

# Bug Out the Big Ones

**Grade Level: 4-6**

**Approximate Length of Activity: One class period**

## Objectives

### Teachers

1. Assist students in learning the importance of using pesticides and fertilizers.
2. Integrate science and fine art in their study of these chemicals.

### Students

1. Learn what pesticides and fertilizers are.
2. Learn the good and bad aspects of using chemicals on crops.
3. Demonstrate student's knowledge of using these products safely by creating a poster.

**Michigan Content Standards: (Science) S.IA.E.1:** S.IA.04.12; **S.RS.E.1:** S.RS.04.16; S.RS.04.17; S.RS.04.18; **L.OL.E.1:** L.OL.04.15; **S.RS.M.1:** S.RS.05.16; S.RS.05.17; S.RS.06.16; S.RS.06.17

## Introduction

Pesticides are chemicals used to control or to eliminate pests. Pesticides are used on crops because they are currently one of the safest and most effective ways to control pests. Pests reduce the quantity and quality of our food supply. Pesticides control pests which carry diseases such as flies, mosquitoes and ticks. This helps to protect our health and the health of our animals. There are more than 10,000 insects, 1,500 fungus-caused diseases and 1,800 weeds that can impair our food supply. Without the use of crop protection products, our current agriculture abundance would not be possible.

There are four types of pesticides that are commonly used. They are insecticides, herbicides, fungicides and rodenticides. Insecticides are used to protect crops from insect damage. Insecticides are also used in buildings and homes to control: ants, flies, moths, roaches and termites. Herbicides destroy weeds or eliminate plants that grow where they are not wanted. Herbicides are used in fields, parks, lakes, ponds and yards. Fungicides are used to control plant diseases that affect food crops. Rodenticides are mostly used in areas where rats and other rodents are a major health problem.

It takes a lot of testing for a new pesticide to reach the market. It undergoes years of laboratory testing and then field testing. Each year, about 15,000 applications are submitted to register a new pesticide. These pesticides go through six to nine years of testing, both in the laboratory and in the field. The pesticides that can be safely used without harming the environment are then registered. Each year only about fifteen new pesticides are registered.

These pesticides are then labeled with instructions for proper use, including handling, storage and disposal. In order to handle a restricted-use pesticide, Michigan farmers and commercial applicators must complete an approved training program in the proper handling of toxic chemicals. The regulation of pesticides is controlled by the U.S. Environmental Protection Agency. Each state may also establish requirements for pesticides.

Fertilizers supply concentrated nutrients that promote higher yields and better quality crops at lower costs. Plants, or crops, need nutrients in order to grow. Some nutrients are supplied by the soil. However, the soil does not have enough nutrients to be able to grow enough food for the world's population. That is why farmers fertilize their fields. Fertilization enables crops to withstand infestation of some pathogens and to speed crop recovery from several forms of stress.

A soil test is conducted before a farmer fertilizes their field. A soil test consists of collecting many soil samples from a field and testing the samples according to what nutrient the farmer wants to analyze. By soil testing, the farmer can determine the rate of application and the most appropriate placement of the fertilizer.

There are sixteen nutrients that a plant needs in order to grow normally. Nitrogen (N), phosphorus (P) and potassium (K) are three of the most important nutrients needed. Nitrogen is part of the makeup of all plant proteins. If a plant is deficient in nitrogen, it will develop a pale yellowish-green color in the leaves. The plant's chlorophyll production will also slow down since nitrogen is required for the plant to produce chlorophyll. Plants adequately supplied with nitrogen are better able to utilize water from rainfall and soil moisture. Nitrogen helps to increase crop yields and provide a high quality crop.

Phosphorus helps to protect plants from disease and improve yield and quality. Phosphorus enables plants to overcome environmental stresses such as cold temperatures and drought.

Potassium helps to protect plants against diseases. Potassium also helps crops to withstand droughts, cool soils, flooding and insects. Potassium improves shipping, handling and storage qualities so fruits and vegetables will stay fresh longer.

## Materials Needed

- Poster board (or construction paper)
- Art supplies

## Activity Outline

1. Begin by introducing the words "pesticide" and "fertilizer." Ask what the students already know about these crop protection products.
2. Explain that pesticides are used to control insects, weeds or unwanted plants, diseases and rodents. Farmers do not use any more pesticides than absolutely necessary to grow a healthy product. They must complete training programs and be tested and certified to apply restricted-use pesticides. If pesticide use was banned, people would eat fewer fruits and vegetables because of the poor quality and high cost. Fruits and vegetables have been shown to reduce the risk of most cancers. Pesticides reduce the cost of producing fruits and vegetables making them more affordable to the public.
3. Continue the discussion about fertilizers. Explain that to grow, plants need nitrogen, phosphorus and potassium, among other nutrients. These nutrients must be applied in the proper ratio to work correctly. Farmers are doing many things to make sure these nutrients are applied so they are efficiently used and not washed away into the water. Such techniques as applying at the appropriate time, placing nitrogen near the roots and testing the soil to use the proper amount, help aid in the efficient use of these nutrients. This helps keep the prices down. Therefore, people can eat more vegetables and fruits, which are good for them.
4. From your discussion, brainstorm possible topics for posters. Such ideas as "Eat More Fruits and Vegetables," "Use Pesticides Properly," to "Chemicals Help Us Grow Better Food" might be used. The students could draw, paint or use pictures from magazines to create their posters. Then display them at a classroom crop protection fair. Students in your class can educate the younger students by describing their posters.

## Discussion Questions

1. Why do we use pesticides and fertilizers?
2. What could happen if pesticides were never used?
3. What kinds of food can we grow an adequate supply of by using crop protection products?
4. How can we make our food safer?

## Related Activities

1. Take your class to an organic food store and regular food store. Compare prices and quality. Discuss the differences in price and quality. (Note: Some grocery stores do carry both organic and regularly processed foods, so you may be able to go to just one store).
2. Go to a nursery or garden center. Ask them to show the class the various pesticides and herbicides they use and why. Ask them to read the labels for safety instructions. These labels are there to ensure safe usage for both the person handling the chemical and the environment.