

# Melissa's Bee School Questions and Ideas

1. Why did the author call the bee, "Meli"?
2. Who was Meli's best friend?
3. Why was Bumble Island a good place to live?
4. Why did Melissa, who was a worker bee, have a stinger?
5. What bees do not have stingers?
6. When is the only time bees sting you?
7. Why did Melissa wonder if she should pollinate broccoli?
8. How did farmers stop insects from eating their crops?
9. Did it get rid of harmful insects?
10. Why was killing insects a bad idea for bees?
11. What were the bee's other problems?
12. How did school children help Meli?
13. Why did farmers make bigger fields?
14. What was Meli's big problem?
15. How did she solve her problem?
16. How did the scientists help Meli?
17. What is pollination?
18. What was Meli's wacky song?
19. What does her song mean?
20. Are there things more important than piles of money?  
Name some. - food- family- water - health- friends- your dog- cat- happiness-  
nature -our habitat -the environment...

## Pollination Lesson

I hope students like Cheetos and candy!!!!

### Materials

Indoor and Outdoor lessons

You need a large bag of "Cheese Twists" or "Cheetos" (No Brand" are cheaper and students will not be eating them.) paper flowers, medium sized paper bags, any medium sized candies (Jujubes are good-(**No peanuts, Please check labels for traces.**)

**Please feel free to change or enhance the lesson.**

**Getting to Know You!** Choose a student for comparing the anatomy of a bee to humans (similarities and differences-eyes, legs, body parts, hair, tongue, ears, antenna, stinger...). Make a chart with headings-**Body Part/Same/Different.**

**Some fascinating differences bees have** -5 eyes-long hairy legs-no ears-hollow hairy tongue -3 body parts-4 wings -leg baskets-2 antennae -can tell an enemy or friend using right antennae -sense of smell 100 times better than humans.

### Lessons on the Bee Hive Activities

1. Tell the students that the class is going to enter the fascinating world of insects. They will act like bees in a hive.
2. Make Flowers- Stick or staple flowers pictures on to the medium sized paper bags. Cut some of the top off the paper bag so students can have easy hand access. Put some candies in the bottom of the bags. Fill the bag 1/4 full with Cheese twists. Spread the flowers around the room. Put 3 of these around the room.
3. Choose a student to demonstrate how bees pollinate flowers. The bee could buzz and flap her wings, then hunt for a flower. When she finds a flower, she will search for the candy (nectar) among the cheese twists. She may eat the candy when she finds it. In reality the bees suck up the nectar with their long straw-like hairy tongue and store it in their stomach. They regurgitate it at the hive as honey. The candy simulates the sweet nectar that draws the bees to

the flowers. They should **not** eat any cheese twists for sanitary reasons. The cheese powder will stick on their fingers. The Cheese twists powder represents the pollen.

4. Now she will fly to another flower and repeat the process.. She will accidentally rub the orange pollen (cheese twists powder) on the second flower. This simulates pollination. Now the flower will grow into food such as watermelon, apple, nuts.....**Students should not lick their fingers.**
5. When the teacher is sure they know the routine, other bees can be chosen by the teacher or student to continue pollination. You might need to add candies to the bags. When all bees have been chosen, you could teach pollination in the real world.

## Outdoors Game

Fun-Exercise-Learn-Exercise

### Bee Simulation Game (Outdoors)) Don't Worry BEE Happy!

Students will go outside to play the role of 1) worker bees 2) queen bee 3) four bee enemies. The game will simulate the workings of a bee hive. You will need 8-10 flowers (paper bags with pictures of flowers on the side), a container for nectar/pollen, PE vests or bib for queen bee and the 4 enemies, rope to mark the boundary of the hive, something such as beans, pasta, pop corn... to simulate pollen, whistle.

Mark off a safe area to represent the hive. A rope in the shape of a circle could be used. The hive is a safe area from enemies. No worker or queen bee can be caught while in the hive. The queen lives here with all the workers. The workers must venture out to collect nectar/pollen from the flowers outside the rope. Inside each of the 10 paper bags, that are placed away from the hive, you can put 30 to 50 beans. (dried pasta, button, pop corn, paper clips... whatever is available) that will represent pollen. Worker bees must venture out (flap wings and buzz if they like) to find the flowers (bags with beans inside). **Only one bean can be taken at each visit to the flower.** The worker bees must work hard to find one bean at a time and fly back to hive with the one bean (which represents pollen) without being caught by their enemies. The worker bee could do a special dance round dance or wiggle dance to tell other workers where the flowers are located. The workers put their bean in a plastic container that is inside the hive.

**Four Bee Enemies-Bear, Mite, Pesticide, Wasp** For their identification they could wear coloured vests from PEd. or other markers. Print pictures of the enemies and tape or staple them on the vests for identification. Their job is to catch the worker bees when they leave the hive. If a worker bee is caught, it must not move. They could buzz loudly to let the queen know they need help. The queen bee who wears the brightest vest is the only one that can free them by going out of the hive to touch the caught bees and free them. When the queen touches them they are free to join the game to collect more pollen for the hive. The queen bee may be caught also. If the queen is caught 3 times, the hive must gather in the safety zone and choose another queen. The old queen becomes a worker. To be successful the hive must collect **50** beans in 15 -20 min. Blow the whistle to end game. Demonstrate with lower grade student how to gather pollen and place it (one at a time) in the container. Now get the bees revved up for work. They could all buzz loudly, flapping their wings, to show they are ready. The game begins when you say, "Ready GO"!

#### Options-

Lower grades might need fewer enemies or a break to regain energy.

If the queen gets tired, she could choose another queen. I found the queen and enemies of bees get worn out fast.

If the enemies get tired, they may switch with a worker bee.

Students could keep count of how many successful flower visits they had to see who was the most efficient worker.

#### Have Fun!

**Debriefing-** Describe how you felt to be a bee. Was it fun to be a bee? Do bees work hard? Tell how you avoided getting caught. If there were more flowers, would it affect the bees? If there were fewer enemies, would it affect the bees? How can we help bees? Why are bees important? Do you feel differently about bees now?

Explain

#### Bee Facts Related to Game

- A honey bee visits 50 to 100 flowers during a collection trip
- To make a pound of honey, honeybees need to visit 2,000,000 flowers.
- A honey bee can fly for up to 10 km and as fast as 24 km per hour.
- It is the only insect that humans raise to produce food and medicine.
- Makes about 200 beats per second with their wings, creating their infamous buzzing sound
- insects are responsible for pollinating 70 of the 100 crops that provide 90% of the world's food.
- One ounce of honey would power a bee for a flight completely around the earth.

#### What can we do? Bee Positive! Plant flowers!

1. Plant a pollinator or butterfly garden (including milkweed), using a wide variety of flowers, at school or at home. Make sure the seeds and plants are pesticide free or you could harm bees.
2. Let the dandelions and clover grow on lawns in the Spring. This is their first food source.
3. Put on a Bee assembly to educate fellow students (dramatize the story).
4. Ask your parents to make part of your lawn into a pollinator garden. Stop using chemical sprays that kill all insects.
5. Teach what organic food is. Is eating organic food a good choice? Visit a grocery store or farm to examine organic and non organic food.
6. Purchase local honey only. Other honey can be contaminated or have additives. Research why honey is beneficial to you.
7. Research the four groups of bee stressors that make bee colonies collapse. Is there a way we could reduce these stressors?
8. What other insects (animals) pollinate plants?
9. Use a natural weed killer if you just can't stand the weeds in your yard. Buy distilled vinegar in bulk and spray it on the weed. It will kill the weeds but not the bees.
10. Build a bee house for Mason Bees and Leaf Cutter Bees.

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#### HONEY BEE TRIVIA

Did you know that a honey bee can fly around 15 mph?

Bees fly 55,000 miles to bring us 1 pound of honey.

During her life (approximately 40 days) a honey bee will gather about 1/12 teaspoon of honey.

Bees must go to two million flowers to gather 1 pound of honey.

Bees can see the same colors we see except red. They can also see ultraviolet.

Bees stroke their wings 11,400 per minute.

It takes approximately 3,500 bees to weigh 1 pound.

Honey bees that collect nectar from flowers are called foragers and visit 50-100 flowers on one flight.

The bees gather 10 pounds of nectar to make 1 pound of honey.

A foraging honey bee can carry 80% of their weight in pollen or nectar.

Honey bees make up 80% of all pollinators.

Honey bees use several dances in the hive to communicate the location of nectar and water to other bees.

One well known dance is called the waggle dance.

Honey bee pollination has a agricultural value of 15 billion dollars a year in the US.

The queen honey bee lays between 1,000-3,000 eggs per day.

There is only 1 queen per colony. More than one queen will fight and only one will survive.

A queen mates with nearly 20 drones and only mates once in her life time.

The drone (the male honey bee) does not have a stinger.

Bees wax begins to melt at 148 degrees.

Bees wax is produced from the wax glands in honey bees.

Propolis is made from sticky plant and tree resin and is used by the bees as a glue and an anti-bacteria substance in the hive. Read more about propolis...

A honey bee lives approximately 40 days in the summer and 4-9 months in the winter

