Oklahoma Ag in the Classroom

Weeds on the Windowsill

Objective

Students will learn about weeds that compete with Oklahoma crops and grow plants in two kinds of garden soil, one of which has been treated (by boiling water) to eliminate weed seeds.

Background

About 1/3 of the crops grown every year in the US are destroyed by pests. Some pests are insects; other pests are plants, or weeds. A weed is any plant growing in a place where it is not wanted. Weeds compete with crops for nutrients, light and water. Any plant can be a weed if it grows in a place where it is not wanted. For example, the milkweed plant is the essential food for monarch butterfly caterpillars. Without it the monarch butterfly cannot survive. Milkweed plants contain digitoxin. Digitoxin is used to produce heart medicine called "digitalis." But milkweed can also be a pest in home gardens, in fields and in orchards. It makes the areas look unattractive and uses nutrients the desired plants need. Lambs that graze on milkweed will get sick and die.

Weed seeds occur naturally in farmlands. The average acre of farmland holds an estimated 30 to 50 million weed seeds. A single weed that reaches maturity can produce 10,000 seeds.

Some of the most common weeds competing with Oklahoma crops are cheatgrass, downey brome, wild mustard, pigweed, annual ragweed, crabgrass, dandelion, henbit, chickweed, bindweed and buckwheat. Some plants, like buckwheat and sunflower, may be considered weeds in the middle of a field of soybeans or vegetables but are planted as valuable food crops in other places. Oats were a nuisance weed to European cereal crops before their value as a food crop was discovered.

Most farmers use pesticides to help control pests. A pesticide is a chemical product used to control pests. Insecticides help control insects, and herbicides help control weeds. Pesticides don't kill all the pests but they do keep them at a manageable level. Without pesticides it would take 40 percent more farmland to produce the same amount of food farmers produce today.

Pesticide products must go through years of testing and research before farmers can use them on their fields. First researchers develop the product in small amounts and test it in labs to find out what pests it will help control. The product is then tested on lab animals to see what effect it might have on humans. Labs have strict guidelines they must follow when they are using animals. These rules prevent animals from being treated inhumanely.

Once the product passes the lab tests it is ready to be tested in the fields of a research farm. Field-testing helps researchers see what effect the product has on the environment. It helps them figure out the safest and most effective way to use the product. Researchers also use field-testing to find out how long the product stays in the environment and how it breaks down in soil and water.

Oklahoma Academic Standards

GRADE 5
Speaking and Listening: R.1,2,3. Vocabulary: R.1,2,3,5
Life Science: 2-1,2; 3-1

GRADE 6
Speaking and Listening: R.1,2,3. Vocabulary: R.1,2,3,5
Life Science: 2-1,2,4,5

Materials

aluminum pie or loaf pans

wheat, lettuce, grass or other small seeds

spray bottle

Vocabulary

annual ragweed—an annual weed with a bitter taste which bears greenish-yellowish flowers and produces an abundance of pollen

bindweed—a twining or creeping species of plant, also glorybind or wild morning glory

brome—the amount of living matter in a specified habitat

buckwheat—a fleshy annual herb with seeds that can be ground into flour

chickweed—a weed pest found throughout the US in cultivated fields, gardens, lawns and ornamental shrubs

crabgrass—any of various coarse grasses that tend to spread and displace other grasses in lawns

dandelion—a plant, native to Eurasia, widely naturalized as a weed in North America and having many-rayed yellow flowers and deeply notched basal leaves sometimes used in salads

Environmental Protection Agency (EPA)—federal agency involved in protection of the environment

henbit—a weed that is related to mint, has small purple flowers and grows in early spring

monitor—to test or sample on a regular or ongoing basis

pest—an injurious plant or animal; one that is harmful

pigweed—a native grass found in Oklahoma

residue—a deposit of material not used by the plant

tolerance—the permissible deviation from a specified value

US Department of Agriculture (USDA)—federal agency involved in all phases of agriculture

weed—a plant considered undesirable, unattractive or troublesome, especially one growing where it is not wanted, as in a garden

wild mustard—the wild variety of a plant native to Eurasia that is cultivated for its pungent seeds

After researchers have finished the first stage of testing, the company wishing to sell the product must complete more research to satisfy standards set by the US Environmental Protection Agency (EPA). All products must be registered with the EPA before they can be used. It takes a minimum of seven years for a pesticide to go through all the tests necessary for EPA approval. Once a pesticide has been approved for sale, the EPA regulates how the product can be used. Failure to follow the instructions that come with the pesticides is a violation of federal law. These laws keep farmers from using dangerous levels of pesticides.

The Food and Drug Administration and the US Department of Agriculture (USDA) monitor food to make sure pesticide residue levels are lower than the tolerance level set by the EPA. There are also state monitoring programs and programs for monitoring food that comes into our country from other countries. If an unacceptable level of residue is found, the crop will be destroyed and the grower may have to pay a lot of money.

Pesticide residues wear off naturally as time passes. Cooking will remove even more traces of residues. The FDA recommends that fresh fruits and vegetables should be washed with clean, running tap water before eating. Washing also helps to remove dirt that has collected on the food. Usually by the time food is on the table, tests are unable to detect pesticide residues.

English Language Arts

1. Read and discuss background and vocabulary.
2. Discuss the suffix “cide.”
   —Students will list words having this suffix (homicide, suicide, genocide).
   —Students will brainstorm what all these words have in common.
   —Students will define the word “pesticide,” based on the discussion. (Pesticides control organisms that threaten production and storage of food, fiber and animal feed.)
   —Write the words “fungicide,” “insecticide,” “rodenticide,” and “nematocide” on the board.
   —Students will determine their meanings by breaking them down into root and suffix.
   —Students will look up the words in the dictionary.

Science

1. Divide your class into four groups.
   —Provide each group with two aluminum pie or loaf pans.
   —Students will take the pans outside and fill them with soil from the schoolyard, or bring soil from home. Make sure students understand the soil should not be potting soil from the store but soil taken from the ground.

—Groups will label the pans treated with boiling water “treated” and the other one “untreated.”
—Take ONE pan from each group and pour boiling water over the soil.
—After the pans have cooled, return them to the groups.
—Groups will label the pans treated with boiling water “treated” and the other one “untreated.”
—Provide each group with a handful of wheat, lettuce, grass or other small seeds.
—Students will sprinkle the seeds over the two pans.
—Students will cover the seeds with soil and water them with a spray bottle.
—Ask students to predict what will happen in the two pans. Will the seeds grow better in the treated or untreated soil? What effect does heating have on the soil? (Kills the weed seeds.)
—Hand out student worksheets.
—Students will spend a few minutes every day misting the soil and recording their observations on the student worksheets.
—After a few days can students see the difference between plants growing from the seeds they planted and weeds coming up voluntarily? (The weeds will probably be healthier.)

Extra Reading

Bunting, Eve, and Greg Shed, *Dandelions*, Harcourt Brace, 1995.
George, Jean Craighead, *Who Really Killed Cock Robin: An Ecological Mystery*, Harper Collins, 1991.
Tant, Carl, *Seeds, Etc*., Biotech, 1992.

Name_____

Weeds on the Windowsill

MAKE A PREDICTION. ***Select one:***

Plants will come up first in the cooked soil _____ or the uncooked soil _____

OBSERVE. ***Select one:***

Plants came up first in the cooked soil _____ or the uncooked soil _____

Draw a picture below of the first plant to come up in your untreated pan.

Draw a picture below of the first plant to come up in your treated (cooked) pan.

Did the plants that came up first in the treated soil look the same as the ones that came up first in the untreated soil? _____*yes* _____*no*

If not, can you hypothesize why? _____

Do you think there are plants in either pan, which you did not plant? _____*yes* _____*no*

If so, which pan? _____ treated _____untreated _____both

How do you think these plants got in there? _____

Are the plants growing faster in the cooked or uncooked soil? _____treated _____untreated

Why? _____

Are the plants from the seeds you planted growing faster in the treated or untreated soil?
_____ treated _____untreated

Why? _____

_____

Oklahoma Ag in the Classroom is a program of the Oklahoma Department of Agriculture, Food and Forestry, the Oklahoma State Department of Education and the Oklahoma Cooperative Extension Service.