Food Production: Fact or Fib?

Florida Ag in the Classroom

A Lesson Correcting Misconceptions

Science, Health ***Good Neighbor – Lesson #3***

Grades: 3-7

Brief Description:
The difference between fertilizer and pest control chemicals is often one of the concepts that students misunderstand. This is proven in documented "man in the street" interviews and focus groups. Students and adults hear the term fertilizer and their first reaction is toxic. They make the assumption that fertilizer is pesticide. This is not true. The two have different sources and serve very different functions. The intent of this lesson is to clear up those misconceptions as well as to teach students about the why we use pesticides, a few ways that pests spread diseases and compare this information with common understandings that students possess about human and animal diseases. This is intended as an introductory lesson on this topic.

Objectives By the end of this unit the students will be able to:
1. Identify factual information about food production from misinformation;
2. Explain the difference between fertilizer and pesticides; and
3. Compare and contrast basic information of human and plant diseases and pests.

Life Skills: 1. Understands Systems
2. Correcting Misconceptions
3. Critical Thinking

Materials:
Copies of Student Cards
LCD Projector
Computer with PowerPoint Capabilities

Next Generation Sunshine Standards Met:	
SC.3.L.17.2	Recognize that plants use energy from the Sun, air and water to make their own food.
SC.4.E.6.3	Recognize that humans need resources found on Earth and that these are either renewable or nonrenewable.
SC.7.L.17.2	Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism.
HE.3.P.1.2	Investigate a variety of behaviors that avoid or reduce health risks.
HE.4.B.3.3	Itemize healthy options to health-related issues or problems.
HE.4.C.1.4	Describe ways to prevent common childhood injuries and health problems
HE.4.P.1.2	Illustrate a variety of healthy practices and behaviors to maintain or improve personal health.
HE.5.C.1.5	Recognize how appropriate health care can promote personal health care
Standard Reinforced or Skill Utilized	
SC.2.L.17.1, SC.3.L.14.1, SC.4.E.6.6, SC.4.L.17.4, HE.4.B.3.3, HE.4.B.3.4, HE.4.B.3.5, HE.4.B.3.6, HE5.C.1.2, SC.7.L.17.	

Time: **Activity One:** 45 minutes

Activity Two: 45 minutes

Preparation:

1. Prior to conducting this lesson complete the "Squanto's Fertilizer" and Feed Me: Nutritional Building Blocks." lessons.
2. Make copies of the student pages and cut them into cards.
3. Decide how you would like to set up the class in small groups.
4. Print out the notes pages to deliver the PowerPoint Presentation or read through the notes and familiarize yourself enough to present the material.
5. Make copies of the student quiz.

Vocabulary: Antibiotics, Vaccine, vaccination

Background:

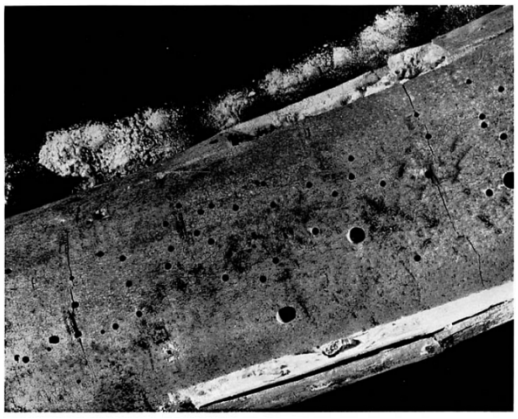
Fertilizer is produced from natural sources and enhanced to enable efficient and effective plant utilization. Pesticides can come from either natural sources or be created synthetically. This lesson is intended to surface student misunderstandings about fertilizer and pesticides and serve as an introduction to great exploration of the topics. Further information is found in the notes section of the PowerPoint presentation.

Activity One- Facts or Fibs?

1. Provide each small group with an equal amount of question cards.
2. Have the students decide if their questions are facts or if they are fibs as a group. The group has to come to consensus and make one decision.
3. Use the PowerPoint presentation to answer the questions – facts or fibs?
4. NOTE: The question of whether plants receive vaccinations to prevent disease has been answered that they do not. For most cases this is correct. However, scientists are researching the possibility of vaccinating plants. A few vaccines have been developed and are in use or being tested. This practice is not widespread or common in the care of plants. Whether it will become more common is unknown. Therefore, the issue has been answered as it is. It is up to you whether you wish to explain this to students. It may cause more confusion in a very gray area.

Activity Two- Food Production Issues

1. Discuss with the students the ways that insects harm humans and animals beyond the information given. (Termites and carpenter ants damage houses, Fire Ants sting and can harm wildlife, Africanized bees can sting to death, flying insects can defoliate trees in a forest, boring insects can create large holes that undermine the strength of trees and shrubs, they eat food crops and ornamentals, weevils damage flour and processed food, etc.)
2. Discuss whether insects and diseases are parasites or competitors with their hosts. (They play a number of roles with their hosts, intermediary hosts, and carriers.)
3. Have the students select one of these topics as a group and conduct research on the topic.
4. Have each group present the information they find in a variety of media. (For example: Students can take these questions and conduct a survey to identify how many people have misconceptions on these issues. Their results could be presented in graph form for each question.)



Evaluation

1. Have the students complete the chart provided as a quiz. Each answer is worth 5 points.

2. Assess the students' cooperation and performance on the group research project.

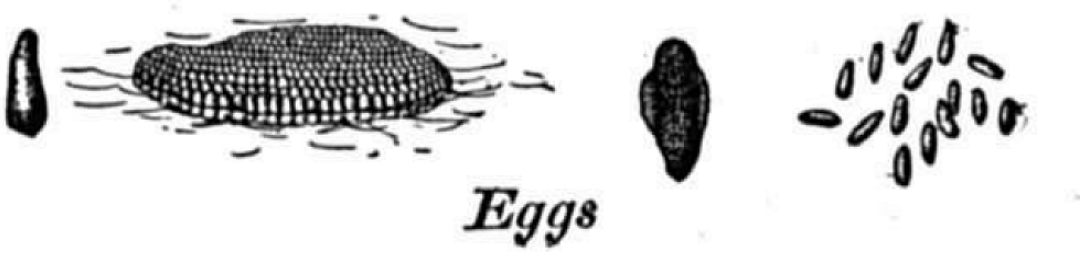
Extensions and Variations

1. Use this lesson to review information before beginning lessons on the carbon cycle or methods that plant use to convert sunlight into various metabolic pathways in grade 8.

Notes:

FACTS NOT FIBS ANSWER KEY

1. A. Nitrogen
   B. Phosphorous
   C. Potassium
2. A. Nitrogen
   B. Carbon
   C. Water
3. A. Controlling Biting and Sucking Insects from spreading disease
   B. Quarantine (prevent contact)
   C. Vaccination
4. A. Biting Insects
   B. Chewing Insects
   C. Sucking Insects
5. A. Aphids
   B. Beetles
   C. Caterpillars
6. (Also fleas, ticks, tse tse flies, mosquitoes, etc.)
   A. By Insects
   B. Person to person to person or animal to animal (Through blood or other body fluids)
   C. Plant to plant
   (Or in the air – atomized particles)
7. Vaccinations
8. Insecticide
9. A farmer would prevent new animals from being introduced into his/ her herd (quarantine), vaccinate animals for those diseases that vaccines have been developed for, control insects and fungi using pesticides, use antibiotics to treat sick animals, plant varieties of crops that are resistant to diseases or insects, use good cultural practices to control all kinds of pests.



Eggs

1. Nitrogen is a non-renewable resource.	**2. N-P-K is a fertilizer ratio found on every bag of fertilizer.**	**3. Many of the minerals that humans need in very small amounts for good nutrition are also needed by plants.**	**5. Fertilizer is the proper term for toxic chemicals applied to crops to kill insects.**
6. Plants can get diseases just as people and animals can.	**7. Insects can spread diseases.**	**8. If your family pet were infested with disease-causing insects you would take them to a veterinarian to get treatment.**	**9. To kill harmful insects, the vet would prescribe an insecticide to kill the insects.**
9. Biting and sucking insects do not spread diseases to plants.	**10. Plant diseases can wipe out crops, whole species of trees and cause famine.**	**11. Spreading disease is the only harm that insects do to crops and animals.**	**12. Diseases can spread from plant to plant and animal to animal without insects assisting the process.**

13. Many diseases in humans, animals and plants can be controlled.	**14. Prevention is one method to control diseases in humans, animals and plants.**	**15. Vaccination is one method to prevent diseases in humans and animals.**	**16. Vaccination can also prevent diseases in plants.**
17. Antibiotics are another method to control diseases in humans, animals and plants.	**18. Antibiotics prevent diseases in humans, animals and plants just as vaccines do.**	**19. Controlling insects is one way to prevent diseases in humans, animals and plants.**	**20. Farmers spray some crops with fungicides to prevent fungal diseases.**

Name _____ Quiz – Facts Not Fibs

Complete this chart with the correct answers:

1. What three nutrients are listed on every fertilizer bag?	2. List three renewable resources that cycle.	3. What are three ways to prevent diseases if plants and animals?
A._____ B._____ C._____	A._____ B._____ C._____	A._____ B._____ C._____
4. What types of insects can spread disease?	5. List three of those insects.	6. How can diseases be spread?
A._____ B._____ C._____	A._____ B._____ C._____	A._____ B._____ C._____
7. Which of these is used to prevent disease – antibiotics or vaccinations? _____	8. To prevent insects from spreading diseases to plants a farmer would use this to kill the insects: _____	

BONUS QUESTION: 10 points

9. A doctor would prevent many diseases in a patient by making sure he/she got vaccinations. A Veterinarian would make sure every dog and cat received a rabies vaccination to keep them and their owners safe from rabies. How would a farmer protect his or her crops or animals from diseases or pests? Give more than one example:

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