

# **The Global Impact of Insect Borne Diseases and Agriculture**

**Instructor:** Susan Steele

**Workshop:** International Insects

**Targeted Grade Levels:** 9<sup>th</sup>-12<sup>th</sup> grades

**Content Areas Covered:** Agriculture, Environmental Science, Global Studies

**Anticipated Duration:** 2 – 3 Weeks, depending upon the student achievement levels

**Rationale:** Students need to understand the global impact of insect borne diseases, the appropriate use of pesticides, and the concept of human interrelations on a world wide scale.

**Objectives:**

The student will be able to:

1. safely apply a pesticide, according to the label
2. define pest, disease, insect, weed, biological, chemical, and cultural terms, associated with IPM
3. know how the major pest groups adversely affect agriscience activities
4. describe weeds based on their life cycles
5. describe both the beneficial and detriment roles that insects play
6. recognize the major components and the causal agents of disease
7. explain and understand the concepts of IPM
8. describe the past and present trends of pesticide use in the USA
9. recognize some popular classes of chemicals used for pest management
10. state the components of proper dress for individuals handling pesticides
11. describe the environmental and health concerns relating to pesticide use
12. identify insects that transmit diseases to humans
13. describe the affects of malaria on the worldwide population
14. debate the use of DDT to control mosquitoes & support your decision with facts
15. recognize disease impacts on a global scale

**Sunshine State Standards:**

- 05.0 **Investigate and utilize basic scientific skills and principles in plant science**
- 05.01 Identify and describe the specializations within the plant science industry. LA.A.1.4.1, 2, 3, 4; LA.A.2.4.4; LA.B.1.4.1, 2, 3; LA.B.2.4.1, 2, 3; LA.C.1.4.1; LA.C.2.4.1
- 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. LA.A.1.4.1, 2, 3, 4; LA.A.2.4.4; LA.B.1.4.1, 2, 3; LA.B.2.4.1, 2, 3; LA.C.1.4.1; LA.C.2.4.1; SC.G.1.4.1
- 05.03 Examine the processes of plant growth including photosynthesis and respiration. LA.A.1.4.1, 2, 3, 4; LA.A.2.4.4; LA.B.1.4.1, 2, 3; LA.B.2.4.1, 2, 3; LA.C.1.4.1; LA.C.2.4.1; SC.B.1.4.1, 2; SC.D.1.4.1; SC.F.1.4.1, 2, 3, 7, 8; SC.G.2.4.2

- 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. LA.A.1.4.1, 2, 3, 4; LA.A.2.4.4; LA.B.1.4.1, 2, 3; LA.B.2.4.1, 2, 3; LA.C.1.4.1; LA.C.2.4.1; SC.D.1.4.1, 2; SC.F.1.4.1, 2, 3, 7, 8; SC.G.2.4.2
- 05.05 Analyze information from a pesticide label. MA.E.1.4.1; MA.B.1.4.1, 2; MA.B.2.4.1, 2; MA.B.3.4.1; MA.B.4.4.1, 2; SC.A.2.4.5
- 05.06 Propagate and grow plants through sexual and/or asexual reproduction. SC.B.1.4.1, 2; SC.D.1.4.1, 2; SC.F.1.4.1, 2, 3, 7, 8; SC.F.2.4.1, 3; SC.G.2.4.3
- 05.07 Investigate the impacts of various pests and propose solutions for their control. LA.A.1.4.1, 2, 3, 4; LA.A.2.4.4; LA.B.1.4.1, 2, 3; LA.B.2.4.1, 2, 3; LA.C.1.4.1; LA.C.2.4.1; SC.B.1.4.1, 2; SC.D.1.4.1; SC.F.1.4.1, 2, 3, 7, 8; SC.G.1.4.1; SC.G.2.4.2
- 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. LA.A.1.4.1, 2, 3, 4; LA.A.2.4.4; LA.B.1.4.1, 2, 3; LA.B.2.4.1, 2, 3; LA.C.1.4.1; LA.C.2.4.1; SC.B.1.4.1, 2, 3; SC.F.1.4.1, 2, 3, 7, 8; SC.G.1.4.1
- 05.09 Explore career opportunities in plant science. LA.A.1.4.1, 2, 3, 4; LA.A.2.4.4; LA.B.1.4.1, 2, 3; LA.B.2.4.1, 2, 3; LA.C.1.4.1; LA.C.2.4.1

**Resources / Materials Needed:**

1. Computer with internet access
2. LCD projector
3. Large Chart Paper
4. Colored Markers
5. Student Garden
6. Insect Collection cups
7. Insect Identification and Classification guides

**Procedure:**

There are several activities included in this unit plan. As an interest approach and to get the students to begin thinking about insect borne diseases on a world wide scale, start the unit with the PBS Rx for Survival activity.

***Rx for Survival Activity***

Use the following website to access the following video clips. As you show the clips, pause often and discuss the key concepts to ensure student comprehension.

<http://www.pbs.org/wgbh/rxforsurvival/series/video/index.html>

Malaria's Tenacious Grip  
 Preventing River Blindness  
 West Nile Virus in the USA

***Dead Mosquitoes versus Dead Children Web Quest***

Divide the students into groups of four. Each student will have a specific role and task, according to the Dead Mosquitoes versus Dead Children Web Quest. Use the following link to access the web quest.

<http://www.geocities.com/malariacontrol/webquest/>

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### ***Pesticide Label Activity***

It is extremely important that students have the ability to read common pesticide labels. Almost all households use pesticides, such as insecticides. The incorrect use or application of these controls can be harmful or fatal. This activity teaches students how to read pesticide labels and use pesticides in a safe way.

Use the following link to access a generic pesticide label. This link allows the teacher or student to point to a section of the label to access information.

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

Go over each section of the label with the students and discuss the importance and relevance for each section. If you wish to cover pesticide formulations, a good power point presentation can be accessed at:

<http://www.glenroseffa.org/lesson%20plans.htm>

The power point presentation is located under Plant Science and is entitled, *Pesticide Formulation*.

After the students know how to read a generic label, bring in a common household pesticide label, such as Ammdro Fire Ant Killer, Raid Ant and Roach Spray, etc. Photocopy the label so that each student has a copy. Create a list of questions that test the students' ability to read, understand, and correctly apply that pesticide.

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### ***Class Garden and Insect Collection Activity***

In the spring and fall, the Agriscience students planted, maintained, and harvested a class garden. In order to apply concepts that the students learned from this unit, I had the students collect and identify insects that were in the garden and around the school campus. The students had to identify the insect and list its correct insect order. In

addition, we had to apply a pesticide to kill fire ants. This allowed the students to demonstrate the appropriate use of a pesticide.

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Assessments:

1. Rx for Survival Activity: Class discussion about key concepts and short quiz
2. Dead Mosquitoes vs. Dead Children Web Quest: Includes assessment and rubric
3. Pesticide Label Activity: Written quiz
4. Student Garden: Teacher observation
5. Insect Identification: Accuracy of common names and insect orders
6. Pesticide Application: Teacher observation
7. Unit Test: Written

Evaluation / Reflection:

The only difficulty that I encountered with this unit, was with the web quest. Each student had a specific role for their particular group. If one of the students was absent, especially for more than one day, it affected the entire group. To prevent this problem, perhaps each group could be composed of eight students, rather than four. Each group would have two students serving in each role. That way if a student was absent, the group would still have another student serving that role.