



madison
AUDUBON



Migration & Energy

Goal: Students are introduced to the topic of migration. They learn about why birds migrate, which birds migrate, and how they migrate. Energy is discussed, as well as the fine balance between having enough fat reserves to migrate and eating so much that a bird is unable to fly.

Science

Grades 4 – 6
(with adaptations for K-8)

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Performance Standards

Environmental Education: B. 4.6, B.4.8, B. 8.5, D. 4.3, D. 8.5,

Total lesson time: 1 hour – 1.5 hours

Story: 15 – 20 minutes (elementary school kids only)

Lesson: 30 minutes

Migration Trivia: 5-10 minutes

Migration Obstacle Course: 20 minutes

Materials needed:

PDF Presentation on Migration

Projector & laptop/ smartboard for PDF presentation


Book: How Do Birds Find Their Way? By Roma Gans (elementary school kids only)

Obstacle Course Materials: saran wrap, traffic cones, boxes, plastic bags, rope, hula hoops, Pillows OR bean bags OR small boxes, OR milk/juice jugs etc.

Lesson

Tips:


- Write the new vocabulary words on the board so that kids know how they are spelled AND teachers can refer to them later on in the presentation and throughout the day.
- During our pilot lessons, it was more engaging for the class if one student took notes in a visible way during the presentation (either on a large notepad, chalk board or white board). The rest of the class saw what that student was highlighting, and this reinforced key ideas.





Notes Corresponding to PDF Presentation:

(Slide/page #. Notes)

1. Introduce yourself & the lesson topic
3. Today we're going to talk about these questions, and you'll be able to answer them when we're done with this lesson.
So let's start with the first question: Who knows what migration is?
4. Read the definition. Then tell them that we'll break it down into parts.
5. Which seasons do birds migrate in? Fall and Spring.
6. Lots of animals migrate! Here we have a monarch butterfly, a giraffe, and a salmon.
Can anyone think of other animals that migrate? (reindeer, sea turtles, bats, elephants, whale sharks, whales, crabs, etc.) -we're going to talk about birds today
7. Birds move around all the time, what makes it a migration? - Move "home base" away from their "neighborhood" to a new location.
8. Ask class to think of a bird that doesn't migrate. Are there any "rules" for which birds stay: size, habitat (answer: not really)?
9. Ask class to think of a bird that migrates. Are there any "rules" for which birds migrate based on size or habitat (answer: not really)?
10. We already talked about this: who remembers?
-Spring migration happens all at once: many birds come back to their breeding grounds during a very short period of time. They're all rushing back so that they can start their nests.
-Many insects all hatch at once as soon as it is warm enough in the spring. All of the birds want to take advantage of this- it is easier to feed their chicks enough food if the food is everywhere & very easy to find!
11. Most bird species will hang out on their breeding grounds until they absolutely have to leave. Most birds will hang around until finding food becomes hard. Birds that eat insects will head South as soon as they have trouble finding food in the North.
Larger birds that can withstand colder weather, and may not leave until Oct or November.
- Some birds, like Bald Eagles, Kingfishers, and Great Blue Herons will stay in the north as long as they can find open water for fishing.
12. Think about a winter in Wisconsin: what is on the ground? What is green? Do you ever need bug spray? Not many resources, not much food, very cold!
14. Some birds adapt to cold weather (able to handle the cold, able to switch food sources, etc):
 - Pheasants & Wild Turkey: large birds, able to dig through the snow for their food.
 - Same with the Red-Tailed Hawk: they are strong enough to punch through crusty snow to catch rodents underneath.
 - Chickadees, Tufted Titmice, and Nuthatches all switch to a seed-based diet in the winter. Also cache (store) food for later.
 - Woodpeckers: Are able to find insects that are overwintering under tree bark. Also can eat tree sap.

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15. Another solution, of course, is to Migrate! These birds don't switch their food sources over the winter, rather they head to a different location with lots of available energy.
 16. Think about spring in WI- what happens? (everything gets green, lots of flowers, lots of bugs). Each spring there is a HUGE increase in resources in the northern US, Canada, and Alaska – including in Wisconsin. They would get much MORE food by moving north for the summer than if they stayed in their winter grounds.
 17. ** We talked about what migration is, and why birds migrate, now we'll talk about HOW they migrate **
Many long distance migrants eat insects or fruit, but not all.
The Bobolink migrates huge distances, from WI to Argentina.
 18. Great-blue Heron, Bald Eagle: both large birds, able to withstand the cold temperatures. BUT they both prefer to hunt on open water. They will stay in their summer territory as long as there is open water – you can see them both in Madison until the lakes freeze over. Then they will fly just as far as they need to in order to find open water. They might go over to the great lakes, or the WI river if it's open.
American Robin: this bird is migratory in some of its range (Canada, some of the northern US), and a resident in other areas. They migrate only if the winter is harsh enough, and may stay in WI year round. Their range and migrational patterns are shifting with Climate Change.
 19. In very cold, hard winters, these northern birds will move from Alaska and Canada to some of the Northern US States. Winter of 2013-14 was a HUGE year for Snowy Owls in Wisconsin.
 20. Some birds navigate using landforms like mountains, rivers, or coastlines. This is partly because they are good visual routes to follow (it is easy to follow the Mississippi River south!) and partly because there are usually strong air currents in places like this. If birds fly with a strong tailwind (the wind is at their backs, helping them along), they can use less energy when they fly.
 21. Who knows what "Nocturnal" means? → active at night. Who can think of a bird that is nocturnal? → any owl species.
-Many birds migrate at night. They're not able to see land formations well, OR see the sun. They navigate using star compasses.
-Many birds that migrate at night travel in huge flocks. You can watch this happen on the same radar you use to check the weather. All of those circles are flocks of migrating birds- and you can watch them move throughout the night!
 22. Who knows what "Diurnal" means? → active during the day. Who can think of a diurnal bird? → most birds.
-Does anyone know what kind of birds these are? → Canada Geese. How could you tell? → They are flying in a "V" formation, have large wings, long necks, and large heavy bodies.
-They can use the sun's position in the sky to navigate As they fly north or south.


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23. Birds need a lot of fuel to get them through their migration, and fat is very high in calories. They put on a lot of fat before they migrate, and carry all of that energy with them to use on the flight. Birds put on fat by eating LOTS of food in the fall.
- Super-cool fact: Birds have see-through skin, and if you blow the feathers aside, you can see yellowish fat deposits (the muscle is pink)
 - Usually, when a bird is not migrating, there is a valley between the rib cage (where your sternum is on your body). In this picture, and when birds are migrating, the entire “valley” fills up with fat! This bird has a LOT of energy stored up to use on migration.
24. When birds migrate, they sometimes fly for very long distances without stopping at all.
- Other times, they need to stop to find food or water, and to rest their muscles a little.
 - In rural or wild areas, food and water are easy for birds to find. In cities or suburban areas, this is harder. Parks, city forests, and even people’s yards can be important for birds if there is food and water available.
 - These green places are called “migratory stopovers” –areas of high quality habitat along the way- to refuel during migration.
 - Picnic Point and the Arboretum are two important Migratory Stopover sites in Madison. Other areas include Pheasant Branch, Warner Park, and Lake Farm County Park.
25. ****have kids think of reasons why migration is dangerous****
- So dangerous = they must REALLY need the resources that they’re migrating for!
26. Birds fly almost continuously for days or WEEKS at a time. They may be flying through storms, or in strong winds. Sometimes they need to travel across large stretches of water (like the gulf of mexico) where there is nowhere to land & rest if they need it.
27. While they are traveling, and when they get to their wintering grounds, they may be encountering different types of predators than they did in the breeding grounds.
- Think of what it is like playing hide-and-seek in your own home or yard: you know where all the good hiding places are, and it’s very quick and easy to get to them. Now pretend you’re playing this game in a new place: you would have to spend a lot more time looking for a hiding place, and it might not be the best one. This is what it is like for birds in a new place.
 - Also, if birds are tired from flying, they may not be as quick when it comes to escaping predators.
 - Birds also need to balance how much fat they put on with how quickly they need to evade predators: more fat means that they will have more energy during migration BUT too much fat means they will need to work harder to fly AND they might be slower when trying to zip away from a predator.
28. In a new territory, they may not know where all of the good resources are: food and water may be harder to find. The same is true of finding shelter & escaping predators.

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29. Humans create a lot of hazards for birds on migration:
 - Tall buildings: birds could fly into them. If they leave their lights on all night, they may confuse birds navigating by star-compass.
 - Windows: Birds sometimes have trouble knowing what is a window and what is blue sky. If a bird flies into a window, it could be injured or killed.
 - Hunting: Many hunting seasons are during fall migration, when birds are headed south. Some ducks and geese are killed by hunters each year. Hunting is not necessarily a bad thing for wildlife populations, in fact, it is often a good thing! We took lots of predators off of the landscape (there are fewer coyotes and wolves in the United States), and hunting keeps the prey populations from getting too big.
 30. See how the windows reflect the forest that is near them? The bird can't tell the difference between the reflection and the real thing.
 - Birds have dust on their feathers that keeps them working properly. This is a picture of a mark that an owl left on a window after it flew into it.
 - You can put window decals on windows so that birds can see the windows and avoid them.
 31. You can make your yard helpful to birds that are migrating, by making sure -there are lots of resources available to them.
Add bird-friendly landscaping, provide food and water

Migration Trivia Questions:

Easy:

1. Name one other animal that migrates besides birds (reindeer, sea turtles, monarch butterflies, bats, elephants, giraffes, whale sharks, whales, crabs, salmon, etc)
2. What is migration? (Seasonal movement of animals from one place to another, or something similar)
3. Name one species of bird that stays in Wisconsin year-round [doesn't migrate] (Black-capped chickadee, American Goldfinch, Tufted Titmouse, Red-bellied Woodpecker, Downy Woodpecker, Hairy Woodpecker, Wild Turkey, Ring-necked Pheasant etc)
4. Name one species of Wisconsin bird that migrates (any warbler, most sparrows, ducks, geese, swans, Sandhill Cranes, etc)
5. What is one season that birds migrate in? (spring & fall)
6. Why do birds migrate? (as a solution to seasonally changing resources OR it gets too cold, they can't find food)
7. What was our cool fact about bird skin?
8. What sorts of land formations do birds use to help them on their migration route? What do they use instead of road signs or maps? (rivers, mountain ranges, wind currents)
9. What sorts of "compasses" do birds use to navigate? Hint: different for birds that migrate during the night or day (star or sun compass)
10. True or False: you can see birds migrating on radar the same way you watch storms move (true)

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11. What is a migratory stopover? (an oasis for birds with food and water- like a highway rest stop)
 12. Why is migration dangerous? (exhausting, predators, new territory, humans!)
 13. What can we do to help birds have a safe migration? (window decals, bird baths, feeders, keep cats inside)

Difficult:

1. What are 2 ways that birds navigate during migration? (star compass, sun compass, land forms, waterways,
2. Name two types of migrants- think “how far do they go?” (long distance, short distance, or irruptive)
3. Which migration happens more slowly: spring or fall? (fall)
4. Name a migratory stopover site near you (Picnic Point, Arboretum, any park, any front yard with native landscaping)
5. Why do birds return to their breeding grounds each spring, or rather, why don’t they just always stay in the south? (there is an IRRUPTION of food in the north each Spring).
6. Name a type of bird that is an Iruptive migrant (Snowy Owl, Great Gray Owl, White-winged Crossbills)
7. Name the bird that we talked about that is a Long Distance migrant (Bobolink)
 - a. Bonus: where does this bird go in the winter?
8. Name a bird that is a short distance migrant, OR one that doesn’t always leave for the winter (Great Blue Heron, Belted Kingfisher, Bald Eagle, American Robin)
9. What does Diurnal mean? (active during the day). Bonus: name a bird that is diurnal (most birds)
10. What does Nocturnal Mean? (active at night). Bonus: name a bird that is nocturnal (most owls, whip-poor-will, nighthawk)
11. How can you tell how much fat a bird has? (their skin is see-through, you can blow the feathers aside and see the yellow fat deposits).
12. Name two ways migration can be dangerous for a bird. (exhausting, new predators, new territory, humans!)
13. Name two ways that birds navigate while on migration (sun or star compass, landscape: rivers, mountains, coast lines)

Migration Obstacle Course

1. Have kids help set up obstacle course
2. After completing the course, track how many students survived.
3. Of the obstacles encountered, in which do humans play a role?
4. What can you/your community do to help birds migrate more safely?
 - a. e.g. grow organic crops only, keep cat inside
 - b. remove one or more of those obstacles and re-run course

1. Set up obstacle course and explain each obstacle to the students:

Item	Obstacle	Action
Saran wrap between chairs	Window	Fly under
Plastic bags	Pesticide-ridden fields	Jump over
Traffic cones	Bright lights and communication towers	Put on blindfold and weave through cones
Boxes	Tall buildings	Jump over
Rope grid on floor (2 squares wide by 5 squares long)	Power lines	Jump in every square without touching the ropes
Stationary person with arms out, turning back-and-forth	Wind farm	Fly around
Hula hoops	Shrinking habitat	Jump in each one without missing
Person crawls along a straight horizontal line	Cat	Fly past the cat without being touched
Milk jugs/pillows/small boxes/bean bags	Fat/energy reserves	Carry as much fat as you can to help you migrate.

2. Explain that you are a migratory bird flying north from Mexico to Wisconsin for the summer. The goal is to avoid all the hazards in order to survive. If you fail at any point along the obstacle course, you “die” and do not complete the migration.
3. To make the obstacle course MORE challenging, have the kids carry “fat” with them on migration. Explain that they can carry as much fat as they can, but if they drop any of it, they were too fat to fly, and are disqualified!
4. Time students as they go through the course.
5. The student with the fastest time who carried the most “fat” wins!



Adjust this lesson for different age groups:

Less Challenging:

- Start with the story about bird migration for elementary students. The pictures and story will help engage them, and you will repeat some of the material in the presentation.
- Use the easy questions for the trivia game.
- Use fewer obstacles for the obstacle course, or use “fat” that is easy to carry (empty milk jugs)

More Challenging:

- Use all of the details/facts for the presentation.
- Use the hard questions for the trivia game.
- Use more obstacles for the obstacle course, or use “fat” that is hard to carry (soccer balls)

Resources:

Gans, Roma, Mirocha, Paul. 1996. How do birds find their way? Let's Read-and-Find-Out-Science. Harper Collins Publishers Inc. New York, NY.