

Lesson B2–15

Exploring the Bee Industry

Unit B. Animal Science and the Industry

Problem Area 2. Identifying and Understanding the Segments of the Animal Science Industry

Lesson 15. Exploring the Bee Industry

New Mexico Content Standard:

Pathway Strand: Animal Systems

Standard: I: Apply knowledge of anatomy and physiology to produce and/or manage animals in a domesticated or natural environment.

Benchmark: I-A. Use classification systems to explain basic functions of animal anatomy and physiology.

Performance Standard: 1. Describe functional difference in animal structures and body systems. 2. Classify animals according to anatomy and physiology.

Student Learning Objectives. Instruction in this lesson should result in students achieving the following objectives:

1. List general bee and honey facts.
2. Identify bee and honey term definitions.
3. Describe where to locate an apiary and where to get bees.
4. Discuss hive management.

List of Resources. The following resources may be useful in teaching this lesson:

A.I. Root Company, Publishers, *Starting Right With Bees*. Medina, Ohio: A.I. Root Company. 1974

Recommended Resources. One of the following resources should be selected to accompany the lesson:

Cooper, Elmer L., Burton, DeVere L., *Agriscience Fundamentals and Applications*. Albany, New York: Delmar. 2002 (Textbook Unit 29)

Other Resources. The following resources will be useful to students and teachers:

Internet keywords: bees, hive, honey, comb, apiculture, and apiary

List of Equipment, Tools, Supplies, and Facilities

Writing surface
Overhead projector
Transparencies from attached masters
Copies of student lab sheet

Terms. The following terms are presented in this lesson (shown in bold italics):

Apiary
Bee eggs
Bee wax
Brood
Casts
Drones
Extractor
Foraging
Foul brood
Hive
Honey
Honeycomb
Mead
Queen bee

Interest Approach. Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

Bring in honey products like wax, honey, an old hive or any other product you have access to and display them on a table. Start a discussion with students about each product.

Summary of Content and Teaching Strategies

Objective 1: List general bee and honey facts.

Anticipated Problem: What are some interesting facts related to bees and honey production?

- I. Here are a few facts about bees and honey production:
 - A. Honey bees can fly 15 miles per hour.
 - B. Honey consists of 80 percent sugar and 20 percent water.
 - C. In the central brood nest, bees maintain a temperature of 92–93 degrees Fahrenheit no matter what the outside temperature.
 - D. One pound of beeswax requires bees to produce 17–20 pounds of honey.
 - E. The term honeymoon describing newlyweds originated because of the Norse tradition of consuming large amounts of mead during the first month of marriage. **Mead** is fermented honey and the most ancient known fermented beverage.
 - F. During the 3–4 year lifespan of the queen, she can lay 2,500 eggs each day. Daily egg production can even equal the weight of the queen bee.
 - G. One single colony can contain up to 60,000 bees during peak pollination times.
 - H. Normal distance bees fly to obtain food is 1–2 miles.
 - I. The brain of worker bees has the densest neuropile tissue of any animal known.

Use TM: B2–15A as a handout to discuss honey bee facts.

Objective 2: Identify bee and honey term definitions.

Anticipated Problem: What are definitions for bee and honey terms?

- II. It is always important to know terminology specific to an industry if you want to discuss it intelligently. The following are common terms used in alphabetical order.
 - A. An **apiary** is where a hive or group of hives is managed.
 - B. A **brood** refers to the eggs and larvae of the hive.
 - C. Small swarms that come from a hive after the main swarm are called **casts**.
 - D. Male bees that mate with virgin queens are much bigger than worker bees and are called **drones**.

- E. **Bee eggs** are laid in a brood cell and will emerge 16–24 days later.
- F. A barrel-like machine used to extract honey from its comb is called an **extractor**. Extractors come in many forms and are made from various materials.
- G. Workers that leave the hive to collect pollen, water, and nectar are said to be **foraging**.
- H. **Foul brood** is the most serious of all bee diseases.
 - I. The **hive** is the bee’s home.
 - J. **Honey** is the product produced by bees from nectar and is stored and used for food. The excess honey not needed by the bees is harvested by the beekeeper.
- K. The **honeycomb** consists of hexagonal cells built up on the side of a central vertical wall and used to store the honey.
- L. The **queen bee** is the mother of the hive and lays eggs but does not leave the hive unless she decides to swarm.
- M. **Bee wax** is secreted by the worker bees from their wax glands in order to build the honey comb.

Use TM: B2–15B to discuss bee terms.

Objective 3: Describe where to locate an apiary and where to get bees.

Anticipated Problem: Where should I locate an apiary and get my bees?

- III. There are many questions to ask before you start your bee enterprise, but none more important than where to locate your apiary and where to get your bees.
 - A. Orchards are wonderful places to put the apiary because they provide shelter from sun and wind and provide immediate accessibility to pollen and nectar. If you live in the country, try to block the hottest sun of the day to help keep your bees comfortable. Also block high winds, especially cold winds. You can make a simple wind block out of boards or shrubs. In more populated areas, place bees as far away from neighbors as possible. Since many people are scared of bees it is necessary to keep the bees out of trouble. Always place the main hive entrance so that it is free from obstructions. Bees get very angry if their line of flight or main entrance gets blocked. Since bees travel a couple of miles for nectar you do not have to be concerned with providing them with enough. They will most likely find everything they need on their own.
 - B. Obtaining bees starts with deciding on a specific species. The possibilities include:
 - 1. Italians
 - 2. Anatolians
 - 3. Carniolans
 - 4. Caucasians
 - C. Always make sure you buy bees that are free from disease. You can buy bees by themselves or with all the equipment included. You can buy or obtain swarms or you can even buy bees by the pound.

Use TM: B2–15C as an overhead to discuss species of bees.

Objective 4: Discuss hive management.

Anticipated Problem: What are some good practices to follow when managing hives.

- IV. Here are some practices to follow in order to manage bees properly.
- A. Become familiar with any pesticides used in your area that could effect your honey or bees.
 - B. Limit swarming of bees by giving all bees enough space in the hive.
 - C. Keep harvested honey away from the bees so they cannot steal it back.
 - D. Place hives in an area protected by prevailing winds.
 - E. Make sure there are no local regulations that prevent you from having bees before you go and get them.
 - F. Always purchase bees from reputable bee sources.
 - G. Replace the queen bee every two years.
 - H. Have bees inspected once a year and before you buy or sell any.
 - I. If you don't want bees to return to a former site, move them at least 5 miles away from the original site.
 - J. Make sure there is a market for your honey before you make a bunch.

Use TM: B2–15D to discuss bee management. Use LS: B2–15A to make a product using honey.

Review/Summary. Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used to determine which objectives need to be reviewed or taught over with a different approach. Questions provided in the recommended textbooks may also be used to help review.

Application. Application can involve student activity with the provided labs.

Evaluation. Evaluation should focus on student achievement of the objectives for each lesson. Various techniques can be used, such as performance, on the application activities. A sample written test is attached.

Answers to Sample Test:

Part One: Matching

1 = h, 2 = f, 3 = d, 4 = b, 5 = a, 6 = c, 7 = e, 8 = g

Part Two: Completion

1. casts

2. hive
3. queen bee
4. drones
5. Foul brood
6. Mead

Part Three: Short Answer

Any five of the following are correct:

1. Become familiar with any pesticides used in your area that could effect your honey or bees.
2. Limit swarming of bees by giving all bees enough space in the hive.
3. Keep harvested honey away from the bees so they cannot steal it back.
4. Place hives in an area protected by prevailing winds.
5. Make sure there are no local regulations that prevent you from having bees before you go and get them.
6. Always purchase bees from reputable bee sources.
7. Replace the queen bee every two years.
8. Have bees inspected once a year and before you buy or sell any.
9. If you don't want bees to return to a former site, move them at least five miles away from the original site.
10. Make sure there is a market for your honey before you make a bunch.

Test

Lesson B2–15: Exploring the Bee Industry

Part One: Matching

Instructions. Match the term with the correct response. Write the letter of the term by the definition.

- | | | |
|-----------|--------------|-------------|
| a. Apiary | d. Bee eggs | g. Bee wax |
| b. Brood | e. Extractor | h. Foraging |
| c. Honey | f. Honeycomb | |

- _____ 1. Workers that leave the hive to collect pollen, water and nectar.
- _____ 2. Consists of hexagonal cells built up on the side of a central vertical wall and used to store the honey.
- _____ 3. Laid in a brood cell and will emerge 16–24 days later.
- _____ 4. The eggs and larvae of the hive.
- _____ 5. Where a hive or group of hives is managed.
- _____ 6. The product produced by bees from nectar and is stored and used for food.
- _____ 7. A barrel-like machine used to extract honey from it's comb.
- _____ 8. Secreted by the worker bees from their wax glands in order to build the honey comb.

Part Two: Completion

Instructions. Provide the word or words to complete the following statements.

1. Small swarms that come from a hive after the main swarm are called _____.
2. The _____ is the bee's home.
3. The _____ is the mother of the hive and lays eggs but does not leave the hive unless she decides to swarm.
4. Male bees that mate with virgin queens and are much bigger than worker bees are called _____.
5. _____ is the most serious of all bee diseases.
6. _____ is fermented honey and the most ancient known fermented beverage.

Part Three: Short Answer

Instructions. Provide information to answer the following questions.

What are five good management practices to follow with bees?

HONEY BEE FACTS

- **Honey bees can fly 15 miles per hour**
- **Honey consists of 80 percent sugar and 20 percent water.**
- **In the central brood nest, bees maintain a temperature of 92–93 degrees Fahrenheit no matter what the outside temperature.**
- **One pound of beeswax requires bees to produce 17–20 pounds of honey.**
- **The term honeymoon describing newlyweds originated because of the Norse tradition of consuming large amounts of mead during the first month of marriage. Mead is fermented honey and the most ancient known fermented beverage.**
- **During the 3–4 year lifespan of the queen, she can lay 1,500 eggs each day. Daily egg production can even equal the weight of the queen bee.**
- **One single colony can contain up to 60,000 bees during peak pollination times.**
- **Normal distance bees fly to obtain food is 1–2 miles.**
- **The brain of worker bees has the densest neuropile tissue of any animal known.**

BEE TERMINOLOGY:

- **An apiary is where a hive or group of hives is managed.**
- **A brood refers to the eggs and larvae of the hive.**
- **Small swarms that come from a hive after the main swarm are called casts.**
- **Male bees that mate with virgin queens and are much bigger than worker bees are called drones.**
- **Bee eggs are laid in a brood cell and will emerge 16–24 days later.**
- **A barrel-like machine used to extract honey from it's comb is called an extractor. Extractors come in many forms and are made from various materials.**
- **Workers that leave the hive to collect pollen, water and nectar are said to be foraging.**
- **Foul brood is the most serious of all bee diseases.**
- **The hive is the bee's home.**
- **Honey is the product produced by bees from nectar and is stored and used for food. The excess honey not needed by the bees is harvested by the beekeeper.**
- **The honeycomb consists of hexagonal cells built up on the side of a central vertical wall and used to store the honey.**
- **The queen bee is the mother of the hive and lays eggs but does not leave the hive unless she decides to swarm.**
- **Bee wax is secreted by the worker bees from their wax glands in order to build the honey comb.**

SPECIES OF BEES

Italians

Anatolians

Carniolans

Caucasians

SOME PRACTICES TO FOLLOW IN MANAGING BEES

- **Become familiar with any pesticides used in your area that could effect your honey or bees.**
- **Limit swarming of bees by giving all bees enough space in the hive.**
- **Keep harvested honey away from the bees so they cannot steal it back.**
- **Place hives in an area protected by prevailing winds.**
- **Make sure there are no local regulations that prevent you from having bees before you go and get them.**
- **Always purchase bees from reputable bee sources.**
- **Replace the queen bee every two years.**
- **Have bees inspected once a year and before you buy or sell any.**
- **If you don't want bees to return to a former site, move them at least 5 miles away from the original site.**
- **Make sure there is a market for your honey before you make a bunch you have no place to go with.**

Lab Sheet

Purpose:

To make honey butter to show a way to use honey.

Materials:

Bowl
1 cup whipped or creamed honey
2 sticks or ½ pound butter
Spoon
Jar with lid

Procedure:

In a bowl, mix honey and butter together. Put into jar and secure lid or use immediately on bread or toast. Store unused portion in a refrigerator.