# Bird Olympics

Volunteer-Led ACTIVITY

*How would you compare if you "faced down" a bird at these world-class Avian Olympics?*

## Learning Objective

Students and festival participants will describe the physical attributes of birds that help them fly, find food, and migrate long distances.

## Background

Birds have several physical adaptations that allow them to fly, find food, and migrate long distances. Feathers help to streamline a bird's body and minimize air resistance for flight. In addition, the long feathers on their wings serve as airfoils to help generate the lift they need for flight. The sternum (breastbone) is greatly expanded to accommodate large, well-developed pectoral (chest) muscles for flight. In fact, all birds that fly have a large keel on the front of their sternum, where the strong flight muscles that move the wings attach.

Most birds have lightweight skeletons made of thin, hollow bones. This lightweight skeleton reduces the amount of energy needed to become and stay airborne. Birds have very efficient respiratory (breathing) and blood circulation systems to meet the energy needs of flight. Two lungs with special air sacs extend into many parts of the bird's body. The lungs remain inflated at all times, so the air sacs provide a constant supply of air. Birds also have a large, four-chambered heart and rapid heartbeat. A small songbird has a resting heart rate of 400-500 beats per minute as compared to a human's 60-90 beats per minute. The resting heart rate of a hummingbird is about 1,000 beats per minute!

Most birds have a keen sense of sight, which is important as they fly among branches, search for food, and watch for enemies. For example, a Red-tailed Hawk can see a rabbit a mile away. Great Blue Herons use their keen eyesight to spot and catch fish, frogs, and other aquatic animals. Most birds also have an excellent sense of hearing, which helps them communicate with one another, listen for danger, and locate prey. Most birds that hunt for food at night, such as owls, have extremely good hearing and can perceive mice squeaking and leaves rustling at great distances. While most birds do not appear to have a good sense of smell, certain birds (such as Turkey Vultures, Kiwis, and Storm Petrels) use smell to locate food or to find their nests.

Many species of birds use their ability to fly to migrate. Migration allows birds to take advantage of seasonally abundant food. Migration also allows birds to avoid the scarcities of food and other resources that occur seasonally in certain regions. While

### OVERVIEW

Participants learn some amazing physical attributes of birds by comparing their own physical abilities to those of birds.

### CONTENT AREA

Science, Environmental Education, Social Studies, Math, Physical Education

### PEOPLE POWER

1 adult and 1 student leader

### SPACE REQUIREMENT

1 booth and 1 flat area (preferably, outdoors), 25-30 yards long

### ACTIVITY TIME

Preparation: 50 minutes
Activity: 10-15 minutes per each of 5 stations

### MATERIALS

- Clipboard
- Paper
- Pencil
- Tape measure
- 1 stopwatch for each leader
- Flagging or rope to mark off 20 yards
- Film canister containing something fragrant
- Scented items, (i.e. lemon peel or cotton balls with cologne)
- Materials to make a banner
- Calculator
- Poster board or easel
- 1 copy (preferably enlarged) of each station page
- 1 copy, 20-Yard Dash Conversion Chart

### TERMS TO KNOW

Neotropical migratory birds

GREAT BLUE HERON

some species of birds migrate only a few miles along mountain slopes, others travel hundreds or even thousands of miles. Many of these birds fly over vast bodies of water or tracts of land that are barren or otherwise inhospitable. One record holder in long-distance travel is the Arctic Tern, which migrates over 22,000 miles (35,400 kilometers) annually. Can you imagine running this distance every year? It's the equivalent of running between Los Angeles and New York 9 times!

Birds that migrate long distances between breeding grounds in temperate regions (Canada and the United States) and wintering grounds in the Tropics (Mexico, Central America, South America, or the Caribbean islands) are commonly referred to as ***Neotropical migratory birds***. Among the approximately 350 species of birds that migrate in North America, about 200 species are Neotropical migrants. Most are songbirds, but many are shorebirds, some are raptors, and a few are waterfowl.

While some bird species stop to rest and feed during migration, others may fly non-stop for 80 to 100 hours. How do birds prepare for such physically demanding flights? Preparation for migration involves a huge increase in food consumption to build up fat reserves. For example, a Blackpoll Warbler weighs about 11 grams at the end of its breeding season. (Four pennies is approximately 11 grams.) To prepare for its transatlantic flight, it may increase its fat reserves and almost double its weight. Can you imagine doubling your weight and then undertaking a demanding physical exercise program to get back to your original weight each year?

If birds encounter obstacles along their migration, they may not have enough fat reserves to provide the energy they need. Such obstacles may include strong storms that can blow birds off course or slow their progress, loss of stop-over habitat due to land conversion or deforestation, or interference from human-made obstacles, such as communication towers.

When you think of the energy reserves needed, the distance traveled, and how fast a bird flies, migration is a truly remarkable accomplishment. Although scientists know a great deal about bird migration, the annual flight of billions of birds is one of the most mysterious and wondrous feats in the animal kingdom.

*Considering the energy reserves needed, the distance traveled, and how fast a bird flies, migration is truly a remarkable accomplishment.*

## Getting Ready

1. Gather the materials for each station.
2. If possible, obtain small prizes, such as temporary bird tattoos, bird stickers, award ribbons, or bird posters, to give participants at the end of the activity. (*See the International Migratory Bird Day catalog online at* www.birdday.org *to find bird-related items.*)
3. Make copies or enlargements of the Station Pages for Station #1, Station #2, Station #3, Station #4, and Station #5.
4. For Station #1, Winging It: leaders need one or more stopwatches (or watches with a second hand) and a clipboard, paper, and pencil to record information. Post a copy of Station Page 1 so participants can see it.

5. For Station #2, Track and Field...and Air!: mark off a flat area that is 20 yards long with rope or flagging. Allow additional room at the end of the run for students to slow down after their sprint. Leaders need a stop watch, clipboard, paper, and pencil. Participants need paper and pencils for the calculation. Leaders should have a copy of the 20-Yard Dash Conversion Chart for this station. Post a copy of the Station #2 Page so participants can see it.
6. For Station #3, What's Your Wingspan?: gather one or more tape measures and paper and pencil to record information. Develop a large banner that visually depicts the actual wingspans of several bird species (see What's Your Wingspan? for typical size wingspans for various bird species). Participants could place their outstretched arms along this banner to see how they compare. Post a copy of the Station #3 Page so participants can see it.
7. For Station #4, Eating Like a Bird: provide a copy of the Station #4 Page and the Calculations for Station #4: Eating Like a Bird Page. Depending on the math level of the students doing this activity, provide paper, pencils, and calculators for participants to calculate the number of hamburgers they would eat. Optional materials include: a scale for participants to weigh in and a map showing the migration of shorebirds from the Delaware Bay to their arctic breeding sites. Post a copy of the Station #4 Page so participants can see it.
8. For Station #5, The Nose Knows: gather one or more film canisters and punch holes in the top. Place something fragrant inside, such as grated lemon peel or a cotton ball soaked in cologne. The number of canisters depends on the group sizes: One canister should be sufficient for groups of 5-10 students. Attach the canister to a poster board or easel. Locate an object 200 feet away from the location of the booth for this station. Post a copy of the Station #5 Page so participants can see it.

## Taking Flight!

1. Each of the five stations contains a posted challenge. By taking on the challenge, the participant gains information about how humans compare to birds, in certain physical abilities.
2. Review the details of what to do at the station where you are.
3. Station leaders should help participants take part in each station and help record their answers and physical accomplishments.
4. After a participant completes a station, make certain he or she takes a moment to read the "Fun Fact."

## Assessment

Describe three of the physical attributes that allow birds to fly, find food, or migrate.

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### ZOOM IN, ZOOM OUT!

To give a better idea of how far some of these birds fly have a map showing the migration of shorebirds from the Delaware Bay to their arctic breeding sites.

Invite local track and field competitors from your school, and even other schools, to compete in this activity. Getting physical education instructors involved can be fun too—perhaps one is willing to be the volunteer who leads this activity.

*Birds have several adaptations that allow them to fly, find food, and migrate long distances.*

### IN STEP WITH SCIENCE STANDARDS

**Standard C: Life Science**

- Regulation and behavior

## Station 1
## WINGING IT!

**CHALLENGE:**
See how your "flapping rate" compares with different birds.

Count the number of times you can flap your arms in 10 seconds. Have someone with a stop watch, or watch with a second hand, tell you when to start and stop as you count your flaps. Record the number of flaps.

**How do you compare?**

| Bird | Wing beats/10 seconds |
|---|---|
| Crow | 20 |
| Pigeon | 30 |
| Peregrine Falcon | 43 |
| Carolina Chickadee | 270 |
| Rufous Hummingbird | 700 |

The master flapper award goes to the Rufous Hummingbird which is able to flap its wings 700 times in 10 seconds—that's 70 times per second!

**SUPER CHALLENGE:**
How long can you flap your "wings" before you start to become tired?

A Blackpoll Warbler travels 2,000 miles, from New England to Venezuela, in three days! This degree of exertion is equivalent to a person running 4-minute miles for 80 consecutive hours.

### 20-YARD DASH CONVERSION CHART

Use this chart to check calculations for human running speeds for 20 yards.

| Finish Time (Seconds) | Miles/Hour | Finish Time (Seconds) | Miles/Hour |
|---|---|---|---|
| 3.0 | 13.6 | 6.0 | 6.8 |
| 3.1 | 13.2 | 6.1 | 6.7 |
| 3.2 | 12.8 | 6.2 | 6.6 |
| 3.3 | 12.4 | 6.3 | 6.5 |
| 3.4 | 12.0 | 6.4 | 6.4 |
| 3.5 | 11.7 | 6.5 | 6.3 |
| 3.6 | 11.4 | 6.6 | 6.2 |
| 3.7 | 11.1 | 6.7 | 6.1 |
| 3.8 | 10.8 | 6.8 | 6.0 |
| 3.9 | 10.5 | 6.9 | 5.9 |
| 4.0 | 10.2 | 7.0 | 5.8 |
| 4.1 | 10.0 | 7.1 | 5.8 |
| 4.2 | 9.7 | 7.2 | 5.7 |
| 4.3 | 9.5 | 7.3 | 5.6 |
| 4.4 | 9.3 | 7.4 | 5.5 |
| 4.5 | 9.1 | 7.5 | 5.5 |
| 4.6 | 8.9 | 7.6 | 5.4 |
| 4.7 | 8.7 | 7.7 | 5.3 |
| 4.8 | 8.5 | 7.8 | 5.2 |
| 4.9 | 8.3 | 7.9 | 5.2 |
| 5.0 | 8.2 | 8.0 | 5.1 |
| 5.1 | 8.0 | 8.1 | 5.1 |
| 5.2 | 7.9 | 8.2 | 5.0 |
| 5.3 | 7.7 | 8.3 | 4.9 |
| 5.4 | 7.6 | 8.4 | 4.9 |
| 5.5 | 7.4 | 8.5 | 4.8 |
| 5.6 | 7.3 | 8.6 | 4.8 |
| 5.7 | 7.2 | 8.7 | 4.7 |
| 5.8 | 7.1 | 8.8 | 4.6 |
| 5.9 | 6.9 | 8.9 | 4.6 |

## Station 2

## TRACK AND FIELD... AND AIR!

**CHALLENGE:**

How fast can you run?

Begin at the starting line and see how long it takes you to reach the finish line. Have someone with a stop watch tell you when to start, and measure how many seconds it takes you to complete the run. The marked-off distance is 20 yards. Using the following formula, calculate how fast you ran in miles per hour:

$$\frac{\text{20 yards}}{\text{finish time in seconds}} \times \frac{\text{1 mile}}{\text{1760 yards}} \times \frac{\text{3600 seconds}}{\text{1 hour}} = \text{x miles per hour}$$

*For Example:* If you ran the 20 yards in 5.9 seconds –

$$\frac{\text{20 yards}}{\text{5.9 in seconds}} \times \frac{\text{1 mile}}{\text{1760 yards}} \times \frac{\text{3600 seconds}}{\text{1 hour}} = \text{6.9 miles per hour}$$

If you want to check your answer, one of the station leaders can use the 20-Yard Dash Conversion Chart to check if your answer is correct. Compare your results with how fast some birds fly.

**How do you compare?**

| BIRD | FLIGHT SPEED IN MILES PER HOUR |
|---|---|
| House Sparrow | 20 mph |
| Crow | 30-45 mph |
| Mallard | 45-60 mph |

**SUPER CHALLENGE:**

How long do you think it would take you to run a distance of 600 miles? (Washington, D.C., to Atlanta, Georgia, is about 600 miles.)

It takes most students about 10 minutes to run a mile. At this speed and without stopping to rest, it would take you about 4 days! A Ruby-throated Hummingbird can complete a 600-mile nonstop flight across the Gulf of Mexico in as little as 18 hours!

**FUN FACT:** The fastest bird is the Peregrine Falcon, which can dive at speeds of up to 175-200 miles per hour when chasing its prey.

## Station 3

## WHAT'S YOUR WINGSPAN!

**CHALLENGE:**
Hold your arms out straight to either side and see how your "armspan" compares to the wingspan of different birds.

After a leader measures your "armspan" using a measuring tape, record the distance.

**How do you compare?**

Ruby-throated Hummingbird . . . . . 4 inches

American Robin . . . . . 15 inches

Crow . . . . . 40 inches

Bald Eagle . . . . . 7 feet

Andean Condor and
Marabou Stork . . . . . .10 feet

Wandering Albatross . . . . . 12 feet

**FUN FACT:** The largest bird in the world is the Ostrich, which can stand over 8 feet tall and weigh more than 300 pounds. The smallest bird is the Bee Hummingbird, which is only 2 inches long, including its bill and tail. (It weighs only as much as a ping pong ball!)

## Station 5

## THE NOSE KNOWS

**CHALLENGE:**
How well do you smell?

See how close you have to get in order to smell the mystery scent in the canister.

**How do you compare?**
If you were a Turkey Vulture, you could have easily smelled this down-wind from 200 feet away. Take a look around and try to locate something 200 feet away from you. Do you think you could smell something from that far away?

**FUN FACT:** Turkey Vultures can "sniff out" their food from up to 200 yards away (that's about the length of two football fields). The Turkey Vulture's sense of smell is so acute that engineers have used them to find leaks in a pipeline 42 miles long. They do this by pumping a chemical that smells like rotting meat (the smell Turkey Vultures use to locate their food) through the pipe and then seeing where the Turkey Vultures gather.

Scientists believe that both Turkey Vultures and Kiwis have an excellent sense of smell that helps them locate food, and that Storm Petrels use smell to locate their nests in dense breeding colonies. Although there is some controversy, most scientists believe that the majority of birds do not have a good sense of smell and rely more on their keen senses of sight and hearing to find food.

**SUPER CHALLENGE:**
Can you think of a bird in your area that uses its sense of sight or hearing to locate food?

## Station 4
## EATING LIKE A BIRD

**CHALLENGE:**
How many hamburgers do you think you could eat in a day?

Some birds increase their body weight by 5% in a single day before migrating. Look at the chart below to see how many hamburgers you'd have to eat in a day if you were a bird getting ready to migrate.

**How do you compare?**

You'd have to eat this many burgers every day for 10 days in a row to gain as much weight as many birds do before they migrate.

| IF YOU NOW WEIGH: | IN A DAY, YOU'D HAVE TO EAT THIS MANY BURGERS: |
|---|---|
| 60 pounds | 42 |
| 100 pounds | 70 |
| 150 pounds | 105 |

**FUN FACT:** Each spring, hundreds of thousands of shorebirds, including Red Knots, Sanderlings, and Ruddy Turnstones, visit the Delaware Bay shore of New Jersey and Delaware to gorge themselves on freshly spawned horseshoe crab eggs. During their stay of about 10 days, Red Knots gain 50% of their body weight in fat—the equivalent of a 100-pound person gaining 5 pounds of fat every day for 10 days. This increase in body fat enables the Red Knots to fly nonstop from the Delaware Bay to their arctic breeding sites. (What do you think will happen if horseshoe crabs are overharvested in the Delaware Bay?)

## Station 4
## EATING LIKE A BIRD CALCULATIONS

**ASSUMPTIONS:**

1. Each hamburger contains 250 calories.
2. Every 3,500 calories consumed results in a 1-pound weight gain.
3. This is a simplistic calculation that does not take into account the calories burned through digestion and through other activities. It also does not take into account different metabolic rates between individuals.

Formula used to calculate the number of hamburgers required to gain a given amount of weight:

(Desired weight gain X 3,500 calories)

divided by 250 calories = # of hamburgers

For example:

To increase body weight by 5%, a 60-pound person would need to gain 3 pounds

60 pounds X 5% = 3 pounds

3 pounds X 3,500 calories = 10,500

10,500 divided by 250 calories = 42

This person would need to eat 42 hamburgers.