

Abuzz for Honey Bees

Instructional Guide Day 1

Objective: Students will learn about the importance of honey bees, the ecological relationship between pollinators and plants, factors leading to honey bee extinction, and how they can help with honey bee conservation. (*Audience: 2nd Graders-4th Graders*)

Overview: This lesson plan is written as an instructional guide to teach educators about honey bees, so they can use the included honey bee lesson without having any background knowledge on honey bees. The lesson plan contains one pollination simulation, two discussions, and one craft along with a time estimate for each activity. The lesson should take about 2 hours.

The honey bee talks include **guiding questions** which the educator can **ask the class** in order to make the lesson more interactive. Each honey bee icon marks a different activity. All of the additional materials needed for the lesson are highlighted in **green for PowerPoints** and **yellow for craft materials**. These materials can be found on the Abuzz for Honey Bees website: <https://abuzzforhoneybees.weebly.com>



A. Ice-Breaker Discussion – Honey Bees & Pollination

Guide:

- Have students gather on the carpet.
- Use **Abuzz for Honey bees Day 1 PowerPoint**
- Use the guiding questions (below) and the PowerPoint to introduce honeybees and their role in pollination.
- Time~15 minutes

Ask:

1. What is your favorite food? **(Slide 2)**

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This slide shows some yummy, kid-favorite foods like chocolate, strawberry short cake, blueberries, and spaghetti. Take a few minutes to talk about the kids' favorite foods and the ones shown on the board.

2. How are all of these foods alike? **(Slide 3-4)**

Explain to the students how honey bees helped produce a majority of the foods that they mentioned (as well as the foods on the slide). Honey bees are responsible for producing 1 out of every 3 bites of food we eat. Some of the foods that honey bees help produce include strawberries, mangoes, pomegranate, blueberries, avocados, onions, allspice, lima beans, kidney beans, carrots, buckwheat, watermelon, and MUCH more. Note: Don't mention that honey bees help produce these foods through pollination in till after slide 5 (use progressive revelation).

3. How did honey bees help produce these foods? **(Slides 5-6)**

Honey bees helped produce these foods through pollination. Pollination is a very important part of the plant life cycle because it allows plants to reproduce (make more plants). The pollination process involves pollen being transferred between flowering plants. The pollen fertilizes the plants and allows them to produce seeds.

4. What role do honey bees play in pollinating? **(Slides 7-8)**

Use the PowerPoint diagram to explain the role that honey bees play in pollinating.

1.) The honey bee flies to a flower looking for nectar. The honey bee's compound eyes contain ultraviolet photoreceptors. This allows honey bees to see colors that would be invisible to us humans. The colors and scents of flowers guide honey bees to nectar supplies.

2.) The honey bee gets covered in pollen as it slurps nectar. Static electricity (similar to how a balloon will stick to you after rubbing it on your shirt) helps the pollen stick to the tiny hairs covering the bee's body.

3.) The honey bee flies to another flower and the pollen covering its body gets rubbed off onto the new flower.

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4.) The pollen fertilizes the egg cells of the plant, so now it can make seeds. The creation of seeds allows plants to make more plants.



B. Pollination Simulation Activity

Guide:

- Use **Pollination Simulation Flower** (make copies for class)
- Use **Day 1 Word Search** (make copies for class)
- Materials~brown paper bags (enough for class), 1 plastic spoon, glitter (2 different colors), spray bottle with water
- Time~40 minutes

Prep Instructions:

- 1.) Begin with explaining directions for how to make the paper bag flower to the whole class. Show them an example of a completed paper bag flower.
- 2.) Have each student cut out and glue a **Pollination Simulation Flower** on to a brown paper bag.
- 3.) As students finish the bags, collect their flower bags and create groups of 5-6 students. Have students complete the following activity one group at time.
- 4.) Fill each of the collected bags with 2 spoonfuls of either color glitter.
- 5.) As students are waiting to do the pollination activity, have them work on the **Day 1 Word Search**.

Activity Instructions:

- 1.) Explain guidelines for the pollination activity to each small group of students. Explain how the students are going to pretend that they are honeybees. Have them practice being honey bees by making a buzzing noise and flapping their arms. Tell them, “don’t put your hands into the flower in till told.”

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- 2.) Moisten each student's hands by lightly spraying them with water.
- 3.) Tell the students to pretend that they are bees (practiced above). Have them close their eyes and dip their hands into the "flowers" (that should be filled with glitter from step 4 of the prep instructions above). Tell them, "keep your hand in the flower in till told."
- 4.) Have the students open their eyes and take their hands out of the bag. Say something like "look the pollen is all over your legs". Demonstrate how to pollinate a neighbor's flower by touching the flower on the example bag with your fingers.
- 5.) Have the students "fly to" and "pollinate" different flowers in their group for a few minutes. Have students wash their hands after their group is done "pollinating".
- 6.) After all groups have done the pollination activity, ask the whole class what the glitter (pollen) and their hands (bee legs) represented. Ask them what they observed about their flowers (covered in glitter -actually "pollen"), and then ask them what they were doing (pollinating). Explain that since the flowers (Apple Blossoms) have been pollinated, they can now produce apples.

Activity Adapted from <https://betterlesson.com/lesson/630819/pollinating-the-bees-have-it>

Bathroom or Recess Break (15 minutes)



C. Honey Bee Conservation Discussion

Guide:

- Have students gather on the carpet
- Use **Abuzz for Honey bees Day 1 PowerPoint**
- Use guiding questions (below) and the PowerPoint to explain the importance of honey bees, why they are dying, and how students can help with honey bee conservation.
- Time~20 minutes

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Ask:

1. What would happen if honey bees did not exist? (Slides 9-11)

-If honey bees didn't exist, there would be MANY less flowers and less food choices. 1/3 of all food crops and 90% of all wild plants in the world are dependent on cross-pollination. While butterflies, birds, beetles, and a wide assortment of other creatures pollinate, bees are the most effective at it. Plants, a major food source, are dependent upon honey bees for pollination because the process allows plants to reproduce and grow fruit. As a matter of fact, honey bees are valued at \$15 billion as commercial pollinators (used by the agriculture industry).

-Additionally, if honey bees didn't exist, mankind would miss out on the many benefits of honey bee products. Honey bees produce many products with countless uses such as royal jelly, honey, propolis, beeswax, and pollen. Some of these uses include pollen for protein supplements, beeswax for candles, royal jelly for cosmetics, honey for wound dressing, and more.

2. What's happening to the honey bees? (Slides 12-13)

-Honey bee populations are dropping at alarming rates. In the 1970s, there were about 4 million honey bee colonies in the U.S. Nowadays, the number of honey bee colonies is about 2.5 million.

- As of 2016, 7 honey bee species were given the endangered status by the U.S. Fish and Wildlife Service.

3. Why are honey bees dying? (Slides 14-15)

-One factor is neonicotinoid pesticides which are insecticides that disrupt the function of receptors in the nerve synapses of invertebrates. While neonicotinoids are effective at targeting pest insects, they could be targeting honey bees. New research leads scientists to suspect that neonicotinoids impact honey bees through disorienting their sense of where flowers and the hive is located.

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-Another factor that is killing honey bee populations is poor nutrition due to less foraging options. In order to be healthy, honey bees must gain all of their necessary vitamins and minerals (similar to how you may take gummy vitamins) from eating nectar and pollen from a wide variety of plants. Many fields that were once filled with wildflowers are being replaced by parking lots, grassed lawns, shopping malls, etc.

-Honey bees are also disappearing due to parasites like Varroa mites and diseases like the Israeli Acute Paralysis virus.

-Honey bee populations are harmed when honey bee swarms are removed by pest exterminators.

4. How can YOU help honey bees? (Slides 16-18)

-Plant a pollinator garden. Pollinator gardens contain a variety of nectar-producing, flowering plants. They should be filled with flowers that bloom at different times throughout the entire growing season. (More information about pollinator gardens can be found on the Abuzz for Honey Bees website.)

-Try to buy organic food when possible. Avoid using pesticides on your lawn and in your gardens.

-If you see a swarm near your home, school, or business, tell your parents to call a local beekeeper to remove the swarm. DO NOT let them call a pest exterminator. *If you live in the Tidewater area of VA, tell your parents to call Tidewater Beekeepers Association's (TBA) Swarm Coordinator at (757) 285-4509. TBA will send a beekeeper out to remove your swarm for free.

-Buy local honey to support local beekeepers and honey bees.



D. Seed Ball Craft Activity

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- Print out **About YOUR Seed Ball** info cards.
- **Materials:** Wildflower seed planting mix, pottery clay, large tub to mix ingredients, large box to dry and store seed balls
- **Time**~30 minutes

Ask:

1. What are seed balls?

Seed balls are a mixture of clay, soil, and seeds that dry with a hard coating. Seed balls protect seeds from getting dried out, blown away, and eaten. They protect the wildflower seeds in till the proper germination window (growing window) comes and provide a good cultivation (growing) environment for seeds. Seed balls act like a turtle's hard shell. The clay protects the seeds in till it's the right time to grow (just like the turtle's shell protects the turtle).

2. What will you do with your seed ball?

Once the seed ball is dry, students can bring their seed ball home and simply throw it in an open area where wild flowers are needed. These wild flowers will provide food for honey bees.

Steps for making Seed Balls:

- 1.) Make clay balls (approximately the size of a baseball) in fort of the whole class.
- 2.) Flatten clay balls into a pancake.
- 3.) Place a handful of the wildflower seed mixture on top of the pancake.
- 4.) Roll the pancake back into a ball.
- 5.) Make a "snake" shape out of the ball.
- 6.) Tear off a 2-inch piece of the snake for each student.

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Activity Adapted From: <https://permaculturenews.org/2016/05/06/awesome-ways-to-make-seed-balls-with-kids/>

REFERENCES:

Blackwell, N., & Ettinger, C. (2013). *Andy the Ant Learns the Buzz on Bees*. North Fort Myers, FL: Faithful Life.

Caron, D. M., & Connor, L. J. (2013). *Honey Bee Biology and Beekeeping*. Kalamazoo, MI: Wicwas Press.

Delaplane, K. S. (2018). *First Lessons in Beekeeping*. Mineola, NY: Dover Publications.

Julivert, A. (1986). *The Fascinating World of Bees*. Moscow: Mir.

Kennedy, M. (2016, October 03). Bees Added To U.S. Endangered Species List For 1st Time. Retrieved January 15, 2018, from <https://www.npr.org/sections/thetwo-way/2016/10/03/496402620/bee-species-added-to-u-s-endangered-species-list-for-1st-time>

Rossmann, S. (2017, May 27). A third of the nation's honeybee colonies died last year. Why you should care. Retrieved January 15, 2018, from <https://www.usatoday.com/story/news/nation-now/2017/05/26/third-nations-honeybee-colonies-died-last-year-why-you-should-care/348418001>

Sarich, C. (2013, August 15). List of Foods We Will Lose if We Don't Save the Bees. Retrieved January 16, 2018, from <https://honeylove.org/list-of-food/>

Sass, Jennifer. "Why We Need Bees: Nature's Tiny Workers Put Food on Our Tables." Bee Facts, Natural Resources Defense Council, 3AD, 2011, www.nrdc.org/sites/default/files/bees.pdf.

Usha, Jyoti, B., & Singh, P. (2015). Honeybees and their importance in sustaining life on earth.

Rashtriya Krishi, 10(1), 1-2. Retrieved January 17, 2018, from http://www.researchjournal.co.in/upload/assignments/10_57-58.pdf

What is a neonicotinoid? (2017, March 5). Retrieved January 16, 2018, from

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<https://citybugs.tamu.edu/factsheets/ipm/what-is-a-neonicotinoid/>

Standards of Learning Addressed:

2.5 The student will investigate and understand that living things are part of a system. Key concepts include a) living organisms are interdependent with their living and nonliving surroundings; b) an animal's habitat includes adequate food, water, shelter or cover, and space; c) habitats change over time due to many influences.

2.8 The student will investigate and understand that plants produce oxygen and food, are a source of useful products, and provide benefits in nature. Key concepts include a) important plant products are identified and classified; b) the availability of plant products affects the development of a geographic area; c) plants provide oxygen, homes, and food for many animals.