

# Migration Game

*Theme: Natural History*

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## **Subject Area**

Science

## **Duration**

42-minute class period

## **Setting**

Classroom or hallway

## **Skills**

Following directions, recall, sequencing

## **Charting the Course**

Valuable ecological and economic resources are related to the horseshoe crab/shorebird phenomenon that occurs each spring in the Down Jersey region. Any activity that teaches students about the significance of this event will help develop an ethic of appreciation, understanding and stewardship.

## **Vocabulary**

Migration, shorebird, limiting factor

## **Correlation to New Jersey Core Curriculum Content Standards**

Science

**5.7** (3,9)

**5.12** (2,4,7)



*Courtesy of the National Park Service. Artist: Larry Morrison.*

# Migration Game

## ■ Objectives

Students will be able to:

1. Recall events that occurred on their migratory flight
2. Identify natural and human phenomena that affected the migration
3. Explain the impact of their individual experiences on the survival of the species

## ■ Materials

Migration cards

Lined paper

Pencil or pen

Stickers with an X

## ■ Making Connections

Students will understand the stresses of migration and the influence of both human and natural events on the survival of individuals and species.

## ■ Background

Migration facts used in the Migration Game are based on the article *The Incredible Flying Machines; the Incredible Journey*, Paul Kerlinger, *New Jersey at the Crossroads of Migration*, NJ Audubon Society, 1989. The following is pertinent information from the article.

Birds fail to complete migration for a variety of reasons. Natural causes can include starvation, competition, disease, storms, and predation. Human causes include collision with human-made objects such as high-tension wires and buildings, hunting, oil spills, and destruction of habitat needed to support the birds.

A combination of natural and human factors can be devastating to the bird in migration. Young birds on their first flight are at greatest risk of mortality.

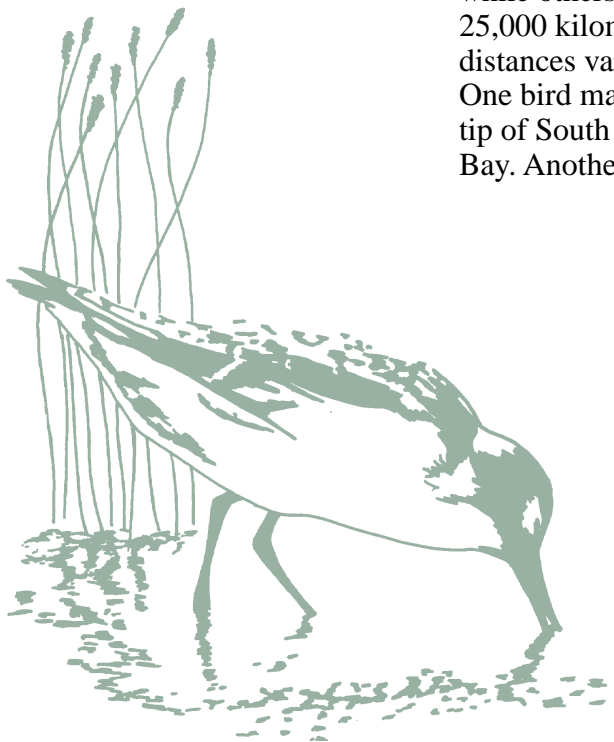
Some birds do not migrate at all while others migrate more than 25,000 kilometers. Migration distances vary within species. One bird may migrate from the tip of South America to Hudson Bay. Another bird of the same

species may start in Florida and end on the same island. The longer the flight, the greater the opportunity for something to go wrong.

In order for a species to survive, birth rates and death rates need to be at least equal. When death rates exceed birth rates, a species is in trouble, especially if this trend continues over a period of years. For a bird, failure to reproduce in a season is the same as death to the species since there will be no offspring from that individual.

Birds may fail to reproduce for several reasons. Birds that reach mating grounds late will lose out in the struggle to find safe nesting sites. A precariously perched nest can be destroyed or subject to predation. Late birds may also be unable to find mates. Late broods that survive to migration will have immature fledglings who will likely be lost during the migration to southern resting grounds. Some birds may be so weakened by migration, that they are unable to continue to mating grounds. Some experts believe that successful nesting and mating requires certain foods available only in certain habitats. A shorebird may spend the summer in the Hackensack Meadowlands, but be unable to find the food needed for breeding. To the species, this is the same as if the bird had died.

Where a bird stops along the migration route can influence weight gain. Louisiana is a richer source of nutrients than the nearby barrier islands of Mississippi. Therefore, an exhausted bird making land fall



Courtesy of the  
National Park Service.  
Artist: Larry Morrison.



in Louisiana will have a better chance of “bulking up” than the bird landing in Mississippi. Weight gain is phenomenal. Fat is the key to maintaining long migratory flights. A shorebird may gain two to five percent of its body weight each day during a migratory stopover. At the Delaware Bay, shorebirds are estimated to gain 50% of their body weight consuming horseshoe crab eggs before continuing on to northern breeding grounds.

## ■ Procedure

### *Warm Up*

Ask students for some examples of things that could influence the survival of shorebirds during migration. Explain that they will be assigned to “Flocks” and playing the role of a migratory shorebird. At the end of the activity students will be asked to write about their flight and assess the survival of their species.

## *The Activity*

Photocopy the migration cards. Tape or glue them onto index cards. Write the number of the event on the back of the index card. Arrange them down the hallway in order. Allow plenty of space between cards.

Divide students into 6 groups.

Start student groups at cards 1-6. Each group will follow the directions and move along the cards in a different pattern.

When students return from their migrations, reassign them so that each group has a “bird” from the migration route. (Each group should now have a student who started at card 1, 2, 3, 4, 5, and 6.)

On a sheet of lined paper, students should list their migration experiences and calculate their species survival rate. Birds who fail to produce viable offspring are the same as a dead bird to the species. Students may assume that their successful hatches produce four offspring.

### *Wrap Up*

Have students report their group’s findings. Students should be able to identify the natural and human events that either helped or hindered their migration.

## *Action*

Students can evaluate the quality of habitat in their community or region. They can use the telephone book to find out the location of wildlife refuges and centers. Students can find out what organizations in their community are active in preservation of habitat for migratory birds.

## ■ Assessment

Evaluate the logic of student group reports.

## ■ Extensions

Contact the NJ Audubon Society for information about the World Series of Birding and other birding events in which students can participate.

## ■ Resources

*New Jersey at the Crossroads of Migration*  
NJ Audubon Society, 1989.

# Migration Game

## Student Worksheet — *Migration Board Game*

### Card 1

You have fattened up and are ready for migration. Take off from Costa Rica across the Gulf of Mexico. Flap on down to 7.

### Card 7

High winds and heavy storms along the Gulf Coast blow you off course. You land in Mississippi, but find little food to eat. Turn around looking for food four times, then fly on to Card 12.

### Card 2

You have fattened up along the coast of Honduras and are ready to migrate. Take off across the Gulf of Mexico. Flap on down to Card 9.

### Card 8

You had an uneventful flight to Florida where you find plenty of food before flying on to Delaware Bay. Flap on up the coast to Card 14.

### Card 3

You are injured on takeoff by a Peregrine Falcon. Hold your injured wing to slow count of 20. Take off for Card 10.

### Card 9

A storm is blowing across the Gulf of Mexico. Flap as hard as you can against the wind as you struggle to fly to Card 15.

### Card 4

The time has come to migrate. Leave the coast of Brazil and flap to Card 8.

### Card 10

You are two weeks behind the rest of your flock. Your still injured wing makes your flight across the Gulf of Mexico difficult. Flap with one arm slowly to Card 19.

### Card 5

Leaving Mexico, you catch a tail wind and cross the Gulf of Mexico in record time. Unfortunately a major Gulf storm leaves you stranded in Mississippi for a week. Sit and count to 25. Fly on to Card 13.

### Card 11

A storm over the Gulf of Mexico scatters your flock. You land on an oil rig platform and wait out the storm. Rock back and forth five times before flying on to card 16.

### Card 6

Say farewell to Mexico and flap on down to Card 11.

### Card 12

The storm that you encountered in the Gulf of Mexico has moved up the Atlantic coast. You land on the beach in Delaware Bay exhausted but alive. Peck around for horseshoe crab eggs before going to Card 18.

**Card 13**

A coastal storm has caused severe beach erosion along the Delaware Bay. You follow the coastline in search of horseshoe crabs. Turn in circles five times. Fly on to Card 17.

**Card 19**

You fall into the surf off the coast of Florida and are washed onto shore near death. Fortunately, you are rescued by members of the Audubon Society. You are released as soon as you are strong. Fly to Card 22.

**Card 14**

There are fewer horseshoe crab eggs this year than last because of bait harvesting. You really have to fight to find eggs. Bob up and down 20 times before flying on to Card 20.

**Card 20**

Congratulations, you have found a nesting site and mate. Unfortunately, DDT is still used where you spent the summer. All of your eggs fail to hatch.

**Card 15**

The storm has blown you out to sea, away from land. Exhausted, you barely skim the waves before falling into the sea and drowning. Go get an X.

**Card 21**

Loss of habitat across Canada forced you off your intended course. By the time you arrive along the Arctic Ocean shoreline, all the secure nesting sites are gone. You find a mate and build a nest, but a storm destroys your eggs.

**Card 16**

An oil spill in the Delaware Bay has left a slick along the beach. Your wings are coated in oil. You drown in the surf. Go get an X.

**Card 22**

You land in Delaware Bay, but have missed the horseshoe crab migration. You find what food there is. Turn around four times and move on to Card 24.

**Card 17**

It's a crowded beach! You turn over stones like crazy to find horseshoe crab eggs. Turn your head side to side 10 times then fly on to Card 21.

**Card 23**

Congratulations, you have landed along the shore of Hudson Bay and have found a nesting site and mate.

**Card 18**

After two weeks in Delaware Bay, you have added 70% to your weight. Flap on to Card 23.

**Card 24**

Unable to go further, you stop in the Hackensack Meadowlands. Although you will survive, you will not complete your migration to the Arctic. You will not mate this year.