

# BIRDS OF A FEATHER

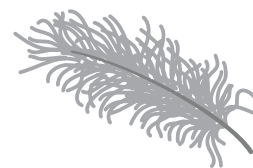
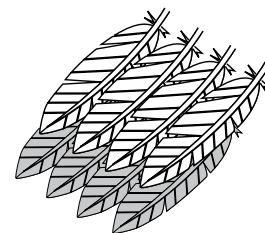
## Background Information for Activity Leaders

### Overview

Children will investigate the parts of a feather, and observe the differences between various types of feathers.

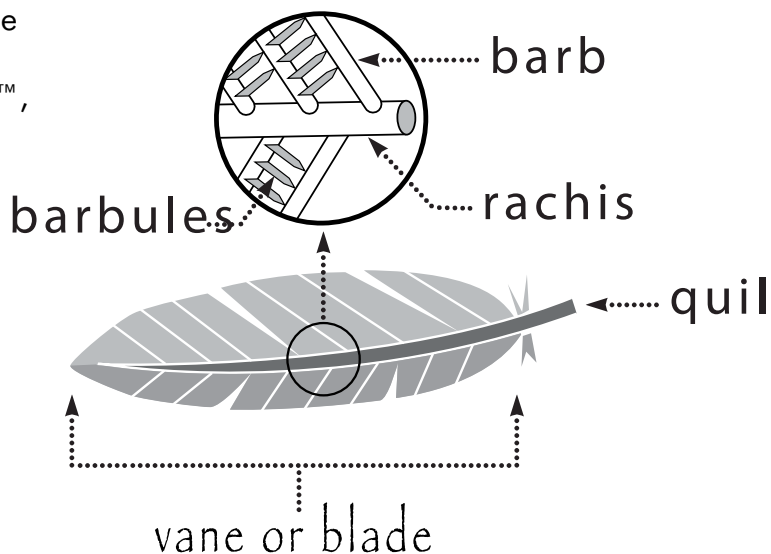
### Key Concepts

- Feathers, just like hair, fingernails, horns, and hooves are made of a protein called keratin.
- Feathers must be shed or molted in order for new ones to grow. Feathers must be lightweight and very strong for flight.
- **Flight feathers** are straight and stiff. They are very aerodynamic and help the bird fly.
- The **tail feathers** are used for lift, balance, steering, and braking.
- The **contour** of **body feathers** makes them overlap like shingles on a roof to give the bird an aerodynamic shape for efficient flight, added insulation, and to keep out wind and water. They also give the bird its color.
- **Down feathers** provide insulation by creating a layer of air which traps body heat close to the skin. The feathers and the trapped air layer also keep the skin from getting wet.
- **Flight feathers** have different parts. Each part serves a purpose or has a function.
- The hard central shaft of a feather is the **rachis**. Parallel rows along the feather are called **barbs**. Parallel rows of barbs make up the feather **vane**.
- The barbules on the outer side of the barb have microscopic hooklets to help interlock the barbs, like Velcro™, and hold the vane together.



A feather functions to:

- provide insulation
- protect the bird's skin
- allow for flight
- allow for camouflage
- attract mates
- give a bird its color



# BIRDS OF A FEATHER

---

## Background Information for Activity Leaders

### What to Expect

- Children will use a plastic bag filled with feathers as a model of a bird. Models can be used during an experiment to substitute objects or phenomena that are impractical to experiment with.
- Children will need to be encouraged to carefully observe the distinctions between the various types of feathers.
- Children may need you to point out various structures after they have done their own investigation, so it is important that you become familiar with them before you begin the activity.

### Common Misconceptions

- *Children may think: “Feathers are necessary for flight, therefore only birds can fly.”*

There are many other animals that fly that do not have feathers. These include many types of insects such as the mosquito, butterfly, and house fly. Bats are present-day mammals that fly. Prehistorically, flying reptiles called pterodactyls also lacked feathers, as did *Archaeopteryx*, a prehistoric bird. Additionally, there are present-day birds with feathers that never fly, such as the ostrich, emu and roadrunner.

# BIRDS OF A FEATHER

## Data Collection Sheet

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### WONDER Why do birds need feathers?

### EXPLORE

Data Table

	type of feather in resealable bag	starting temperature	final temperature	change in temperature
Part 1	down feathers			
	no feathers			
Part 2	flight feathers			
	no feathers			

### CONCLUDE

Which type of feather in the resealable plastic bag had the smallest drop in temperature? \_\_\_\_\_

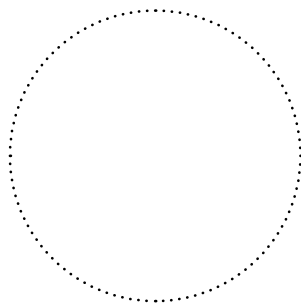
Describe what happened to the temperature in each resealable plastic bag.

---

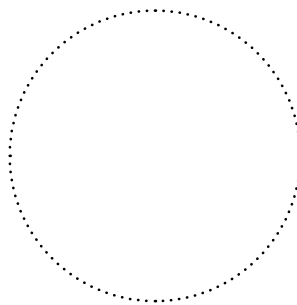
Which type of feather is better at keeping a bird warm?

---

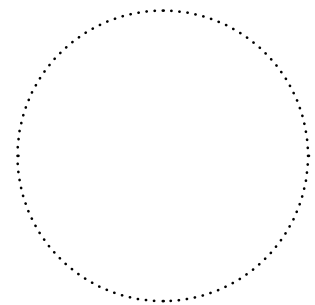
**EXPAND** Examine Velcro™, flight feathers and down feathers using a magnifier. Draw what you see.



Velcro™



flight feather



down feather

Which type of feather resembles Velcro™? \_\_\_\_\_

## Set Up the Expedition

### Materials:

#### For the activity leader:

- *Birds of a Feather* Learning Cards
- (1) bird poster
- (1) flight feather slide

#### For each group:

- (2) thermometers
- (2) rulers
- (1) large bowl half filled with ice water
- (1) handful of down feathers
- (1) handful of flight feathers
- (2) plastic resealable bags
- (1) 2 inch (10 cm) piece of Velcro™
- (1) microscope

#### For each child:

- (1) *Birds of a Feather* Data Collection Sheet
- (1) magnifier

#### Prepare the demonstration:

1. Display the bird poster where all the children can see it.

#### Prepare the exploration:

1. Distribute two plastic resealable bags, two thermometers, a handful of down and flight feathers, and a piece of Velcro™ to each group.
2. Distribute a magnifier to each child.

## BIRDS OF A FEATHER

### Activity Leader's Guide

**Group Size:** 4-6 children

**Time:** 45 minutes

## Engage

- 1 Gather the children together.

### Ask:

*Can you name some living things that have feathers?*

As the children respond, encourage them to describe the feathers of each bird they mention.

### Say:

*Feathers can only be found on birds.*

- 2 Point to the various birds on the bird poster.

### Ask:

*Are there different types of feathers on a birds body?*

**Flight feathers** are straight and stiff. **Body feathers** overlap like shingles on a roof. **Down feathers** are fluffy.

### Ask:

*Why do you think birds might have different kinds of feathers?* Give the children an opportunity to contribute their ideas.

### Say:

*Some feathers help a bird fly.*

*Some feathers keep birds warm.*

Group their ideas into two basic functions.

### Say:

*Birds need their feathers for many reasons. One of the most important reasons has to do with body temperature. Lets find out how a birds temperature depends on its feathers.*

# BIRDS OF A FEATHER

## Activity Leader's Guide

### Explore

- 3** If you are working with more than 4-6 children, divide the children into groups. Distribute the Data Collection Sheets and the Learning Cards.

**Say:**

*Today you are going to determine whether feathers can keep birds warm.*

**Say:**

*Follow the directions on your Learning Card.*

- 4** Allow children enough time to complete the WONDER, EXPLORE, RECORD and CONCLUDE sections of their Learning Card.

### Conclude

- 5** Gather the children together and ask the following questions:

*Each bag is a model we can experiment with. Which bag represents a bird?* Models can be used during an experiment to substitute objects or phenomena that are impractical to experiment with. In this case the bag with feathers represented the bird, while the bag without feather was used as a source of comparison.

*Which bag had the smallest change in temperature?*  
The bag with the down feathers will have the smallest drop in temperature.

*Which feathers are best at keeping a bird warm?*  
Down feathers.

*How do humans use down feathers?* We use down in jackets, coats, blankets and quilts to help us stay warm when it's cold outside. The feathers work for us just like they do for a bird.

### Expand

- 6** Ask the children to follow the EXPAND instructions on their Learning Card. Children will compare the structure of a flight feather to Velcro™ using magnifiers and a microscope.

**Ask:**

*What differences did you find when you compared the two types of feathers?* The flight feather has hooks and loops like Velcro™, which only come together in one direction. The down feather is fluffy. It does not have hooks and loops. Since smooth feathers are better for gliding, the interlocking system is better for flight.

**Say:**

- 7** *Congratulations! You have earned your Ask Me About Birds stamp. You are ready to tell people about birds.*

# BIRDS OF A FEATHER

## Expedition Learning Card

? What is the function of a feather?

down feather  
flight feather  
body temperature

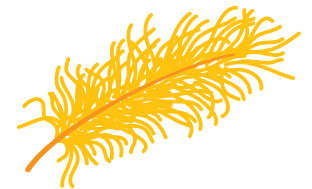
Explore why the structure of a bird's feather has a lot to do with its function.

**1 WONDER** Why do birds need feathers?

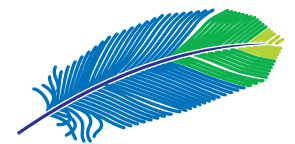
 Write or draw your ideas on your Data Collection Sheet.

**2 EXPLORE** Birds need their feathers for many reasons. Follow these steps to learn more about why feathers are important to birds.

- 1.** Record the temperature of each thermometer in the Data Table.
- 2.** Place one thermometer inside a resealable plastic bag.
- 3.** Surround the thermometer with down feathers.
- 4.** Place the second thermometer inside an empty resealable plastic bag.
- 5.** Close both resealable bags.
- 6.** Use a ruler to hold down both bags in a bowl of ice water for one minute.
- 7.** After one minute, record the temperature of each thermometer.
- 8.** Repeat steps 1 - 7 using flight feathers.



down feather



flight feather

# BIRDS OF A FEATHER

## Expedition Learning Card

**3 RECORD** What was the starting and final temperature of each bag?

 Use your Data Collection Sheet to calculate the change in temperature for each bag.

**4 CONCLUDE** Which type of feather had the smallest drop in temperature? Explain what happened to the temperature in each bag. Which type of feather is better at keeping a bird warm?

**5 EXPAND** Flight feathers need to be tightly woven to help a bird push and glide through the air.

1. Use your fingers to zip and unzip the pieces of Velcro™. Next, run your fingers up and then down the flight feather. Do the same with the down feather.
2. Use a magnifier to observe the Velcro™ and each type of feather. Use the microscope to observe the slide of the flight feather.

Did you notice any parts of a feather that connect like Velcro™?

 Draw what you see on your Data Collection Sheet.

## Discovery

### Why did we do that?

- Feathers are important to a bird's survival.
- Some feathers are used for flight, others are used to keep a bird warm.

### Congratulations!

You have earned your "Ask Me About Birds" stamp! Now you are ready to tell people about birds.

