



One of our missions at Nature Nate's Honey Co. is to share the awesomeness of honey bees and 100%, raw & unfiltered honey. Honey bees are small but mighty (just like your students!), and their work pollinates one-third of the world's crops.

Our Long Live the Bees lesson plans showcase these amazing insects and encourage students to help bees survive and thrive. Our k-2nd grade version includes 5 lesson plans that fit into a cohesive unit on bees and honey and offer you the flexibility to use one lesson plan or the full unit as you schedule your lesson plan calendar.

We are beyond grateful to the 5 educators who worked with us to develop our k-2nd grade version. Merry from California, Tess from Colorado, Julie from Connecticut, Kristen from Indiana, and Jennifer from Texas have a love and excitement of bees and honey and, like you, make an impact with their students every day. We're thankful for their talent and time and the treasures they shared in the Long Live the Bees lesson plans.







### Objective

Students will explore the world of bees by listening to the teacher who will provide information on the different jobs bees have and how teamwork plays a role. Students will learn about the bee colony/hive, how every bee's job is important and how no single bee can survive on its own.

### Vocabulary

colony - a group who builds a settlement in another territory or land stinger - the part of an insect or animal that holds a sting, like a needle

### Introduction

Show the students a picture of a bee and ask: Have you ever seen a bee buzzing outside? If so, where did you see them? We all know that honey is delicious, but did you know it takes a huge effort by an entire colony (city) of bees to make this happen? Today we will learn the different jobs bees have and how they can compare to humans and our jobs.

### Instruction

Begin by telling students that in a bee colony/hives (explain that a colony can be compared to a city where humans live and work), bees have different jobs to help the colony/hive thrive. After speaking and describing each bee, the teacher will place their picture in an anchor chart paper under their name, for visual reference to the students and for use in the guided practice.

**Queen Bee**: There are many jobs in the hive, but the most important one is the queen bee. Although we may think she is in charge of the hive because of her name, she does not give orders or rule the hive. She can be compared more to a mother figure, like our human moms, since her job is keep the bee population alive by making thousands of baby bees (although our mothers can't do that). She is capable of making up to 1,500 eggs in a single day. She is fed and cared for by worker bees. Queen bees have a long body and have a caramel colored pointy bottom. They have a stinger, and they can sting multiple times, which sets them apart from the other bees.

**Worker Bee**: The worker bee is a bee of many jobs and has the highest population in the hive. The other bees would not survive without the worker bees. This type of bee is always female (girl). Shortly after being born she is put to work by cleaning at just two days old, and they work every day of their life. They're in charge of guarding the hive, cleaning, feeding the babies, nursing the sick bees and foraging for nectar. These bees can be compared to a teacher who also has many roles in a classroom. A teacher also protects her students, cleans, responds to multiple comments a day about aches and pains (nurses) and runs the classroom the way worker bees run the hive. Worker bees are easy to spot as they have a smaller body than the queen bee. Worker bees can only sting once.





Drone Bee: Drone bees are always male (boy) bees, and they work outside of the hive. They spend their whole lives eating honey and waiting for the opportunity to make bee babies with the queen bee. Drone bees are wide-bodied with a round bottom and have very large eyes. This sets them apart from queen bees. These bees do not have stingers and cannot defend themselves or the hive. The queen bee and drone bees both have 1 job, where as the worker bee has several jobs.

 $\label{eq:matrix} Materials needed: \bullet The Various Roles of a Bee printables (2-different bees + bee hive template) \bullet bubble wrap \bullet washable paint$ 

### Guided Practice

On the anchor chart where you put the bee pictures during the instruction, ask for volunteers to help you write at least one job for each bee and what human job it compares to, if applicable. Chart student responses. Ex:



Have students (turn to a partner and) discuss the different things that makes each job important to the hive/ colony. Discuss student responses. Students will go back to their desks, and teacher will pass out a beehive template, bubble wrap & paint:



Explain to students that they will be making their very own bee colony and, afterwards, writing about their favorite kind of bee and why. Model by using your fingers to paint the bubbles on the bubble wrap carefully. Then place the painted bubble wrap on top of the bee hive paper and press lightly to make the pattern. While the paint dries, pass out the writing paper and have them write a fact about their favorite bee and why. When the hive is done drying, students can draw bees around it and glue their writing paper on the bottom of the hive to be displayed around the classroom or bulletin area.

### Conclusion

As a wrap-up, students apply and reflect on what they have learned from the lesson by answering a series of questions about bees: (1) How can I compare the jobs of bees to jobs of humans? (2) What are some jobs that worker bees have? Students should be able to talk about 4 different jobs that worker bees have. As a final discussion, the whole group can discuss the lesson the bees taught us on teamwork and how we can apply that to our daily lives in the classroom.











### Objective

Students will understand that honey bees make feral hives (also called wild hives or nests) in the wild as well as in man-made hives called bee boxes. Students will learn that honey bees build honeycomb in their bee hive in the wild or in a beebox. Students will learn that honey bees build their honeycomb cells in the hexagon shape, that it contains six sides, and that each side and angle is the same length.

### Introduction

Do you know the difference between a wild hive and a bee box hive?

Honey bees are great builders. They construct honeycomb in their hive in the wild and in a man-made bee box. The honeycomb is made up of cells that the bees build with wax. These cells are all built using the same shape. The main difference between a wild hive and a bee box is that a bee box contains an area called a "super" where the bees store excess honey for the beekeeper to harvest.

Do you see the same shape over and over in the honeycomb? (See guided practice for image of honeycomb) Answer: The shape is a hexagon

How many sides does the shape have?

→ Answer: 6

Are the sides of the shape equal?

→ Answer: Same-size length units are equal- meaning that each side of the shape is the same length

### Instruction

Scientists look for patterns and order when making observations about the world. We can make the observation that honey bees use the same shape, a hexagon, to make their honeycomb. Every cell in a honeycomb is a hexagon. It turns out that bees are excellent builders, and they build hexagons because the hexagon is a great shape for building honeycomb! Bees like to build perfect hexagons with all six sides having equal lengths in nature. Hexagons can be next to each other without having empty space in between. The hexagon cells are the ideal shape for bees to store honey and raise their young in!

Materials needed:

- Welcome to the Hive printable (hexagon sheet)
- Pencil
- Ruler or other straight edge object
- Scissors
- Tape



### Guided Practice

Use a ruler or other straight edge to complete the hexagon.



Use scissors to cut out the shape below. Be careful not to cut off the tabs! Fold along each dotted line, folding in the same direction to make a 3D hexagonal tube. Use the tabs to connect the last side with tape. Connect the 3D hexagons to make your own honeycomb!

### Conclusion

Summarize what the student should have learned during this lesson and how they can see shapes and patterns in their environment or everyday life. Scientists agree that patterns and shapes that are found in nature are built that way for a reason. Bees build honeycomb in the shape of a hexagon, because it is the ideal shape for storing honey and raising their young bees. The hexagon is also a strong shape that can be built next to each other without wasted space in between. Bees are builders; they've found a way to build their honeycomb in the best way!







## How Do Bees COMMUNICATE?

### Objective

By the end of the lesson, students will be able to explain how bees communicate to each other helping them find nectar and create honey.

### Introduction

Q: What are some ways that people communicate? Q: Can you think of any ways that we communicate without talking?

Today, we are going to study how honey bees communicate with each other. Can honey bees talk? [No!] We're going to learn how honey bees use their bodies and a special dance to tell each other important information.

### Instruction

Bees turn **nectar** into honey → nectar comes from flowers → **forager bees** go out and find where the best nectar is located and then tell the other bees where to find it using a **waggle dance**.

**Nectar:** Raise your hand if you like sweet things. Guess what...bees do too! Nectar is a very sweet liquid that is inside of flowers, and honey bees LOVE it! What happens when you eat a lot of sugar? How does it make you feel? Bees collect nectar from plants and eat it to have more energy. They also use nectar to make honey.

**Forager bees:** Every bee in the hive has a specific job. Some worker bees are foragers, which means they fly out and look for nectar, pollen and water - things a hive needs to survive. Different forager bees fly off in different directions and then come back to the hive to tell the other bees what they found.

---> Invite students to share with a partner/at their table/or whole class: "What are some characteristics that a forager bee might have?" [brave, leader, fearless, strong, adventurous, selfless, etc.]

We just learned that nectar is a very sweet liquid found in flowers, and bees need nectar for energy and to make honey. Forager bees spend most of their day flying back and forth from the hive to different flowers, collecting nectar.

Materials needed: • How Do Bees Communicate printables (2 – map + sun and flowers sheet) • pencil • butcher paper • tape

### Guided Practice

I want you to look at this map and tell me/share with your partner what you notice about the flowers you see. [some of the flowers are very close to the hive; some of the flowers are far from the hive; in some areas there are a lot of flowers; in some areas there are not many/no flowers opportunity to practice compare/contrast language depending on grade/language level.]

→ Help students understand that if there are only a few flowers in an area, there may not be very much nectar there/the nectar may be all gone. If the flowers are too far from the hive, the bees will get tired going back and forth and have a higher chance of encountering some kind of danger.

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### Guided Practice

Now imagine you are a forager bee, and you have to fly back and forth from the hive to flowers all day to collect as much nectar as possible; which flowers would you want to go to? Circle the flowers you would fly to, and draw a line from the hive to the flowers, showing how you would fly to get there.

→ Have students share with a partner/at their table/or whole class which flowers they chose and why, and describe how they chose those flowers.

You were all just forager bees! You found where the best nectar was and then explained to the rest of the class (all the other bees) how to get to the best nectar!

Now, if you were a real honey bee, would you be able to talk to your friends and tell them where the nectar is? No. Instead, you would tell them by doing a waggle dance!

When a forager finds great flowers that she wants to tell the other bees about, she will come back to the hive and do a waggle dance. How long the bee dances and what direction she waggles her body tells the other bees which direction they need to fly and how far they have to fly, in order to find the flowers.

- Have students use their finger to draw the number 8 in the air-this is the pattern that bees dance in.
- When the forager bee wants to tell the other bees which direction to fly in, she waggles her body in that direction as she dances.
- The longer a bee dances for, the farther away the flowers are.

Videos for reference:

https://youtu.be/-7ijI-g4jHg https://www.youtube.com/watch?v=1MX2WN-7Xzc

Practice tracing some waggle dances on the worksheet. \*For older students, they can sketch where they think the flowers would be, based on the given dance pattern. \*

#### Let's try some waggle dancing of our own!! \*This can be prepped ahead of time\*

• Tape up the sun at the back of the room, and the flowers on one wall of the classroom, fairly close to where the dancing will be done. Put down a large sheet of butcher paper and draw a figure 8, using a squiggly line to indicate that the students should "waggle" when walking in the direction of the flowers. It should be a short waggle, since the flowers are close this time. You may lead first and invite a few students to join in.

• Repeat, leaving the sun and dancing area in the same position, but move the flowers to a different side of the room and put them much further away. Draw a new figure 8, and make sure that the waggle time is longer to indicate that the flowers are farther away.

### Conclusion

Honey bees fly to flowers to collect the nectar they need for energy and honey. Bees want to go to areas with lots of flowers that are not too far away. Good forager bees help the rest of the hive find the best nectar by communicating information through a waggle dance. All people and animals have different ways of communicating with each other. Sharing information and helping each other helps the bees make more honey and not waste energy. We have to communicate and listen to help each other.









# Explore the FLAVORS OF HONEY

### Objective

Students will learn how honey varietals are created. They will classify several honey varietals by taste/aroma (and color!).

### Introduction

How many of you have eaten honey? What does honey taste like? (Most kids will answer "sweet.") Honey is sweet but has a very complex taste. There are so many types of honey flavors, that not all honey tastes the same! Honey actually has many types of flavors! Can you guess how many? (Take several answers). There are more than 300 honey varietals (flavors) in the United States alone!

### Instructions

Different kinds of honey is called a "varietal" - which sounds like the word "variety" doesn't it? Different varietals have different colors, aromas and tastes.

Why might one honey taste different than another honey? Let's read and see if we can find the answer.

Read aloud pages 14-17; 20-21 from **The Life and Times of the Honeybee** by Charles Micucci. (The Busy Days of a Field Bee; How Honeybees Make Honey; A Honey Flower Menu).

Why do you think we have so many honey varietals in the world? (Accept answers and clarify as needed). Honey varietals result from bees collecting pollen from different types of flowers.

One honey can taste, look and smell so different from another honey, you might enjoy using different types of honey in recipes! Some people like a strong-tasting honey in their coffee or oatmeal, while lighter-tasting honey might be better in a cake recipe.

Materials needed: • Explore the Flavors of Honey (honey tasting chart) printable • Nature Nate's blog "title tbd" or The Life and Times of the Honeybee (optional) • 2 or 3 varietals of honey • wooden tasting spoons • paper plates • crayons or markers (one color per honey, for teacher use)

### Guided Practice

When professional honey tasters describe honey, they use many descriptive words, not just "sweet" or "sugary." A few categories of honey flavors are: warm, floral, fruity, fresh.

What are some flavor words you heard in our reading that could describe honey? (strong, light, minty, spicy).

Hand out the Honey Tasting Chart Printable (this is a simplified version of the honey flavor wheel professional tasters use). Discuss this chart before the taste-test, and/or use as a cut/paste word sorting activity before or after the taste test. We'll use this chart to help us describe different honey tastes.



### Objective

Honey Taste Test Directions:

Show students the honey varietals you'll be testing. Do not tell them the kinds of honey yet. Cover the names of each honey using a piece of tape. Number each jar with a different color.

OPTIONAL: Have students look at the color of each honey. Arrange the bottles from light to dark, with student input. The darker the honey, the stronger the flavor.

Use a crayon to divide a paper plate into 2-3 sections and number each section (depending on how many honey varietals you'll taste). This can be done ahead of time.

Dip a tasting stick in each honey varietal, and place on the matching numbered section of the plate. Create one tasting plate per child.

Direct the class to select honey #1 and smell it first. Then instruct them to taste it and describe the flavor. Ask students if they tasted any of the flavors on the Honey Tasting Chart. Or, did they taste a different flavor? Add this word to your chart! Students may taste several flavors at once!

Teacher: As students describe each honey, circle the flavor words on the chart with the matching color on the jar to keep track of the class's taste test results.

Continue to taste each honey varietal, discussing what flavors students taste and circling the flavor words with the matching color.

When all the honey has been tasted, reveal what kind of honey created each flavor!

### Conclusion

Honey comes in more than 300 varietals in the U.S. alone! Even the taste of those varietals can be different bottle to bottle and year to year, based on which flowers the bees visit, the weather and other environmental factors. With so many honey flavors, we might never taste the same exact honey flavor twice. And now, we know how to describe the honey we're eating so other people can imagine how it tastes too.

Materials needed:

- 2-3 honey varietals
- Wooden tasting spoons (2-3 per student)
- Paper plates (1 per student)
- Crayons/Markers (1 color per honey, for teacher use)
- Honey Tasting Chart (1 per student)

Resources:

- http://naturenates.com/why-do-honeys-have-different-tastes/
- https://www.dummies.com/home-garden/hobby-farming/beekeeping/honey-tasting/



## HONEY TASTING CHART

WARM	FRESH	FLORAL	FRUITY
Nut	Mint	Rose	Citrus
Chocolate	Rain	Violet	Berry
Butter	Lemon	Flowers	Raisin

# HONEY TASTING CHART

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### How We Can Help SAVE THE BEES

### Objective

Students will be able to identify several ways they can take action to help the bees and to understand why bees are so important to us.

### Introduction

Read either one of the following books to gather some background knowledge about the importance of bees, or use the discussion points below to begin a conversation about bees.

What If There Were No Bees?: A Book About the Grassland Ecosystem (Food Chain Reactions) Paperback by Suzanne Buckingham Slade (Author), Carol Schwartz (Illustrator)

### The Case of the Vanishing Honeybees: A Scientific Mystery

By: Sandra Markle (available for free for teachers on Epic Books www.getepic.com)

Discussion Points:

Have children go outside to observe bees at work or talk about a time when they watched bees at work. Ask them to share what they noticed the bees doing and what they think the bees were doing at that time. "Are there any other times when you have watched bees at work? Maybe you watched bees hard at work moving from flower to flower or plant to plant. Why do you think they were doing that?" Let the child(ren) explain their thinking through words, pictures, or by acting out what they saw bees doing.

Create a classroom KWL chart (see printable) to collect students current knowledge and understandings of bees, as well as what they want to know about bees and any misconceptions about bees. Use the K section to ask students what they already know, the W section is where you will list their questions and wonderings, and the L area is where you will write what they have learned at the end of the lesson.

 $\begin{array}{l} \mbox{Materials needed: } \bullet \mbox{How We Can Help Save the Bees (2- Save the Bees sheet + KWL chart) } \bullet \mbox{What If There Were No Bees or The Case of the Vanishing Honeybees (optional) } \bullet \mbox{a shallow dish or bowl or a shallow bird bath } \bullet \mbox{clean water } \bullet \mbox{small pebbles } \bullet \mbox{1-inch or so diameter stones} \end{array}$ 

### Objective

Ask students why they think bees are so important to us. (See attached printable to use for recording ideas)

- → How would the world be different if there were no bees in it?
- → What are things that bees need to survive?
  - \*Allow students to give their responses and record them on the recording sheet.

Help students notice that bees need lots of the same things that we do!

- → What are some things that both people and bees need? (Food, water, air, shelter/home, etc.)
- ---> What would we do if we did not have the things we need to survive?

Share with students that bees are an important part of our food chain. They help to pollinate plants, fruits, and vegetables for us as well as produce honey! Without bees, the pollination rates would go way down, and many foods we eat would disappear.

- → What kinds of things are hurting the bees? (Pesticides, weather, some people, etc.)
- → What are some ways they could help the bees?



Below are some ideas to discuss with students if they are unable to name a few ways they can help bees.

- make sure there are plants that bees can gather pollen/nectar from
- create a new safe zone in your school area or backyard where bees can find plants or a hive to call home
- make sure schools/homes are pesticide free
- offer a "bee pond" where bees can grab a drink of water
- pick up litter
- sponsor a hive
- help a local beekeeper by purchasing honey
- tell others how important bees are and why they should help protect them!

### Guided Practice

Tell students that one simple way they can help the bees is by providing a bee pond where bees can get a drink of water when they are taking a break between pollinating.

To create the bee pond, you will need:

- a shallow dish or bowl, or a shallow bird bath
- clean water
- small pebbles
- 1 in or so diameter stones

Fill your container with clean water. Arrange the pebbles and stones inside the dish, bowl, or bird bath so that they poke out of the water. Bees can land on the pebbles and stones to take a break and to get a drink of water. Be sure to keep replacing the water, so it stays clean for the bees. Periodically, take the pebbles and stones out and clean the container so it stays germ free for the bees!

Place your "bee pond" near a place where you notice frequent bee visitors.

Students can also help plant native flowers in a school/backyard garden and help care for it. Native plants are different in each area of the country, so be sure to contact your local garden center or experts to ensure you are planting bee-friendly plants. Make sure to pick up any litter found in the garden so that it stays clean and healthy for the bees!



### Conclusion

After reading and sharing their ideas about how they can help bees, have students brainstorm how they can share that message with others. Possible ideas include posters, brochures, sharing with families, etc.

Students can also complete a home inventory with the help of their parents. Does their yard have bee-friendly plants? Is there any visible litter that can be picked up? Is there a clean water source for bees? Are pesticides used to treat plants growing in a garden?

After completing this lesson, students should be able to share several ways they can take action to help the bees and, ultimately, have a new understanding of why bees are so important to us!





