

THE BUZZ ON BEES

75 MINUTES
SBI3U, SBI3C

A high school lesson plan provided by the University of Guelph

This activity will allow students to use their understanding of the honey bee and expand their knowledge on the social structure and anatomy of a bee. Students will be able to test their knowledge of these important insects through this interactive lesson plan.

Curriculum Alignments and Expectations

- Explain the fundamental principles of taxonomy and phylogeny by defining concepts of taxonomic rank and relationship, such as genus, species, and taxon
- Describe unifying and distinguishing anatomical and physiological characteristics (e.g., types of reproduction, habitat, general physical structure) of representative organisms from each of the kingdoms
- Explain the reproductive mechanisms of plants in natural reproduction and artificial propagation
- Assess the positive and negative impact of human activities on the natural balance of plants

Learning objectives

- Apply knowledge of the honeybee
- Discover the differences between the types of bees
- Learn the honeybee anatomy
- Develop understanding by taking part in demonstrations and activities

Assessment Strategies and Success Criteria

- Open-ended questions
- Think-pair-share
- Group summary and debrief
- Peer instructors
- Quiz

Cross Curricular Links

- Career Studies – Identifying Trends and Opportunities
- Environmental Science – Human Health and the Environment
- Geography – Human Impacts on Natural Spaces and Species

Materials

- “Who is this Bee?” handouts (comparison chart, queen bee, worker bee and drone bee)
- “Bee body” handout
- “Bee Body” answer key



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TEACHER NOTES

1. Begin by giving an introduction to honeybees and their importance. Ask students why honey bees are important.

Note: Honey bees are important for pollination. Pollination is required for plants to reproduce, which is important for the diversity of ecosystems. Pollination is required to produce food as it results in the production of seeds, nuts, fruits and vegetables.

2. Discuss the concepts of taxonomy and phylogeny. How are honey bees classified?

- Kingdom – Animalia,
- Phylum – Arthropoda,
- Class – Insecta,
- Order - Hymenoptera (bees, wasps and ants),
- Family - Apidae (bumble bees, sweat bees, carpenter bees, etc.),
- Genus - Apis (honey bees),
- Species - mellifera (“honey-bearing”)

3. Ask students what they know about the honey bee’s social structure.

Note: Honey bees are social insects and the hive acts as one uniform living individual. A honey bee colony is almost like a really large family consisting of: 1 queen (fertile female), tens of thousands of female workers (unfertile) and many male drones. They each play their own crucial role in the colony.

4. Activity 1: Buzzing Bees

Materials: “Who is that Bee” comparison chart, Queen Bee photograph, worker bees photograph, drone bee photograph

Introduce the three types of bees in a hive using the comparison chart. Make note on different size and shape. Hold up the first bee identification card. Ask students to identify the bee in the photograph and follow up with two trivia questions. *Have some extra information about each type of bee in your “back pocket” to elaborate on trivia questions. Complete all three photographs. Do your best to answer questions.

5. Background Information:

Worker bees are unable to mate or reproduce. After hatching they will begin to clean and prepare cells. Next the worker will begin to feed young larvae and the queen. After nursing the workers begin to produce wax from their wax-secreting glands. This wax is used to build the honey combs. When a worker can no longer produce wax she will begin to unload returning foragers and store collected food. At about 2 weeks of age the workers will guard the hive against robbery. Then a worker’s final task is to forage for food. At approximately three weeks of age the worker will die.

Drone bees hatch from unfertilized eggs. After hatching they stay around the hive to eat honey. Drones do not do any work:

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they don't have a stinger or produce wax. A drones only job is to reproduce with queen bees from other colonies. After reproducing with a queen a drone will die.

Queen bees are fed a unique diet consisting of royal jelly shortly after hatching. The queen will have a larger abdomen that allows her to mate and lay eggs. A newly hatched queen will go on a "mating flight" to reproduce with approximately 12-15 drone bees from other bee colonies. After returning from her mating flight she is fertilized for life and will not leave the hive. Her main jobs are to lay eggs and produce pheromones for hive communication.

There are many videos available online that show the life cycle of the queen bee, worker bee and drone bee. These videos may allow students to have a better visual of the life cycle and hive structure of live bees.

6. Introduce and discuss the following terms: head, compound eye, antennae, mandibles, legs, thorax, stinger abdomen and wings

Fun Facts:

- The compound eye made up of thousands of small eye facets. Bees cannot see the colour red, but they are able to see ultraviolet rays.
- Each antennae are covered in tiny sense hairs that have the ability to smell. They use this sense of smell for detecting flowers, smoke and pheromones.
- The mandibles are a part of the bee's mouth, used to chew pollen and mould wax.
- Bees actually have four wings: two forewings and two hind wings.

7. Activity 2: The Bee Body

Materials: Bee body handout, answer key
In groups or as individuals give students the "bee body" handout. Ask students to label with the following terms: head, compound eye, antennae, mandibles, legs, thorax, stinger, abdomen and wings. Use the answer key as a guide.

Additional Resources

- School of Environmental Sciences www.uoguelph.ca/ses
- The Honey Bee Research Centre, University of Guelph www.uoguelph.ca/honeybee
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