

CANADA
4-H PEI

4-H PEI Beekeeping Project

Leader Info

In this introductory course, members will inquire into how honey bees live and survive in colonies, how humans can help them to do this and also reap some delicious and useful rewards. Some activities may include learning about the different types of bees, understanding the social structure of the bees, dissecting a honey bee, creating seed bombs to launch into nature to create ideal bee habitats and visiting a beehive with a beekeeper to explore this exciting profession/hobby.

Project Completion Requirements (PCR)

- ☐ Complete at least five (5) project activities.
- ☐ Display all tangible items at Achievement Day (ie. Seed bombs, dissected bees with labels, products created).
- ☐ Document all activities or project meeting topics on the **Project (1) Page specific to Home Economic or Life Skill Projects**

⇒ *Additional Activity: Members can create a scrapbook if they choose, but this is not required and will not be credited as a project activity.*

Exhibition Requirements

Members may choose ONE tangible project item to send on the Exhibition Circuit.
Group members do not have to send the same items.
Chosen item must be approved by the 4-H Specialist at the Club Achievement Day.

Members are strongly encouraged to participate in the 4-H Classes at PEI Fairs & Exhibitions.
Please check with your Project Leader or visit **www.pei4h.ca** for more Exhibition information.

4-H Year Completion

In order to complete the 4-H year members are required to:

- ☐ Complete the **PCR's (Project Completion Requirements**) as outlined above
- ☐ Complete a **Communication** (public speaking) Project
- ☐ Complete a **Community Service** Activity
- ☐ Complete an **Agriculture Awareness** Activity
- ☐ Complete the **Member Documentation** (4) pages found in member's Portfolio or on the website
- ☐ Compile all documentation and PCRs to have on display at Club Achievement Day

Note: As the project leader you are only responsible for facilitating the first requirement for the members of your group, the remaining requirements are the responsibility of the member.

GETTING STARTED

*The resources below can be found on 4-H PEI website (www.pei4h.ca) on the page dedicated to this project.

What you need:

⇒ This **Leader Booklet**

⇒ A copy of the **Project Information Page**. This will give you the most up to date information on requirements for the project.

⇒ **Exhibition Information**—this is updated in May of each year so be sure to review the information again at that time.

Optional resources:

⇒ Sample **Educational Activity Plans** as well as a guide to creating your own

⇒ Various other resources as they become available, such as 4-H resources from other provinces, and links to online videos, articles, activities, and project related organizations, clubs, and events.

** Please do not feel obligated to cover everything in all of the provided optional resources. It is completely each leader's prerogative which of these resources, if any, they utilize if planning and leading their project meetings.*

THE PROJECT LEADER'S JOB

To begin, thank you for volunteering your time to be a 4-H project leader! We appreciate your time and willingness to teach today's youth a new skill and share your knowledge.

Becoming a project leader can feel overwhelming at first, but we hope that this page will make your "job" clear and offer some tips to help you be successful.

Responsibilities:

1. **Become a screened leader:** You may have already completed this step, but it is a very important one. The best place to go is to the 4-H PEI website and visit this page: https://www.pei4h.ca/4-h-leaders, to see if you have completed all the necessary requirements. Project meetings cannot begin until you have received a "conditional letter" from the Provincial 4-H Office.

2. **Set project meeting dates:** The amount and length of project meetings is determined by you, the project leader. That being said, you are responsible for covering **all the Project Completion Requirements** for this project with your group. You may decide that you'd like to have five meetings - covering one requirement per meeting, or you may decide to spend two 5 hour sessions with your group and cover multiple topics or activities in one meeting. This will also depend on the project you are leading. For instance, if you are leading a quilting project, then the member will be focused on one large item with multiple steps and skills involved. However, a rabbit project may require multiple meetings (and even locations) to cover different activities and topics. Meetings can begin anytime after November 15th.

   Whatever the case, we highly recommend that Project Leaders **set dates in advance of members signing up for the project.** This method will ensure the members know what they are signing up for, or enable them to make a decision to not sign up if they cannot commit to the dates listed. We also hope that this will avoid a lot frustration for you, because working around multiple schedules is almost impossible!

3. **Choose topics and activities:** You may choose to work on this step before setting dates for project meetings. Some topics and activities may be able to be covered in one project meeting, while others may need their own meeting. Regardless, we ask that you document your project meetings and topics covered so that the 4-H Specialist can refer to this information at Achievement Day if necessary.

4. **Materials & supplies:** While you are responsible for determining what materials and supplies are needed, you **<u>are not</u>** responsible for covering these costs. Options to consider:

   A) 4-H Canada has a FCC 4-H Club Fund that all leaders are welcome to apply to. These grants are valued at $500 each. Applications are accepted August through to the end of October.

   B) Asking for supplies. Depending on what project you are leading, just putting a call out for the supplies you need to friends, family, etc. may be successful.

   C) Determine an estimate total for the materials and supplies needed and set a "project fee" that all members will pay to help cover the additional costs.

5. **4-H year completion and project completion requirements:** The project leader **is not** responsible for 4-H Year Completion (these components will be completed at the club level) though each member **must** complete these components. Project leaders should focus on the Project Completion Requirements, found on the front cover of this guide. These are the items that the 4-H Specialist will expect to see on display at the Club's Achievement Day (typically scheduled for June-July).

6. **Club meetings & events:** Project leaders are not expected to attend monthly club meetings, but are more than welcome to attend if they'd like to know what is going on at the club, provincial, or national levels of 4-H. Similarly, club events and activities are open to project leaders, but it is not necessary to attend. Project leaders are encouraged to attend Achievement Day. This is an event that wraps up the Club's 4-H year and a celebration of member success.

4-H LEADER POLICIES

To learn more about what being a 4-H leader please take a look at the **4-H in Canada Volunteer Leader Guide** (https://bit.ly/3oIdUaE). Of special importance are pages 46 through 51 which covers our Youth Safety and Risk Management Policy, and Code of Conduct.

Rule of Two: There must always be a least **one trained leader** present, plus at least **one other screened volunteer**, who are not spouses, at any 4-H gathering (including project meetings).

You can find the **Youth Safety at 4-H in Canada Policy Manual & FAQS**, and **Youth Safety Reporting System** (i.e. Activity Plan and Incident Report forms) on the **Youth Safety at 4-H in Canada** page (https://4-h-canada.ca/youth-safety).

If you need guidance in completing your 4-H leader screening, understanding our policies, or at any point while leading a 4-H project, do not hesitate to reach out to your regional 4-H Specialist.

You can find their contact information on our website's Contact Us page: https://www.pei4h.ca/contact-us

Helpful Resources!

https://extension.unh.edu/resources/files/Resource002759_Rep4060.pdf
https://4-h-canada.ca/proudtobee
https://www.extension.purdue.edu/extmedia/4H/4-H-571-W.pdf
https://peibeekeepers.ca
https://www.princeedwardisland.ca/en/employee/menzies-cameron
https://www.thebeecause.org
https://www.treehugger.com/how-identify-different-types-bees-4864333
www.padlet.com

PLANNING YOUR PROJECT

Review & Select the activities which you want to learn more about based on your division level - possible topic choices are included on the next page! One project that is mandatory for this course is the visit to a hive with a working beekeeper. (Suits/hats will be made available for this provincially or through the PEI Beekeeper Association).

Remember...

The multiple intelligence theory teaches us that people learn in at least 8 different ways. All individuals will be stronger in some ways of "intelligence" and weaker in others. It follows that the more ways we teach, the more members we will reach. Teaching projects using a broad blend of writing, reading, hands on work, artwork, self evaluation, discussion, and so on, will help increase the learning potential of all members.

Projects are designed to teach many skills. However, the 4-H member is always more important than the subject matter. Stress cooperation in the activities where possible to develop teamwork and cooperation skills. These are valuable skills that will assist them in a number of settings. Ensure the work is completed in a manner that members feel good about themselves and their efforts. This can be done by assigning appropriate tasks or roles based on member's individual abilities. Modeling and expecting supportive behaviour (i.e. no "put-downs") amongst members, or by other adults, also contributes to a positive experience.

THE PROJECT LEADER'S PLAN

After reviewing the Project Completion Requirements list on the front of this guide, review the Project Activity Ideas page/s. You can also pull ideas from past experiences, books, social media, online, or you can plan to join a tour, attend an event, or book a guest speaker. The sky is the limit! It might be a good idea to ask the 4-H members in your project group what they envision before making a concrete plan. In some cases, the project group members may depict what activities or topics based on what project item they have in mind.

Topics and Activities:

1. _____

Supplies needed:

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2. _____

Supplies needed:

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Supplies needed:

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4. _____

Supplies needed:

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5. _____

Supplies needed:

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NOTES: _____

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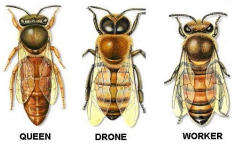
POSSIBLE PROJECT IDEAS

1. Are all bees the same?
Create a poster (online or on cardboard) of the different bees in our region.

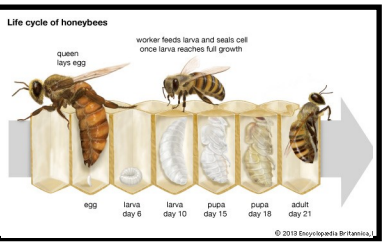
7. Pollination
Act like a bee and pollinate some flowers, while enjoying the fruits of the bees' labour.



2. Social Structure of Bees
Research the social structure of a bee hive and present findings according to members' choice.

8. Seed Bombs/Native Plants
Help the local bee population by creating seed bombs to launch, plant and share.

3. Life Cycle of Bees
Create a chart of the life cycle of bees.

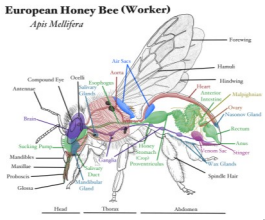


9. What do honey bees eat?
Taste different honey products and guess their origins.

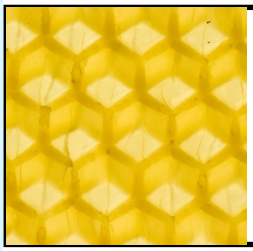
4. Bee Pheromones Lesson
Sniff your way to the right hive with this "scent-sational" activity.

10. Honey Bee Relay Races
Become a member of a bee hive and race other bee hives to gather more pollen and nectar.

5. Bee Anatomy
Dissect a dead honey bee to learn about its distinctive parts.



11. Bee Fountain
Create a fountain bees can safely drink from.



6. Bees as Builders
Research the structure of honeycomb, some recipes for products using wax and make your own product to use.

12. Visit with a Beekeeper (Mandatory)
Observe the actions of a beekeeper in the field in person.

1. ARE ALL BEES THE SAME?

Inquiry Questions: How many types of bees are working in Canada? What are their functions?

How do we show/present our knowledge? Members could create a poster of the different bees in Canada or a short report that outlines the names and functions of the bees they might see in their Canadian gardens or backyards. At the very least, they could take notes and come to the meeting ready to discuss their findings. This could be done together as a group, or assigned by a leader to be done before a meeting, then discuss findings together as a group. Group members could also share their findings digitally through a Padlet (padlet.com), shared google doc or shared google slides presentation. Members could also write a journal entry describing what they learned.

Materials needed: Computer, poster creation materials if you choose this option.

Misconceptions: All bees are used for honey production. Bumblebees are honey bees. There is only one type of bee in our environment.

Steps: For an inquiry with students, you will probably need a computer or web-enabled device each. Also, before beginning research, ask students if they have any questions of their own related to the main question. Add these member questions to the list - maybe on a paper or shared document where everyone can see.

1. Have the students research the inquiry question and their own questions that they might have. They can take notes with pen and paper on these answers, or can record these notes electronically on a shared document (google doc, slide, padlet).
2. Students discuss their findings and the differences they found. Can create an individual or a shared product that highlights this gained knowledge (poster, slideshow, etc.).
3. Discuss any misconceptions they might have had. If none of the above had come up, the leader could ask if all bees produce honey, if bumblebees are the same as honeybees, etc.
4. Leader can point out that from now on, the honeybee (apis) will be the main point of discussion, as it is this bee that is used in hives to produce honey.

Discussion Questions: If you choose as a leader to have the students do the research before your lesson, students can bring the information they gathered, share their findings with the group discussing the knowledge they have learned, misconceptions they had (did they change their mind while they were researching?) and any questions this new knowledge has brought up. You may want to record their questions and tailor the project towards answering these questions.

2. SOCIAL STRUCTURE OF BEES

Inquiry Questions: What is the social structure of honey bees in the hive? What are the functions of the different types of bees? What do they look like? What are their lifespans?

Concepts members will be introduced to: There is a queen honey bee in the hive who is surrounded by worker and drone bees. Members will research and identify the differences and similarities between these types of honeybees. Members will attempt to identify the different members through videos of hives.

How do we show/present our knowledge? Reflective journal entry, poster (handmade or electronic) of the different members of the hive, slideshow presentation.

Materials and Resources:

- Internet access
- (Option) poster making materials

Steps: This could be done in person, or assigned as a web search beforehand for a discussion at the meeting (done in person, or virtually). If done in person, each member would need a web-enabled device for a web search, and potentially for documenting their knowledge electronically (on google docs, padlet or other electronic platform).

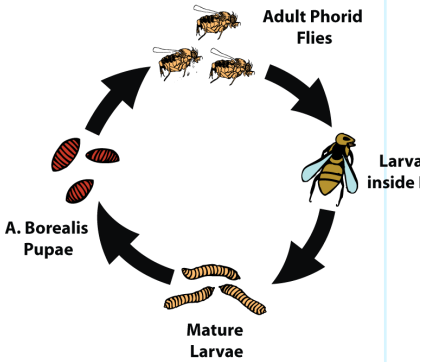
If work is done beforehand, members can come to the meeting with their notes to discuss their findings and the leader can show various videos of working hives that show the different types of bees in action. Members then can try to guess the types of bees they are seeing.

Some YouTube resources that were active at the time of publication are:

- Honeybees Inside the Hive
- How Do Honeybees Get Their Jobs? | National Geographic
- Queen Bee laying eggs!!! (complete video)
- Lifecycle of the Queen
- Life Cycle of the Worker Bee
- Life Cycle of the Drones
- Bee cam - we placed a small camera inside a bee hive to watch the "goings on"
- Honey Bee Hive powered by Explore.org

Discussion Questions: What surprised you about honey bee colonies/hives?

3. LIFE CYCLE OF BEES *Adapted from Bee Cause



Inquiry Questions - What are the stages of the life cycle of a bee?

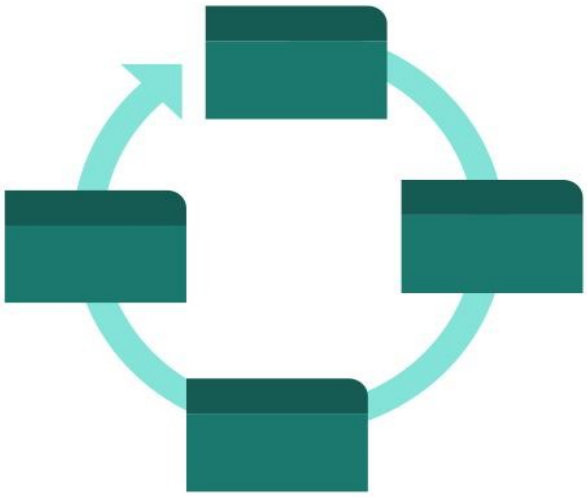
Materials and Resources -

- Blank Life Cycle Template (or white paper to create your own)
- Internet access and device to watch The first 21 days of a bee's life | Anand Varma, and The first 21 days of a bee's life | Anand Varma (Short version).

Steps:

1. Discuss what members might know about the life-cycle of a bee (or any other living thing).
2. Show students Anand Varma's entire Ted Talk or just the one-minute version of the Time-Lapse Life Cycle video. Remind students that this is only a shortened version of a 20-day process.
3. Create a life cycle chart (or have one printed beforehand) that students can complete with the information about the 4 stages of the life cycle of a bee - egg, larva, pupa and adult. Write descriptions of each stage below the title.
4. Option - Print out pictures of each life cycle and have students act out the various phases of the life-cycle. Pictures can be found in the Bee Cause Guide.

Discussion Questions: How is this life cycle like our own? If you were a bee, what stage would you be at?



4. BEE PHEROMONES LESSON

*Adapted from Bee Cause Curriculum

Inquiry Question: How do bees communicate?

Materials and Resources:

Video Links: Bee Pheromones
What is the Nasonov Gland? encycloBEEdia
What is the Alarm Pheromone? encycloBEEdia
Honey Bee Landing Zone powered by Explore.org

If you have a large group, or would like your small group to present at a club meeting, you could also gather 4 baking flavours (vanilla, orange, peppermint or almond essences) or 4 different essential oils, enough cotton balls for each student and if possible, a small container to put the cotton balls in.

Steps:

1. Watch the first two videos and discuss that the nasonov pheromone bees excrete tells the bees that they are home and their hive is their home. The scents are unique to each hive. The pheromone is released into the air so the bees can find their way home. You can point out the gland in the second video -it's a white spot at the base of the bee abdomen.

2. Explain that guard bees will only let members of the family into the hive - they have to have the same scent.

3. If teaching a large group, tell the members that today, they will be acting like bees and trying to find their family members that have the same scent.

4. Give each student a container with a different scented cotton ball inside. Show members how they can silently fly to another member, sniff their container, shake their head yes if it smells the same and no if it smells different.

5. Members of the same family should link arms and try to find the rest of their family. When all members of the same family have joined in a chain, they can sit and wait for all members to finish.

6. When all families have been sorted out, double check that all members of the family have the same scent.

Discussion Question: How do humans use smell? (food tasting, memories, home smells, etc.)

5. BEE ANATOMY *Adapted from Bee Cause Curriculum

Inquiry Question: What are the parts of a honey bee's body?

Materials and Resources:

⇒ Dead honey bees collected from a beekeeper
⇒ Tweezers (one pair per member)
⇒ Scissors
⇒ Magnifying glass (one per member)
⇒ Image of bee anatomy (from Bee Cause Curriculum or another source)
⇒ Scotch Tape
⇒ Printout of bee to label (https://www.enchantedlearning.com/subjects/insects/label/bee.shtml)
⇒ Bee Bits

Steps:

1. Explain that bees have a short life cycle - only about six weeks. They are cleaned out of the hive by the worker bees. The bees you will give them are from a local beekeeper and have died naturally. They will be dissecting these bees today to learn more about the body.

2. Have members begin the process by examining their bee body using a magnifying glass. What do they recognize? Do they know any names of the parts?

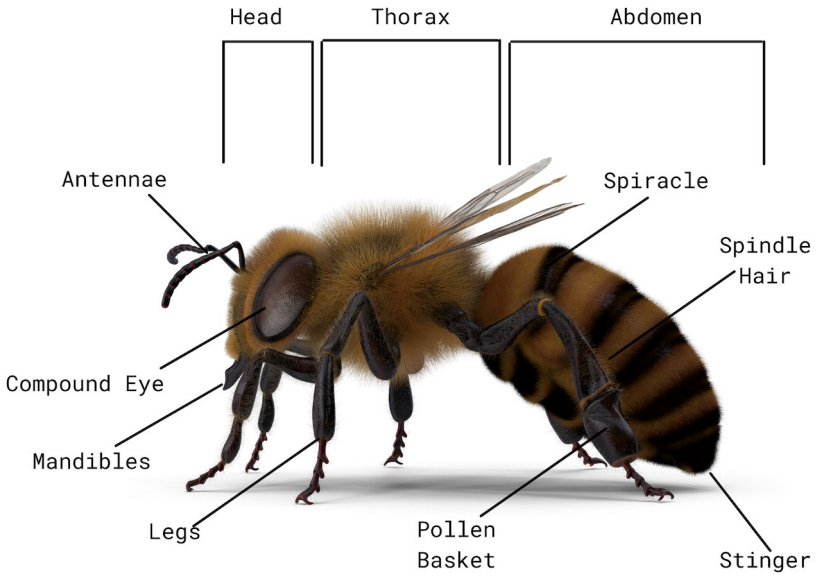
3. Watch the YouTube video, Bee Bits.

4. Pass out a copy of the Bee Anatomy page. Fill out the parts you can from the video. Use other online resources or google, if necessary, to get the rest of the names.

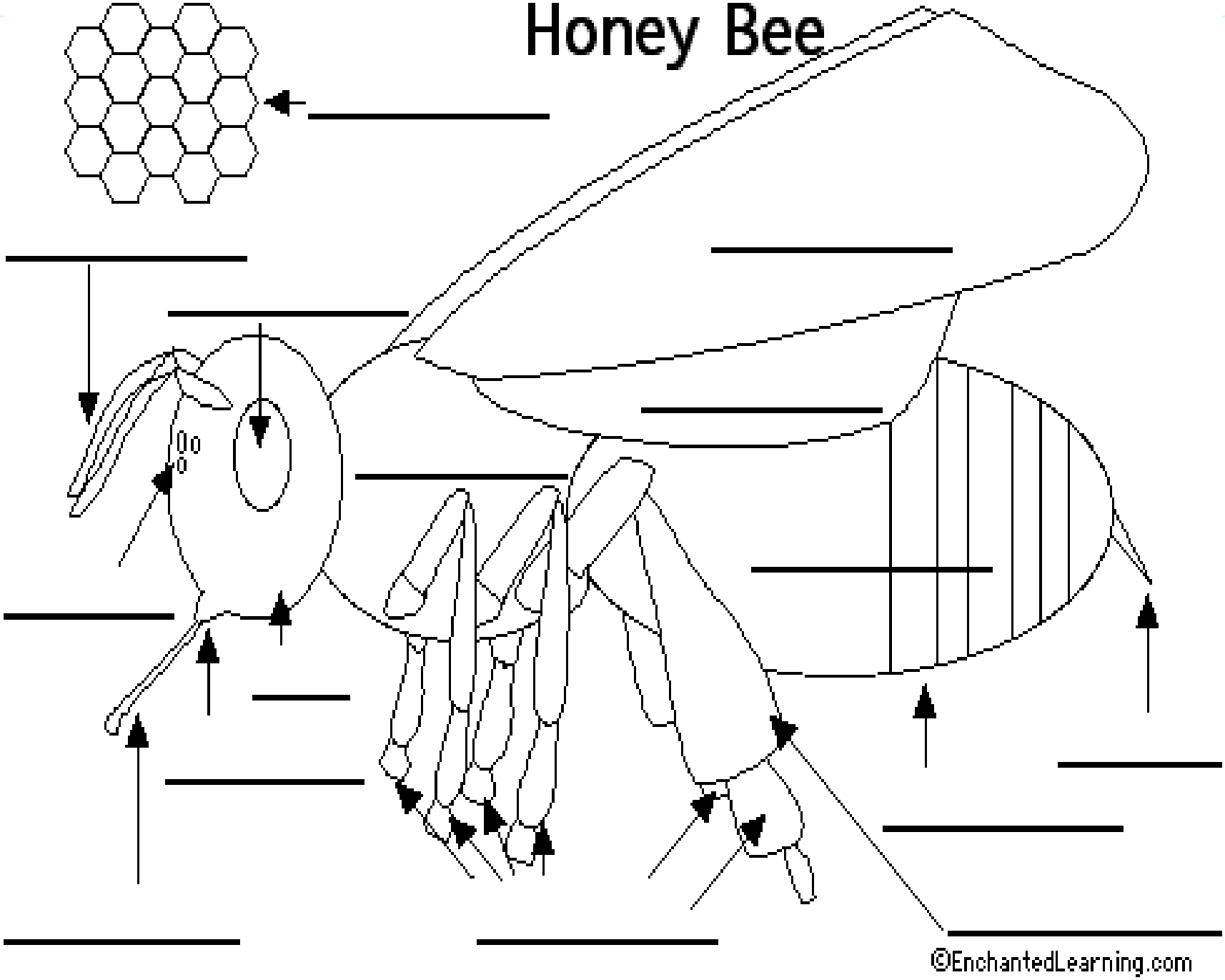
5. Allow students to dissect their bee using scissors and tweezers. These parts can be taped in the corresponding area on the Bee Anatomy page. Tape must completely cover the bee part to keep it from decomposing, if you are using this as an exhibition piece.

6. Encourage students to get as many parts as possible - head, thorax, abdomen, stinger, wings, tongue and antennae could be seven to strive for - any more than that might be difficult because of the size of the bee.

Discussion Questions: How are bees similar to humans? How are they different?



Honey Bee



6. BEES AS BUILDERS - THE STRUCTURE OF THE HIVE

Inquiry Questions: Why are honeycombs shaped the way they are? What material is used to construct hives?

Materials and Resources:

⇒ Why do honeybees love hexagons? - Zack Patterson and Andy Peterson

⇒ Hexagons are the Bestagons

⇒ https://uxdesign.cc/why-do-bees-love-hexagons-119cfd0d95a9

⇒ Honey BeesWax and its Uses

⇒ Honey with comb

⇒ Option: Shape tiles of various sizes (as found in an elementary school classroom) with hexagons, squares, triangles, circles, etc.

⇒ Computer with internet access for researching.

Steps:

1. Examine some honeycomb from a jar of honey that contains comb or comb obtained from a beekeeper. What do students notice about the shape? Why do they think it is like that?

2. If you have a set of assorted shapes, have members tile an area with multiple copies of one shape. Watch how they fit together. Look for strength of shape, as well. In the case of triangles, see if members can find multiple ways to put these shapes into patterns (squares, rectangles and hexagons).

3. Watch YouTube videos about why bees construct their hives using hexagons.

4. Share with members that beeswax also has benefits for humans. Watch Honey BeesWax and its Uses or another video on YouTube that explains this.

5. Research different products and recipes online using beeswax. Options are varied - candles, lip balm, moisturizer, beeswax wraps, soap. Can depend on the interest of students.

6. Students/Leaders can create a list of materials they need to create a product and can make these products at the next meeting (or with the entire club at a meeting).

Discussion Questions: What are the benefits of natural products made of beeswax as opposed to products that aren't natural? Can compare ingredient lists of some common products.

7. POLLINATION *Adapted from Bee Cause

Inquiry Questions: What is pollination and why is it important?

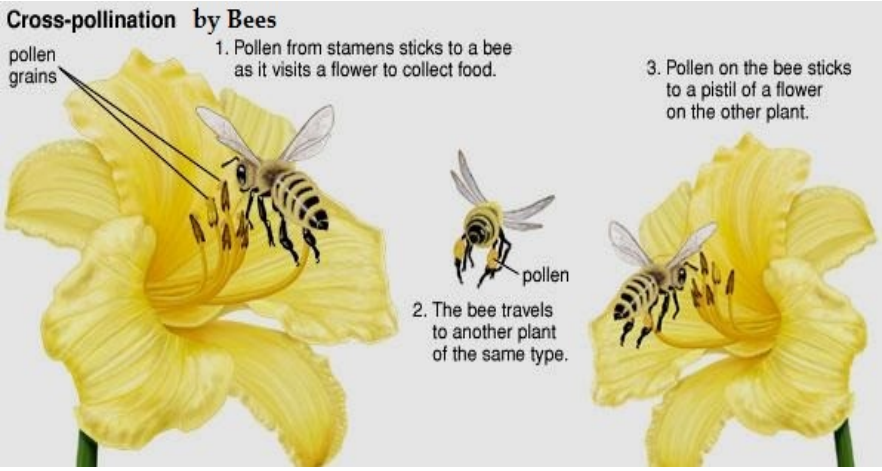
Materials and Resources:

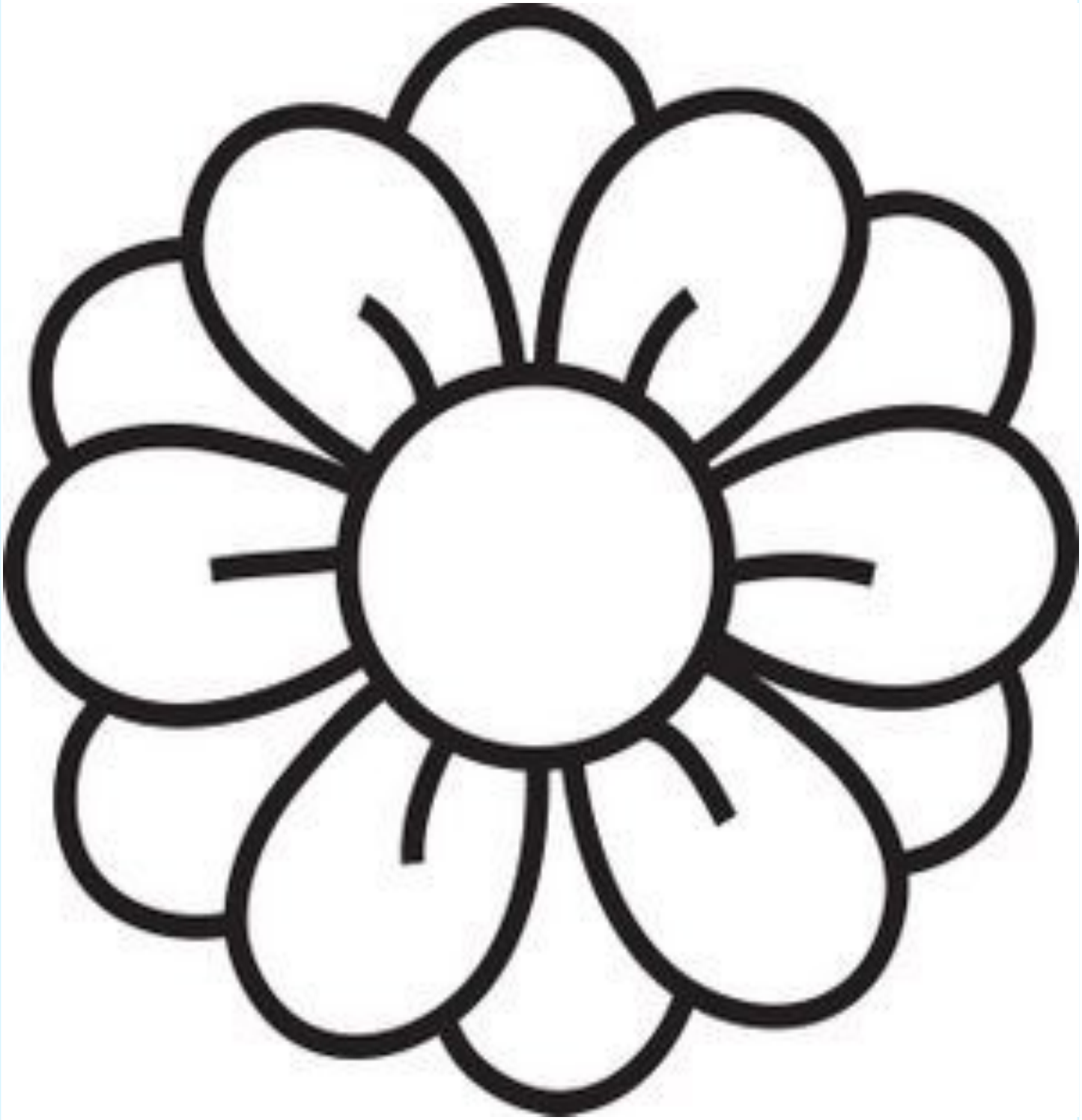
⇒ The beauty of pollination
⇒ Pollination Printable
⇒ Option - Wild Blueberries (frozen work well)
⇒ The Honey Bee with its Pollen Basket
⇒ Bee pollen slow motion Flow™ Hive
⇒ Why do honey bees dance? | We The Curious
⇒ Round and Waggle Dance
⇒ Copies of Black and White Flower
⇒ Cheetos

Steps:

1. Show "The beauty of pollination" video. Discuss members observations.
2. Explain how flowers are constructed - that they contain both male and female parts. The pollen is the male part and the tall sticky part in the centre, the pistil, is the female part. When the pollen touches the female part, it sticks to it and pollination occurs. This process forms the new seeds. Pollination creates the seeds that grow into new plants.
3. Bees (and also butterflies and bats) are instrumental in this process, as they spread the pollen from flower to flower, drinking the nectar. Bees are responsible for pollinating many crops that we eat. Have some blueberries to sample and explain that blueberries are dependent on bees (and especially honey bees in PEI) to pollinate. Show a video of a honey bee with a pollen basket.
4. Bees even dance to communicate where good flowers are, with yummy nectar and pollen. Show the Waggle Dance video.
5. Explain to members that they will now act as bees and "pollinate" some flowers.
6. Have flowers on tables around the room, one for every two members (this could be done as a club for greater impact). Place Cheetos in the centre of each flower.
7. Leader can demonstrate how a bee should land on a flower, pick up a Cheeto, and fly to another flower. When landing on the new flower, the "pollen" will rub onto the centre of the flower (the pistil). The "bee" should pick up another Cheeto, then move on to another flower.

Discussion Questions:
What do the fingerprints represent?
Why is pollination important?





8. SEED BOMBS/NATIVE PLANTS

Inquiry Questions: How can we help bees? What plants can we grow to feed them?

Materials and Resources:

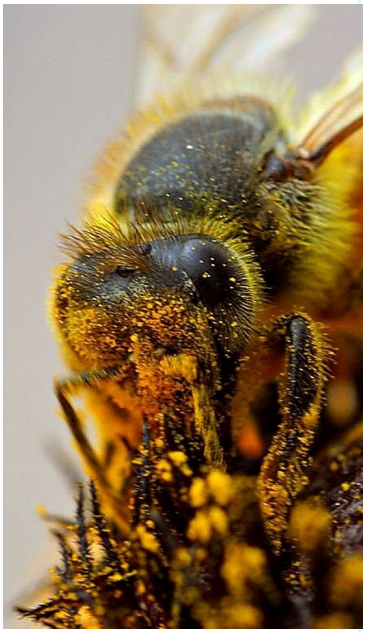
⇒ https://pollinatorpartnership.ca/assets/generalFiles/PrinceEdw.Isl.2017.pdf
⇒ Soil
⇒ Powdered Clay
⇒ Native pollinator seeds

Steps:

1. Read over the pamphlet entitled "Selecting Plants for Pollinators" written by Pollinator Partnership Canada. Pay special attention to the lists of plants at the end of the document that require bees to pollinate.
2. Select some seeds as a group (or have the seeds ready beforehand) that members can use to make seed bombs.
3. Mix one part moist soil with one part powdered clay and add in the seeds.
4. Roll the mixture into 2cm to 4 cm balls and allow them to dry for at least 24 hours.
5. Decide what you will do with the seed bombs as a group - options can be to package and give out to the community with instructions, go for a nature walk in the spring and throw them where the group feels they would help the environment, sell as a fundraiser or any other ideas members can think of.
6. Seed bombs can also be sown into garden beds.

Discussion Question: Can members brainstorm any other ways to improve the environment for the bees?

9. WHAT DO HONEY BEES EAT?



Inquiry Questions: What do bees do with all of the pollen and nectar they gather? What do honey bees eat? If bees gather pollen and nectar from different flowers, what does honey taste like?

Materials and Resources:

⇒ Different types of honey
⇒ Stir sticks for tasting
⇒ Chart to record
⇒ Selecting Plants for Pollinators (Beebread examples)
⇒ How Do Bees Make Honey?
⇒ Honey Bees Make Honey ... and Bread? | Deep Look
⇒ How a Bee Becomes Queen
⇒ Option - have a beekeeper come to explain the different honeys and tastes?

Steps:

1. Explain that after honey bees gather pollen and nectar from the flowers, they take it back to their hive to make one of three products - bee bread, royal jelly and honey.
2. Watch the videos explaining the three substances and show pictures of bee bread.
3. If a beekeeper were to come, they could explain the information above, or talk about the videos and then have a discussion about the honey they sell/make.
4. The honey samples can be numbered ahead of time and the names hidden for a true blind taste test.
5. Members taste the honey one type at a time and describe/discuss its characteristics. Thoughts can be recorded on a chart (see next page) and members can guess the types of flowers the bees have foraged on.
6. Names of honey can be revealed at the end and members can discuss whether or not their guesses were correct.

Discussion Questions: What is your favourite honey and why? What could you use the different honey for?

Honey Samples _____ Characteristics/ Discussion Points	1	2	3	4
Colour				
Texture				
Taste				
Guess what flowers were used to make this?				
Name of honey				
Rating				

10. HONEY BEE RELAY RACES

Inquiry Question: What does it feel like to be a forager/worker honey bee?

Materials and Resources:

⇒ Cardboard beehive cells (one per group) How to tutorial here

⇒ Paper cups (possibly with flower pattern)

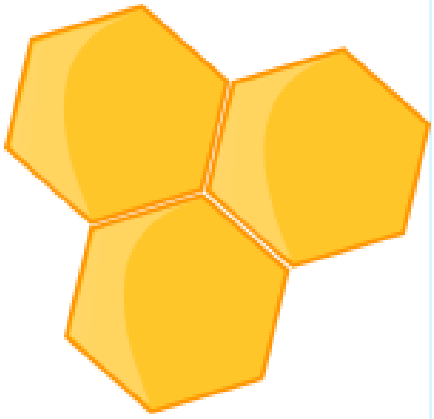
⇒ Print out of black and white flower

⇒ Yellow pom-poms or corn pops

⇒ Eye droppers (one for each group)

⇒ Honey Bees Make Honey ... and Bread? | Deep Look

⇒ Bee pollen slow motion Flow™ Hive

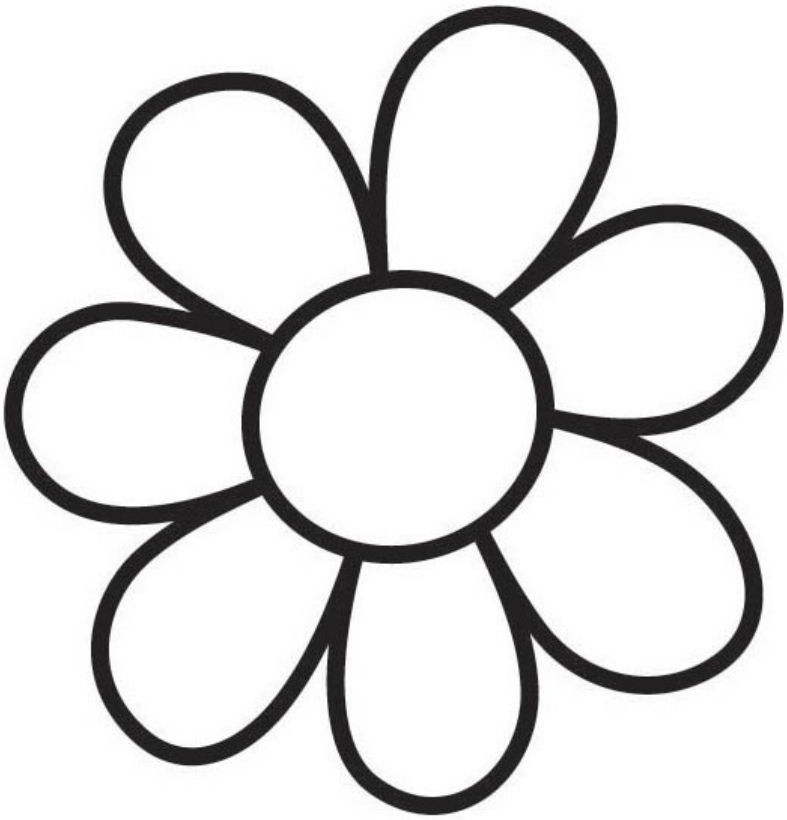


Steps:

1. Discuss with members how the last job of a worker bee is to leave the hive to collect nectar and pollen. When they do this, they are called a forager bee.
2. Use the videos from the resources to show the forager bees returning to the hive with nectar and pollen and also the honeycomb cells filled with pollen and nectar.
3. Tell members they are going to become forager bees. They will do this by participating in a relay race. Group can be divided into 4 different hives (this number can be adjusted depending upon the size of the group).
4. On one side of the room, set up four different cardboard beehives with 6 - 9 cells in each hive (or one beehive for each group). Put 3 paper cups in 3 of the cells for "nectar" (water) collection.
5. On the other side of the room, set up four different "gardens" - a paper flower with a nectar cup in the middle and 20 pom-poms or corn pops on the petals of the flower around the paper cup. Half fill the cup with water (or "flower nectar").
6. Line up each group in front of the hive.
7. Instruct students that they will:
    - Fly to the garden (walk fast) and use the dropper (bee proboscis) to suck up water from the cup (flower nectar).
    - Pick up one yellow pom-pom (or corn pop).
    - Walk quickly back to their beehive to deposit the nectar in one of the paper cups and drop the pollen in an empty cardboard cell.
    - When you are finished, the next member of the group repeats.
    - Continue until the garden is empty of nectar and pollen.
    - The first bee family to finish wins.

Discussion Questions: How do honey bees make honey from this nectar they find? (They fan it with their wings to evaporate some of the water and enzymes from their stomach also help that nectar turn to honey.) Members can fan their nectar to stimulate this, as well.

How much honey does an average worker bee make in its lifetime? Show students 1/12 of a teaspoon. That is how much one bee will make. For a 16 oz (450 mL) jar of honey, honey bees travel 112,000 miles (180,000 km) and visit 4.5 million flowers.



11. BEE FOUNTAIN

Inquiry Questions: What do bees need to survive? Like humans, they need food, water, air and shelter to survive. How do they drink water?

Materials and Resources:

⇒ Honey Bees Drinking Water in Slow Motion

⇒ Build A Water Feeder For Bees, Bugs & Insects In 5 Minutes!

Guided Option:

⇒ Shallow dishes

⇒ Stones

⇒ Glass marbles

⇒ Planter trays

STEAM Option:

⇒ Members gather their own resources to create bee fountains

Steps:

1. Explain to members that honey bees cannot swim. They will drown in standing water, ponds, puddles, sewers, etc. Also, honey bees cannot fly if their wings get wet. You can show them the slow motion videos of honey bees drinking water. Notice that they are always on the edge of the water source.
2. How could members provide a water source for honey bees? Brainstorm some different ideas.
3. Additional Challenge - can they design a self-filling fountain?
4. Guided option: Members fill shallow dishes with stones or beads and then add water to just below the top of the beads or stones.
5. Discuss where members can put their fountains. Can they add them to a park? Community centre? Back yard? Their fountain should be in a place where they can ensure the water level stays constant. A place where they can fill it on drier days and empty it, if necessary, on rainy days.

Discussion Question: All living things need food, water, air and shelter to survive. How do honey bees get the rest of their needs met?

12. VISIT WITH BEEKEEPER/ BEEKEEPER FOR A DAY

Inquiry Questions: What is it like to work with bees? What tools do beekeepers use? What do beekeepers wear?

Materials and Resources:

- ⇒ Student sized beekeeper suits (borrowed from beekeeper or provincial office)
- ⇒ Meeting with a beekeeper at their location

Steps:

1. Prepare questions with members for the beekeeper beforehand and email these questions to the beekeeper in advance so they can prepare.
2. Have the beekeeper show protective clothing, tools they use, smoker and an empty hive box with some frames.
3. Have the beekeeper describe what is done during a hive inspection, honey harvest and any other tasks they perform.
4. Take members on a hive tour, wearing protective clothing. Members can write notes on their Hive Observation Checklist.
5. Thank the beekeeper for their time and ask any last questions.

Discussion Questions: Would you like to be a beekeeper? Why or why not? Give at least three reasons to support your decision. (Member opinions could be documented in an opinion essay for Exhibition Display.)

Alternative Exhibition Display Item - Completed Hive Observation Checklist with photos of observations.

Hive Observation Log **Date:_____**

What to look for...	Observations
Hive temperament: (C)alm, (N)ervous, (A)gressive	
Traffic at entrance (H)igh, (M)edium, (L)ow	
Saw the queen? (Y)es, (N)o	
Population (H)eavy, (M)oderate, (L)ow	
Do bees appear crowded? (Y)es, (N)o	
Laying Pattern? (U)niform and solid, or (R)andom	
See eggs? (Y)es, (N)o	
See larvae? Is there open brood? (Y)es, (N)o	
Signs of disease? Hive (B)eetles, (M)ites	
Bees crawling on the ground? (Y)es, (N)o	
Queen cells? (Y)es, (N)o	
Drone cells? (L)ow 30, (A)vg. 30 - 100, (H)igh 100+	
Open nectar in cells? (Y)es, (N)o	
Bees bringing in pollen? (Y)es, (N)o	
Honey stores: (H)igh, (A)verage, (L)ow	
Need to feed hive?(Y)es, (N)o	
Other notes:	