Cabrillo Marine Aquarium
Lesson Plan

Grade Level: First through Fourth Grades

Title: Globetrotters: A Lesson on Bird Migration

Objective: Students will learn about natural habitats and the many dangers and threats faced by birds along their migration routes.

California Science Standards: **1st:** 2a-d **2nd:** 4d, 4g **3rd:** 3a-d **4th:** 2a, 2b, 3a, 3b

Time to Complete: 60 minutes

Materials Provided by CMA Ocean Discovery Kits: ***Reading Handout: Globetrotters of the Bird World, Worksheet: Bird Skeleton Coloring Sheet, Worksheet: Parts of a Bird Skeleton, Graphic: Parts of a Bird Skeleton Answer Key, Graphic: Migration Game Cards,*** Bird Specimens, Great Blue Heron Bones (Hands-on Specimen box), Feathers, Nests, Eggs, Posters, *Eyewitness* Books & DVD

Materials Provided by Teacher: Outdoor play area or gym, 10 to 15 hula hoops (or chalk or rope for marking habitats), whistle, migration props: clothespins ("bird beaks"); elastics, pipe cleaners, twist ties and/or dried pasta ("bird food"), stopwatch, photocopies of handouts

- NOTE: All Marine Birds are protected by Federal Law. It is illegal to collect or possess marine birds or any parts of a marine bird (bones, feathers, etc.) without a permit.

Vocabulary: Migration, predator, fragmentation, molt, flock, breeding, conservation

Background Information: Many animals periodically **migrate** over long distances in search of food, water, and a place to mate, lay their eggs and raise their young. Disruption of any part of their migratory route can threaten their existence and the future of their species.

Lesson Outline:

- **Activity 1:** ***Reading Handout: Globetrotters of the Bird World***
- **Activity 2:** Introduction to Bird Migration: Discussion Questions
- **Activity 3:** Outdoor Migration Game

Lesson Procedures:

Activity 1: Read aloud to your class & discuss ***Reading Handout: Globetrotters of the Bird World***

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Activity 2: Introduction to Bird Migration: Discussion Questions

- Tell students to imagine that they are walking to the grocery store, but when they get there, it is closed. **What they would do?**
- **What would happen if the next store they tried is also closed?**
- **Where would they get their food?**
- **How long would they have the energy to keep looking for food?**
- **How would this affect their behavior?**
- Compare their walk to the grocery store to the migration cycle of a bird. Explain that along the way they must stop daily to find food and shelter. When some of these areas disappear, it makes the journey difficult, just like it would for humans if more and more grocery stores closed.
- Explain that today they will learn the many threats faced by birds along their migration journeys.

Activity 3: Outdoor Migration Game

- Prepare the activity area ahead of time:
- Label one end the **Wintering Grounds (south),** and the other end, the **Summer Breeding Grounds (north).**
- Place hula hoops or circles along a scattered path between these two points. (You can draw circles in the dirt or sand with a stick, use chalk on pavement, or wind rope in a ring).
- If possible, use different circle sizes and space them variably, but no more than five giant footsteps apart. Each circle represents a different habitat.
- Place a ***Migration Game Card*** in each circle, using stones to weigh them down.
- At the Summer Breeding Grounds, place a stack of elastics, twist ties, pipe cleaners or dried pasta (worms and insects) on a table, chair or tree stump.
- Explain to students that they are each playing the role of a bird that migrates annually between its Summer Breeding Grounds and Wintering Grounds
- Point to these areas on a map or globe (if available), and then in the activity area.
- Have students form several V-shaped flock formations (about 7 students/flocks) at the Wintering Grounds.
- Explain the ***Migration Game Rules.***
- The object of the game is to fly from the Wintering Grounds to the Summer Breeding Grounds, stopping ONLY in the habitat circles. Any other area is unsafe and birds that don't make it to a habitat will get sick or die.
- When the teacher blows the whistle, birds will fly from one habitat to the next in a forward direction, flapping their wings and taking <u>NO MORE THAN FIVE STEPS.</u>
- If they don't make it in five steps, they die.
- If the habitats are different sizes, all the students may not be able to fit within the circle. This is also a reason why birds do not succeed in their migration, because there is not enough area to sustain them.
- At each habitat, one student reads the ***Migration Game Card*** and all birds follow the instructions.

- Once all birds are in their place, the teacher blows the whistle and birds fly to the next habitat of choice.
- Start the game by saying: "Remember: only five steps, and flap your wings. It is now Day One. Let's take our steps and fly (blow whistle) – 1, 2, 3, 4, 5!"
- As birds arrive, players should keep track of the order they arrive.
- The birds that aren't able to reach a habitat in five steps are sick/dead and must line up at the side of the course.
- At each habitat, one player reads the ***Migration Game Card*** and the birds must follow these directions.
- Once all players have completed their tasks, the teacher blows the whistle and Day 2 begins: "1, 2, 3, 4, and 5 steps to the next habitat."
- Repeat until all <u>live</u> birds reach the Summer Breeding Grounds.
- All surviving birds are consolation winners of the game.
- At the Summer Breeding Grounds, each surviving bird can pick one of the sick/dead birds to hatch and come to life again.
- Explain that food is usually more plentiful in Summer Breeding Grounds than in Wintering Grounds, so now is the time for all birds to eat as much as they can to breed successfully and build energy to migrate south again.
- All birds form a single line.
- One-by-one, each student is timed (15 seconds) while using a clothespin (beak) to transfer pieces of elastics, pipe cleaners, twist ties or pasta from one pile to another designated pile.
- The top three birds (i.e., those that transfer the most food) get to start the return migration by proceeding to their first habitat, while the other birds start from within the Summer Breeding Grounds.
- Explain that even though you only arrived six weeks ago, the weather is starting to get cold, and it's time to make the long flight south to the warmer Wintering Grounds.
- Repeat the migration process.
- You will notice that some birds will start making adaptations to avoid troublesome habitats.
- All birds that survive the return migration are consolation winners.
- Players that survived both migrations win the game!

Lesson Wrap-up: Discussion

- **How many birds started the game?**
- **How many survived the migration north?**
- **How many birds survived the migration south?**
- **How many survived both north and south migrations?**
- **How does habitat loss change the lives of birds?**
- **Did you adapt your behavior on the return migration to avoid trouble spots?**
- **What are some human-made threats to bird migration?**
- **What are some natural threats to bird migration?**

Lesson Extensions: Flying to Survive!

- Have the students go online and play the online **Flying to Survive!** Migration Game: http://www.bonnecherepark.on.ca/games/game-birds.html
- Then ask them to take the **Habitat: There for the Birds!** interactive quiz: http://www.bonnecherepark.on.ca/games/quiz-birds.html
- Remind them to hand in their scores.
- ***Worksheet: Parts of a Bird Skeleton, Graphic: Parts of a Bird Skeleton Answer Key***

Further Student Exploration: The Young Scientist's Introduction to Wetlands

- This 15-page booklet was written for students K- 5th grade. Students will learn about the wetlands, the kinds of plants and animals found there and why wetlands should be preserved visit: http://el.erdc.usace.army.mil/wetlands/ysi.html
- Watch Video Clips from National Geographic:
    - Great Blue Heron: 2:05 minutes
      http://video.nationalgeographic.com/video/animals/birds-animals/waders-and-waterfowl/heron_blue/
        - Have students investigate the **bones** from a **Great Blue Heron (in the Hands-on Specimen Box)**
        - Make copies of the ***Worksheet: Bird Skeleton Coloring Sheet***
    - Millions of Migrating Birds: 5:10 min
      http://video.nationalgeographic.com/video/news/animals-news/us-oil-spill-bird-migration-vin/
    - Endangered Shorebird : 2:26 minutes
      http://video.nationalgeographic.com/video/news/animals-news/spoon-billed-sandpiper-vin/

References:

- A Modified Lesson from The Friends of Bonnechere Parks and The Ontario Ministry of Natural Resources
  http://www.bonnecherepark.on.ca/html/programs/resources-birds.html

Reading Handout: Globetrotters of the Bird World

Each year millions of birds fly thousands of miles, stay for sometimes only 6 weeks, and then begin the journey back again. **Migration** is a behavioral adaptation that boosts a bird's chances of both survival and successful reproduction. However, migration presents many risks. Headwinds and storms, unseasonal temperatures, disease and **predators** (especially cats) are all natural hazards faced along the way.

Human-made dangers include automobiles, trains, airplanes, power lines, high buildings, and windows. On a larger scale, the development of roads, buildings, new communities contribute to the **fragmentation** (cutting up) and loss of natural habitat.

Birds are supremely adapted for migration. Some species migrate further than others, but size is not necessarily an indication of how far a bird will travel (e.g. the tiny hummingbird migrates farther each year than many larger birds). Physical adaptations for flying long distances include long pointed wings, large lungs and heart, air sacs, large chest muscles, hollow lightweight bones and a streamlined body shape.

Bird feathering is also related to different migratory strategies. Some birds that migrate long distances, **molt** their flight feathers each year and grow fresh ones to maximize flight efficiency. Birds that migrate shorter distances may molt their flight feathers slowly over several years and use remaining energy for other purposes.

Birds often migrate at night, which reduces the chances of overheating, dehydration and predator attack, and allows for use of favorable winds. To some degree migrating in a **flock** protects individual birds from predators, and formation flying reduces energy loss. They migrate in a community and then disperse. Birds must also feast before migration on berries or insects and other high-energy foods to build-up fat reserves for the journey ahead. How birds navigate during long migratory journeys is not completely clear. It is believed that they find their way using a combination of methods: position of the sun and stars, Earth's magnetic field, and natural landmarks such as mountains and habitat areas.

To avoid the stresses of migration, some bird species (e.g. American robin) have adapted to the point where they keep long distance travel to a minimum and do not migrate each year (depending mostly on weather and the availability of food).

We can all do our part to help migrating birds. Since migration requires large amounts of energy, and birds must be able to find adequate food and safe areas to rest, we must focus on protecting their natural habitats. Community **conservation** programs, wildlife refuges, wilderness clean-up initiatives and public education are just a few of the positive factors that can enhance migration success.

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