



**STEMsational Ag:**  
**The Virtual Farm**  
MIDDLE TENNESSEE STATE UNIVERSITY

Module 10: Feed the Bees  
**UNIT 2: BEE LIFE**  
**Kindergarten – Grade 2**



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## STEMsational Ag—The Virtual Farm

### Welcome to Module 10 Unit 2: Bee Life



#### Kindergarten – 2nd Grade:

##### Introduction:

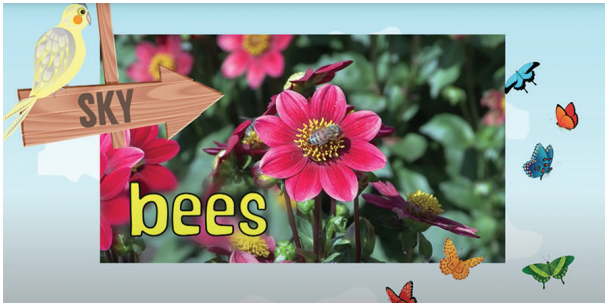
On pages 3-6, look at the video screenshots and read the narration of " Bee, Animals for Kids, All Things Animal TV." This will build some quick basic background knowledge on honeybees.





# \* BEE \* | Animals For Kids | All Things Animal TV...

<https://youtu.be/dA05LOfPbIY>



Bees...

Buzzing bees can be found all over the world.



There are lots of types bees.

From Honey Bees to Bumble Bees.



Solitary bees... like carpenter bees, digger bees and mining bees, live alone.





While social bees, like the most common honey bee, live in large colonies.



Each bee has a job.



The important Queen bee lays lots of eggs. They live a long time.



Drone bees are male, and busy worker bees are female. They use beeswax, to build the hive.



Here are some hives in the wild.

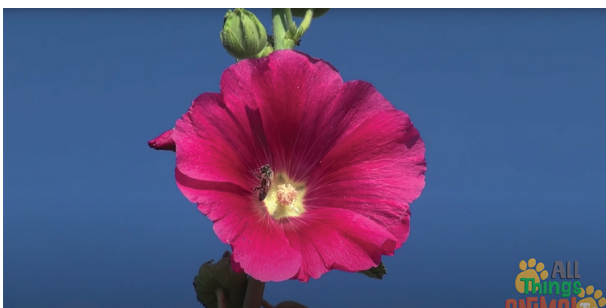


And here is a beekeepers hive.



Can you see the honeycomb structure?

And busy worker bees take care of the young, clean the hive, groom the Queen.



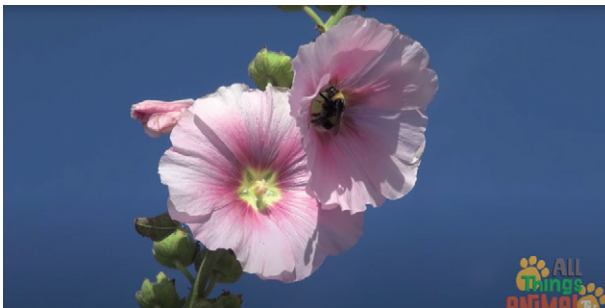
And... they collect pollen and nectar from flowers.



With their long tongues, they slurp up the sweet pollen and nectar.



Collecting the pollen on pollen baskets on their bodies. They make Honey with the nectar and pollen. Honey is used to feed the whole colony.



Did you know? Bees are some of the most important animals on the planet.

Because they help pollinate flowers, fruits and vegetables.



This means they help other plants grow.

So you can thank bees for your yummy fruit and vegetables!





## **Pre-assessment:**

- What do you know about honeybees?
- Write your answer on paper or type your answer into the computer using a Word or Google Document.

## **Purpose:**

The student(s) will learn about the lifecycle of honeybees, the jobs honeybees perform, and a little bit about what goes on inside a hive through the exploration of an interactive DIY hive.

## **Student Learning Outcomes for the Unit:**

- Students will identify the difference between a queen, drone, and worker bee.
- Students will be able to identify honeybee jobs. (i.e., worker bees nurse, clean, make honey and bee bread and go outside the hive to collect or forage for pollen).
- Students will explore an interactive beehive display to learn the lifecycle of honeybees and become familiar with basic beekeeping terminology.

## **National Agricultural Literacy Outcomes**

Agriculture and the Environment Outcomes, Theme 1

T1.K-2

C. Identify natural resources.

Plants and Animals for Food, Fiber & Energy, Theme 2

T2. K-2

A. Explain how farmers/ranchers work with the lifecycle of plants and animals (planting/breeding) to harvest a crop.

Culture, Society, Economy & Geography, Theme 5

T5. K-2

D. Identify plants and animals grown or raised locally that are used for food, clothing, shelter, and landscapes.



### Vocabulary:

- **Honeybee:** a stinging winged insect that collects nectar and pollen, produces wax and honey, and lives in large communities (a bug that makes honey and lives in a hive)
- **Life cycle:** the series of changes that the members of a species undergo as they pass from the beginning of a given developmental stage to the inception of that same developmental stage in a subsequent generation (a queen bee lays an egg, a larvae hatches from the egg, this is the baby bee, a larva grows into a pupa, this is a teenager bee and finally the pupa grows into an adult honeybee)
- **Queen:** the single reproductive female in a hive or colony of honeybees (a girl bee that lays eggs for the hive – there is only one queen)
- **Drone:** a male honeybee, does not have a stinger. His only job is to mate with the queen (a boy honeybee that does not sting)
- **Worker:** are female but are not capable of reproducing. They do all the work in the hive, and they control most of what goes on inside (a girl bee that takes care of the hive doing jobs like babysitting, cleaning, grocery shopping (foraging/collecting pollen) and door monitoring)
- **Comb:** a grouping of 6-sided cells built from beeswax that is used to store food and baby bees
- **Cell:** describe any type of closed space created from wax by bees, usually in a hexagon shape

### Materials Needed:

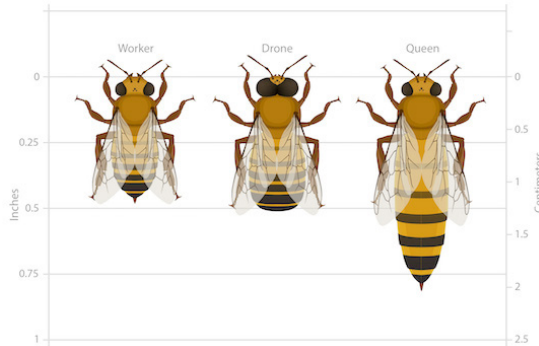
- 1-Poster board, any color (allow student(s) to decorate the edges for more fun)
- 10-Empty toilet paper rolls or 5 empty paper towel rolls cut into ½ inch pieces folded three times to create a hexagon shape
- 2-Grains of rice (represents eggs)
- 2-Macaroni noodles or a noodle that is C-shaped (represents larva)
- 1-small container of white play dough or modeling clay (model into a pupa)
- 1-Felt bee, toy bee, honeybee cutout (adult honeybee to complete the lifecycle)





- 1-Cut out of one queen bee, multiple worker bee cut-outs, a few drone bee cut-outs

You can find honeybee cutouts used in the course on this website from [Arizona State University, "Bee Bonanza: The Story of Honey Bees,"](https://askabiologist.asu.edu/bee-colony-life) <https://askabiologist.asu.edu/bee-colony-life>



Optional: You can purchase a ["Lifecycle of the Honey" set on Amazon](#)



**About this item**

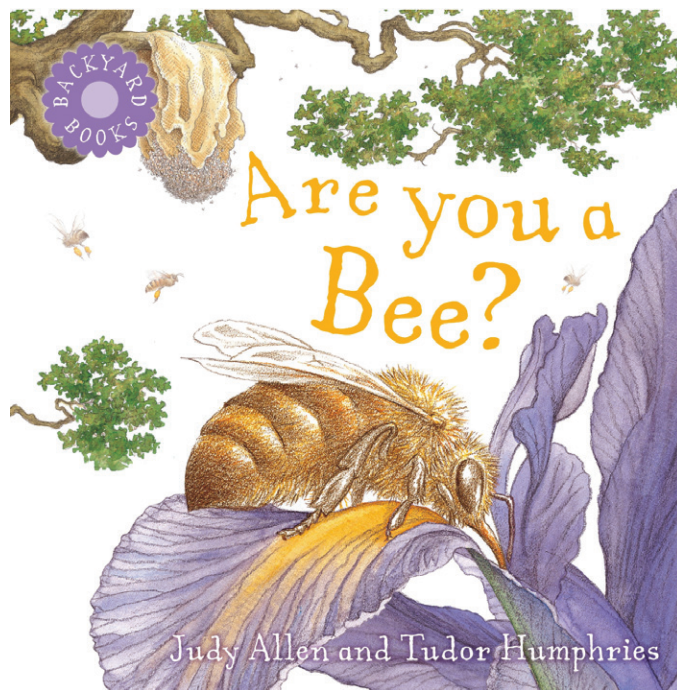
- Honey Bees are fascinating creatures which have been kept by humans for centuries. Now you can explore the life cycle of the honey bee without being stung. Watch as it grows from an egg, to a larva, and to a pupa before finally emerging as a mature adult.
- Part of Safari Ltd's Safariology Life Cycles Collection, which allows children to explore miraculous and awe-inspiring transformations in close detail. This product can be admired, displayed, squeezed, touched, and played with.
- Made with Safari Ltd's industry-leading standards, each replica in the Life Cycle Collection has been individually hand painted and features solid construction from quality, safe, phthalate-free and lead-free materials.
- Includes egg, larva, pupa, mature adult honey bee, and educational information in 3 languages.
- Complete package measures 9"L x 7.8"W x 0.5"H. For children ages 4 and up.

- 5-8-Clothes pins for worker bees
- 1 pack-Orange and yellow pompoms or yellow and orange pipe cleaners (any material that could represent pollen)
- 1 bottle-Clear glue
- 1 bottle-Orange or yellow food coloring (only need to use 2 drops, to represent honey) and baby bees
- Cell: describe any type of closed space created from wax by bees, usually in a hexagon shape



### Read a book:

- Read the book "Are You a Bee?" by Judy Allen and Tudor Humphries.
- For Educators, while reading the book with the students, be sure pause after reading each page to allow students to see the pictures and point out important features such as the lifecycle, differences between queens, drones, and worker bees, and the jobs each bee does.
- For Students: Answer the following questions by writing them down on paper to discuss your answers with a parent or another adult:
  - What did you like learning most about honeybees from the book?
  - Would you like to become a beekeeper?
  - If you were a bee, what bee would you want to be? Worker, Queen, or Drone?
  - Do you or your family have honeybees?



<https://youtu.be/NdZMsNO6I-A>



# "Build a Honey Bee Lifecycle Instructions"

## PowerPoint

### Creating an Interactive Honeybee Display



Project Created by Amber Dunnaway

### Materials Need:

- 1-Poster board, any color
- 10-Empty toilet paper or 5-paper towel rolls cut into 1/2 inch pieces folded three times to create a hexagon shape
- 2-Grains of rice (represents eggs)
- 2-Macaroni noodles or a noodle that is C-shaped (represents larva)
- 1-Small container of white play dough or modeling clay (model into a pupa)
- 1 package-Orange and yellow pompoms or yellow and orange pipe cleaners
- 1-Clear glue bottle
- 1-Felt bee, toy bee, honeybee cutout (adult honeybee to complete the lifecycle)
- Cut out of one queen bee, multiple worker bees cut-outs, a few drone bees cut-outs
  1. You can find honeybee cutouts used in the course on this website from [Arizona State University](#) "[Bee Bonanza: The Story of Honey Bees](#)."
  2. Optional: You can purchase a "[Lifecycle of the Honey](#)" set on Amazon
- 5-8 Clothes pins for worker bees
- 1-Bottle of orange or yellow food coloring (only use 2 drops)





## Steps to Make the Hive

### Parts 1, 2, and 3

## Steps to Make the Hive (Part 1)

- Take empty paper towel or toilet paper rolls and cut them into  $\frac{1}{2}$  inch strips. Fold each strip into three sections to create a hexagon shape.
- Glue the hexagons together into multiple rows and columns to create honeycomb.
- Add the lifecycle into the cells:
  - Grains of rice will represent eggs
  - C-shaped dry pasta noodles represents a young larva
  - Construct the pupa from modeling clay or play dough
  - Complete the life cycle with an adult bee (use a plastic bee, create one from art supplies, or use a cutout)





## Steps to Make the Hive (Part 2)

- Next, add honey in the hive.
  - Mix clear liquid Elmer's glue with yellow or orange food coloring to display "honey".
- Use yellow and orange pom poms to represent pollen. Stuff a bunch of pom poms into a hexagon (cell).
- Add cutouts of a queen bee, drone bees, and worker bees around the hive doing each job.
  - Place the queen near the eggs.
  - Place drones near the queen or outside the honeycomb.
  - Worker bees can be placed everywhere around the hive doing jobs like tending to the young, bringing in pollen, making honey, cleaning, etc.

## Steps to Make the Hive (Part 3)

- Finish the interactive hive by placing labels on the hive.
  - Labels should include:
    - The comb
    - Cell
    - Egg
    - Larva
    - Pupa
    - Adult
    - Queen
    - Worker
    - Drone
    - Honey
    - Pollen
    - Propolis (explain to students that propolis is the "glue" that holds the hive together)
    - Pollen basket



## The Complete Hive Description (Part 1)

- This is an aerial view of a frame of a honeycomb, as if a bee keeper pulled it out of the hive.
- The first thing that a bee keeper would look for in a honeycomb is the life cycle of a worker bee, which is on the left side of the honeycomb.
- The life cycle stages are:
  - Eggs, represented by a grain of rice. When a bee keeper sees these, they know the queen bee is alive and well.
  - Larva, represented by a dry c-shaped pasta noodle.
  - Pupa, represented by white modeling clay or play dough. In this stage, the honeybee starts developing eyes and wings.
  - Adult. It will hatch out of the cell, represented by the hexagon. It hatches as a full-size, adult honeybee.





## The Complete Hive Description (Part 2)

- Now, the middle of the hive will be described.
- Honey is represented in a cell by combining clear Elmer's glue and drops of food coloring (either yellow or orange).
- Worker bees store and make honey in cells.

## The Complete Hive Description (Part 3)

- Outside of the hive, in bottom right corner, there is a worker bee carrying pollen to the hive. The small yellow pom poms represent the pollen, which is on its legs and called the pollen basket (part of the bee's body).
- The cells that are full with yellow and orange pom poms, represent grains of pollen. Pollen is a protein source and is used as their food to survive. Pollen is also used in the pollination process with flowers.
- Propolis, is gathered by honeybees from sap and resin from pine trees. Bees use it to glue everything in the hive. It's very sticky! The glue used in the display represents propolis.



## The Complete Hive Description (Part 4)

- The various types of bees are in certain locations in the hive as follows:
  - Queen: Has a longer abdomen and is next to the eggs in the life cycle. Her main job is to lay eggs in the hive to ensure the future generation of her hive lives on.
  - Drones: Have a more “stout” body. They do not have stingers. They surround the queen and their main job is to mate with the queen to ensure she has fertilized eggs.
  - Learn about Worker Bees on the next slide.

## The Complete Hive Description (Part 5)

- Workers:
  - The body of the hive is full of worker bees. There can be 60,000-80,000 worker bees in a hive.
  - They are in many places in the hive, which is why the worker cut outs are attached to clothes pins. Feel free to move them around the hive!
  - First, you will see worker bees around the life cycle area, near larva and eggs. They feed and take care of bees in the life cycle stages so that they can grow and hatch into adults. For this reason, they are called “nurse bees” because they take care of the young.
  - There is also a worker bee close to the queen bee. They take care of her by cleaning the queen and bringing her food.
  - There is also a worker bee on a cell with honey. The worker bee makes honey from nectar.
  - Lastly, there is a worker bee outside of the hive bringing in pollen and a worker bee making bee bread, their food source. They do it all!







## Explore the Hive

### Directions

- Educators, walk your students through the various areas of the poster board using the bulleted talking points.
- If you are an individual learner, read the talking points with a parent or adult as you explore.
  - First, start at the left side of the poster board to explain the lifecycle of a honeybee. Ask students what they see (they should see grains of rice which represent honeybee eggs).
  - When a beekeeper sees eggs or the tiny grains of rice, they know they have a laying queen bee.
  - Next, you will look at the C-shaped noodle representing the larval stage of a honeybee.
  - Nurse bees feed honeybees during the larval stage.
  - The modeling clay or play dough represents the pupal stage. During this stage honeybees develop eyes, wings, and many other features.
  - Finally, the bee will emerge from the cell as an adult. When a bee emerges, it will either be a queen, drone, or worker.
  - Ask the students how many queen bees they see. There should only be one!
  - The queen should stay near the eggs representing her job as the main reproductive female in the colony.
  - Next ask them how many drone bees they see. Just a few!
  - Place one of two drone bees close to the queen to represent that their job is to mate with the queen so she can lay eggs.
  - And finally, how many worker bees? So many!! Some hives can have up to 80,000 bees!
    - Worker bees can be placed all throughout the interactive hive representing the many tasks they do.
    - As a worker bee matures it will take on different jobs in the following order: cleaning, nursing (feeding the young bees), tending to the queen (feeding and grooming her), making honey from nectar, guarding against predators, and foraging for pollen and nectar.
  - As you go through the bee jobs you can point to where each bee is within the interactive hive.



- Some worker bees will be making honey, some storing pollen, some bringing pollen and nectar into the hive.
- Some bees are placed on clothespins as to move them around the hive. The student(s) may be able to tell you some of these details from the book/video previously read.
- Let the student(s) interact and move the bees and pollen around the hive as much as they want allowing them to discover the work it takes to create honey and most importantly to create new bees to pollinate our agricultural crops and flowers that we enjoy.

## **Post-Assessment**

On a piece of paper, draw or write:

- What are two jobs that bees have?
- Based on this unit, what kind of job could you do when you grow up?