



Wild Kids

Avian Flight

STUDENT GUIDE

FLYING FEATS

Speed

Swifts fly at speeds of over 100mph.

Diving

Peregrine falcons can reach speeds of 175 mph or more during a dive.

Height

Ruppell's griffons can fly as high as an airplane at 37,000 feet.

Wing Flapping

Ruby-throated hummingbirds flap at 700 beats per second.

Length

Albatross' soar over the ocean for months at a time without coming to land.

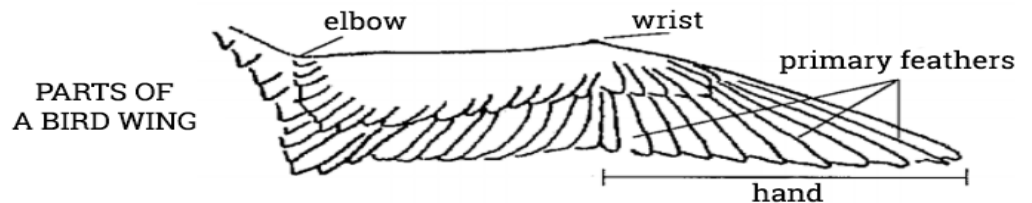
Total Migration

Arctic terns travel approximately 25,000 miles round trip during migration.

Daily Migration

European swifts can fly 560 miles in one day during their migration.

Birds are the largest group of vertebrates that can truly fly. Vertebrates are animals that have a backbone and include mammals, birds, reptiles, amphibians and fish. Bird flight is similar to airplane flight. Both use wings for support and steering. Both use tails for steering, braking and for control when landing. So, HOW do birds fly?



Lift and drag are the main forces in flight. The basic lifting surfaces are wings. The wing of a bird consists of two parts - the inner part nearest the body and the outer part or "hand" section. The flight feathers, also called primary feathers, are located in the hand section. It is the first flight feathers that act as a propeller when the bird flaps its wings to fly. Primary feathers force more air under the wings for added lift.

A bird can control its hand section just as humans can control their hands and fingers. Birds use their primary feathers just as a plane uses its propeller, wing flaps and wing slots - to turn, to decrease or increase speed and for braking when landing.

There are four different types of flight that birds can use:

Flapping flight - the whole wing beats up and down from the shoulder. During the downstroke the wings are fully extended. The upsweep begins with the wrists, followed by the rest of the arm. It is the downstroke that moves the bird forward.

Gliding flight - the simplest and easiest form of flight because birds do not move their wings. They are moving "downhill" by using their body weight to overcome their forward movement. If a bird does not begin flapping or find an updraft of air, it will land.

Soaring flight - the bird maintains or increases altitude without flapping. During soaring, birds mainly ride thermals (rising air currents).

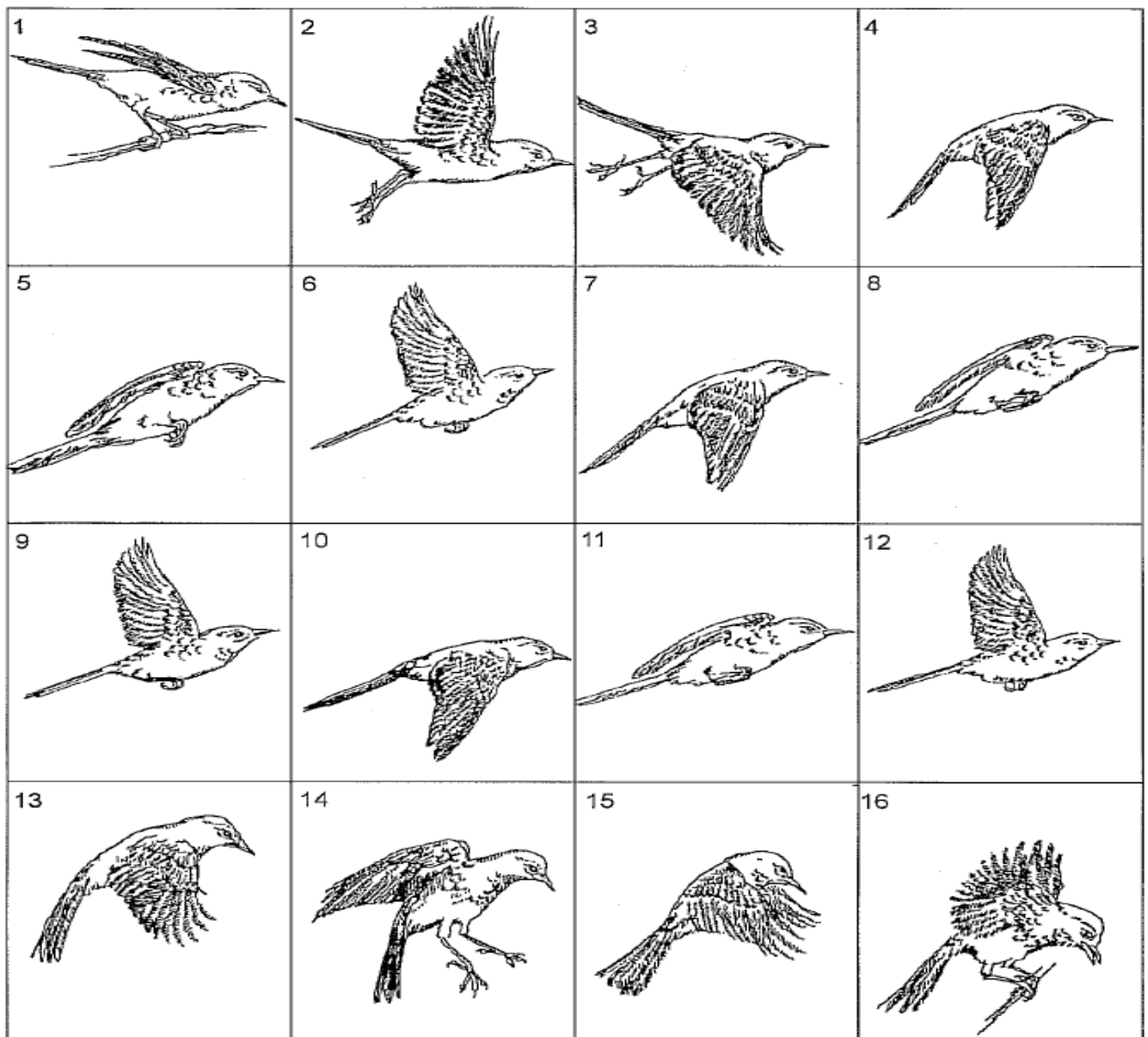
Hovering - the bird flaps its wings fast enough to stay in one spot in the air. The bird is not moving in any direction. It is still.

Most birds can flap and glide. Soaring and hovering require special adaptations.

FLYING BIRD FLIP BOOK

Now that you've learned a little about how birds fly, let's try an activity. For this, you will need some index cards and the images of the birds below. We are going to create a flip book that will show you the flapping motion of birds.

- Cut 8 index cards in half to make 16 smaller cards.
- Color each of the pictures below. Use the same colors in each picture.
- Cut out the pictures on the solid lines and glue one to the bottom right-hand corner of each index card.
- Arrange the cards in numeric order, with picture 16 on the bottom and picture 1 on the top. Staple all the cards together down the left-hand side.
- Flip through the cards and watch your bird "fly."





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TEACHING GUIDE

Overview

In this activity, students will read a passage about how birds fly. Then, they have the opportunity to make their own flip book which will animate bird wing flapping and allow them to observe it up close.

Suggested Procedures

1. Print the worksheet above. If possible, print it double sided.
2. Ask students to read the article.
3. Once they have read the article, ask them: What types of adaptations do you think would help a bird with hovering and soaring? Discuss ideas with the class.
4. Have the students move to the second page. Inform them that they will be creating their own flip book. You can explain that flip books are an early form of animation. They line up a bunch of illustrations on top of each other and flip through them quickly. If done correctly, the images will appear to move. In this case, they will have the opportunity to see a bird flapping its wings.
5. Have the students follow the directions. They will need index cards, scissors, glue and a stapler.
6. Students can spend some time flipping through their book. They should be given an opportunity to experiment. What happens when they change the speed? Direction? They can even make some observations.
7. Once everyone has finished their flip books, bring the class together and ask some follow-up questions:
 - In what ways are bird wings and human hands similar?
 - Why is understanding bird flight important? What might we learn from it?
 - As you watched your bird fly in your flip book, did you notice anything? Were you surprised by any of the movements?

Grade

3rd

AZ Science Standards

- 3.L1U1.5

Science and Engineering Practices

- Develop and use models

Crosscutting Concepts

- Structure and Function