



# The Book Planter



**Ag in the Classroom**

Post Office Box 27766 | Raleigh, NC 27611 | (919) 782-1705  
ncagintheclassroom.com

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***Bugs Everywhere***

**Written by: Lily Murray**

**Illustrated by: Britta Teckentrup**



There are bugs everywhere! Some of them live in jungles, some of them live underwater, and some certainly live in your house. And all of them are fascinating! Britta Teckentrup's work will enthrall budding entomologists. This delightful addition to a popular nonfiction series sparkles with personality and is chock-full of weird and wonderful facts about all kinds of creepy-crawlies.

## **Discussion Questions**

1. What are the characteristics of insects?
2. Where do insects live?
3. What are the parts of an insect?
4. How are insects the same/different?
5. What is the life cycle of an insect?

## **Student Motivator/Engage<sup>1</sup>**

1. Ask students if farmers experience any problems with insects. (Answers may vary, but yes, farmers experience problems with insects. These are called pests.)
2. Introduce the concept of invasive species to students by having them use existing knowledge about pests from real-world experiences or previous lessons/units. Post the following questions on chart paper around the room:
  - What is a pest?
  - What does invasive mean?
  - What are species?
  - What are invasive species?

3. Ask students to move around the room and write a response for each prompt. After each student has visited each prompt, ask for a student representative to summarize the responses. For younger students, you may choose to do this as a class discussion.
4. Make sure students understand that invasive species can be plants, animals, insects or pathogens that are not native to an ecosystem and are likely to cause harm. In the following activities, students will focus on invasive plant pests and diseases. Alert students to the fact that invasive pests might even be found in their own backyards!
  - You can make this visual by referring to the [Top Invasive Pest Threats page on USDA/APHIS](#).
5. Share with students an example of a hungry pest (invasive species) to help them further understand the elements of an invasive species. For example, the Giant African Snail is an invasive pest that was first found in southern Florida in the 1960s. It took 10 years and \$1 million to eradicate it from the State, but the snail was reintroduced into Florida in 2011. The Giant African Snail is one of the most damaging snails in the world because it feeds on at least 500 types of plants and can cause structural damage to plaster and stucco structures. This snail can also carry a parasitic nematode that can lead to meningitis in people, making it a threat to human health. The giant African snail reproduces quickly, generating about 1,200 eggs in a single year.

### **Activity: Agricultural Pests<sup>2</sup>**

#### *Materials*

- Pictures of pests that affect our food crops.
  - Pests should include insects, mites, weeds, and, if possible, diseases. See [Agricultural Pests](#), [Natural Enemies Gallery](#), [USDA Image Gallery](#), or [Identification Guide](#).
  - Pictures can be printed, or compiled on PowerPoint slides.
- Pictures of beneficial organisms similar to the pests you chose.
- Internet access
- [Agricultural Pests](#) worksheet, 1 copy per student
- [Credible Source Guide](#), 1 copy per student
- [Background Information](#) for teacher reference

#### *Procedures*

1. Divide students into small groups and give each group a copy of the Agricultural Pests worksheet.
2. As a class, create a preliminary definition of an “agricultural pest.” To begin creating the definition, have students brainstorm in their groups examples of organisms they think might be pests. They should take notes and make changes in their definition as they discuss options with their group. Remind them that “pests” can be plants, animals, insects or pathogens.
3. Have students look through the set of agriculture-related pest pictures provided for each group.

4. Instruct students to complete the data table as they review their pictures. If needed, have students research the organisms online to learn if they are pests or beneficial and why they belong in this category. Students should also use the [Credible Source Guide](#) as they perform their research. Select a “Fact Checker” for each group.
5. When students complete their data tables, each group should present their findings, and a Fact Checker from another group should verify accuracy.
6. Provide names of a few organisms to research if students were unable to fill their table.
7. When students have completed their data table, watch the two videos about agricultural pests. The first video shows how plants can defend themselves and which pests might affect the plants. As students watch each video, have them record the names of the different pests. [The Amazing Way Plants Defend Themselves](#)
8. Next, [watch Do We Really Need Pesticides?](#)
9. After students have viewed both videos, discuss the various pests shown in the video. If pictures of fungal and bacterial pests were not used at the beginning of this activity, look at some pictures of the effects of these organisms. Most of them are microscopic and cannot be directly observed—what we observe are the effects of the organism living in or on the plant.
10. Have students review their notes and worksheet to create a final working definition of “agricultural pest.” The definition should be similar to: *An organism living and growing where it is not wanted and can cause damage to crops that are grown for food.*

#### Sources

1. <https://agclassroom.org/matrix/lessons/151/>
2. <https://agclassroom.org/matrix/companion-resources/1115/>

#### K-5 Subject Areas: English Language Arts, and Science

##### English Language Arts

- RI.K.1 With prompting and support, ask and answer questions about key details in a text.
- RI.K.2 With prompting and support, identify the main topic and retell key details of a text.
- RI.K.4 With prompting and support, ask and answer questions about words in a text
- .RI.1.1 Ask and answer questions about key details in a text.
- RI.1.2 Identify the main topic and retell key details of a text.
- RI.1.4 Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.
- RI.1.5 Know and use various text features to locate key facts or information in a text.
- RI.1.7 Use illustrations and details in a text to describe its key ideas.
- RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
- RI.2.7 Explain how specific images contribute to and clarify a text.
- RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
- RI.3.2 Determine the main idea of a text; recount the key details and explain how they support the main idea.
- RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
- RI.4.2 Determine the main idea of a text and explain how it is supported by key details; summarize the text.
- RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
- RI.5.2 Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.

##### Science

- PS.K.1 Understand how objects are described based on their physical properties and how they are used.
- LS.K.1 Understand the characteristics of living organisms and nonliving things.
- LS.K.2 Understand characteristics of organisms that make them alike and different.
- LS.1.1 Understand the basic needs of a variety of plants and animals in different ecosystems.

- LS.2.1 Understand animal life cycles.
- LS.2.2 Understand that organisms differ from or are similar to their parents and other offspring based on characteristics of the organism.
- LS.4.1 Understand the effects of environmental changes, adaptations, and behaviors that enable organisms to survive in changing habitats.
- LS.5.2 Understand the interdependence of plants and animals within their ecosystems.
- LS.5.3 Understand some characteristics of an organism are inherited and other characteristics are acquired.



# BACKGROUND INFORMATION

## PART 1

### Growing Food Challenge

Plants growing in a natural environment face several challenges that affect which plants will survive and grow, produce seed, and complete their life cycle. Various pests such as weeds, herbivores, and pathogens can threaten plant production of grain, fruit, or flowers. Cultivated plants can have other stressors such as dry weather or a lack of soil nutrients. As a result, growers often manage their fields to reduce stress through methods such as irrigation, fertilization, and pest control to increase crop production.

Crops and their environment have an impact on each other. In agriculture, various approaches impact water use, pesticide use, and CO<sub>2</sub> release (**carbon footprint**). Tillage practices, fertilizer use, conventional pesticides, biopesticides, etc., are all factors that impact a crop's environmental footprint. **Environmental footprint** is the effect that a person, company, activity, etc., has on the environment, e.g., the amount of natural resources that a crop uses and the amount of harmful gases it produces.

**Official Definition of Pest** –An organism is declared to be a pest under circumstances that make it deleterious to man or the environment, if it is: (a) Any vertebrate animal other than man; (b) Any invertebrate animal, including but not limited to, any insect, other arthropod, nematode, or mollusk such as a slug and snail, but excluding any internal parasite of living man or other living animals; (c) Any plant growing where not wanted, including any moss, alga, liverwort, or other plant of any higher order, and any plant part such as a root; or (d) Any fungus, bacterium, virus, prion, or other microorganism, except for those on or in living man or other living animals and those on or in processed food or processed animal feed, beverages, drugs, and cosmetics. (U.S. Code of Federal Regulations)

Approaches to pest control include mechanical, biological, chemical, or cultural techniques. Some growers also use **integrated pest management (IPM)**, a decision-making

framework that helps growers decide when to apply pest control and which control techniques to use. IPM focuses on long-term pest control and aims to minimize pest impact on crop quality.

### Methods of Pest Control in Crops

Method	Examples
Mechanical	Tilling, Mulching
Biological	Biological pesticide, Beneficial insects, Disease-resistant plant varieties developed through conventional breeding or GE methods
Chemical	Pesticides, Insecticides, Herbicides, Fungicides, Nematocides, Rodenticides, Bactericides
Cultural	Irrigation, Crop rotation, Mixed cropping, Cover cropping, Row covers, Sanitation

### MECHANICAL PEST CONTROL

Plant pests can be controlled in many ways. Simply pulling weeds from a garden or flower bed reduces the competition for moisture and plant nutrients and helps avoid the insects those weeds might attract and harbor. This is known as a physical or mechanical control method of plant protection. Plant pest control often starts with preparing a site to make it harder for pests to survive. For example, a grower might **till** (turn over) the soil or put down mulch cloth to reduce weeds. Reduced tillage systems are also common and have certain benefits, such as reduced soil erosion.

Farmers can use different tilling methods to prepare soil before planting. **Reduced tillage** includes different approaches that conserve soil by leaving more plant residue on the soil surface and uses less energy. **No-till** is a method that leaves the soil undisturbed through use of a coultter (a vertical blade) that slices the soil, and another tool that places the seed at a proper depth. However, even in no-till systems, farmers may need to till every few years to reduce crop debris that could harbor crop pests such as insects and pathogens. **Conventional tillage** normally involves three or more steps using tractor-pulled tools. The environmental footprint varies with different tillage methods of pre-planting soil preparation.



### BIOLOGICAL CONTROLS

Biological controls are more complex than simply plowing a field. They use a biological organism or process to protect plants from damage caused by other organisms. Several types of natural or biological plant protection innovations have been developed throughout farming history. The most commonly used are:

1. Selective breeding to cultivate damage-resistant plants
2. Use of beneficial organisms to control weeds or insect populations
3. Biopesticides produced from microbial cultures, plants, or other organisms
4. GE plants designed to resist pests

#### Biological Control Using Predators

Biological control with predators uses an organism (such as an herbivore, predator, pathogen, or parasitoid) that consumes the pest to reduce pest populations. For example, predator insects such as lady beetles and lacewings eat other insects. Parasitoid insects such as wasps lay their eggs on or in some life stage of the target insect. After an egg hatches, the developing immature stage of the parasitoid insect kills the targeted host by consuming the host tissues. Biological control might also involve releasing beneficial organisms to the environment or changing the landscape to increase populations of beneficial organisms.

#### Limitations of Biological Control Using Predators

There are limits to the safety and effectiveness of biological insect control. For example, it may be necessary to eliminate or reduce the use of broad-spectrum pesticides, since both beneficial and target insects could be killed. Fungicides used against plant pathogenic fungi can also impact desired fungi when applied to reduce insect pests. In addition, strict regulations must be used to ensure that today's insect predator will not become tomorrow's pests.

Managing an insect attack can be complicated, because the attacking predatory or parasitoid insects cannot thrive until there are sufficient numbers of target insects to serve as prey or hosts. Some biocontrol insects may also destroy a broad range of insects – both beneficial and harmful. Sometimes beneficial insects can be considered pests when they become too numerous or are in the wrong place. Invasive lady beetles from Asia have displaced some native species in the United States. They can also become minor pests in the home when they invade in large numbers when weather starts to turn cool.

### CHEMICAL CONTROLS

Pesticide use is one of many management practices in agriculture. Continuous pressure to feed increasing populations has influenced agriculture to progress through many stages from domestication and improvement of crop plants, to mechanization, fertilization, and pesticide use. Pesticides are applied to crops, gardens, animals, lawns, recreational areas, and around homes and other buildings. They help provide abundant, disease-free, pest-free foods, improve crop yield, and reduce disease vectors for humans, animals, and plants.

Pesticides were considered necessary in crop production in the mid-twentieth century and were often applied in multiple passes across the field. Pesticides still are considered necessary in crop production, but improved technology provides pesticide options that are more compatible with other control methods and reduce environmental consequences. In addition, more judicious pesticide application has evolved over time, with application following field scouting to ensure that pesticides are only applied when there is a danger that pests may reach levels that significantly impact a crop's sale value.

#### DID YOU KNOW?

Many plants have evolved to produce natural compounds to defend themselves from pests. Some of these substances are potentially harmful to animals (including humans) that eat the plants. How harmful a consumed substance is for humans or animals varies depending on exactly what the substance is and how much is consumed (the dose).

There are different types of pesticides such as herbicides, fungicides, insecticides, rodenticides, etc. Different herbicides are designed to be most effective at different timings: Some are only applied before planting to control germinating weed seeds, and others are applied after the crop plants emerge.

Pesticides are often used to solve plant pest problems, but if they are used incorrectly, some of them might not provide the desired results or can harm crop plants or the environment (including groundwater, lakes, or rivers). Pesticides are evaluated for their impact on the environment and for how they may affect the health of people who may be exposed to the pesticides. The Environmental Protection Agency (EPA) works with the U.S. Department of Agriculture (USDA) and the Food and Drug Administration (FDA) to monitor use of chemicals in food production and determine levels of safe use.

#### Pesticide Impact on Humans

Pesticides may contain chemicals with possible health risks to humans. The risk is determined by the hazard and exposure,

# MODULE 3: ENVIRONMENTAL FACTORS

## BACKGROUND INFORMATION



i.e., how someone comes into contact with the pesticide (ingested, inhaled, or through skin contact).

The EPA classifies pesticides based on their chemical toxicity and separates them into four categories – Category I, II, III, or IV, with Category I chemicals being the most toxic. Using these categories, EPA restricts where the pesticide can be applied, how much can be applied, and also anticipates its possible exposure level to humans.

### Pesticide Impact on the Environment

Some pesticides can contaminate soil, water, turf, and other vegetation. In addition to killing insects or weeds, pesticides can be toxic to other organisms including birds, fish, beneficial insects, and non-target plants.

For the last 30 to 40 years, researchers have been developing pesticides that are more specific to their target pests and that have a reduced impact on the environment. Different pesticides also break down at different rates, which are further influenced by conditions such as moisture and temperature.

A **Risk Quotient (RQ)** is used to quantify the environmental impact of most commonly used pesticides (insecticides, fungicides, and herbicides) in agriculture and horticulture. The RQ value is calculated using key factors such as a pesticide's active ingredient(s), toxicity, amount applied, and how long it persists in the environment. RQ values allow pesticide options to be compared.

### Biological Pesticides (Biopesticides)

The most widely applied bacterial species used as a biological pesticide is *Bacillus thuringiensis* (*Bt*), a bacterium found in soil. *Bt* produces a natural crystal protein that is toxic to some other organisms like insects and nematodes. Some strains of the *Bt* bacterium produce toxins that are naturally highly specific to certain pest insects, but harmless to most other organisms. When *Bt* produces spores, a toxic crystal protein is formed inside the spore. The spores are suspended in a liquid and sprayed on the plants. When a targeted pest eats the spores, the crystal toxin is released, and the pest will die. *Bt* spores are regarded as safe to humans and the environment because they are so specific to a few types of insects.

There are many other natural organisms that can be used to produce a biological pesticide. Researchers in Florida are growing a naturally occurring fungus, *Hirsutella citriformis*, to fight the Asian citrus psyllid (jumping plant lice). Asian citrus psyllids are small insects that feed on citrus plants. They can transmit the bacteria that causes citrus greening disease to their host plants.

Citrus greening is one of the most serious citrus plant diseases in the world and affects many citrus trees in Florida

and the South. It is also known as Huanglongbing (HLB) or yellow dragon disease. An infectious virus of citrus known as Citrus tristeza virus (CTV) is being evaluated as a vector of biologically active peptides targeting the HLB bacterium into the cells of the citrus trees. While CTV is a pathogen of citrus, it can be used as a biological control of HLB in this case, because it uses CTV strains that have been selected to cause only a few mild symptoms when trees are infected.

Tillage methods influence pest control. In conventional tillage, few selective herbicides may be needed because the tillage helps to control weeds. Reduced tillage and no-till systems may require broad-spectrum (less selective) herbicides because there is less tillage. However, reduced tillage and no-till systems may have benefits such as enhanced nutrient cycling and water retention. Conventional tillage releases the most greenhouse gas when stored carbon in the soil is released into the atmosphere and more fuel is used for power tilling equipment.

### DID YOU KNOW?

Some people think all food that is labeled "organic" was grown without pesticides. However, there are many "organic" pesticides approved for use in growing food crops that can be labeled "organic." *Bt* is an organic pesticide. For a complete list of allowed and prohibited substances, see USDA's National Organic Program list: [www.ams.usda.gov/about-ams/programs-offices/national-organic-program](http://www.ams.usda.gov/about-ams/programs-offices/national-organic-program)

## FOCUS ON GE PLANTS

### GE Plants with Enhanced Traits (Biotechnology)

Several GE crops have been developed specifically to be **insect resistant (IR)** or **herbicide tolerant (HT)**. IR *Bt* GE crops have been designed to produce a protein that kills specific target insects, such as the European Corn Borer, when they attack the plant. These proteins only affect specific receptors in the gut of certain target pests and are harmless to humans, mammals, and most non-target insects.

One unanticipated consequence of this pesticide specificity is the resurgence of some secondary pests (e.g., cutworms, wireworms) that are not targeted by the *Bt* endotoxin and can become primary pests in some years, in some locales. HT crops are designed to tolerate specific broad spectrum (non-selective) herbicides, which kill surrounding weeds but leave the cultivated crop intact. Glyphosate-tolerant crops are the most prevalent, although many new combinations of HT mechanisms are also used with older herbicides, such as dicamba, that are used commercially. In addition, HT traits are not required for reduced tillage or no-till practices, but they can make it easier for farmers to use these practices.



### European Corn Borer



Photo credit: Pennsylvania State University Entomology Department

### Biotechnology Approaches to Combat Plant Diseases

According to CropLife International (an association that promotes agricultural technologies such as pesticides and plant technology), more than a third of the world's potential crop production is lost each year to pests and plant diseases. Most crops can be damaged by diseases caused by soil-borne plant pathogens and insect-vectored viruses. The three predominant types of plant disease agents are viruses, bacteria, and fungi.

- **Combating viral diseases:** Scientists have transferred virus genes, such as those that produce a virus coat protein, into plants. This acts like a vaccine that makes the plant resistant to that specific virus. Another way to increase plant resistance to viral infections is to inhibit the vectors, such as insects and nematodes, that carry the virus.
- **Combating bacterial diseases:** All crop plants are susceptible to bacterial infections. Bactericides, including antibiotics, are not a complete solution, because bacteria quickly evolve resistance to them, and this could have implications for treatment of infections in man and animals.

Fire blight is an example of a harmful bacterial disease that destroys pears, apples, quince, and some ornamental plants. One remedy is to spray trees with large quantities of antibiotics. Scientists have identified DNA markers for fire blight resistance and are working to develop resistant varieties.

- **Combating fungal diseases:** Fungi cause billions of dollars in crop losses each year. They attack nearly all fruit, vegetable, and grain varieties. Some plants are more susceptible to fungal diseases than others, simply because they are too slow to start fighting back after they are attacked, or they lack the resistance gene for that particular fungus. Some techniques can trigger these plants to respond sooner by treating them with fungal pathogens

that have been disarmed, or by using resistance inducers like salicylic acid, a naturally occurring plant biochemical, making the fungus harmless to the plant.

#### DID YOU KNOW?

Viroids, algae, and parasitic plants can also be disease agents or pests of crops. Viroids are similar to viruses but without the coat protein and with their own unique properties; they are folded RNA molecules with secondary structure and can cause significant diseases, e.g., potato scab.

### Environmental Impact of Growing GE Plants

GE crop technology has been used widely since the mid-1990s in several countries and has mainly been used in four main crops: canola, maize, cotton and soybean. The adoption of GE IR and HT technology has significantly reduced certain insecticide and herbicide use. Source: [www.ncbi.nlm.nih.gov/pmc/articles/PMC6277064/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC6277064/)

Generally, less fuel is consumed in the production of major GE crops because the HT traits make no-till practices easier to use, which results in lower carbon dioxide emissions. Specifically, HT GE crops require less tilling. The no-till process requires effective herbicide control of weeds in lieu of mechanical tillage and is facilitated by the adoption of HT crops. Farmers use less fuel because fewer passes are made through the field to till and to spray herbicides on GE crops.

The no-till method also reduces erosion on susceptible land in steep terrain or fragile landforms and reduces chemical use. The use of plants modified to resist corn borer and rootworm has also decreased insecticide use. These production practices allow GE crops to have increased yield, which also makes food cheaper to produce on less land.

GE crops are sometimes blamed for lowering genetic diversity of crops and speeding the development of herbicide resistance in weeds. However, when farmers use seeds from fewer family lines, diversity decreases regardless of whether GE or non-GE seeds are used. In addition, herbicide use can result in the selection of weeds resistant to the herbicide in GE or non-GE crops. Herbicide-resistant weeds have long been a concern for farmers. The availability of HT GE crops has arguably resulted in faster selection of weeds resistant to the herbicide, but GE crops with multiple HT features could also help slow the selection of herbicide-resistant weeds.

#### How serious is weed resistance to pesticides?

In the United States, there are currently 14 weeds associated with common crop production that are resistant to the most popular non-selective, post-emergent herbicide. From the International Survey of Weed Resistance: [www.weedscience.org](http://www.weedscience.org)

# CREDIBLE SOURCE GUIDE

The internet is such an extensive source of information that it can be challenging to find credible information. A credible source is one that is balanced and is written with factual evidence. Credible sources can vary with the audience, topic, and discipline. To determine if a source can be trusted, consider the following characteristic of a credible source:

<b>Author</b>	Information that includes an author or additional contact information can be a good indicator of credible work. An author who is willing to identify him/herself as the writer validates this site or work. The author's credibility can also be verified through searches for their background as well as for additional articles by the author.
<b>Date</b>	The date of research information shows whether the information is recent. The validity of older information can be confirmed by considering whether more recent information supports it.
<b>Sources</b>	The information found on websites or articles should have citations, i.e., list sources of the information included in the article.
<b>Domain</b>	Many domains (ex: .com, .org, and .net) can be purchased and used by any person or group. The domain .edu is used by higher education schools, colleges and universities; the .gov domain is reserved for government websites. Information found on the .edu and .gov domains usually host credible information, but sometimes students are given a .edu address for their personal use by universities — be careful when citing). The .org domain is usually used by non-profit organizations that may host articles or information that supports a specific perspective and is not solely educational information.
<b>Site Design</b>	Often, a well-designed site can indicate reliable information (however, this is very subjective). A well-designed site or article helps make information more easily accessible.
<b>Writing Style</b>	Poor spelling and grammar indicate that the site or article may not be credible. Credible sites carefully review writing style and grammar to ensure that information is clear, concise, and accessible to its audience.

There are always exceptions to any rule; sometimes there are credible sites and articles that don't conform to these six categories. If you are unsure that the site you are using is credible, crosscheck the information with other sources that are known to be credible, such as an encyclopedia or another reliable source about the subject.

Adapted from <https://uknowit.uwgb.edu/page.php?id=30276>

## POSTER/INFOGRAPHIC RUBRIC

CATEGORIES	4	3	2	1
<b>Required Elements</b>	All required elements and additional information are included.	All required elements are included.	All but 1 of the required elements are included.	Several required elements were missing.
<b>Labels</b>	All items of importance are clearly labeled.	Almost all items of importance are clearly labeled.	Many items of importance are clearly labeled.	Labels are too small to view or no important items were labeled.
<b>Graphics - Relevance</b>	All graphics are related to the topic and make it easier to understand.	All graphics are related to the topic and most make it easier to understand.	All graphics relate to the topic.	Graphics do not relate to the topic.
<b>Attractiveness</b>	The presentation is exceptionally attractive in terms of design, layout, and neatness.	The presentation is attractive in terms of design, layout, and neatness.	The presentation is attractive but it may be a bit messy.	The presentation is poorly designed and not attractive.
<b>Grammar</b>	There are no grammatical/mechanical mistakes.	There are 1-2 grammatical/mechanical mistakes.	There are 3-4 grammatical/mechanical mistakes.	There are more than 4 grammatical/mechanical mistakes.

# STUDENT WORKSHEET

## ACTIVITY 1: AGRICULTURAL PESTS

Name \_\_\_\_\_ Date \_\_\_\_\_ Class/Hour \_\_\_\_\_

Write your working definition for agricultural pests here: \_\_\_\_\_

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DATA TABLE		
Name and Kind of Organism	Pest or Beneficial	Action

List the pests that affect the plants shown in the video, *The Amazing Way Plants Defend Themselves*  
<https://ed.ted.com/lessons/the-amazing-ways-plants-defend-themselves-valentin-hammoudi>

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List the pests that affect agricultural crops shown in the video, *Do We Really Need Pesticides?*  
<https://ed.ted.com/lessons/do-we-really-need-pesticides-fernan-perez-galvez#review>

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Final working definition for agricultural pests: \_\_\_\_\_

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