**INTRODUCTION**

This beekeeping project for K-3rd grade youth offers learning activities that encourage and strengthen positive interactions between parents (mentors or teachers) and children. It uses the 1993 Experiential Learning Model by Deen and Newman and Iowa State Univ. Extension Targeting Life Skills models as a foundation. This project book is divided into two levels. **Step I** is for children 5 and 6 years in age (with little required reading). **Step II** is for children 7 and 8 years in age and uses more reading skills and is for children who may have completed **Step I** and seek more activities. They are best performed as a joint activity between adult and child(ren).

This Project Book is designed to assist Extension staff, parents, or mentors to implement effective, age-appropriate, cooperative learning experiences for children 5 to 8 years old. **This Beekeeping Project Book is not designed as a lesson in beekeeping or the honey bee, but all subject matter material is accurate.** The benefit of this subject is to introduce honey bees and beekeeping to our youngest in a responsible way that will help them realize the importance of honey bees and reduce potential fear of the insect.

Respecting the diversity of development in this age group, activities are divided into two levels, or steps. **Step I** is a good starting point, especially for the younger 4-H’ers around kindergarten and first grade. After completing **Step I**, older 4-H’ers may want to proceed to **Step II**. Iowa State Life Skills Model identifies 4-H’ers aged 5-8 as curious, creative, having many questions, learn best by doing, use their senses, and learn to observe.

Some activities may be too difficult for certain individuals at a particular time in their life or additional help may be needed, but a range of difficulty is included for a range of abilities in this age group. **Do not feel obligated to attempt them all.** Take advantage of the checklist pages to decide which activities to do. One may also return to this activity book at a later date to complete the more advanced activities.

The **life skills** that this project book works toward are social interaction, decision-making, self-understanding, health and fitness, and learning to learn, learns by doing, learns to observe, is creative, identifies alternatives, problem solving, learns about a community, sets goals for the project, learns to listen when others speak, takes field trips, uses observational and counting skills and uses imagination. The leader questions at the end of this project booklet are important suggestions toward developing these traits.

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Step I

Choose and Check The Things I plan to do:

- Send for a beekeeping supply company catalog. Look up a picture of a beehive. Look up a picture of a smoker.
- Check out a book about honey bees from the library with an adult. Ask the librarian for help. Read it with your parent.
- Make a peanut butter and honey sandwich with your parent and share it with each other.
- Take a trip to the grocery store and list the fresh fruits and vegetables that you see which are pollinated by bees. Share this information with your family at dinner.
- Attend a local beekeepers club meeting with an adult. Ask your agent for the nearest one. Find out why a beekeeper uses a smoker and from where honey comes.
- Visit a garden in bloom during the mid-morning hours when the temperature is above 60 degrees. Watch for any bees. See how many different flowers were visited by them. Look to see if the bees have a favorite color flower. Watch to see if they visit the leaves or stems. If possible, make another visit late in the afternoon or when it is cold and compare the number of bees you see visiting flowers then.
- Ask your parent to catch a honey bee in a jar or zip lock bag. Place it in the freezer overnight. The next day, use tweezers and a magnifying glass to examine it. Be careful not to squeeze it or touch the stinger even when it is dead. Look for the three main body parts.
  - Look for the two antennae.
  - Look for the two large eyes.
  - Count the number of legs.
  - Count the number of wings.
  - Look at the color of the wings.
  - See if the body is smooth and shiny, or fuzzy with hairs.
- Draw a picture of a honey bee. Make sure it has all the correct parts.
- Recognize words in a bee word search.
- Follow a path in a bee maze.
- Make a cardboard and pipe cleaner model of a honey bee.
BEE-WORD SEARCH

BUZZZLUG
EDCHTRJ
ETHOIXL
QFENMMM
WPAECBE
OADYICG
SIXVLEG

BEE
COMB
HIVE
SIX
HEAD
HONEY
BUZZ
WAX
LEG
EGG
BEE MAZE

Help the queen find the egg she laid in the cell.
Pipe Cleaner Bee

Color the parts of the honey bee on the next page. Remember that the wings are clear. You and your parent will also need several pipe cleaners to make six legs and two antennae. Three paper brads will help to attach the wings and head to the thorax. Have your parent help cut out the parts of a bee from the next page. Glue the three main body parts to a piece of cardboard (such as a cereal box) or cardstock. Have your parent cut out the parts.

Next have your parent punch holes as marked for the head, wings, antennae and legs using a small nail or awl. Use your pipe cleaners to make the legs and antennae and attach them through the proper holes. Use the brads to attach the head to the thorax and the wings to the thorax.
Buzzz……………..
**Step I**

**Check the things I have learned:**

- A bee has three main body parts.
- A bee has six legs.
- A bee has two pair of clear wings.
- A bee has a hairy body.
- I have talked with and listened to a beekeeper. One thing I learned was ________________________________________
- How to use a product of honey bees to make a meal or snack
- Honey bees visit flowers most in the morning of warm days.
- Bees make honey from nectar collected from flowers.
- Some of the fruits and vegetables that need honey bees to visit them
- The part of a plant that is attractive to bees
- Bees have favorite colored flowers to visit.
- Beekeepers keep honey bees in a box called a beehive.
- I have learned beekeeping terms in the word search.
- Completed a bee maze.
- Beekeepers use smoke to calm bees.
- I have shared some of my knowledge with my family.
Step II

Things I plan to do:

- Complete a honey bee maze.
- Complete a beekeeper word-search.
- Compare pictures to find the one that is the same.
- Unscramble bee words to solve a riddle.
- Uncover a bee word hidden in code.
- Recognize beekeeping words in a word search.
- Find hidden bee words in sentences.
- Do an imagination exercise with a honey jar.
- Do an investigation with an apple.
- Make an observation about a seed.
- Learn what it is like to be a busy bee collecting nectar.
- Help a bee navigate using a map.
- Dress a Beekeeper cut-out with his/her needed equipment.
Circle the picture that is The Same?

<table>
<thead>
<tr>
<th>![Beehive]</th>
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Bee Maze

Help the worker bee find the path to the flower to collect nectar. Then help her fly home to place the nectar in the honeycomb.
Bee Jumble

Unscramble the “Bee” words below. Then use the circled letters to form the answer to the riddle in the box.

WIGN

YONEH

KESMO

PAPU

Write your circled letters here.  ➤

Now arrange the letters from the circles to spell a word that will solve the riddle, below.

What large orange vegetable used to make pies and jack-o-lanterns, grew on the vine after the bee visited the flower?
BEE CODE WORD

Find out what a beekeeper uses to remove honey from frames of honeycomb.

*Circle every third letter in the row of letters below and then copy it, in order, to the lines below.*

J R E M T X L T T O C R L K A W M C I G T Q H O U Y R

Uncapped honey frames are placed in this spinning machine and the honey is thrown out of the cells when the crank turns. It runs down the inside of the drum and out the valve at the bottom. (image courtesy of A.I.Root, Co.)
Circle these words that you find in the grid above. They may read in any direction. If you have an equipment catalog, it may be helpful to look at pictures of the items below.

HIVE       BROOD       PUPA
COMB       QUEEN       EGG
APIARY     CELL        FLOWER
VEIL       HIVE        POLLEN
WORKER     SMOKE       LARVA
                WAX
Starting from the Bee each time, follow the directions below to track the bee’s visits.

1) Fly four blocks West,
Three blocks North,
One block East.  
The bee finished at the ________________.

2) Fly one block East,
Three blocks North,
One block East.  
The bee finished at the ________________.

3) Fly five blocks North,
Two blocks West,
Three blocks South.  
The bee finished at the ________________.
Hidden Bee Words

1. bee  4. hive  7. wing
2. honey  5. flower  8. worker
3. drone  6. queen  9. smoke

From the list above, help each other find the numbered hidden word in the corresponding numbered sentences below. Underline it. (Hint: Look for the first letter of each word in the sentence.)

1. Example: It has been a long day.

2. Most eggs come with one yolk.

3. Dr. Oneill treated my cold.

4. Of all the fruit which I've tasted, grapes are my favorite.

5. I need to wear the scarf lower around my neck.

6. Mouth-watering odors from the barbeque entered my nose.

7. We closed the window in Grampa’s car in case of rain.

8. Always be careful with a saw or kerosene.

9. Cosmo kept his dog in the pen.
**Imagine**-

Pretend that you operate a honey stand. If you have a jar of honey in your kitchen, get it out. What would you say to your neighbor to convince him/her to buy a jar of honey? Have your parent write it down.

![Honey Jar and Bottle](image)

**Investigate**-

Have your parent cut an apple across the middle. Count the seeds. Ten seeds mean that the apple was completely pollinated by insects visiting the blossoms. Shriveled or missing seeds mean that the blossoms were not completely pollinated. An apple like that may not be completely round. Taste the apple at the top, bottom and middle to see if it is as sweet in all places.

![Apple Cross Section](image)
Observe-

Watermelons, pumpkins, cucumbers and squash need bees to visit their flowers for fruit to grow. Plant a watermelon or pumpkin seed in a disposable cup using some moistened potting soil. Poke a hole in the bottom for water drainage. Choose 2-3 of the darkest or largest seeds to plant if you collect the seeds directly from one of the fruits. Place the seeds about one inch below the top of the soil surface.

Write down the day you planted the seeds. Watch to see when the seed sprouts. Write down that day and count to see how many days it took.

Date planted ___________ Date sprouted _____________

It took _____ days to sprout.
Nectar Collecting

It takes about 1,000 visits to a flower by a honey bee for the hive to make a single teaspoon of honey. Here’s an activity to give you an idea how much work it takes.

Have your parent help you pour a glass of your favorite juice. Empty the glass of juice into a shallow cereal or soup bowl and place it at one end of the kitchen. Place the empty glass at the other end of the kitchen. Now, using a teaspoon, transfer the juice from the bowl to the glass one spoonful at a time. Hold a napkin under the spoon in case you drip. (Your parent may prefer to do this activity outside or use water instead of juice.)

Count how many trips it takes you to fill your glass. __________ trips

What would it be like if you had to fill ten glasses with juice?

What would it be like if you had to run to a neighbor’s house for every spoonful of juice?
Beekeeper Cut-Out Figure

Color the beekeeper figure and his equipment on the next two pages. Remember that bees don’t like dark colors. You can draw a face in the hooded veil or have your parent print out a picture of your own face from a computer to use. Cut out, or have your parent help you to cut out the figure and all the equipment. Glue the beekeeper to a piece of cardboard (such as a cereal box) or card stock. Have your parent cut out the figure again. Now glue the hooded veil, pants, gloves, and boots onto the figure. Then glue the hive tool in one hand and the smoker in the other hand.

Use the cut out shape of the beehive to fold up and tape together to make a box-like beehive for the beekeeper. Dotted lines indicate the folds.
Unseen flap for taping

Top of hive. Fold down.

Unseen shaded flap for taping

smoker

hive tool

gloves

boots
Step II

Check things I have learned:

- Completed a honey bee maze.
- Completed a beekeeper word-search.
- Compared pictures to find the one that is the same.
- Unscrambled jumbled letters to solve a riddle.
- Solved a code to learn how honey is removed from honeycomb.
- Found hidden bee words in sentences.
- Did an imagination exercise to sell a jar of honey.
- Investigated the number of seeds in an apple.
- Observed how long some seeds need to sprout.
- Felt what it was like to be a busy honey bee collecting nectar.
- Navigated a map using compass directions and a grid.
- Cut out and learned what equipment a beekeeper needs.
Parent/Mentor/Teacher Answers

Pictures that are the same.  hive-second; clover-first; honey bear-third; beehive-third

Bee Jumble:  WING, HONEY, SMOKE, PUPA, = PUMPKIN

Bee Code Word = EXTRACTOR

Hidden Bee Words
Most eggs come with one yolk. (honey)
**Dr. One**ill treated my cold. (drone)
Of all the fruit which I’ve tasted, grapes are my favorite. (hive)
I need to wear the scarf **flower** around my neck. (flower)
Mouth-watering odors from the barbe**que** entered my nose. (queen)
We closed the window in Grampa’s car in case of rain. (wing)
Always be careful with a saw or kerosene. (worker)
**Cosmo** kept his dog in the pen. (smoke)

Bee Navigation
First location – bird bath; Second – hive; Third – sunflower.

Find a local NC Beekeeper Club http://www.ncbeekeepers.org/

Beekeeping supply company examples:

- Brushy Mountain Bee Farm
  610 Bethany Church Rd.
  Moravian Falls, NC 28654
  1-800-233-7929
  [www.beeequipment.com](http://www.beeequipment.com)

- Dadant & Sons, Inc
  51 South 2nd St.
  Hamilton, IL 62341-1397
  1-800-637-7468
  [www.dadant.com](http://www.dadant.com)

Some common fruits and vegetables needing bee pollination:
Apples, pears, almonds, blueberries, strawberries, blackberries, cucumbers, squash, melons, pumpkins, watermelons.
Parent/Mentor/Teacher Life Skills Questions

Leaders can ask these questions for each activity.

**Step I**

- Did you have any trouble finding the picture of the beehive in the catalog? Did it look like what you expected? Where have you seen beehives before?

- What did you like most about the book we read about bees? Was the book about somebody? What happened to that character?

- Do you like making your own peanut butter sandwich? Do you think you can do it again by yourself? Did you like honey or jelly better with peanut butter? What other foods would you like to try honey on? [cereal, pancakes, other]

- You know that some fruits and vegetables must have a bee visit the flower before the fruit will form. How many fruits and vegetables did you find in the grocery store that need bees? Would you be sad if there were no more of these foods? [Common fruits and vegetables in the grocery store that use bees for pollination are: cucumbers, squash, pumpkins, melons, blueberries, strawberries, apples.]

- Did anything surprise you at the beekeeper meeting? What does the smoker do? Where does the honey come from? Would you like to be a beekeeper someday?

- How many bees did you see visiting flowers in the garden? Why were they on the flowers only? Do you think bees visit flowers at night? Why not?

- After looking at the dead bee, how is the bee body different from yours? [legs, eyes, antennae, body, wings, size]

- Pretend your pipe-cleaner bee is flying around the room. What would it land on? Why?
Step II

- What is a pumpkin used for besides jack-o-lanterns? [pie, soup, seeds, cheesecake, cookies]

- An extractor is used to spin liquid honey from a honeycomb. Have ever seen another machine like this? [spin cycle on washing machine]

- If the sun rises in the East, which direction would the bee fly toward if it flew toward the sun at 8 o’clock in the morning?

- What do you think are the most important things to mention about honey to convince them to buy it?

- Do you think the shriveled seeds would sprout if planted? If you tasted the apple, where was it the sweetest?

- Did you become tired moving all that juice from one place to another? Would it have been easier if ten friends helped you? How is collecting nectar similar to collecting blueberries to make a pie? Is there any similarity with reading an entire book? [a collection of single berries to make a pie, or reading one word at a time to make a whole story]

- [If you made the cut-out beekeeper figure…] Why was the smoker important to the beekeeper you made? How would the beekeeper act if he opened the hive without the smoker? If it had tiny bees, where would you place the hive model in a safe place in the room? Why? If you had a beehive in your backyard, where would you place it?