



# Migration Activation

**SUGGESTED GRADE LEVELS:** MS

**SUBJECTS:** Science

**SKILLS:** analysis, discussion, generalization, kinesthetic concept development, observation, prediction, psychomotor development

**CORRELATION TO NEXT GENERATION SCIENCE**

**STANDARDS:** MS-ESS3-3, MS-LS2-1, MS-LS2-4, MS-LS2-5



## Objective

Students will simulate migration (a periodic movement from one place to another and back again) and relate habitat events and migration hazards to population size.

## Method

Students learn the promises and pitfalls of annual migration by taking on the role of migrating birds.

## Background

Birds move through migration from areas with dwindling food supplies to winter feeding grounds with more abundant food. Only the fittest individuals survive migration, therefore ensuring that only the strongest birds may reproduce. Birds encounter many hazards during their migration. Nocturnal and low-flying migrants risk flying into an assortment of humanmade objects, such as tall


buildings, power lines and towers, windows and aircraft. Hunting seasons for migratory game birds (primarily ducks and geese) generally are scheduled during the fall migration. Harvest quotas are set so that the number of harvested birds is within limits that a population can withstand. Predatory species, such as hawks, often migrate at the same time songbirds do. Habitat destruction and pollution are serious migrational hazards. Destruction and pollution of the northern breeding grounds affect spring migrations. Likewise, people's actions on southern feeding grounds, such as tropical deforestation, result in the death of untold numbers of birds. Severe late season weather on the spring breeding grounds also kills many migrants.

## Materials

140 3" x 5" note cards; tape or chalk; two shoe boxes; five envelopes labeled 1-5; large playing field or gym



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## Procedure

1. Prepare 10 sets of “Good News/Bad News” cards, with one message on each card (70 Wintering Habitat and 70 Nesting Habitat for total of 140 cards).

### Wintering Habitat cards

----- ✂ -----

Hunter harvest: 4 ducks die.

----- ✂ -----

Wetlands drained: remove one X, 4 ducks die.

----- ✂ -----

Habitat improved: survive and thrive!

----- ✂ -----

Extra food: survive and thrive!

----- ✂ -----

Plenty of rain: survive and thrive!

----- ✂ -----

Cholera: 4 ducks die.

----- ✂ -----

Exhaustion: 4 ducks die.

----- ✂ -----

### Nesting Habitat cards

----- ✂ -----

Botulism: 4 ducks die.

----- ✂ -----

Raccoon steals eggs: no new ducklings.

----- ✂ -----

Nest land protected: add 2 ducklings.

----- ✂ -----

Mild weather: add 2 ducklings.

----- ✂ -----

Good ground cover: add 3 ducklings.

----- ✂ -----

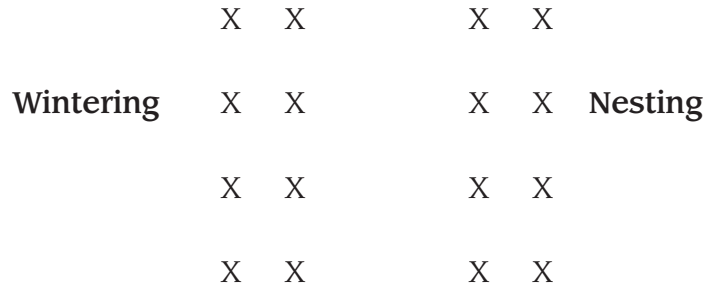
Severe drought: 4 ducks die.

----- ✂ -----

Nests disturbed: remove one X, no new ducklings.

----- ✂ -----

2. Fold cards and place them in two separate shoe boxes, one labeled “Wintering Habitat” and one labeled “Nesting Habitat.” You should have a total of 70 cards in each shoe box.
3. Mark “Xs” (one for every 4 students) on the playing field or gym floor with tape or chalk as shown below.



4. Identify one student to be the biologist. This individual will not migrate but will collect the cards at the end of each season and place them in an envelope (envelopes numbered 1-5). One nesting and one wintering feeding season should go in each envelope. Have the biologist count the number of ducks alive at the end of each nesting season and record this information on the envelope.
5. Explain to students that they will all begin the activity as hatchlings in the northern nesting grounds. In order to fit into the habitat, students must have one foot on an X with no more than four students on each X. If a student can't locate an X with less than four students on it, he/she is considered a dead duck and must stand on the sidelines and wait for an opportunity to return to the flock. To control the excitement of the game, announce that anyone who wastes energy roughhousing or running will perish from exhaustion and needs to step aside.
6. To migrate, students wait for your signal, and then walk quickly to an X at the other end of the field or gym.
7. Once settled on their X, one student from each X will draw a Good News/Bad News card from the appropriate habitat box. If a student draws a Bad News card, his/her group will be considered dead ducks and must stand on the sidelines. Students can re-enter the flock only when cards are drawn calling for new ducklings. If the students draw a “Wetlands Drained” or “Nest Disturbed” card, the X must be eliminated due to habitat loss, making survival even more competitive upon the return trip.
8. Have the ducks complete five full migration cycles, ending in the nesting grounds on the fifth year.

## Extensions

- Graph the results of the biologist's duck counts. Was there a trend or cycle that could be followed? Explain. Why does the number of animals in a population fluctuate over time?
- Use the attached map to locate nesting and wintering grounds for the ruby-throated hummingbird, Kirtland's warbler, Canada goose, whooping crane and blackbird. Research current land-use practices in these areas and report any current activities that will result in good news or bad news for the bird populations. Discuss the trends.
- The Great Backyard Bird Count (<http://gbbc.birdsource.org/gbbcApps/results>) is sponsored by the Cornell Laboratory for Ornithology, the Audubon Society and Bird Studies Canada and takes place over four days in February each year. People throughout North America watch and count birds in their yard, a nearby park or at their school and report their findings online. Examine the maps, top 10 lists, state tallies and detailed results sections of the "Explore the Results" link on the Web site and discuss trends and differences annually or geographically. Re-search weather conditions and discuss how weather may have affected reported numbers.
- The mission of the American Bird Conservancy is to conserve native birds and their habitats throughout the Americas (<https://abcbirds.org/>). Discuss the bird collision trends data provided under the "Browse by Topics/Threats to Birds" link on their Web site and noted below. What measures could be taken to minimize each type of threat?

Collisions with:	Year of estimate	Mortality estimate low	Mortality estimate high
Wind turbines	2009/10	100,000 (2010)	440,000 (2009)
Towers	2008	4,000,000	50,000,000
Power lines	2001	10,000,000	154,000,000
Roads/vehicles	2005	10,700,000	380,000,000
Urban light	2009	31,158,000	
Glass	2006	100,000,000	1,000,000,000

- Through the "Lights Out Chicago" program, Chicago became the first U.S. city to dim tall building lights to save birds' lives. Under the program, decorative lights in Chicago's tall buildings are turned off for almost five months during spring and fall bird migration. Researchers at the Field Museum of Natural History estimate that the program saves the lives of more than 10,000 migratory land birds each year. Research and discuss what impacts decorative lights have on migrating birds. Which species migrate at night?

- According to staff members of the Field Museum of Natural History in Chicago, 31,705 individuals of 141 bird species were found dead at one Chicago building from the fall of 1978 through the fall of 2004. The table below lists the top 10 species. Research these species and determine what, if any, similarities in their migration routes may be a factor in this trend.

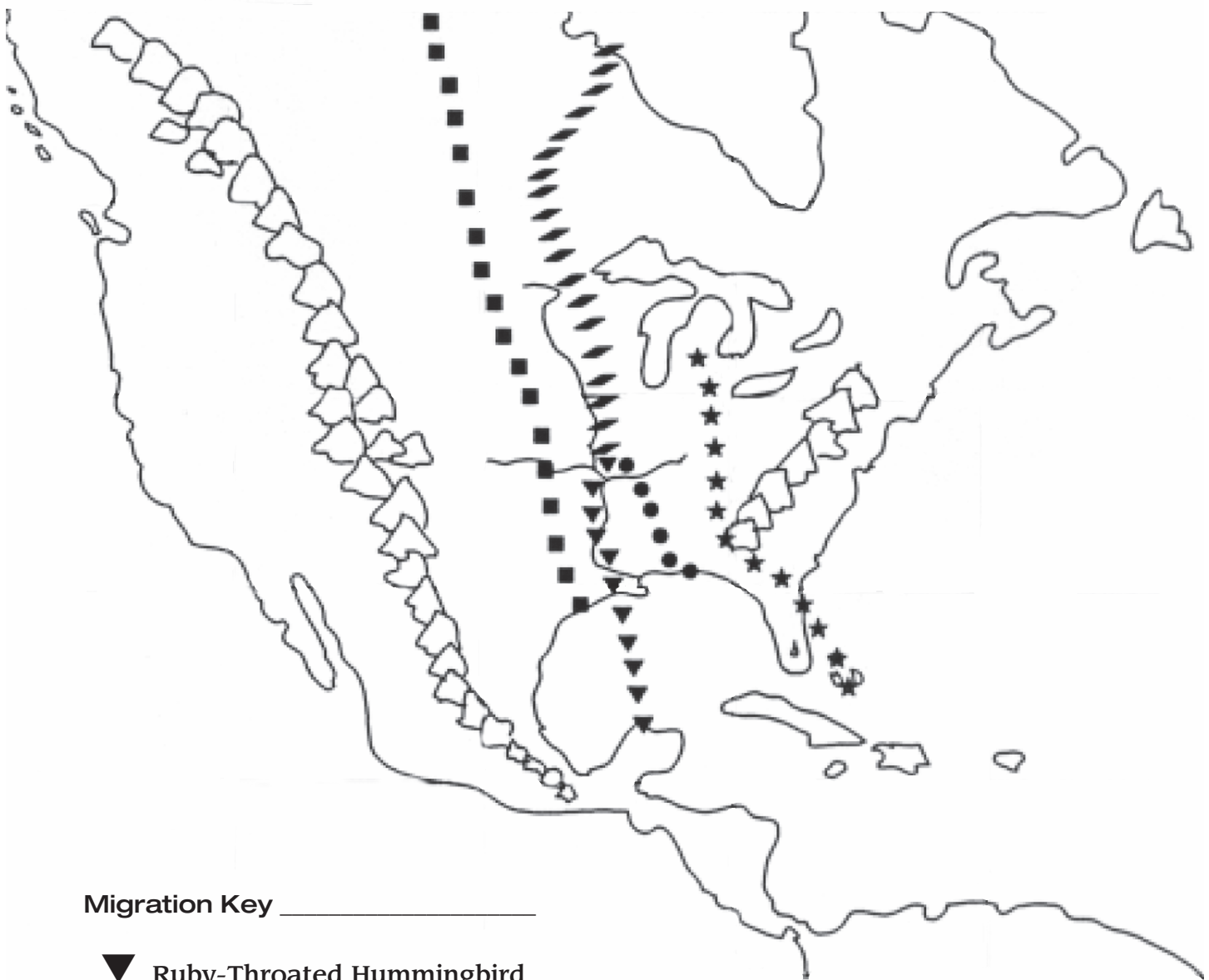
	Number Found Dead	% Total
song sparrow	4,136	13
dark-eyed junco	3,632	11
swamp sparrow	3,362	11
white-throated sparrow	2,532	8
hermit thrush	1,417	4
ovenbird	1,272	4
fox sparrow	1,244	4
Lincoln's sparrow	1,025	3
American tree sparrow	938	3
Tennessee warbler	929	3

Of the birds found dead, 45 percent (14,283 individuals of nine species) were members of the sparrow family and 32 percent (10,059 individuals of 25 species) were members of the warbler family. What factors may account for the high mortalities (totaling 77 percent of the birds killed in building collisions) of birds from these families?

## Evaluations

- Discuss what happened during the game.
- What sorts of activities resulted in good news for the birds? Identify other positive events.
- What activities resulted in bad news for the birds? Identify other negative events.
- What can be done to prevent bad news events or promote good news events?
- Distinguish between effects on individual birds and effects on the population.
- Why is suitable habitat important for migrating water birds?
- Habitat loss is more important to migratory species than to non-migratory species. Do you agree or disagree with this statement?

Adapted with permission from National Audubon Society, *Wild wings heading south*. <http://www.pbs.org/audubon/wildwings/migact.html>.



Migration Key \_\_\_\_\_

- ▼ Ruby-Throated Hummingbird
- ★ Kirtland's Warbler
- ▤ Canada Geese
- Whooping Crane
- Blackbird