant diseases, try to decide what is wrong with the plants. Write your ideas here. \_\_\_\_\_

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Can you think of any way to check a plant for nematodes without pulling the plant out of the ground? Write your ideas here.

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## Plants that are Protected

Pests may have several reasons for attacking plants. They may be looking for

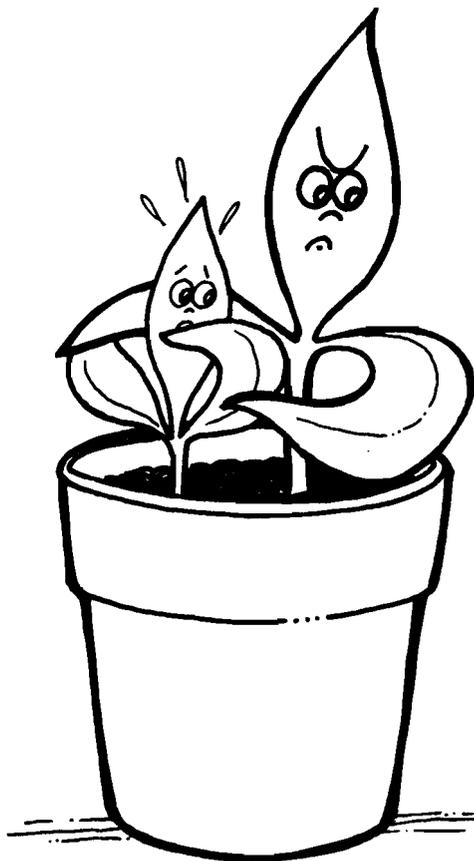
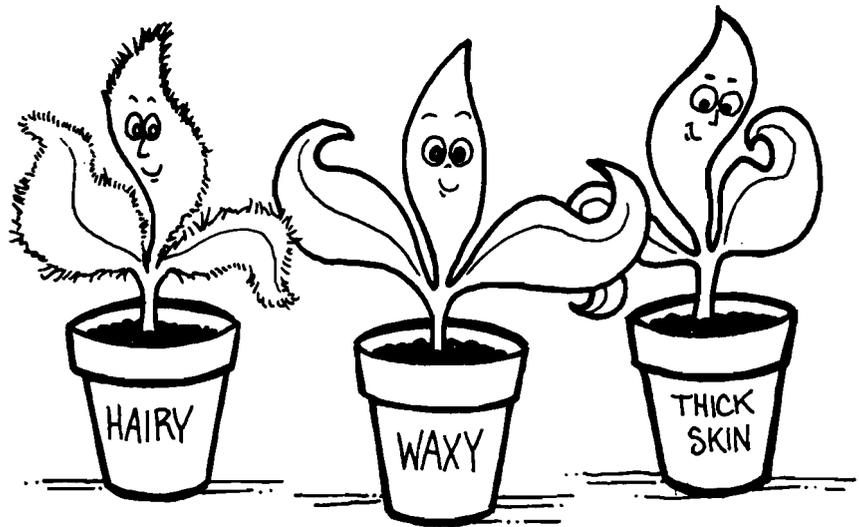
shelter. Or, they may be looking for a place to lay eggs. Mostly, though, they are looking for food.

Not all plants are food to all pests. Some plants may be harmful to a certain pest if the pest eats them. Or, the plants may not have all the food in them that the pest needs.

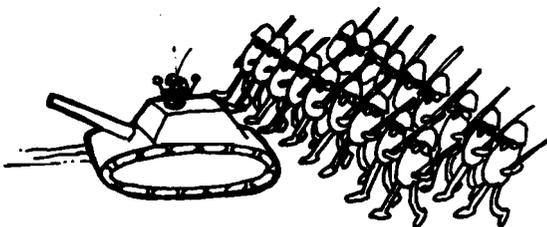


Certain plants grow in ways that protect them from pests. They may be hairy, waxy, or thick-skinned. For example, some varieties of

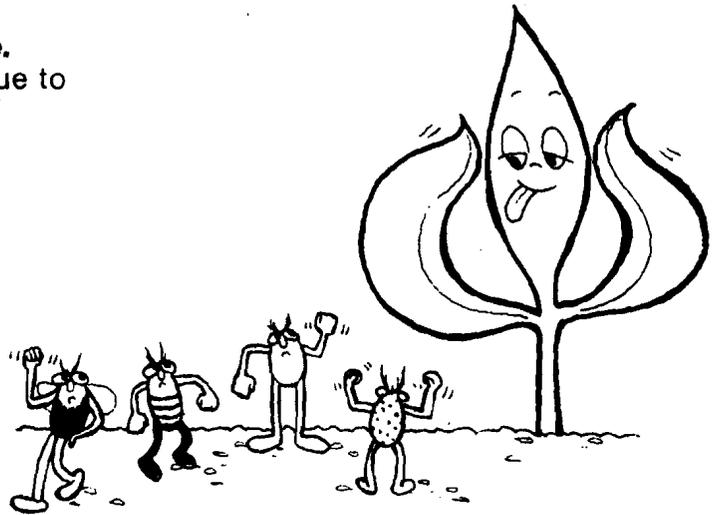
corn have very tight husks. This protects the ear of corn inside the husk from *some* kinds of insects and pathogens.



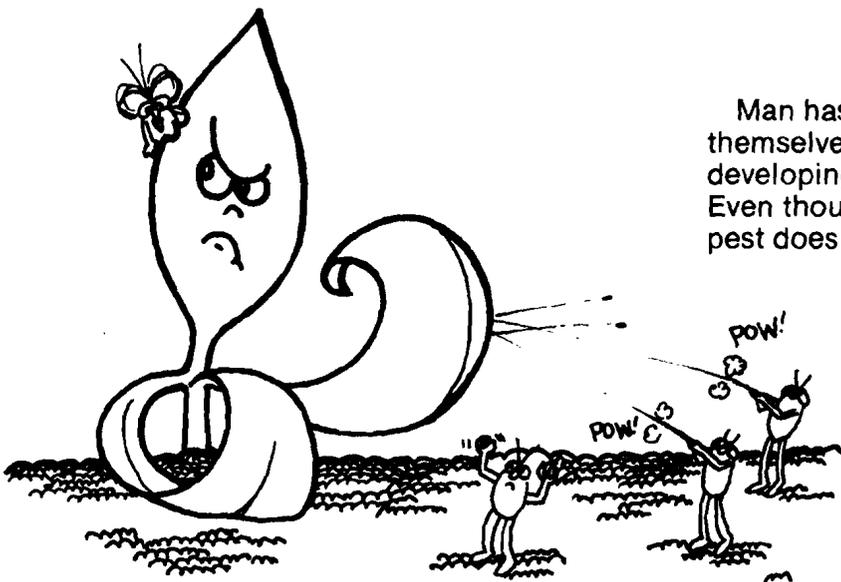
Some plants have developed **tolerance**. This means a plant can produce a crop even if it has been attacked by a pest. There are several factors that influence how well tolerance works. Age and size of the plant are the main factors. Also, the health of the plant affects tolerance. Older, well-established plants often can stand more pest damage than younger plants (if the plants are healthy). Many plants can even regrow parts damaged by pests.



Some plants have developed **resistance**. Resistance of plants to pests is mostly due to a special **trait** of the plant. The amount of resistance can vary. Some plants are very resistant to some pests — others are only slightly resistant.



If all pests liked all plants, no plants would be left. Most pests **prefer** to eat certain kinds of plants. A pest won't eat a plant it doesn't like. In fact, if you put a pest and a plant the pest doesn't like in a jar, the pest probably will starve to death.



Man has found ways to help plants protect themselves from pests. We have done this by developing plants that are resistant to pests. Even though the pest may be on the plant, the pest does not damage the plant.

## Activity

Talk to your county Extension agent. Find out which plants growing in your area have resistance to pests.

1. Name of plant \_\_\_\_\_
  2. Does the plant have general or specific resistance? \_\_\_\_\_
  3. To which pest or pests? \_\_\_\_\_
  4. Is there a special way it resists the pest? (bad taste, waxy coat, etc.) \_\_\_\_\_
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## How Resistance is Used in I. P. M.

In Integrated Pest Management we use a six step process.

1. Identification
2. Prevention
3. Monitoring
4. Prediction

5. Decision
6. Evaluation

As we use this six step process, we may find it necessary to treat pests. IPM provides many methods or tools to manage these pests.

The use of resistant varieties of plants is one very important IPM tool. Resistance can be used to *prevent* many pests from becoming problems.

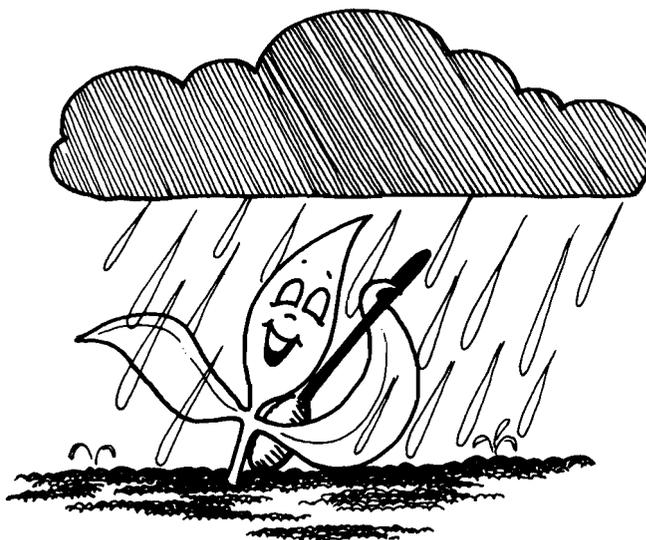
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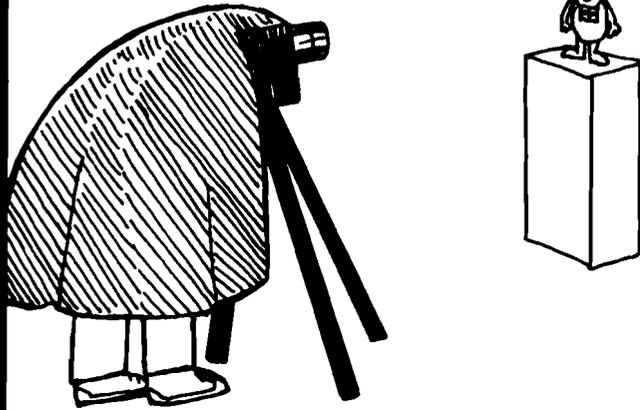
## Problems with Resistant Varieties

Resistance will not solve all pest problems.

1. Some pests will damage varieties of plants that are resistant to other pests.
2. Pests may, over a period of time, become tolerant of some pesticides.
3. How well resistance works often depends on the **environment**. This includes rainfall, light, and temperature. These factors can affect the health of a plant which can in turn affect its resistance to pest damage.



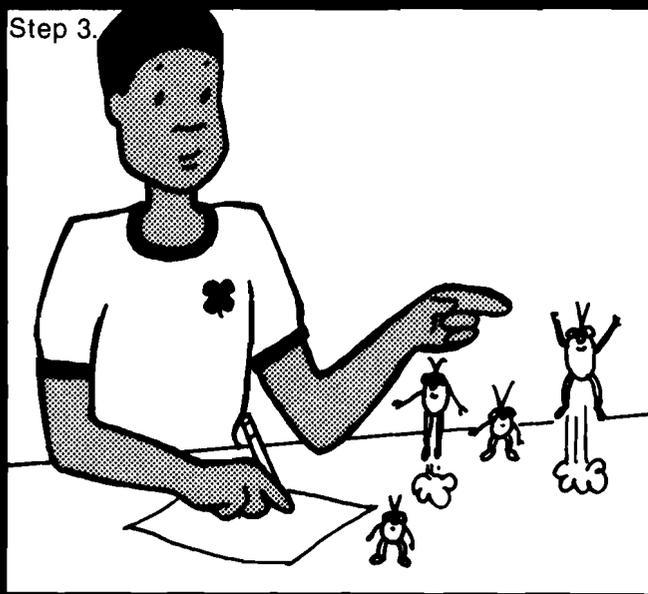
Step 1.



Step 2.



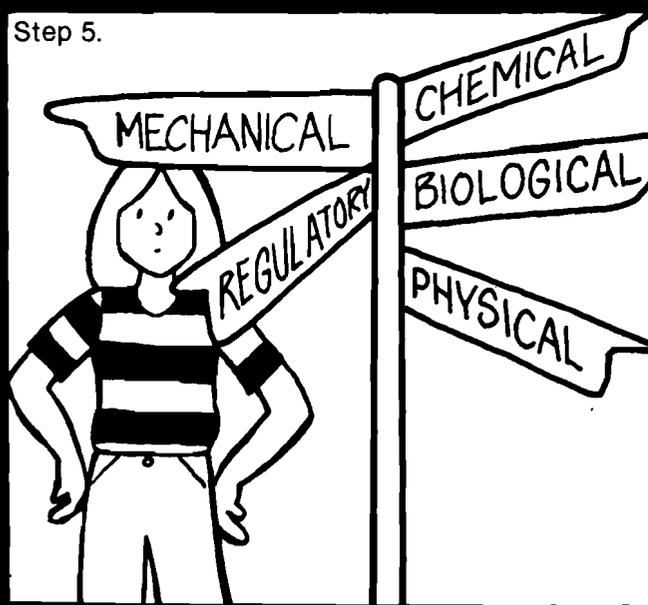
Step 3.



Step 4.



Step 5.



Step 6.



# SUMMING UP

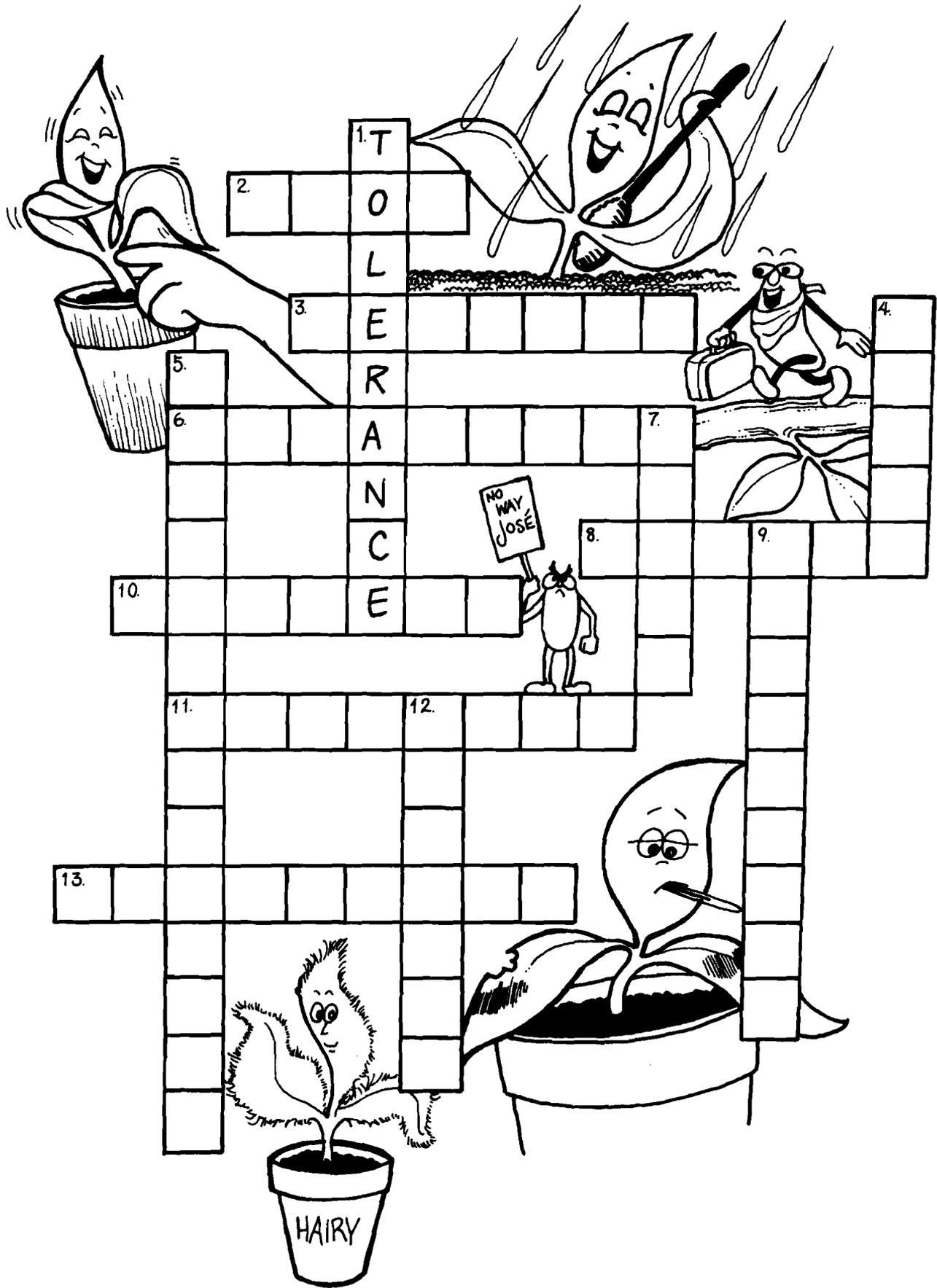
Here is a crossword puzzle. In case you have never worked one, this is how you do it: You are given a set of clues. Each clue describes a word you learned about in this unit. Figure out what each word is. Then write it in the row of boxes that begins with the same number that the clue is. An example is given for you: Clue number 1 Down is "Plants with \_\_\_\_\_ can produce a crop even if they are attacked by a pathogen." The word is "tolerance." It has been filled in for you. If you have trouble, ask your leader to help you.

## Across:

2. Plants that man manages are called \_\_\_\_\_ plants.
3. \_\_\_\_\_ resistance means that a plant has some resistance to more than one kind of a pest.
6. All animals and plants are \_\_\_\_\_ .
8. There are green \_\_\_\_\_ all around us.
10. Resistance can be used to \_\_\_\_\_ many pests from becoming problems.
11. \_\_\_\_\_ resistance means that a plant is very resistant to one kind of pest.
13. \_\_\_\_\_ cause diseases in plants.

## Down:

1. Plants with \_\_\_\_\_ can produce a crop even if they are attacked by a pathogen.
4. Organisms that harm man's crops are called \_\_\_\_\_ .
5. This unit is about \_\_\_\_\_ .
7. Host resistance will not \_\_\_\_\_ all pest problems.
9. Tiny organisms called \_\_\_\_\_ may sting the roots of plants.
12. \_\_\_\_\_ live on plants and may eat them.



## Glossary — To Help You

1. **Agriculture** — Growing food and fiber. Agriculture includes both growing crops like corn, wheat, peaches, and cotton and raising livestock like chickens, cattle, and hogs.
2. **Effective, effectiveness, effectively** — Producing the results wanted; working properly.
3. **Environment** — Surroundings, including anything that affects man, other animals or plants.
4. **Host** — Any plant or animal that shelters or gives a home to a parasite or other natural enemy.
5. **Humidity** — the moisture content in the air.
6. **Infect** — To contaminate as to cause disease.
7. **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.
8. **Organisms** — Living things; includes all animals and plants.
9. **Pathogen** — Very tiny organism that causes a disease. The three types of pathogens are fungi, bacteria, and viruses.
10. **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.
11. **Prefer** — To choose over another; to value more.
12. **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.
13. **Tolerance** — Capable of growing and producing even when subjected to a pest.
14. **Traits** — Distinguishing features or qualities.

## 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.

1. Do you know a crop plant is? \_\_\_\_\_  
Can you give three examples of crop plants?

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In just a few words, describe what a crop plant is: \_\_\_\_\_

---

2. Draw a *simple* picture of a plant. Put an "X" in places where pests might hide. 2.

List what pests you were thinking of:

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3. Draw a *simple* picture of a way that a plant might protect itself. Label the drawing. 3.

4. Draw something that affects the way resistance works.

Can you write three ways that a pest can do damage?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_