



**El Salvador
Sixth Grade**

National Standards for Grade Six Lessons

Visual Arts

Standard 2

Knows how to use structures (e.g., sensory qualities, organizational principles, expressive features) and functions of art.

Level III (Grade 5-8)

Knows how the qualities of structures and functions of art are used to improve communication of one's ideas.

Geography

Standard 2

Knows the location of places, geographic features and patterns of the environment.

Level III (Grade 5-8)

Knows the relative location of, size of and distances between places (e.g., major urban centers in the United States).

Life Sciences

Standard 6

Understands relationships among organisms and their physical environment.

Level III (Grade 5-8)

Knows factors that affect the number and types of organisms an ecosystem can support (e.g., available resources; abiotic factors such as quantity of light and water, range of temperatures and soil composition; disease; competition from other organisms within the ecosystem; predation).

Mathematics

Standard 6

Understands and applies basic and advanced concepts of statistics and data analysis.

Level III (Grade 5-8)

Reads and interprets data in charts, tables, plots (e.g., stem-and-leaf, box-and-whiskers, scatter) and graphs (e.g., bar, circle, line).

Organizes and displays data using tables, graphs (e.g., line, circle, bar), frequency distributions and plots (e.g., stem-and-leaf, box-and-whiskers, scatter).

Sciences

Standard 6

Understands relationships among organisms and their physical environment.

Level III (Grade 5-8)

Knows factors that affect the number and types of organisms an ecosystem can support (e.g., available resources; abiotic factors such as quantity of light and water, range of temperatures, and soil composition; disease; competition from other organisms within the ecosystem; predation).

Geography

Standard 3

Understands the characteristics and uses of spatial organization of Earth's surface.

Level III (Grade 5-8)

Understands how places are connected and how these connections demonstrate interdependence and accessibility (e.g., the role of changing transportation and communication technology, regions and countries Americans depend on for imported resources and manufactured goods).

Thinking and Reasoning

Standard 6

Applies decision making techniques.

Level III (Grade 5-8)

Makes decisions based on the data obtained and the criteria identified.

Secures factual information needed to evaluate alternatives.

Environment and Society

Standard 14

Understands how human actions modify the physical environment.

Level III (Grade 5-8)

Understands the environmental consequences of people changing the physical environment (e.g., the effects of ozone depletion, climate change, deforestation, land degradation, soil salinization and acidification, ocean pollution, groundwater-quality decline, using natural wetlands for recreational and housing development).



Sixth Grade
El Imposible National Park, El Salvador

Lesson 1: Why do some birds have two homes when we have one?

Concept

Many species of migratory birds have two main homes: a temperate forest and a tropical rainforest. Their survival depends on the health of both forest systems. And the health of both forest systems depends on the survival of migrating birds.

Essential Question

Why do some birds need two homes, thousands of miles apart, when we only need one?

Objectives

1. Students will research different physical and behavioral characteristics of birds and create theories about their migratory behavior.
2. Students will research the natural histories of different migratory birds and create diagrams describing the bird's annual cycles of behavior.
3. Students will carry out a variety of mathematical calculations to understand the phenomena of bird migration.

Additional Resources

- **Resource Index**- Check out this page at <http://www.rainforest-alliance.org/programs/education/teachers/curriculum/resources/index.html> for additional supplemental materials that complement these dynamic units and to access many of the resources listed below.
- **Slideshow** – The Learning Site provides a slideshow and script about El Salvador that includes background information about the animals, people and landscape of this region. The slideshow can be downloaded for viewing in the classroom, printed out and read as a story, or viewed online with the students.
- **Unit-Specific Stories**- The Rainforest Alliance has developed two original stories for use with these units, available in English, Spanish and Portuguese. The stories are available to download and print or can be viewed on-screen.

**Alex Goes Exploring in El Imposible
Life In San Miguelito**

- **Species Profiles** - The species profiles, available to view on screen or download from the beginning of the unit or the Resource Index, include photos, habitat, foraging behavior, group relationships, threats and many more facts.
 - Ocelot
 - Great Curassow
 - King Vulture
 - Blue-Crowned Motmot

- **Rainforests: Supermarkets to the World** - A great two-page introduction to the many fruits, vegetables, medicines and other products that we use everyday, which are harvested from tropical rainforests.
- **Park Profile** - Visit <http://www.rainforest-alliance.org/programs/aar/el-salvador.html> for a basic introduction to El Imposible National Park.
- **Rainforest Poster** - Check out this colorful two-page poster depicting the layers of the rainforest, rainforest products, and the threats faced today by many of the world's rainforests is available for your use.

Inside the Canopy – Structure and species of the rainforest
Status Report – What is happening to the rainforest

- **Rainforest Products** – Visit <http://www.rainforest-alliance.org/resources/forest-facts/lives.html> for a summary of products that we use in our everyday lives that originate in rainforests. Both teachers and students will find information on the products found in their homes and supermarkets that either originated in tropical forests or are currently produced there.
- **Profiles in Sustainability** – Click [here http://www.rainforest-alliance.org/programs/profiles/index.html](http://www.rainforest-alliance.org/programs/profiles/index.html) for case studies on companies who work closely with the Rainforest Alliance to ensure that their practices protect wildlife, workers and communities.
- **Conservation Coffee Summary** – Visit <http://www.rainforest-alliance.org/programs/education/teachers/curriculum/pdfs/conservation-coffee.pdf> to access an eight-page introduction to the issue, including a glossary of terms. These are appropriate for students to read independently.
- **Venn Diagram Template** - Download a photocopy-ready Venn diagram designed to complement this unit.
- **Certificate of Accomplishment** - Print out colorful rainforest certificates for your students to commemorate their completion of these units.

Informational Introduction for the Teacher

This lesson challenges students to explore the task of migration and understand how this important bird adaptation is related to temperate forest and tropical rainforest ecology. By observing birds and sorting pictures, students' theories about migrations surface. These hypotheses are then tested as students form new knowledge about forests and migrations. Students then explore the enormity of the task of migration by using mathematics. Last, students research a select bird and demonstrate their understanding of forest ecology and bird migration by designing a creative diagram of a year in the life of a migratory bird.

Informational Introduction for the Students

Consider the greatest distance you've ever walked in one day. Were you tired? Imagine if your life depended on you walking that far for every day for a week straight. Consider the coldest day of winter you've ever experienced. Now imagine being outside in that weather every day for a week straight. These types of experiences are typical in the world of birds. Bird life depends on their ability to move, find food and shelter and eventually mate. All of these behaviors are ultimately linked to the forest in which they reside. In this lesson we'll discover how birds survive and how the forest helps them.

Step 1 - CONNECT (The Concept to Prior Knowledge)

Challenge

Students observe birds in nature and examine pictures of birds, then compare their own theories to experts' theories on patterns of migration. Students consider how migrating birds help sustain both temperate forests and tropical rainforests.

Materials

- Photocopied pictures of overwintering and neotropical migrant birds (one set per pair of students). The Neotropics include Mexico, Central America, South America and the Caribbean.

Overwintering birds

Black capped chickadee
American raven
White-breasted nuthatch
Blue jay
Pileated woodpecker
Great horned owl

Neotropical migratory birds

Ruby throated hummingbird
Turkey vulture
American robin
Red eyed vireo
Yellow warbler
Wood thrush

Procedure

1. Have the class observe birds at a feeder near the classroom or somewhere on the school grounds. Ask students to make observations about each bird in order to determine whether each bird migrates during winter months or spends winter in temperate forests.
2. Have students work with a partner. Give each pair of students a set of bird pictures. Challenge students to use their prior knowledge and observations of the birds at the feeder to separate the pictures into two categories: (1) birds that live in their area year round and (2) birds that migrate somewhere else during part of the year.
3. After sorting the bird pictures, have students discuss their ideas about the following questions. Ask them to share their theories for the entire class to discuss.

Discussion Questions

- a. What physical characteristics, if any, influenced your decision to sort the birds into their respective categories?
- b. What behavioral characteristics, if any, influenced your decision to sort the birds into their respective categories?
- c. Why do you think some species like chickadees live in below freezing temperatures when snow is up to our hips and other species like warblers fly 2,000 miles to live in a warm, rainy, lush forest during the winter?
- d. Why would a bird living in a tropical rainforest, with plenty of shelter, refuge, food and resources abandon its warm, winter home at the onset of spring, and risk the trials and tribulations of flying 2,000 miles north in order to raise a family, only to fly back 6 months later?
- e. Do you think warblers (and the other migrants) really require two homes? Or are these just affluent birds indulging in more than they need? What do the warblers have that the chickadees don't?
- f. How do you think migrating birds can help sustain both temperate forests and tropical rainforests?

Step 2 - LITERATURE/DISCUSS (Give Expert Information Book; Ask Questions)

Challenge

Students work with partners to research how experts answer the questions posed in Step 1. After sharing and discussing their findings, students are challenged to interpret a list of true or false statements.

Materials

- Sorted bird pictures from Step 1
- Research materials
- True/False statements

Procedure

1. Ask students to work together to make any corrections to their initial sorting based on the discussion in Step 1.
2. Students use field guides, birding books and Internet sources to research answers to the questions in Step 1. After finding answers, students make additional changes to their original sorting.
3. Challenge students to take the True or False quiz. Tell them that the answers will be revealed afterwards, and the quiz is intended to offer experts' insights into bird migration.
3. After taking the quiz, engage students in a discussion about the statements. Encourage students to explore their disagreements to expose the reasoning behind each the class opinions.
4. Reveal the correct answers and engage students in follow-up discussion about any confusing points.

True or False?

1. Most birds that live in northeastern US do not migrate.
2. There is much less food for birds to eat in temperate forests in winter.
3. Most non-migrating species depend on humans to survive the winters in the northeastern US temperate forest.
4. Birds leave the rainforest in spring and migrate north because it gets too hot for them there.
5. Migration is a movement from temperate forests to tropical forests.
6. Penguins migrate.
7. Some birds migrate as far as 22,000 miles in one year!
8. Migration is an adaptation birds have for survival.
9. Humans used to migrate like birds before modern heating systems.
10. Birds help forests by scattering seeds and eating insects that may harm trees.
11. Birds help forests by providing food for other animals that eat them and in turn help disperse seeds as well as nourish the forest soil with nutrients when they die.

Answers:

1. *False*. Approximately 520 of the 650 birds that inhabit North America migrate.
2. *True*. Due to the cold weather and snow, many food sources are inaccessible or have been eaten, forcing the birds to migrate.
3. *False*. Most birds survive without the assistance of humans.
4. *False*. Birds migrate north to establish breeding sites, mate, and raise their young.
5. *False*. Some birds spend winter in temperate areas and migrate north to the Arctic circle to take advantage of the abundance of life brought on by twenty-four hours of sunlight in summer months.
6. *False*. Penguins move periodically throughout each day and after breeding season, but they do not migrate.
7. *True*. Arctic terns make the longest migration of any animal on Earth. Each year, they fly from the Arctic to the Antarctic and back.
8. *True*.
9. *False*. Human migration generally has a different meaning than bird migration. Humans have moved from place to place for many reasons, regardless of modern heating systems. Many humans inhabited the northern latitudes despite the cold without modern heating conveniences.
10. *True*. Birds are important in maintaining a healthy food web in tropical rainforests.
11. *True*. Birds are important in maintaining a healthy food web in tropical rainforests.

Internet Resources:

- http://whyfiles.org/006migration/fact_sheet.html
- <http://www.adelie.pwp.blueyonder.co.uk/FAQs/migrate.htm>

Step 3A - PRACTICE (Math and Language Arts)**Challenge**

Students carry make calculations to fully appreciate the phenomena of bird migration.

Materials

- Mathematical problems
- World atlas

Procedure

Challenge students to work individually on the problems listed below:

1. How much energy do you spend coming to school each day?
 - a. Calculate how many miles your school bus travels and multiply that number by the current rate of gasoline.
 - b. If you walk to school, calculate how far and multiply that by the calories spent walking certain distances. (Any calorie counter will offer this information.) Estimate how many calories you spend in one week walking to school.
 - c. Find out how many miles one of the migratory birds flies in one year of travel. Calculate how many calories it would take for you to walk that distance.
 - d. Find out how many calories are in your favorite foods. If you walked the distance a bird travels, how much of that food would you have to eat in order to fuel your trip?
 - e. Find out your 'bird of choice's' favorite food. Guess how many insects/other food your bird would have to consume in order to fly that distance.

Step 3B - CREATE (Performance Tasks Related to Standard Indicators)

Challenge

Students choose a neotropical migrant species of interest, research its patterns of movement throughout the year and design a graphic representation of how it spends one year.

Materials

- Black tape for outline of continents
- Colored tape
- Index cards
- Art supplies
- World atlas
- Research materials (bird books, Internet)

Procedure

1. Students choose neotropical migratory birds which interest them and research the following aspects of the species' natural history: winter range, summer range, migration arrival/departure times (online at www.birdnature.com/timetable.html), migration distances and duration of migration, feather coloration throughout the seasons, bird calls and songs, food sources, description of habitats, how the forest provides food and shelter, etc.
2. Students create a draft drawing of their bird's year. Each drawing should include a map of the bird's migration patterns and symbols to represent different behaviors. For example, when birds are in mating season, the symbol may be a bird with bright plumage calling a female with hearts in the air to denote attraction of a mate. This draft will be translated onto the large diagram on the classroom floor.
3. Using a world map as a guide, students draw outlines (using chalk, black tape, etc.) of North America, Central America, and South America on the classroom floor.
4. Using colored tape and index cards, students translate their draft drawings onto the classroom floor. Each student's addition should highlight their bird's route to and from their temperate and tropical rainforest habitats. Encourage students to draw symbols on index cards and tape them alongside the route. The symbols should represent primary activities at each of the birds' habitats and intermediate destinations. Specific dates of migrations and a picture of their bird may also be helpful.

Step 4 - PRESENT (Edit Work/Students Orally Present Projects)

Challenge

Students present their projects to younger students. Students are challenged to explain what they know about bird migration by taking others on a full year migration of their selected species.

Materials

- Migration chart on classroom floor
- Students' draft drawing of their selected bird species

Procedure

1. Students take younger students on a simulated tour of their selected bird's year. Their description should include things like time of migration, reasons for migration, distance, how the forests supply what the birds need, how the migrants supply the forest with what the forest needs, and knowledge of where this bird might be at the present moment.
2. After the younger student completes the tour, ask him/her to take on the role of tour guide, and explain what he/she learned about bird migration and its relation to forests.

LESSON 1 ASSESSMENT RESULTS:

Teacher observations of tasks with rubrics as listed below, as well as collected work samples.

Assessment Guidelines	3 = P (Proficient)	2 = S (Satisfactory)	1 = NW (Needs Work)
1. Student works well with partner to collect data. Student is able to work cooperatively to make decisions about which birds migrate.			
2. Student makes appropriate changes to sorted bird groups based on class discussion, researched information, and the opinions of others.			
3. Student accurately represents the bird's behavioral patterns using accurate information and clear and creative symbols.			
4. Student is able to explain clearly and accurately the key aspects of the bird's natural history and explain how it is related to temperate forests and tropical rainforests.			