

IPM Module: Pesticides in the Environment

Note: This module should be used as a reinforcement tool for promoting IPM as a necessary program. This module should be taught with the home and school IPM lessons and with all of the modules. It may also be taught independent of the other lessons as an environmental science lesson. It is designed to enhance environmental awareness, the use of pesticides, their dangers, and effects on the environment. It may be best incorporated with Lesson 4 – Decision making.

Resources

Extension Toxicology Network - Movement of pesticides

<http://extoxnet.orst.edu/tibs/movement.htm>

Environmental Protection Agency

<http://www.epa.gov/pesticides/>

EPA - Environmental Affects of Pesticides

<http://www.epa.gov/pesticides/ecosystem/index.htm>

EPA - Endangered Species Coloring book

<http://www.epa.gov/espp/coloring/>

EPA - Information about Pesticides for kids, students, and teachers

<http://www.epa.gov/pesticides/kids/>

EPA - Learn about chemicals around the house

<http://www.epa.gov/kidshometour/>

Objectives

Students will:

- Reinforce their knowledge of pesticides
- Learn about pesticides in and around the home
- Learn about types of pesticides
- Understand the effects of pesticides on the environment
- Understand the movement of pesticides in the environment
- Create a pesticide life cycle using inquiry, art, and writing skills

Vocabulary

Pesticides

Drift

Environment

Pesticide movement

Residue

Safety

Pesticide selection

Persistence

Crop emergence

Insect breeding

Crop canopy

Backpack sprayer

Pesticide efficacy

Crop dusting

Runoff

Pesticide safety

Poison

Poison control

Activity

Step One, Discussion

Revisit Activity 4 of Lesson 4. Remind students of the discussion that took place about their knowledge of pesticides. It might be useful to re-ask some of the questions and create a pesticide desirable/undesirable (pro/con) list on the board. Help them remember what they discovered when they found pesticides labels at home. You may wish to use some of the following questions in your discussion.

- What are pesticides?
- Where are pesticides found?
- What are pesticides used for?
- Who uses pesticides?
- What good do pesticides do?
- Are pesticides safe for people and pets to be around? Why or why not?
- What kind of harm do pesticides cause?

Be sure to talk in depth about the dangers of pesticides, and about pesticides in the environment.

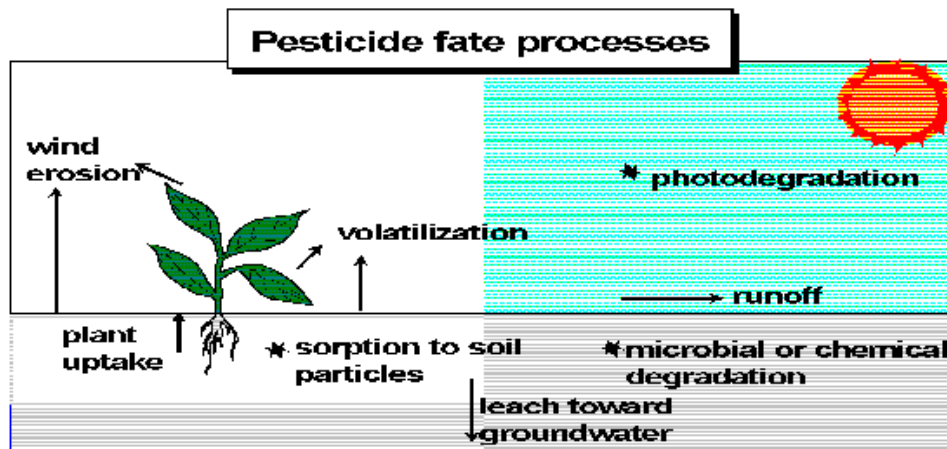
Step Two: EPA Pesticides around the home:

Use the EPA website: EPA - Learn about chemicals around the house

<http://www.epa.gov/kidshometour/> to help students learn more about varieties and uses of pesticides. This is a very good interactive and informative tool. It is a pesticide scavenger hunt for students. This website gives detailed information about various chemicals that can exist in and around the home. It also gives important information about pesticide safety and poison control.

If the classroom is equipped for the entire class to participate in this activity you may wish to do so. However, if the classroom is not equipped for entire class internet use, have the students work in small groups of 2-3 and tour the EPA home searching and learning about pesticides.

Step Three, The Life Cycle of the Pesticide:



Use the Extension Toxicology Network - Movement of pesticides in the environment <http://extoxnet.orst.edu/tibs/movement.htm> for background information prior to this lesson. It explains the movement of pesticides in the environment. Explain to students that there are many outcomes of a pesticide in the environment.

When pesticides are applied to a resource (crop, garden, flower bed, house plant, pet, etc.), depending on the chemical nature of the pesticide and the conditions in which it was applied, the pesticide can have many fates. Those pesticides that remain in the environment for long periods of time are said to be persistent.

- Pesticides that are moved off-site through wind, water, or other means are known as pesticide drift.
- Pesticides can be taken up by plant through their roots and into their stems and leaves are translocated.
- Pesticides can be adsorbed into the soil (clinging onto soil particles).
- Pesticides can move through soil and into ground water.
- Pesticides can linger in the environment; this is called residue.
- Pesticides can be degraded by sunlight.

Allow your students to choose a brief situation from the list below, or create situations of your own. *For Grades 6 & 7:* students should research a pesticide that could be used in their chosen pest situation. They should find and read the label for pesticide formulation (liquid, powder, granule), directions for use, environmental hazards, rates (amount to be applied), and time of application. *For grades 2-7:* ask them to create a life cycle for a pesticide. What do they think happens to the pesticide when it is applied? Where does it go? Who or what is affected by it? They may choose to draw the life cycle, or create a story about it. Use the subsequent Environmental Protection Agency reports to help students understand that pesticides do not stay in one place after they are applied. It may even be useful to discuss the EPA situation with your students.

Pesticide Situations:

- A potato grower applies a powder pesticide, on a windy day, with an airplane. This is known as crop dusting.
- Mosquitoes are pestering vacationers. Pesticide applicators apply the pesticide to the pond that is the environment for mosquito breeding.
- Pesticides are applied to the ground before a corn crop emerges. The crop is near a wooded area.
- Pesticides are applied to orchard fruits through backpack sprayers
- Liquid pesticides are applied to a crop of cranberries. Cranberries grow in bogs (low wetland areas).
- Powder pesticides are applied to a crop canopy
- Mouse poison is hidden in the corner of a home.

Teacher Information, Ideas of possible outcomes of listed situations.

- Pesticide is carried on wind currents – drifts to nearby water source – water is taken in by fish – fish are eaten by birds – birds die. Or pesticide is carried by wind currents – drifts to homeowner’s garden that does not use chemicals and has small children – children eat vegetables – become sick.
- Pesticide is in water – taken in by plankton – plankton eaten by small fish – smaller fish eaten by larger fish – larger fish eaten by birds – ingestion of pesticide by birds affects bird reproductive processes and eggs fail to hatch.
- Crop emerges – plants have taken in pesticide – deer population eats plants along the edge of the forest and crop – fawns become sick and die
- Pesticides drift onto neighboring plants – fruits are harvested and sold to grocery stores – consumers purchase fruit and intake fruit without washing – later in life consumer gets cancer from pesticide residues
- Pesticides for cranberries leaks through the soil into the ground water – water is pumped by a city – water filtration systems are inadequate on a particular day – and pesticides are pumped into a city through water.
- Powder pesticides applied – remain in the soil, are degraded by microbes, are degraded by sunlight before absorption into the soil
- Household pet eats the mouse poison and becomes very ill.

Step Four: Pesticide Safety

In this exercise, students will learn the importance of pesticide safety. Gather a variety of pesticides to bring to class for discussion. Pesticides for home and garden use can be found at a local hardware store or garden center. Discuss with students the importance of reading the label. Pesticides must be used in accordance with the label.

Choose one pesticide and ask the students to write down the best answer as you ask the following questions. After asking the questions, arrange the students into groups of three, and have them discuss their answers, choosing the best from the group. Then conduct a class discussion about the pesticide. Inform students that all of this information can be found on the pesticide label. Read the labels to the class to help the students formulate correct answers.

- What pest does this pesticide control?
- Is this pesticide used indoors or outdoors?
- Who may use this pesticide?
- When should this pesticide be used?
- What protective clothing should be worn when using this pesticide?
- How should the person using this pesticide clean up?
- What other animals or plants could this pesticide harm?
- How does the person using this pesticide know how much to use?
- Where does the person learn how to use this pesticide?
- What could happen if this pesticide is incorrectly used?
- How would someone know if the pesticide harmed the person?
- Who should be called for help?

Following discussion about labels and pesticide safety, arrange for a guest speaker from the poison control center and/or school nurse. Ask this person to provide information about:

- How to contact the poison control center.
- What information is needed when reporting poisoning?
- What are the symptoms and signs of human poisoning?