

# Start with a Book: Read. Talk. Explore.

## Summer Science: Bees

Find lots more activities + fiction & nonfiction booklists + cool apps & websites at [www.startwithabook.org](http://www.startwithabook.org)

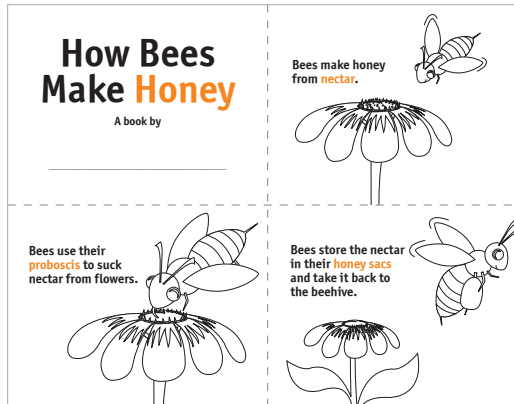


### Invent a Pollinator Robot

This drawing activity challenges kids to design and draw a robot that could complete the transfer of pollen from one blossom to another and help a plant grow its fruit.

Supplies: paper pencil, markers, ruler, household junk (boxes, rubber bands, pipe cleaners, paper clips, toothpicks, LEGO™ blocks or K'NEX™ blocks)

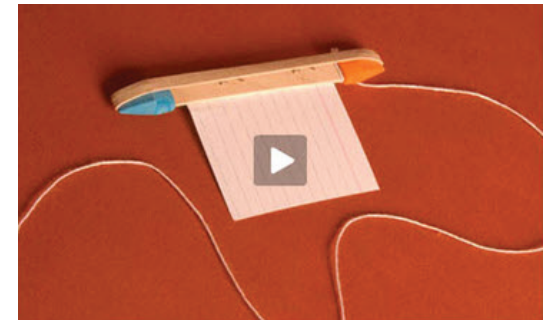
See PDF for instructions.



### Your Own Bee Book!

Do you know the steps in how bees make honey? It's fascinating! Practice sequencing skills and learn some great science vocabulary (proboscis, anyone?) by creating your own bee book.

Just print the PDF pages, cut out, assemble, and staple.



### Make a Bee Hummer

This simple toy sounds like a swarm of buzzing bees when you spin it around.

Supplies: craft stick, cap erasers, index card, string, a wide rubber band, scissors, and a heavy-duty stapler.

See PDF for instructions.



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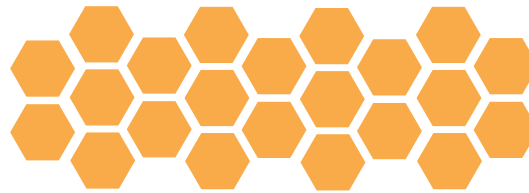


### Bee Thankful

Thanks to bees, we have many good foods to eat. While bees are out collecting nectar, they're also moving pollen from flower to flower — to help grow the important fruit and vegetable crops we eat.

Raise a glass and toast the hardworking bees with a refreshing drink to make together.

See PDF for a recipe and conversation starters (and the link to an awesome website).



### Hexagon Hunt

Bees build their hives out of tiny cells shaped like hexagons (with six sides). This shape lets adult bees fit a huge number of cells into the hive, holding thousands of new bee eggs.

Insects and other things in nature (like snail shells or leaves) come in many shapes. What hexagons and other shapes do you see around you?

Supplies: pencil or crayon, magnifying glass, black paper.

See PDF for instructions.



### Cool Apps and Websites

Apps:

- Meet the Insects: Village Edition
- Bee Farming

Websites:

- Dances with Bees (PBS NOVA)
- San Diego Zoo: Bees
- Buzz About Bees



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### Fiction Books

The Beeman by Laurie Krebs

The Bee-man of Orn by Frank R. Stockton

The Bee Tree by Patricia Polacco

The Honey Jar by Rigoberto Menchu

The Honeybee Man by Lela Nargi

The Humblebee Hunter by Deborah Hopkinson

Winnie-the-Pooh and Some Bees by A.A. Milne

### Nonfiction Books

Are You a Bee? by Judy Allen

The Beautiful Bee Book by Sue Unstead

The Bumblebee Queen by April Pulley Sayre

The Buzz on Bees: Why Are They Disappearing?  
by Shelly Rotner

The Hive Detectives by Loree Griffin Burns

The Honey Makers by Gail Gibbons

The Life and Times of the Honeybee by Charles Micucci

Life of the Honeybee by Heiderose and Andreas Fischer-Nagel

The Magic School Bus Inside a Beehive by Joanna Cole

What If There Were No Bees?: A Book About the Grassland  
Ecosystem by Suzanne Slade



# the pollinator



Take a close look the anatomy of the bee in ***The Life and Times of the Honeybee*** or another nonfiction book about bees. The bee has many specialized body parts — from compound (multiple) eyes with ultraviolet vision to pollen baskets on the outside back legs. Bees are built to contribute to the survival of their colony (family).

Bees also contribute to our survival. Without their pollination of many fruits and vegetables, our food supply would be greatly reduced. As a bee visits flowers in search of their food (nectar), tiny grains of pollen from the anther (the male part) of a flower stick to the bee's body. As the bee moves on to other flowers, it takes the pollen along, transferring it onto the stigma (the female part) of the next flower and starts the pollination process — how a flower or plant develops new seeds.

This drawing activity challenges your child to design and draw a robot that could complete the transfer of pollen from one blossom to another and help a plant grow its fruit.

## Supplies

- >> Drawing supplies: paper, pencil, markers, ruler
- >> Household junk — containers, boxes, rubber bands, pipe cleaners, paper clips, Styrofoam, toothpicks, etc. — or a building set such as LEGO or K'NEX (optional)

## Getting Started

Ask your child to think about what you read about how a bee performs her pollen-collecting task. You might want to read more with your child to help him understand pollination and which bee body parts and bee senses make pollination possible. Then, ask your child to draw a bee and have him point out the bee anatomy that makes the bee good at pollinating.

Now help your artist focus on a new type of pollinator — a robotic one of his own design. To get him started, you might discuss:

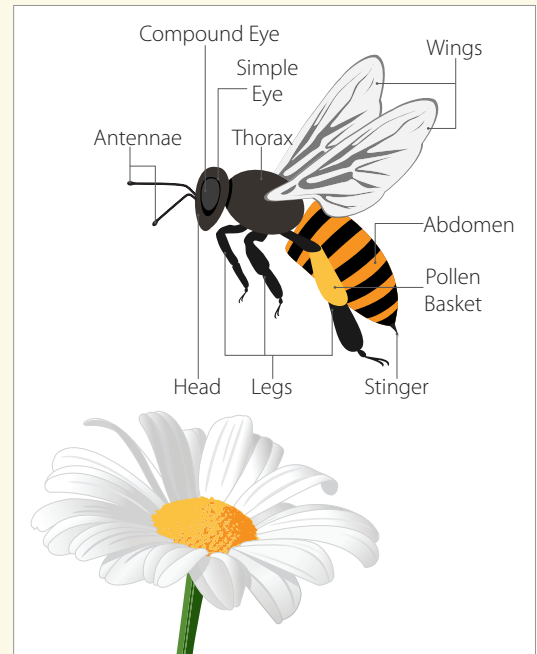
- >> What materials would he use to build the robot?
- >> What tasks does the bee robot need to complete?
- >> How could it be constructed?
- >> What could be the harm or benefit to nature of having robots perform pollination?
- >> How will his robot understand its environment?

Let him create and explain his design to you. If he's interested, provide some materials to create his robot or a 3-D model. When he's finished, talk together about what kind of reaction his robot might get from a real bee.

## Buzz about Robots

Compare or get inspiration from the robot bees at Harvard University: <http://micro.seas.harvard.edu>

Learn why cuteness counts in robot design: <http://labcast.media.mit.edu/?p=206>

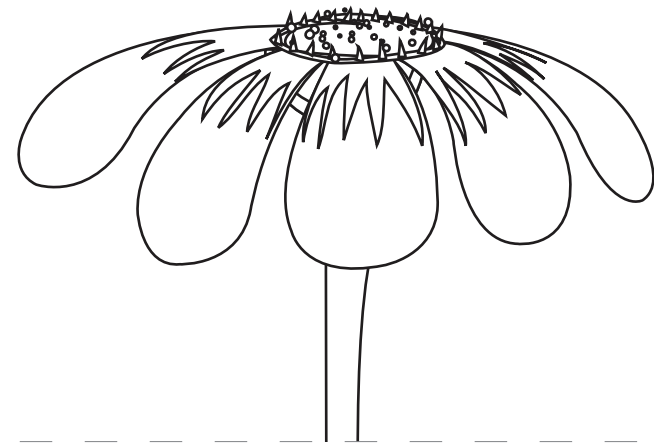
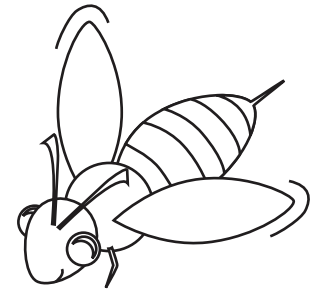


# How Bees Make Honey

A book by

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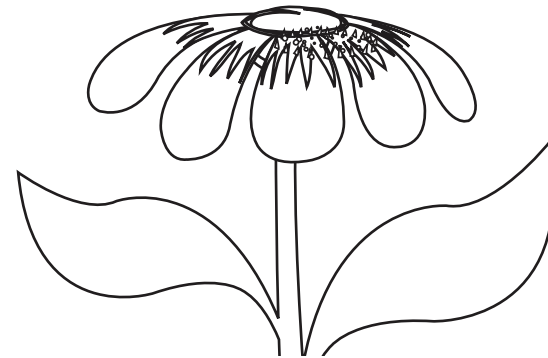
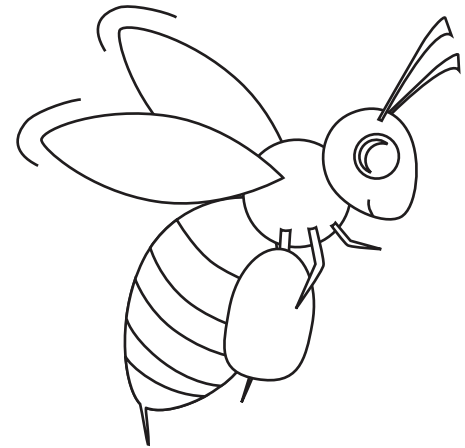
Bees make honey  
from **nectar**.



Bees use their  
**proboscis** to suck  
nectar from flowers.



Bees store the nectar  
in their **honey sacs**  
and take it back to  
the beehive.





At the hive, the bees **transform** the nectar so that it can become honey.



Bees build a **honeycomb** in their hive to store the nectar.



Bees in the hive fan their wings over the honeycomb to **evaporate** most of the water from the nectar.



Bees cover the cells with wax, and the thick nectar inside **ages** the honey.

[The **proboscis** (*pronounced pro-BOS-kis*) is a bee's long tube-like tongue.]

[**Nectar** (*pronounced NEK-ter*) is a sweet liquid in the center of many flowers.]

[**Transform** means to change one thing into something else. Here, the bees change the sugar in the nectar into a simpler form of sugar.]

[A **honey sac** is a special bee stomach that holds the nectar.]

[When water **evaporates**, it changes from a liquid form to a gas form.]

[A **honeycomb** is a structure made of thousands of six-sided wax cells, or spaces, to store honey, pollen and bee eggs.]

A few good books about **bees**

*The Beautiful Bee Book* by Sue Unstead

*The Honey Makers* by Gail Gibbons

*Honeybees: Jump into Science* by Deborah Heiligman

*The Life and Times of the Honeybee* by Charles Micucci

Find lots of **children's book lists** at [ReadingRockets.org](http://ReadingRockets.org)



[When honey **ages**, it isn't getting old! It's turning into the best honey it can be until bees are ready to eat it. ]



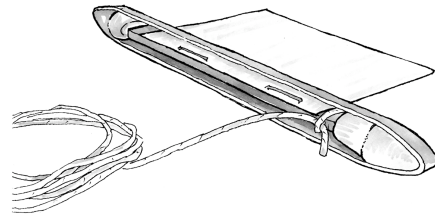


## Bee Hummer

In this activity, you'll make a "bee hummer"—a toy that sounds like a swarm of buzzing bees when you spin it around.

### What Do I Need?

- a Popsicle stick or craft stick
- cap erasers
- index card
- scissors
- stapler that's strong enough to staple the index card to the Popsicle stick
- string
- a wide rubber band (about 1/4 inch wide) that's long enough to stretch lengthwise around the Popsicle stick (e.g., #64 rubber band)



### What Do I Do?

- 1.** Put a cap eraser on each end of the Popsicle stick.
- 2.** Trim an index card (about a quarter of it) so it fits in the space between the two erasers on the Popsicle stick.
- 3.** Staple the card to the Popsicle stick.
- 4.** Cut enough string—about two feet—to safely swing the card.
- 5.** Tie the string next to one eraser; make several knots so it's secure.
- 6.** Stretch the rubber band around the Popsicle stick from one eraser to the other, and make sure it's snugly in place.
- 7.** Swing the bee hummer. You should hear a sound like bees buzzing.

**Note:** Make sure the rubber band isn't twisted, and that the string isn't touching the rubber band. Either of these things could stop the sound.

## Decorations

You could draw wings on the card, or cut the card into the shape of wings.

## Going Further

- What happens when the index card is curved or folded?
- Can you make a bee-hummer that is really loud?
- Try a different sized rubber band.
- Try to spin it faster (a longer string may help).
- You can modify your materials by using clay or play dough instead of erasers, using different string or rubber bands, or using different sizes and shapes of cards.

### What's Going On?

When you spin the hummer, moving air causes the rubber band to vibrate. Sound is produced by those vibrations, in the same way that vibrating strings on a guitar or violin produce sound. The sound is *amplified*—made louder—by the index card.

# bee thankful



How do you feel when you see a bee? Talk with your child about his attitude toward bees and other insects. Children may be concerned that a bee will sting. The nonfiction title you read together should help your child understand why and when a bee might sting and how to avoid that situation.

In the fiction book you read — especially in *The Honeybee Man* or in *The Bee-Keeper of Orn* — point out how bees and people get along. The bees are considered friendly, helpful creatures, especially when they are busy making honey. And when people take care to be considerate and careful around bees, they benefit from the bees hard work.

Thanks to bees, we have many good foods to eat in addition to delicious honey. While bees are out collecting nectar and filling their pollen baskets, they are also moving pollen from flower to flower making possible pollination and the growth of important fruit and vegetable crops that we eat.

You and your child can raise a glass and toast the hardworking bees with a refreshing drink you make together.

## Supplies

- >> Glasses
- >> Straws
- >> Blender or food processor
- >> Measuring cups and measuring spoons
- >> Honey
- >> Juice — apple, cranberry, mixed berry
- >> Fresh or frozen strawberries, blackberries, blueberries, cherries or raspberries
- >> Ice

## Getting Started

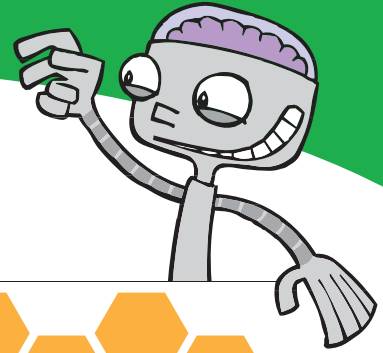
Choose your own fruits and juice to make this smoothie-style drink to your own tastes. Blend together about 2-3 cups of fruit, 1 to 1½ cups of juice, and 2 to 4 teaspoons of honey. If you are using fresh fruit, you may want to blend in ice to make a thicker, frozen creation.

As you and your child decide what to add, have him write down the ingredients and amounts used in order to create a recipe that can be made again or to help you both to figure out what to change or try differently if you don't like the results.

Before you toast the bees, add a straw for drinking and ask your child to pretend with you that you are bees, sucking up sweet nectar with your proboscis — the bee's long, hollow tongue.

If the season and weather is right, enjoy your drinks outdoors. Take some time to observe the interaction between plants and insects and talk with your child about how plants and insects depend on each other and the role the honeybee plays in pollinating more than 150 agricultural crops — including your drink ingredients! If there are no busy bees about, check out this video [www.youtube.com/watch?v=L\\_etyEdu9fQ](http://www.youtube.com/watch?v=L_etyEdu9fQ) featuring bees in action as they perform pollination for peaches, apples, blueberries, blackberries and more.

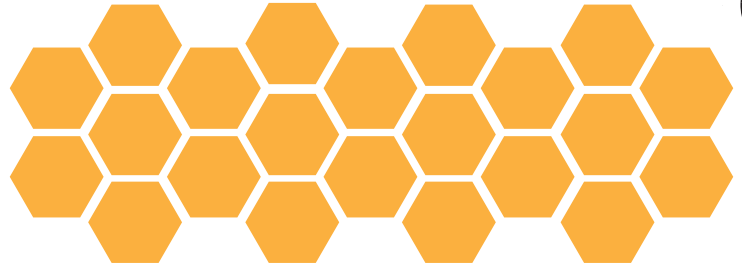
# HEXAGON HUNT



Bees build their hives out of tiny cells shaped like hexagons (with six sides). This shape lets adult bees fit a huge number of cells into the hive, holding thousands of new bee eggs.

## WHAT YOU'LL NEED

- Pencil or crayon
- Magnifying glass
- Black paper



## WHAT TO DO

### 1 Draw It

Can you find the hexagons in this picture of a beehive? How many do you see? Draw the hexagons you found.



### 2 Find It










Insects and other things in nature (like snail shells or leaves) come in many shapes. What hexagons and other shapes do you see around you?

**ACTIVITY CONTINUED ON NEXT PAGE (PAGE 1 OF 2)**

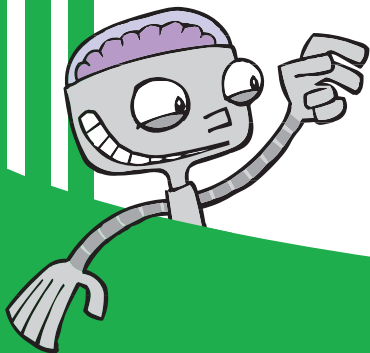
# HEXAGON HUNT (ACTIVITY CONTINUED)

## 3 Record It

Use this chart to keep track of all the shapes you can find in a week.

Shape	Where You Found It
Hexagon 	Example: Snowflake
Hexagon 	
Square 	
Triangle 	
Circle 	
Rectangle 	
Pentagon 	
Oval 	
Heart 	

4 In winter, when snow is falling, take some black paper outside. Let the paper get very cold. As soon as snowflakes land on the paper, look at them through a magnifying glass. Do any look like hexagons?



## DID YOU KNOW?

- The pattern of shapes on an animal's skin can help the animal hide or scare away enemies.