THE BEE’S-KNEES!

OVERVIEW

In this indoor-outdoor activity students will get the chance to learn about the process of making honey and why bees fly when, according to the physics of flight, they should not!

A Honey bee goes from flower to flower collecting nectar, storing it in their abdomens to bring it back to the hive. The nectar mixes with chemicals. The bees then chew it up, throwing it up into a cell of the beehive. This mix becomes honey! Each bee can only make 1/12 a teaspoon of honey in its lifetime of 5 to 6 weeks (or 12 bees to make one teaspoon). Bees are also very important because they help flowers and plants grow. As they fly from flower to flower, they collect pollen on their legs. Some of this pollen is spread to other plants which helps them grow. Take a look at the size and shape of a bee. It is pretty amazing that they can fly with such a large body and small wings. Bees flap their wings 230 beats per second. That’s very fast! They also have flexible wings. Rigid wings would not allow them fly. Because their wings are so flexible, they can create enough lift by twisting their wings. It uses more energy and seems less efficient than other insects that fly with rigid wings.

LEARNING OBJECTIVES

- Learners will learn and describe the purpose of bees in an ecosystem.
- Learners will observe how bees fly.
- Learners will identify the force of flight bees use to fly.

VOCABULARY

- OBSERVATION – to look very closely at something and notice things about it
- DESCRIBE – to represent or give an account of a thing using words
- IDENTIFY – to know or name what something is
- LIFT – the upward force generated by air moving around a wing, working against gravity
- THAUMATROPE – an optical illusion toy that, when spun rapidly, causes two separate images to appear to merge

MATERIALS

- Table or clear space to lay out materials
- Printed Thaumatrope Template – cardstock works best
- Picture of a Honey Bee
- Tape
- Scissors
- Markers
- One straw (can be a pencil or anything round shaped and thin)
SET-UP

→ Print thaumatrope template or draw your own version using the template for reference.
→ Gather markers, scissors, tape, and straw or other material for a handle.

LESSON PLAN

1) Before cutting out the thaumatrope, talk about bees and how they fly, ask questions to gain group understanding.
   Example Questions
   • What do you know about bees? What sorts of things do they do?
   • What do you know about how honey is made?
   • What forces of flight do bees use to fly?
   • What do you notice about the bees’ wings in the picture?

2) Talk about how to construct the thaumatrope and how they might want to color or decorate it.

3) Make your thaumatrope by:
   a. Cutting out the template along the solid lines.
   b. Color your template any way you choose!
   c. Put the straw (or other handle) on the inside of your template and folding the two edges together and secure using tape. This will help you see how a bee flies using its powerful wings (that flap 250x per minute!) to generate lift and fly.

4) Find a spot outside or inside near a window. Talk about what you think will happen with the pictures if you spin it quickly.

5) Spin the thaumatrope between your palms.

6) Make observations about how the wings move! Imagine together what it would be like to be a bee and have to move your wings so fast that it creates a buzz…! Encourage your learners to show you how they can move like a bee.

7) Discuss your observations and what you saw.
   Example Questions
   • Did your thaumatrope do what you thought it would? In what ways?
   • What do you think would happen if you drew one wing using a different color?
   • Did the thaumatrope allow you to see how a bee’s wings work?

8) Experiment more with your thaumatrope by changing the colors or even creating a whole new picture!

FURTHER EXTENSION

In the Museum
During your visit to The Museum of Flight, make sure to visit our Control Tower to learn more about bee flight! Stop by the Alaska Airlines Aerospace Education Center to check out an Insect Backpack to investigate more about natural flight.

Other Museum Programs
Aerospace Camp Experience (Individual Program)
Fossett Adventurers (Group Program at The Museum of Flight)
The Bee’s-Knees!

SUGGESTED READING/ ADDITIONAL RESOURCES

- **BEE & ME** by Alison Jay
- *Buzz* by Eileen Spinelli, Illustrated by Vincent Nguyen
- An audio story about the history of thaumatrope: [What is a Thaumatrope?](#) By Indiana Public Media
- Arizona State University’s ‘Ask a Biologist: Bee Bonanza’ explains more about the science of bee flight!
Support Images and Templates

Make the Bee Fly

(Image Source: Wikimedia Commons)