

***Dedicated
to Reducing
Pesticides***



**University of
Connecticut**
College of Agriculture
and Natural Resources
Cooperative Extension System

Enrichment Lesson 2: It's Good to "Bee" Home

Focus Areas: Insect Life Styles; Science, Math

Focus Skills: recognizing patterns, critical thinking

Objectives

- To understand the role cooperative effort plays in the life style of honeybees
- To appreciate the instinctive behavior of honeybees
- To realize that honeybees are beneficial insects

Essential Question

How do bees provide for their basic need for shelter?

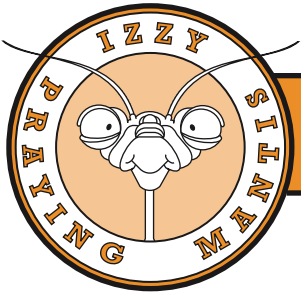
Essential Understanding

Bees are social insects and provide for their basic needs through cooperative effort and division of labor.

Background

Although man may provide suitable "bee homes" to allow him to gather excess honey for his own use more easily, wild honeybees tend to build nests in hollow trees. The ideal "home" has a southern exposure for warmth, an opening at the base no more than 1 1/2 " in diameter for waste removal, a slightly larger opening near the top for easy access by residents, but also easy defense against intruders. The interior must be large enough to accommodate the 6 1/2 gal. or 40 lbs. of honey needed to get the thousands of residents through the winter, and must also be high enough to discourage predators.

Once the optimum site has been found, the interior walls are scraped free of loose debris and treated with a coating of resin, **propolis**, to protect the interior against the weather. Scents from flowers and the

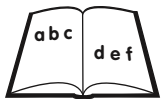


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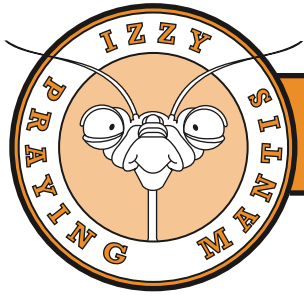
pheromones from the queen are also included in this interior coating to help residents find the nest, and help guards distinguish enemies from those who belong in the hive! Next, the worker bees construct combs by chewing secretions from the undersides of their abdomens to produce beeswax.

Combs are composed of six-sided, double-walled hexagons, **cells**, attached horizontally to the ceiling and walls. The comb is built vertically from top to bottom. The upper levels are for the storage of honey, the middle for pollen storage and the lower levels are the nurseries in which **workers** are separated from **drones**. On the very bottom layers are the special peanut shaped **cells** that house the potential **queens**. Each cell is between 1/5" and 1/4" in diameter and the typical hive is composed of 100,000 cells distributed in 27 sq. ft.

Vocabulary



basic needs	requirements like food and shelter that all living organisms need to survive
beeswax	a substance secreted by worker bees to build cells of the comb
brood	the eggs, pupae, and larvae within a colony
cell	one of the six-sided compartments of the honeycomb
colony	a group of bees living together
drones	male bees
hexagon	a figure with six equal sides
hive	the home of a bee colony



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honey	a sticky sweet substance that bees make from nectar to feed members of the hive
honeycomb	a series of six-sided wax cells in a beehive
nectar	sweet liquid produced by plants and a food source for bees
pollen	a powdery substance produced by plants and used as a source of vitamins and amino acids by bees
queen bee	female bees who mate with drones and thereafter supply the hive with brood bees
worker bees	female bees that care for the brood and the queen, build, maintain, and protect the hive, and gather nectar and pollen to produce honey



Logistics

Time: 30 minutes

Group Size: 4 to 30

Space: a room large enough to allow free movement

Materials



Hexagonal Pattern Blocks (a minimum of one per child) *

Izzy puppet *

Handout 1 "*Honeycomb Poem*" *

chart paper or other large writing surface

unlined paper 8 ½" x 11" (one sheet per child)

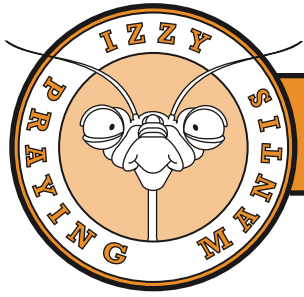
drawing tools (crayons or markers)

honey with honeycomb

Overhead 1 "*Man-made Beehives*" *

honey graham crackers

* single copy provided



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Preparation



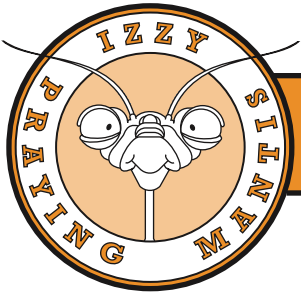
1. Read the **Background** section.
2. Gather art supplies and snack materials.
3. Borrow or buy a honeycomb.
4. Produce enough pattern blocks for the group.
Note: If not enough have been provided to accommodate the group's size, create additional hexagons of the same size using tag board.
5. Prepare copies of the poem *Honeycomb* (optional).

Activity



Introduction

1. Izzy asks the participants to share their address in a round robin.
2. Draw a simple house on the board, and ask volunteers to tell you what the house needs. Draw these items on the house. (doors, windows, chimney, etc.)
Note: Each child may draw their own house on art paper as you complete the large model.
3. Print the word **HOME** on the board, ask someone to read it, and have the children print it on their paper.
4. a. Izzy brainstorms what rooms are found in homes by asking:
 - If you want a glass of milk, what room would you go to?
 - When it's time to sleep, which room do you go to?
 - Where do you go to brush your teeth?**Note:** Additional questions may be added at your discretion.
- b. Lead children to draw the conclusion that our homes have special rooms in which they do certain things.
5. a. Refer to the word "**HOME**" printed on the board. Print the word "**ME**" above it, and "**ROOM**" below it.
b. Beside the word "**ME**" print "**BEE**", and beneath bee print "**H.**"

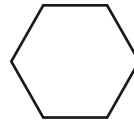


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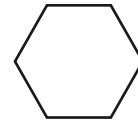
- c. Izzy asks what a bee's home is called. (**HIVE**) Print this beneath the word "**BEE**".
- d. Refer to the word "**ROOM**", and have Izzy poll the group as to whether they think bees might have special rooms in their homes too.

Me
Home
Room

Bee
H _ _ _
(Cell)



6



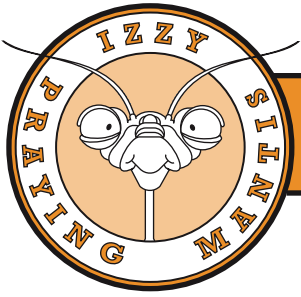
Hexagon

Note: This may be done by a show of hands or as a tally of "yes" and "no."

- e. Explain that if they said "YES", they are absolutely correct. Beside the word "**ROOM**" and beneath the word "**HIVE**", print the word "**CELL**" and pronounce it for the children.
6. a. Draw a hexagon beside the word **CELL** and have children count the sides as you point to them.
b. Print the number 6 on the board, draw another hexagon beside it, and print **HEXAGON** having the children say each letter as you print it.
c. Izzy calls on a child to pronounce the word hexagon and asks the children how many sides a hexagon has.
7. Trace the hexagon shape and ask the children if any rooms in their homes are hexagons. (Some may be) Ask if all the rooms in their house are hexagons. (Probably not)
8. Izzy *shares the wonder* that not only are all the **cells** in the **hive** **hexagons**, but that the bees build these hexagons themselves!!

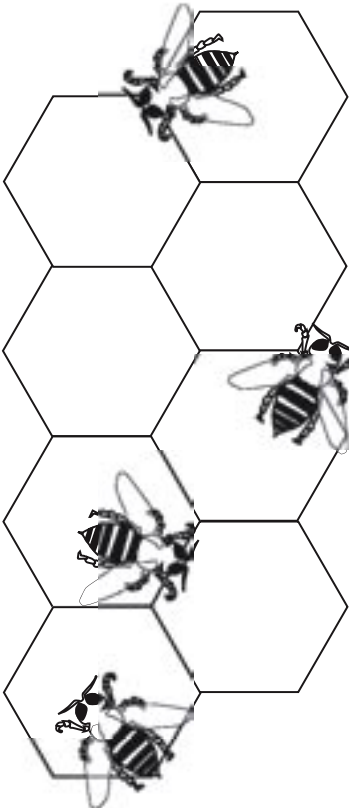
Involvement

1. a. Izzy tells the group they are going to become **worker bees** and build a hive!



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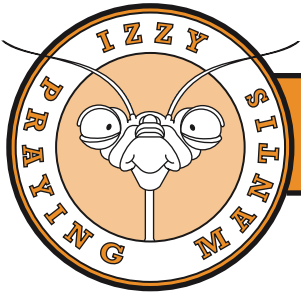
- b. He explains that this is one of the many jobs **worker bees** perform.
 - c. Izzy adds that all worker bees are really girls, but for today, we'll all pretend to be worker bees.
2. Distribute the pattern blocks, (one per child) and ask what these blocks represent. (cells)
3. Izzy explains that when it's their turn to place their pattern block, they **must** place it so it touches **at least one side** of another block, but if they can **touch more than one side that's even better!**
4. Izzy selects individuals to place their cell on the floor, helping them when necessary.
5. When all cells have been placed, tell the group they have created a **HONEYCOMB** (print word on board) just like real bees!
6.
 - a. Show the group the honeycomb and explain that the honey made by bees is food for us too!
 - b. Izzy explains that honey is so important that people build hives for the bees so that the honey will be easier to harvest.
 - c. Show a photograph or actual man-made beehive.
7. If parents give permission, share a snack of graham crackers with a dollop of honey.



Follow Up

OPTION 1: If group is developmentally ready:

1. Izzy tells the group that there are three kinds of cells in the **honeycomb**:
 - a. **Honey storage cells**, where the food for the hive is kept
 - b. **Pollen storage cells** where material for the baby food, **beebread** is stored
 - c. **Brood cells**, bedrooms, for the baby bees
2. Draw a diagram of a hive on the board.



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3. Izzy asks where they think each type of cell would be and guides them to discover:
 - a. **Brood cells** in the center (most protected)
 - b. **Pollen cells** surrounding **brood cells** (for ease of getting food to the babies)
 - c. **Honey cells** on the edges (returning foragers need to deposit their cargo and go out again)
4. Izzy adds that there are passageways (hallways) between the cells to allow movement.

OPTION 2:

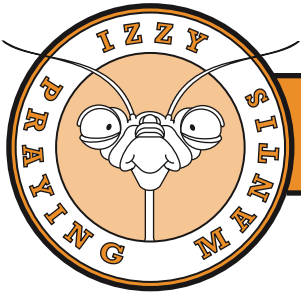
1. Read *Honeycomb* with the group:
2. Invite the children to write a final verse and share the results.

OPTION 3: Guest Speaker

Ask a local beekeeper to come and speak to the group.

FOR ADDITIONAL INFORMATION

Go to NOVA <http://www.pbs.org/wgbh/nova/bees/hive.html>



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Notes

