

# Flight Dreams: Birds Flew First

Title: Birds Flew First

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Suggested Grade Level(s): P-6 This comprehensive lesson can be adapted at all elementary grade levels.

Suggested Length of Class Time: This lesson is composed of a series of activities that that can be done separately over a period of days. Estimated time for each activity is noted next to the activity.

Subject Areas: Science, Art, Language Arts

## Rationale:

Through observation of birds in the natural world, students can begin to make their own connections between the mechanics of bird flight and machine flight. Students' thinking is extended into history, noting the impact on early inventors of the observation of birds.

## Logistics:

*Classroom setup:*

Each activity indicates space and setup requirements.

## Materials

- Paper for recording (can be in notebook or on clipboard)
- Pencil
- Bird guidebooks
- Binoculars (optional)
- 10-20 index cards per student
- (sheet of birds in flight as examples or to glue into flip books)
- Stapler
- Corks (one per student)
- Feathers (4-8 per student)
- Compass point or nail and small hammer

*Suggested Resources/Images:* See attached bibliography

## Suggested Outcomes:

### *Science:*

- Explore movement of birds, planes
- Use materials to build objects that move in a specific manner
- Identify factors that affect movement

*Art:*

- Students will explore and manipulate a range of materials
- Students will develop a wide range of independent and collaborative art making strategies

*Language Arts:*

- Students will respond to and give simple directions or instructions
- Students will engage in research projects, and record information
- Students will ask and respond to questions seeking information, exploring possibilities and solutions
- Question, demonstrate, assess simple conclusions about various factors that affect the motion of an object

**Introduction:**

This lesson intentionally begins with a step back into history, with the students as observers, in the manner of Leonardo daVinci in the 1500's, Sir George Cayley in the 1700's, Otto Lilienthal in the 1800's, and the Wright Brothers in the early 1900's. They will be able to experience the same sense of wonder these men did. Orville Wright said, *"We could not understand that there was anything about a bird that could not be built on a larger scale and used by man . . . if a bird's wing holds it up in the air, so should a wing be able to hold up a person."*

By observing birds flying in the natural world, students can begin to make their own connections between bird flight and man's quest for flight. If they have done previous lessons on flight ( ), they can apply the principles of lift, thrust, drag, etc. as they explore bird flight. Teachers can choose a book to read that will focus the students on birds and flight as they begin this lesson: "Have You Seen Birds?", Barbara Reid, "For the Birds", Margaret Atwood, "Atlantic Puffin: Little Brother of the North", Kristin Bieber Domm, etc., while explaining that the students are about to do their own study of birds and flight.

**Lesson #1:** Observing Birds (Lesson time: one hour for initial observation. This includes time for introductory story, distribution of materials, and observation of birds. Depending on the age of the students, additional time could be used for discussion, recording, writing activities, etc., upon return to the classroom.)

*Materials:* Each student should have either a notebook or sheets of paper on a clipboard and a pencil. (Binoculars are optional, as are bird guide books)

1. Take the students to a place where they can observe birds. This can be in woods behind the school, near a bird feeder, at a local park, etc.
2. Sit in a circle and have students create their log page for the day: date, time, location, weather. (With younger students it would be helpful to have enough adults to have working groups of four per adult for assistance, or you can fill in the log pages before you leave the classroom)

3. Tell the students that they're going to prepare for looking by first listening. "Close eyes and be silent for thirty seconds." Invite students, once they have opened their eyes, to describe what they heard.
4. Now, they're ready to record. On the log page, have them note birds they see. This can be by name: robin, or by description: black bird, size of a chickadee, with gray chest, or with a sketched picture.
5. How does it fly? Draw a line that shows it's flight pattern, or write a description. How does it take off? How does it land? Does it flap its wings all the time? Does it soar? Does it flap and soar?
6. Questions to raise outside or when the students return to the classroom: Did all birds fly in the same way? What did you notice about the shape of the birds' wings? Do large birds and small birds fly in the same way? What did you notice?
7. The big question: What does observing birds teach you about flight?

### Extensions:

At this point, there are many choices to extend this lesson:

1. Study bird bones by bringing in the bones from a cooked chicken. Students can note that bones are hollow, have thin walls, and a delicate skeleton. Why is this important for flight? What relation do they see between bird and plane wings?
2. Students can be encouraged to do research on birds, answering questions about how fast birds fly, the distance they fly, the speed of their wing beats, the shape of birds wings, the patterns of flight, the heaviest bird that can fly, the fastest wing beat, the differences in feathers, how the feathers are designed and overlap to catch and hold air, what tail feathers do, etc. (see bibliography for ideas on locating books and websites)
3. Research the *archaeopteryx*, the oldest bird known, that lived about 150 million years ago. (It's name means "early wing" and research indicates that it climbed trees and then glided.) The Internet is a great source for such research.
4. The connection between bird flight and mans' early flight attempts is a rich research possibility. Starting with Leonardo da Vinci in the 1500's, students can look online or in books for his sketches and plans for flying machines, ranging from propeller driven to flapping and gliding. Sir George Cayley (1773-1857) created a "whirling arm apparatus" and actually designed and built a tri-plane that flew, in 1849, with flappers and a 10-year-old boy as "pilot". Otto Lilienthal (1848-1896) said, "To invent an airplane is nothing. To build one is something. But to fly is everything." He was known as the German glider king and wrote the book, "Birdflight as the Basis of Aviation", which is still available, (see bibliography) and flew his gliders nearly 2000 times until he crashed and died. The Wright brothers said, "We could not understand that there was anything about a bird that could not be built on a larger scale and used by man." and "If a bird's wing holds it up in the air, so should a wing be able to hold up a person." Check out the story of Icarus and find out who painted an important and fascinating record of the event.
5. Bird writing, ranging from research reports and journal entries, to poetry using words that describe flight: high, jerky, bouncy, darting, circling, straight, bounding, erratic, twinkling, irregular, swooping, unsteady, soaring, zigzagging . . . create your own list with your students to work from.

6. *Flip and Fly* books can be constructed by each student (see template in appendix). This is a way to slow down bird flight by creating separate steps in a flipbook and it's fun.
7. Whirlybirds can be constructed using corks and feathers to give students a hands-on example of flight.
8. Go back to the woods and observe birds again after the beginning discussions, with students focused on questions that have arisen.

### Suggestions for Assessment:

Students can be observed as they gather information, noting: ability to focus, to record, to discuss, to find sources for facts, to share information, to cooperate with others, to make connections. Depending on the extensions chosen, writing can be evaluated according to the skills at individual students' levels, science outcomes can be assessed through oral or written responses, asking what they have learned about the movement of birds.

### Bibliography

*The Wright Brothers for Kids*, Mary Kay Carson, Chicago Review Press  
ISBN 1-55652-477-3

*First Flight—The Story of the Wright Brothers*, DK Readers, [www.sk.com](http://www.sk.com)  
ISBN 0-7894-9291-1

*Into the Air, an Illustrated Timeline of Flight*, Ryan Ann Hunter, National Geographic  
ISBN 0-7922-5120-2

*Fantastic Flights—One Hundred Years of Flying on the Edge*, Patrick O'Brien  
Walker and Co., [www.walkeryoungreaders.com](http://www.walkeryoungreaders.com)

*Airborne, A Photo Biography of Wilbur and Orville Wright*, Mary Collins  
National Geographic, ISBN 0-7922-6957-8

*Wild About Flying, Dreams, Doers and Daredevils*, David Marshall and Bruce Harris  
Firefly Books, 2003, ISBN 1-55297-849-4

*Atlantic Puffin: Little Brother of the North*, Kristin Bieber Domm ISBN 1-55109-518-1

*Ahmed and the Nest of Sand: A Piping Plover Story*, Kristin Bieber Domm ISBN  
1-55109-338-3

*Have You Seen Birds?*, Barbara Reid, Joanne Oppenheim, ISBN 0-590-73825-9

*Gibson's Guide to Bird Watching (Maritime)*, Merritt Gibson, ISBN 1-55109-564-5

*Nova Scotia Birds*, Jeffrey C. Domm ISBN 0-88780-507-8

*The Kids Canadian Bird Book*, Pamela Hickman, ISBN 1-55074-334-1

*This Bird Can't Fly*, Susan Canizares, Daniel Moreton, (Scholastic ISBN 0-590-76968-5)

*Birds*, Susan Canizares, Pamela Chanko, Scholastic ISBN 0-590-76966-9

*For the Birds*, Margaret Atwood, ISBN 0-88894-825-5

*Birds at my Feeder*, Bobbie Kalman, ISBN 0-86505-187-9

Use the Internet—for example, on Wikipedia if you type in Otto Lilienthal, you get pages of fabulous images of him flying with his glider. This is true for any of the early flyers or when looking for bird information.

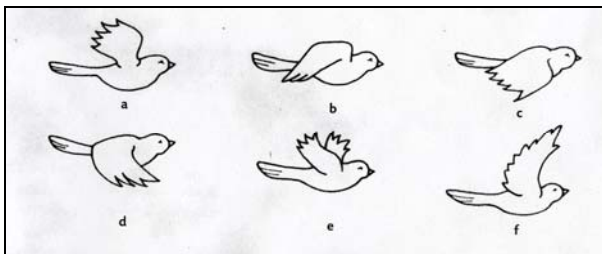
### Appendix - #6 – Flip and Fly Books

#### Materials:

- 10-20 Index cards
- Pen or pencil
- Stapler

(When students look at birds flying, it looks easy. It doesn't really show how complicated bird flight is. Birds have to continually adjust their wings, depending on the wind and other factors. This is a simple way to slow down bird flight by breaking it down into six different stages.)

1. Note the pictures shown below. These can be enlarged and displayed for students to draw their own birds (if drawing, they should number or letter each card for the next step), or they could be photocopied and the students can glue them onto the index cards. (Decide how many cards you want each book to be composed of in advance, 12, 18, etc.)
2. Have students stack the cards in order, a-f, or 1-6.
3. Staple the cards into a book.
4. Make the pages flip and the birds fly.



## Appendix - #7 – Whirlybirds

### Materials:

- One cork for each student
- Four feathers for each student
- Nail—hammer if needed
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(This is a simple experiment that can show how feathers provide air resistance and keep things in the air—for a little while in this experiment)

Note: with younger children, this would be a good activity to do at a centre with an adult to assist.

1. Poke four slanting holes, one on each side, near the top of the cork, using a nail or compass point. The purpose is to have a hole that will receive the tip of a feather. (If this is demonstrated, students will be able to understand what their goal is)
2. Push the shaft of each feather into the prepared holes (all feathers should be twisted in the same direction)
3. Drop the cork from a height and see what happens (it will spin) Toss it up in the air and let it drop. Drop from different heights.

*Extend with questions:* Does it always spin in the same direction? Does it matter what angle the feathers are put in? What if you turn them so they slope in the opposite way? What if you turn two one way and two the other way? and so on . . .

