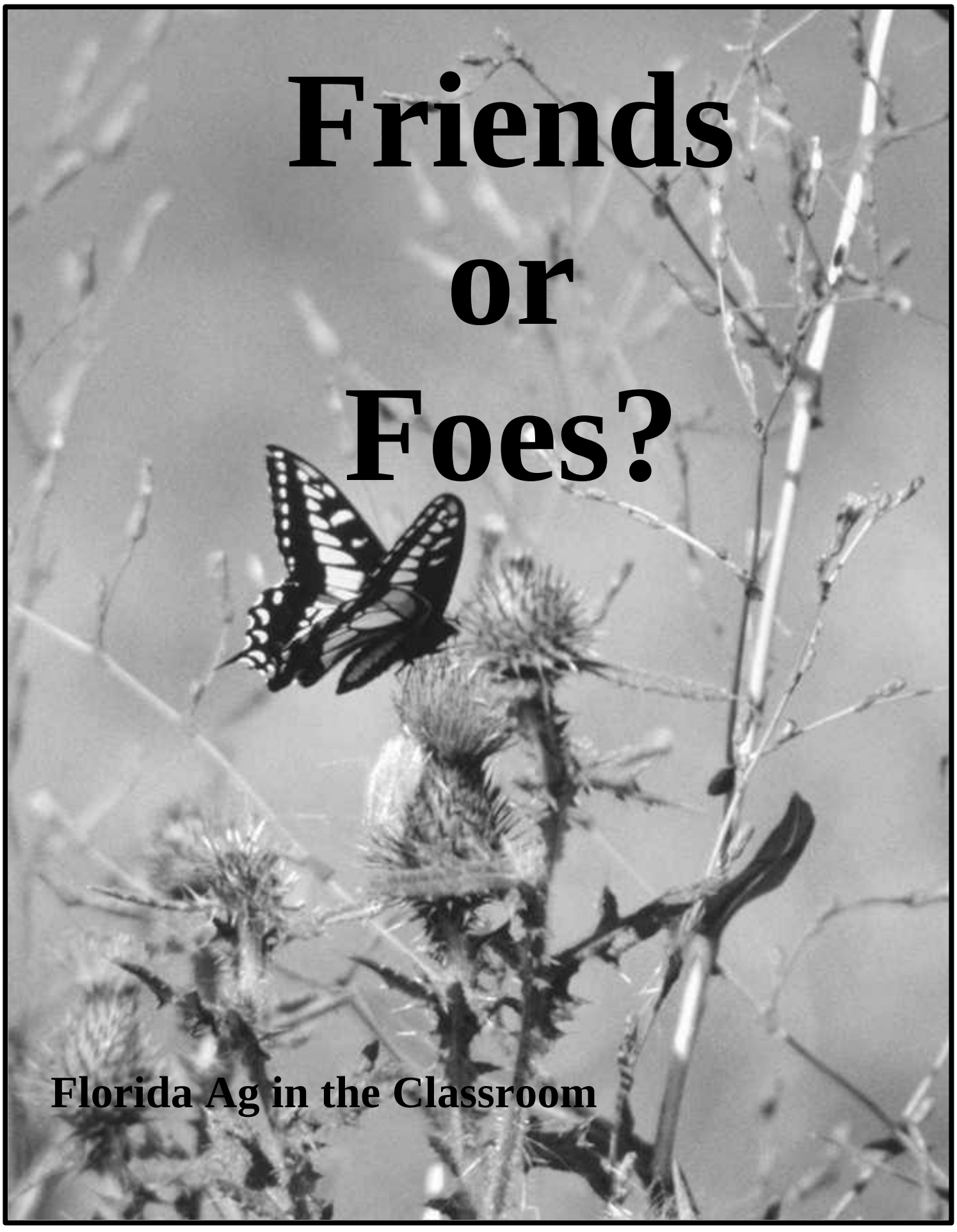

Friends or Foes?

Florida Ag in the Classroom

Friends or Foes?

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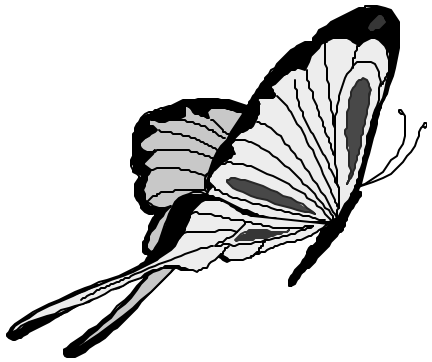


Friends or Foes?

Grade Levels - Middle School
Subjects - Science, Social Studies, Mathematics, Language Arts

Unit Overview

Unit Description: Pests can be harmful to the agricultural industry and humans. One of those pests, insects, can be either harmful or beneficial. Students will learn both beneficial and harmful interactions that humans and insects have. Students will learn about the gradual or complete metamorphosis that make up insects' life cycle. They will also learn about Integrated Pest Management or the minimization of pesticide use to control harmful risks to crops.

Sunshine State Standards:	
LA.A.2.3.1	**MA.A.3.3.2**
LA.A.2.3.5	**MA.A.3.3.3**
LA.B.1.3.1	**MA.B.3.3.1**
LA.B.2.3.4	**MA.D.1.3.2**
LA.E.1.3.3	**MA.E.1.3.1**
LA.E.1.3.4	**SS.A.1.3.1**
SC.F.1.3.1	**SS.A.1.3.2**
SC.F.1.3.7	**SS.A.2.3.3**
SC.G.1.3.3	**SS.A.3.3.3**
SC.G.1.3.4	

Pre-Tests/Post-Tests:
Several lessons have pre- and post-tests for your utilization, where appropriate.

Objectives: The students will:

1. define and describe pests.
2. describe pest categories and categorize pests into the appropriate category.
3. explore folklore and arts as it involves one segment of pests, insects.
4. use the Internet to obtain information about pests and their influence on human history, beneficial insects, pest control.
5. collect and identify various insects.
6. differentiate between gradual and complete metamorphosis.
7. determine the type of metamorphosis their collected insects undergo.
8. identify insects harmful to agricultural crops, animals, and humans and identify pest damage.
9. assess the severity of pests in a crop field.
10. determine the type and the amount of pest control to use to minimize pest damage.
11. identify and describe five beneficial insects.
12. read about and answer questions about Africanized honeybees.
13. explain integrated pest management.
14. discuss alternative pest control techniques.

Beneficial Insects

Florida Ag in the Classroom

Language Arts, Science ***Friends or Foes? - Lesson #4***

Brief Description: This lesson will further familiarize students with the role of beneficial insects in daily human life.

Objectives: Students will be able to:

❶ identify and describe five beneficial insects.
❷ use the Internet to obtain information about beneficial insects.
❸ read and answer questions about Africanized honeybees.

Sunshine State Standards:		
SC.F.1.3.1	-	understands that living things are composed of major systems that function in reproduction, growth, maintenance, and regulation.
LA.A.2.3.5	-	locates, organizes and interprets written information for a variety of purposes, including classroom research, collaborative decision making and performing a school or real-world task.
LA.B.2.3.4	-	uses electronic technology including databases and software to gather information and communicate new knowledge.

Life Skills:

❶ Acquiring, Analyzing and Using Information
❷ Understanding Systems

Materials:

- Copies of ***Africanized Honey Bees*** and ***Reading for Content*** question pages
- Computers with access to the Internet
- Copies of ***Insect Pollinators of Cultivated Crop Plants***

Time: three, 45 minute class periods, plus time for Internet research

Preparation:

- Make copies of ***Africanized Honey Bees*** and ***Reading for Content*** question pages.
- Arrange for computers with access to the Internet.
- Make copies of ***Insect Pollinators of Cultivated Crop Plants.***

Vocabulary: beneficial insects

Background:

Beneficial Insects:

Insects can directly provide several products we use in our daily lives. Silk from the silkworm, shellac from the lac scale, butterflies for jewelry, honey from honeybees, and dye from the cochineal scale. These are examples of insects which provide a primary benefit to man. Moreover, insects also provide many secondary or indirect benefits to man. For example, pollination of fruit and nut crops, biocontrol agents of weeds and insects, and as scavengers of carrion.

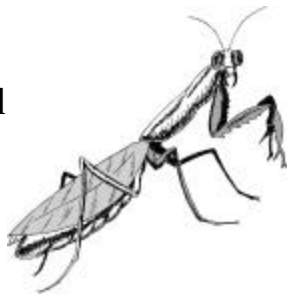
As beneficial insects that are used to control other damaging insects, these few insects can have a tremendous impact.

Dragonflies - These insects reduce the population of mosquitoes and other aquatic flies.

Lady beetles - There are 5,000 species worldwide and are one of the most beneficial insects in Florida. Adults and larvae feed on aphids, mites, and immature scale insects.

Earwigs - These prey upon insects such as chinch bugs, small mole crickets, and other insects on the soil surface.

Praying Mantis - These green or brown insects feed on a wide array of other insects including other praying mantises.



Green Lacewing - These insects feed on aphids and nectar as adults. In the larvae stage they eat aphids, small caterpillars, and beetles.

Honey Bees

The honeybee is perhaps the best-known and respected insect in the world. When the Europeans first came to America, they found many flowers, fruits, and vegetables, but no honeybees. Honeybees are not native to the Americas. In fact, honeybees were not introduced into the New World until the 17th century and were called by Native Americans the white man's fly. During the 1600s, settlers brought honeybee colonies with them from Europe, hence the name European honeybees. The honeybee is a very efficient pollen gatherer and today is the most important pollinator of our commercial crops.

Today, honeybees are commonly seen visiting flowers to gather nectar needed to produce the sweet food product, honey, that is associated with this insect. In the process of visiting blossoms, honeybees pollinate cultivated crops valued at $30 billion annually. Additionally, honeybees play

an important role in pollinating plants that are necessary for wildlife. Bees have numerous predators, including humans that take the honey, pollen, and beeswax that the colony produces for its survival. Consequently, honeybees have developed effective colony defense strategies. If unprovoked, honeybees rarely use their stingers; but if they do sting, they only do it once and die soon afterwards.

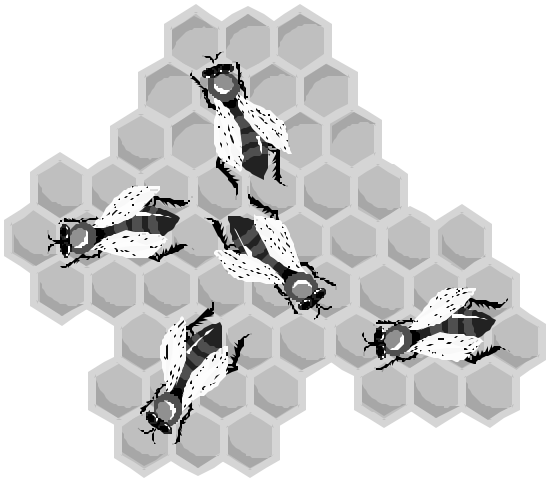
Honey

The major raw material for honey is nectar gathered from plant nectaries. A small percentage of honey is made from honeydew secreted by aphids. Most nectars contain water and sugar, mainly sucrose; the same sugar that is in table sugar. As the nectar is converted to honey, the water content is reduced to between 16 and 19 percent and the glucose is converted by invertase mainly to fructose (the most sweet common sugar) and glucose (the least sweet sugar, corn syrup). Each nectar also contains a unique blend of pigments, nutrients, and other components. This is what gives honey different tastes depending on the major nectar source. Honey also contains many vitamins, but often in concentrations too low to be used as a supplement.

As honey ages, it crystallizes; you have probably noticed this in your own honey jar. But, honey very rarely spoils; 3000-year-old honey has been found in the tombs of the pharaohs. In fact, honey can be used as an antiseptic.

Wax

It is estimated that a bee consumes 6 to 10 pounds (3 to 4.5 kg) of honey for each pound of the wax that it secretes in small flakes from glands on the underside of its abdomen. The beeswax is obtained, after removal of the honey, by melting the honeycomb, straining the wax to remove impurities, and pressing the residue to extract any



remaining wax. The purified wax is then poured into molds to solidify. Color and quality are preserved by melting the wax in water, avoiding direct heat; the wax may also be bleached. Beeswax is used for candles (religious ordinances often specify its use for church ceremonial candles), for artificial fruit and flowers, and for modeling wax. It is also an ingredient in the manufacture of furniture and floor waxes, leather dressings, waxed

paper, lithographic inks, cosmetics, and ointments.

Shellac

Shellac has been used since 1200 BC, and is made from an insect called the lac scale. The lac scale is a native of India and Burma and its host plant is related to the fig trees. The word lac is derived from the Sanskrit word, laksha that means 100,000 and refers to the large number of the minute insects required to produce lac. All female scale insects are wingless and the lac females cover their bodies with a resinous secretion. The resin hardens into a shield. Because the lac insect is sedentary, densities on branches can become very high. Branches on the host tree that become highly coated with the resin are referred to as a stick lac. The stick lac is ground up to free the lac granules that are crushed and boiled in water. The lac floats to the surface of the water and is skimmed from the surface and dried in the sun. After the lac is dried, it is placed in burlap bags and stretched over a fire. As it is heated, the bags are twisted and the melted lac drips out. Before the lac hardens it is stretched like toffee. After the lac hardens, it is broken up into pieces and sold. About 17,000 to 90,000 lac insects are needed to produce a pound of lac.

Besides shellac, lac is the basic ingredient of an amazing list of articles; stiffening agents in the toes and soles of shoes and felt hats, shoe polishes, artificial fruits, lithographic ink, glazes in confections, phonographic records, playing card finishes, and hair dyes.

Dyes

Another scale insect that is used by man is the cochineal scale. It feeds on cacti in Mexico and is used to produce a carmine colored dye. The Aztecs used cochineal to produce a red dye for use in foodstuffs and painting. The Spaniards enslaved the Aztecs to produce the dye, which was shipped back to Spain. The insects are carefully brushed from the cacti into bags and are then killed by immersion in hot water or by exposure to sunlight, steam, or the heat of an oven; much of the variety in the appearance of commercial cochineal is caused by the differing modes of treatment. It takes about 70,000 insects to make one pound of cochineal. Although for most uses cochineal has been replaced by synthetic dyes, it continues to be used as a coloring agent in cosmetics and beverages. Many other scale insects have also been used to make dyes. The Greeks used kermes, a brilliant red dye, and it was so prized by the Romans that the insects were used as tribute from conquered nations. Margarodes, another dye produced from scale insects, was harvested about the time of feast day for St. John; hence it was called St. John's Blood.

Ink

The Aleppo gall has been used since the time of the Greeks as a nonfading ink. It is also used by the United States Treasury in the formula for money ink. The gall is made by a small wasp; the

female deposits an egg on oak trees found in Eastern Europe and in western Asia. Once the larva starts to feed, the plant reacts by forming a cancerous like growth, called a gall. There are many types of insect galls, you have probably seen the one which forms on golden rod.

Silk

Sericulture, or the culturing of silkworms, is at least 4000 years old. The silkworm moth is a completely domesticated insect and is no longer capable of living in the wild. Silk is prized as a fabric because it is finer than human hair, lighter than cotton, and stronger than steel. In 1881, a man was shot in the chest at close range by a pistol. But there was no bleeding. When examined the bullet was found to have penetrated his jacket, bones, and tissues. A silk handkerchief, found in the pocket, was not torn by the bullet and was pushed into the wound where it stopped the bleeding. Several historical offshoots are related to sericulture. In 19th century France, sericulture was an important industry but the silkworms were dying of a mysterious disease called Pebrine disease. Louis Pasteur was begged by the French government to help find a cure for the disease, which was ruining the French sericulture industry. Five years later, Louis Pasteur demonstrated that the disease was contagious and was spread by microscopic creatures. The theory of disease contagion was based on Pasteur's work with Pebrine disease. In an attempt to start a North American silk industry, a Eurasian moth, the gypsy moth, was imported into Massachuetts. The moth did not prove to be a very effective silk producer, but it became very important when it escaped and became one of the most devastating pests of trees in the Northeast. It has spread as far west as Minnesota. Dragline silk from the golden orb-weaving spider, *Nephila clavipes*, is now being investigated as an even stronger more resilient silk. It is tougher, stretchier, and more waterproof than insect silk. Today's synthetic fibers cannot match it. Synthetic spider silk will be used to make stronger ropes, nets, seatbelts, and parachutes, rust free panels and bumpers for automobiles, and medical supplies such as sutures, bandages, artificial tendons & ligaments, and supports for weak blood vessels.

Medicines

Since the beginning of time, humans have used various insects as cures for sicknesses, such as leprosy, fever, headaches, wounds and many other as maladies. Today, many Chinese use insects for everything from tinnitus to dermatitis. Some of these cures are documented to be effective.

Maggots and Medicine

During the Civil War, the wounded often did not receive prompt treatment. When finally examined, some of the casualties had fly maggots in the wound area. The doctors observed that wounds that were infested with maggots seemed to heal faster, there was less infection, and amputation was not needed as often. The maggots are

larvae of the blowfly. These maggots only feed on dead or decaying flesh and do not harm living and healthy flesh. Additionally, they excrete urea, which acts like an antiseptic, thus keeping the wound clean. In fact, these maggots were used in hospitals to clean wounds until cheaper antibiotics and antiseptics were found. Today, in severe burn cases where the old skin has to be removed or for wounds that will not heal, maggots are still used.

Bandages and Stitches

Ants from the silk cotton tree collect lint that can be used as a bandage to stop bleeding. Spider webs also help stop bleeding. If the wound is too large for bandaging, try soldier ants. By holding the wound together and letting the ants bite so that their mandibles go across the wound, they will pull the tissue together and suture the cut closed. They do not let go even if their bodies are cut off.

Arthritis

An old-fashioned cure for stiff joints is a bee sting. Beekeepers have less arthritis than most people and they claim that frequent bee stings keep their joints supple. Research is underway today to determine the effectiveness of these claims.

Insects As Food

Many cultures consider insects a delicacy and some may not have survived without the use of insects in their diet. It is not unusual to see a Chinese child munching on a diving beetle during a stroll through a park. Native Americans used grasshoppers to sustain themselves during the long winter months. How many of you enjoy lobster tails or crab legs? Remember that they are closely related to insects. Crabs and lobsters feed on decaying animals, so what would you rather eat, something that eats dead fish heads or nice clean plants? Are insects nutritious? We need vitamins, minerals, carbohydrates, fats and proteins to maintain good health. We must get vitamins from our diet,our bodies cannot manufacture them. Silkworm pupae have ample amounts of vitamin A, locusts are rich in riboflavin and niacin, and honeybee larvae contain high amounts of vitamin D.

Activity One:

1. Review what the students have learned about insects as pests and ask if there are ways that insects are beneficial to humans. *(See list and descriptions in the background.)*
2. Have the students select one of the beneficial insects listed above or others if they'd prefer, conduct Internet research on them and prepare an oral report and poster project on one.
3. Have the students develop a worksheet, table or crossword puzzle for their classmates to complete as they give their report.

Activity Two:

1. Hand out copies of the ***Africanized Honey Bee*** article and ***Reading For Content*** questions.
2. Have students read the article and answer the questions.

3. Discuss the information with the students.

Activity Three:

1. Hand out copies of the ***Insect Pollinators of Cultivated Crop Plants***, one per student.
2. Have students read the list and discuss how many of their favorite foods would be unavailable without pollinators.
3. Have the students write an acrostic, poem or rap that includes at least 20 of these crops.

Extensions or Alternatives:

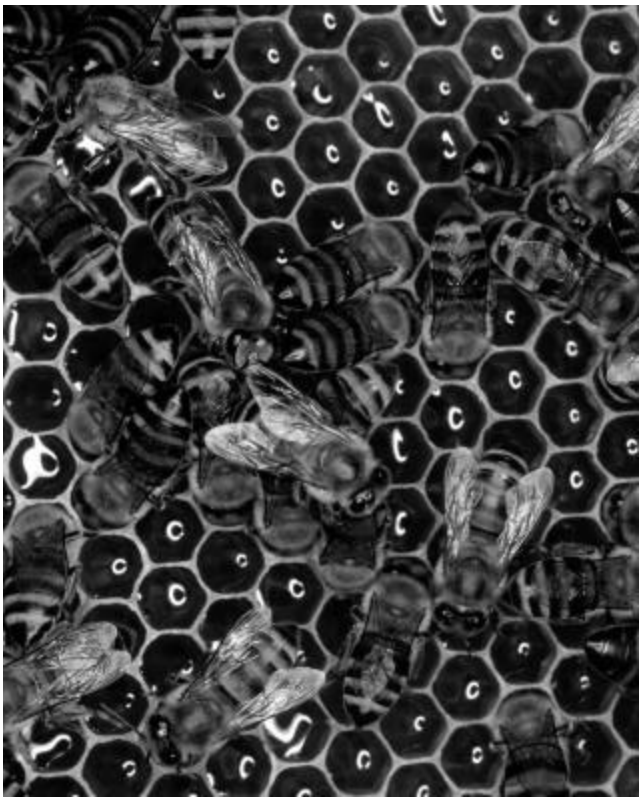
1. Divide the class into small groups to complete activity one.
2. Have the students research the dance of the honeybee and use it to communicate a message to their classmates.
3. Invite a beekeeper into class with his hive of bees as a speaker.
4. Using information found on the websites, have students create a tivia quiz or game.

Evaluation Options:

1. Evaluate the oral reports of the students, their posters and creative tools they developed for other students to use.
2. Assess the accuracy of the reading for content answers.
3. Evaluate the creative efforts in activity three and include the work in the student's portfolio.

Resources:

1. The number of websites that provide reliable, science-based information on entomology is phenomenal. A thorough website listing of sites is found in the appendices. Several excellent sites follow.
2. An adjudicated site that has screened hundreds of sites and recommends the best sites and resources available is developed by the University of Florida at Gainesville. http://www.ifas.ufl.edu/~entweb/uf-bob/.



3. BugBios, Insects on the Web, http://insects.org/index.html.

4. Insect Zoo, http://www.naturalpartners.org/InsectZoo/TableOfContents/index.html.
5. Orkin Insect Zoo: Bibliography -- Young Adult and Adult Insect Books. http://www.naturalpartners.org/InsectZoo/Bibliography/adultBooks.html.
6. Young Entomologist Society, MiniBeast Museum, http://members.aol.com/YES/minimenu.html

ANSWERS FOR READING FOR CONTENT

1. a
2. b
3. d
4. c
5. c

Notes:

Africanized Honeybees

In 1956, researchers in Brazil attempted to develop a more appropriate honeybee than the races that had been imported from Europe. Honeybee queens from Africa, whose offspring were presumably better suited for tropical Brazilian conditions, were imported and established in test colonies in Rio Claro, Sao Paulo, Brazil. In 1957, some African bee swarms escaped into the Brazilian countryside where their queens hybridized with the more docile resident European honeybees. African honeybee queens were also given to beekeepers at that time. The offspring of these bees defended their nests more vigorously, swarmed more often, and were generally better suited for survival in the tropics than European honeybees. Researchers named this African - European hybrid the Africanized honeybee. However, as a result of widely publicized stinging incidents, the movie industry and media used the name "Killer Bee" to describe the Africanized honeybee, thus giving the public serious misconceptions about this type of honeybee. Occasional swarms on ships coming from South and Central America are a concern, but are not major threats to the public or to the beekeeping industry. The first Africanized honeybee colony found in the United States (as a result of natural range expansion) was reported on October 15, 1990, at Hildago, Texas, very near the Mexican border. Other Africanized honeybee swarms have been found since then, but all known Africanized honeybee swarms have been destroyed.

Defensive Behavior Of Africanized Honeybees

Unlike the docile European honeybees common in the United States, the Africanized honeybee defends its hive more quickly and will pursue intruders greater distances. Most serious stinging incidents have involved animals; but, on rare occasions, humans have also been stung. Stinging occurs after a human or animal has intruded the territory of the honeybee colony. In some cases, vibrations from machinery have provoked stinging incidents. Chance encounters with individual Africanized honeybees on blossoms pose no greater threat than an encounter with European honeybees. Even though mass stinging is terrifying and could be life threatening, it is rare. Also, the venom from one Africanized honeybee sting is no more potent than the venom of a single European honeybee's sting. Common sense is the best defense for avoiding stings from all stinging insects - not just honey bees. If you are being stung, or you are in the vicinity of large numbers of insects you think might sting, calmly, but quickly, move away from the area.

Other Africanized Honeybee Traits

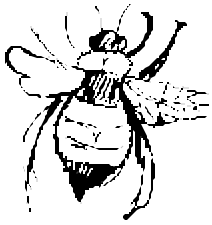
In spite of its "big" reputation, the Africanized honeybee is actually smaller than the European honeybee. However, the difference is not obvious. For identification, special techniques must be used. Beekeepers in areas recently Africanized commonly complain that honey yields have dropped precipitously. However, after developing different management schemes over several years, honey yields in Africanized areas have recovered somewhat.

The Africanized honeybee produces swarms more often than the European honeybee currently found in the United States. This is due in part to their shorter development time and the propensity to use resources to rear more bees, rather than to store their resources for periods of shortage. Consequently, Africanized honeybees sometimes gain a population advantage over European honeybees. Africanized honeybees frequently construct nests in exposed areas that would rarely be selected by European honeybees. However, the higher frequency of exposed nests could be because the preferred sites are occupied. Since these bees are well suited for life in warm climates, there is reason to believe that the warmer states will have to contend with feral Africanized honeybee establishment first. However, due to potential encounters with European honeybees in great numbers, the Africanized honeybee could become further hybridized. In the future, even honeybees in northern states may show some Africanized honeybee traits. Both European honeybees and Africanized honeybees require pollen collected from plants as a protein source. The Africanized honeybees' unique manageability characteristics concern many U.S. beekeepers who move thousands of colonies each season for crop pollination and honey production.

If Africanization Is Suspected

If Africanization is suspected, contact your county agent, state apiarist, state beekeeping extension specialist, or the local bee inspector for help. Determining whether or not Africanization has occurred is a difficult procedure that will require technical assistance. The county extension office will usually have the address and telephone numbers for authorities who can help.

Understanding The Africanized Honey Bee



Scientists have studied the Africanized honeybee in other countries for many years. These projects conducted in Argentina, Venezuela, French Guiana, Brazil, and other South and Central American countries during the past twenty years have yielded much information about Africanized honeybee behavior and biology. Cooperative programs between the United States and Mexico have also been helpful in understanding the Africanized honeybee's swarming behavior and rate of spread. Though much has been learned about the Africanized honeybee, more research is needed.

Articles about deaths associated with the Africanized honeybee have been published, but the actual number of deaths has been very small. Statistically, everyday risks, such as auto accidents, pose a much greater risk to the public. The public should stay informed about issues concerning Africanized honeybees, but not be unduly alarmed. Any future Africanized honeybee problems are not without solutions.

This article was adapted from a fact sheet prepared by Dr. James E. Tew, National Program Leader, Apiculture, Extension Service, United States Department of Agriculture (USDA) and The Ohio State University at Wooster, Ohio and Dr. Anita M. Collins, Research Leader, Honey Bee Research Laboratory, Agriculture Research Service, USDA, Weslaco, Texas in cooperation with the USDA Interagency Technical Working Group on the Africanized Honey Bee.

Florida Ag in the Classroom

Name _____Reading For Content

Africanized Honeybees

Read the article on Africanized Honeybees and then answer these questions. Please read carefully and select the best answer by circling it.

1. Why were African honeybees brought to the Americas?
   a. to develop a honeybee better suited for South America
   b. to attach bees in the U.S as a form of warfare
   c. to create killer bees
   d. none of the above
   d. all of the above

2. Africanized honeybees are _____compared to European honeybees.
   a. more docile
   b. more aggressive
   c. easier to handle
   d. none of the above

3. Africanized honeybees can be brought to attack in mass by:
   a. an attack on their hive.
   b. the vibrations of heavy machinery.
   c. a person stepping on a nest.
   d. all of the above.

4. If you were to find an Africanized honeybee hive, you should:
   a. hit it with a stick to kill the queen.
   b. leave it alone and tell no one.
   c. leave it alone and call the county agent or a local beekeeper.
   d. all of the above.

5. The Africanized honeybees are:
   a. easy to tell apart from European honeybees.
   b. larger than European Honeybees.
   c. slightly smaller that European honeybees.
   d. all of the above.

Insect Pollination Of Cultivated Crop Plants

by S.E. McGregor, USDA

Originally published 1976

Alfalfa
Allspice
Almonds
Anise
Apple
Apricot
Artichoke
Asparagus
Avocado
Beans of all types
Beet
Black Berry
Black Pepper
Blueberry
Broccoli
Brussel Sprouts
Buckwheat
Cacao (Cocoa beans)
Cabbage
Carambola
Caraway
Cardamon
Carrots
Cashew
Cauliflower
Celeriac
Celery
Cervil
Chayote
Cherimoya
Cherry
Chestnut
Chicory
Chives
Citrus of all types
Clove
Clovers
Coconut
Coffee
Coriander
Cotton
Crabapple
Cranberry
Cucumber
Currants
Dates
Dill
Eggplant
Endive
Fennel
Figs
Flax (linen)
Gherkins
Gooseberry
Gourds
Grapes
Guava
Herbs
Huckleberry
Kenaf
Kiwi
Kola nut
Lavender
Leeks
Lettuce
Litchi
Loquat
Macadamia Nuts
Mangos
Mace
Muskmelon
Mustard
Nectarines
Nutmeg
Okra
Olives
Onion
Papaws
Papayas
Parsley
Parsnips
Passion Fruit
Peppers of all types
Peaches
Pears
Peas of all types
Peanuts
Persimmons
Plums
Pomegranate
Prunes
Pumpkins
Quince
Radish
Raspberry
Rutabaga
Safflower
Sesame
Squash
Strawberry
Sunflower
Tea
Tomato
Trefoil
Turnip
Vanilla
Vetch
Watermelon
White Pepper

Insects on the Web

Honeybees

Tales From the Hive
http://www.pbs.org/wgbh/nova/bees

Bee Article
http://www.slimeworld.org/honey/bbarfart.html

Beekeeping
http://www.edis.ifas.ufl.edu/scripts/htmlgen.exe
http://www.ces.ncsu.edu/depts./ent/notes/Beekeeping/bee15.html
http://edis.ifas.ufl.edu/BODY_AA088

Glorybee Foods, Inc.
http://glorybee.com/art13.html

Honey.com
http://www.honey.com

The Honeybee Dance
http://gears.Tucson.ars.ag.org/ic/dance/dance.html
http://ourworld.compuserv.com/homepages/Beekeeping/beedance.htm

Honeybee Trivia
http://www.umt.edu/biology/bees/trivia.htm

NASS Report
http://gears.Tucson.ars.ag.gov/dept/adf.html

National Honey Board
http://www.nhb.org

The Value of Honey Bees as Pollinators of U.S. Crops in 2000
http://bee.airoot.com/beeculture/pollination2000/pg1.html

General Insect Topics

Arthropod Trivia
http://members.aol.com/YESedu/trivia.html

Basic Facts: Benefits of Insects
http://www.natural partners.org/InsectZoo/Student/Basic.benefits.html

Basic Facts: Harm Done by Insects and Spiders
http://www.natural partners.org/InsectZoo/Student/Basic.harm.html

BugBios, Insects on the Web
http://insects.org/index.html.

Bumble Bees
http://www.farminfo.org/bees/bumble-bees-m.htm
http://www.Cardiff.ac.uk/ibra/bumble.html
http://Hercules.users.netlink.co.uk/Bee.html

Classification and Identification
http://members.aol.com/YESedu/arthrocl.html

Insect Zoo
http://www.naturalpartners.org/InsectZoo/TableOfContents/index.html.

Insect Goods and Services
http://www.ndsu.nodak.edu/instruct/brewer/goods.htm

Insect Recipes
http://www.ent.iastate.edu/misc/insectsasfood.html

Insect Trivia
http://www.ag.auburn.edu/dept/ent/misc/trivia.html

Insect World
http://www.inearthlife.net/insects/

Insects in Chinese Culture
http://ux6.cso.uiuc.edu/~z-huang/insect.html

Introduction to Insects
http://members.aol.com/YESedu/introbug.html

MINIBEAST FOLKLORE
http://members.aol.com/YESedu/folklore.html

MINIBEAST MUSEUM
http://members.aol.com/YES/minimenu.html

Young Entomologist Society, MiniBeast Museum
http://members.aol.com/YES/minimenu.html

Sites that Have Been Screened

Best of the Bugs
http://www.ifas.ufl.edu/~entweb/uf-bob/.

Bibliography: Young Adult and Adult Books
http://www.naturalpartners.org/InsectZoo/Bibliography/adult Books.html

Iowa State Entomology Index : K-12 Educators' Recommended Sites
http://www.ent.iastate.edu/List/k-12_educator_resources.html