

**National Science
Education Standards**

- ✱ Standard C: *Life Sciences* — Populations and ecosystems.
- ✱ Standard C: *Life Sciences*— Diversity and adaptations of organisms.
- ✱ Standard F: *Science in Personal and Social Perspectives* — Populations, resources, and environments.



Teeter-Totter

OVERVIEW

Students stage a simple puppet show between two spotted sandpipers—one from Puerto Rico and one from Alaska. Students learn about the temperate and tropical rain forest ecosystems through the dialog between the characters.

OBJECTIVES

Students will:

1. Understand the similarities and differences between temperate and tropical rain forests.
2. Appreciate the impact humans have on rain forest ecosystems.
3. Understand the challenges faced by migrating birds that depend on widely-scattered habitats throughout their summer and winter range.

SUBJECTS

Science, Language Arts, Creative Arts

VOCABULARY

Migration, species, neotropical migrants, endemic

TIME

- 50 minutes for activity
- 2, 50-minute periods to create more elaborate puppets

MATERIALS

Puppet stage (or a simple screen for the performance); sandpiper puppets; popsicle sticks; art materials

BACKGROUND

Spring brings not only May flowers but also a variety of migrating birds to North America. Not all birds spend their entire year here. Some birds are within the borders of our country only temporarily, feeding and resting during their migration to and from the tropics. Others that migrate make their homes here during the summer to breed and raise their young. We refer to birds that spend their summers in North America and their winters in the New World tropics of Central and South America, Mexico or the Caribbean as **neotropical migrants**. The International Partners in Flight program has identified over 250 species of birds as Neotropical migrants.

Because of their adaptation for flight, birds are able to be highly mobile when necessary. The ability to fly has resulted in the development of regular patterns of seasonal migration by many species of birds. The advantage for neotropical migrants is that they can spend their summer in North America where food is plentiful and competition is often reduced.

While the majority of neotropical migrants return north to their breeding areas in April and May, each species has its own schedule.

Migration distances vary greatly among neotropical migrants as well as between individual birds of the same species. The shortest migrations are made by birds that breed in the southern United States and winter in Central America and the Caribbean, a trip which can be as short as a few hundred miles.

Most neotropical migrants are insect-eating land birds. Some of these, such as swallows, swifts, nighthawks, and the flycatchers feed on insects in the air. Others such as most vireos, orioles, and warblers glean insects from the foliage of plants. In addition to these insectivorous birds, various species of raptors, thrushes, hummingbirds, sandpipers, plovers, terns, and a few types of waterfowl (for example the Blue-winged Teal) are also mainly neotropical migrants.

Since many of the neotropical migrants are land birds that depend on forests or forest edges for nesting, they are not as commonly seen as many of the year around residents in our backyards and urban areas. Yet, with a little effort, many of the migrant species can easily be viewed or heard in urban parks, wooded neighborhoods, and along country roads.

Ornithologists generally agree that neotropical migrants evolved their current patterns of migrations between ten and thirty million years ago. It is hypothesized that the driving force for their migratory behavior was to take advantage of rich summer bounty of the North American temperate environments. Now, however, with the rapid increase in the human population, both the temperate and tropical habitats are being lost to development and resource exploitation. As a result, some species of neotropical migrants are almost certainly experiencing population declines. Migratory song birds are important components of many natural systems and are seen as indicators of the health of the environment. Their population trends can mirror our own quality of life. If song birds decline, then the quality of our life is likely also declining. Many of the neotropical song birds that are insectivorous play a critical role in controlling insect populations during the summer.





ACTIVITY

1. Discuss with your class the concept of migration and neotropical migrant birds. Identify birds in your area that migrate seasonally. Identify reasons why they nest or travel through your area. If desired, students can each research a neotropical migrant that is found in your region.
2. Have teams create stick puppets. They can use the included photos or line art to create Mancho and Teeter. Alternatively, they can use fabric, papier mache' or other materials to make more elaborate puppets. Independent research may be required to ensure that the puppets are accurately portrayed.
3. Divide class into 2-person teams. Have teams read the *Teeter and Mancho* puppet show.
4. Choose teams to present the puppet show to the class. Ask students in the audience to take notes on key information.
5. Have students write their own puppet show between a temperate and a tropical rain forest character. Alternatively, students can continue the Teeter and Mancho dialog. When completed, students present their puppet shows to the class.

EXTENSIONS

1. Have students research the life history of spotted sandpipers. They can write a story about a sandpiper or another local neotropical migrant.
2. Have students prepare a bulletin board about local migrant birds. International Migratory Bird Day is held each spring and provides many excellent on-line resources for use. Visit their website at <http://www.birdday.org/>
3. Have students present their puppet shows to younger classes.
4. Students can develop a set of "interview" questions for Teeter and Mancho about the temperate and tropical rain forests. Questions can be swapped among the class and students can conduct research to find answers. These answers would be presented to the entire class.

ASSESSMENT

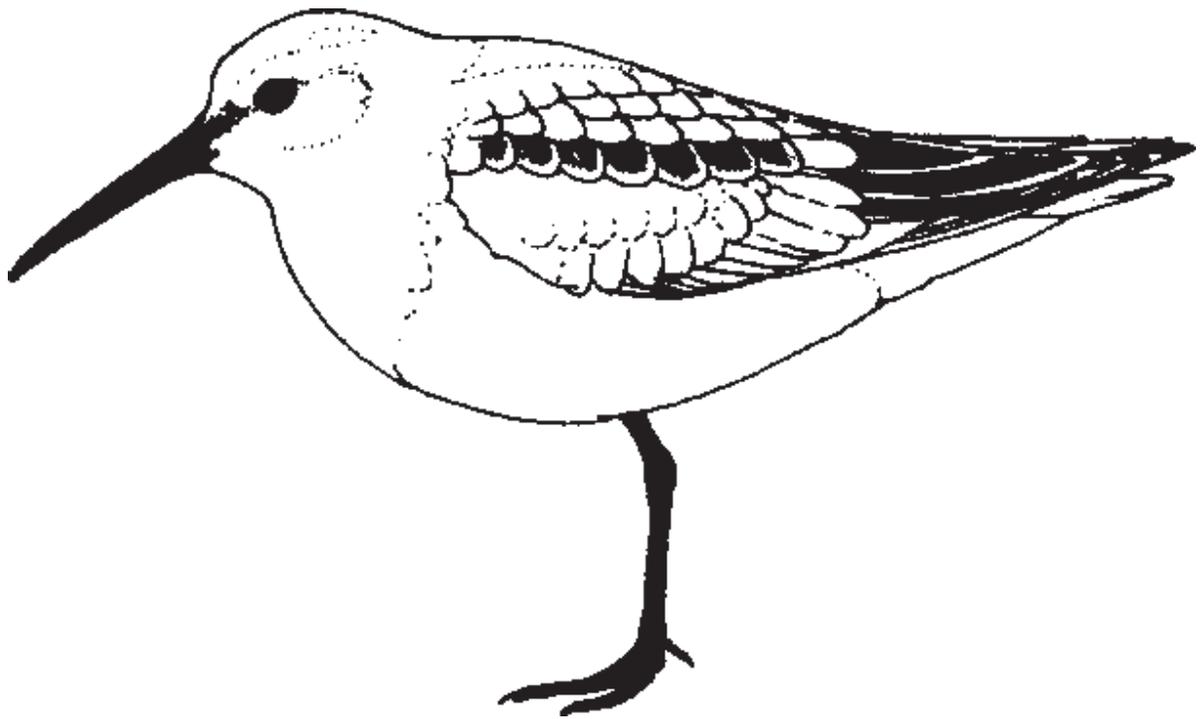
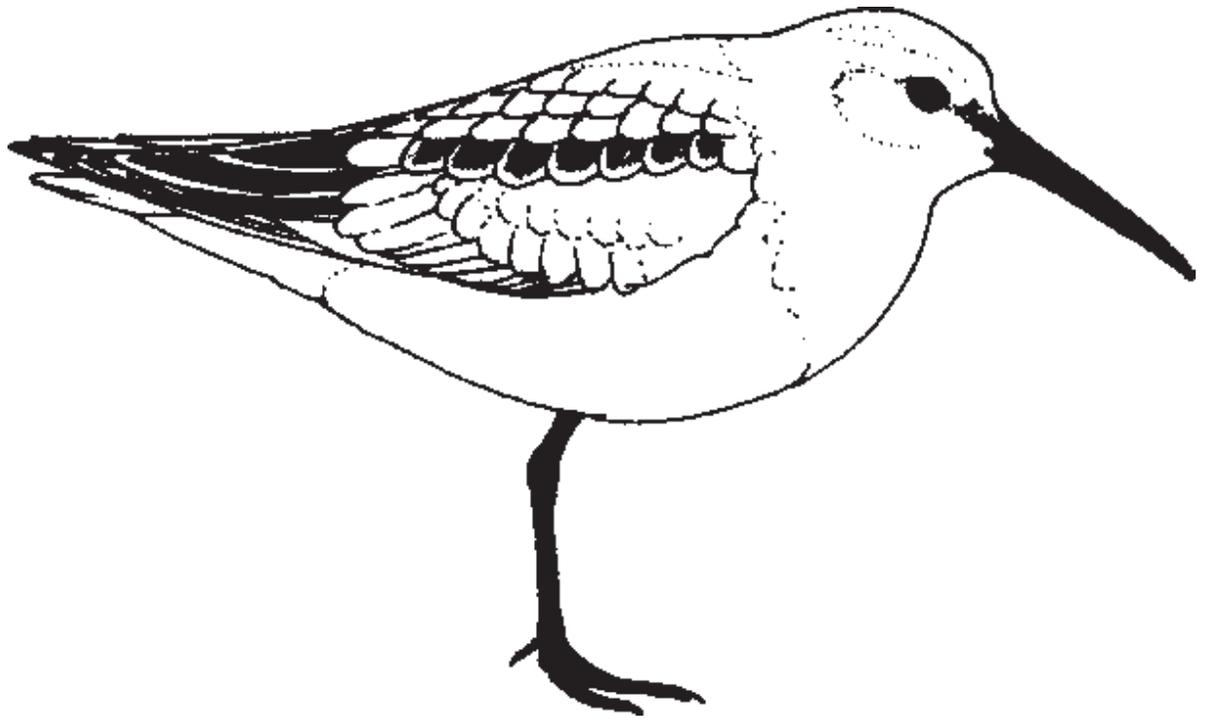
1. Have students list three similarities and three differences between temperate and tropical rain forests.
2. Have students write a report on either the temperate or tropical rain forest ecosystem.



CREDIT

This original puppet show was written by Dr. Frank Wadsworth, of the International Institute of Tropical Forestry. Go to <http://www.fs.fed.us/global/iitf/welcome.html> for more information about this research organization.

Prince William Network's
**America's
Rain Forests**





Teeter and Mancho—*birds of a feather*

Teeter and Mancho meet along a small, quiet stream in Prince William Sound, on the Chugach National Forest in southcentral Alaska. Mancho is exhausted after his long trip, but Teeter is all a-twitter with the excitement of meeting a new friend. Before too long, they start comparing notes on how their homes are similar--and different!

Teeter-tail: Hi stranger! You look exhausted! You must have just flown in. Where are you from?

Mancho: Oh - I'm on an adventure--I just flew all the way from the America's southernmost National Forest.

T Wow! Well, you landed on the Chugach--the northernmost National Forest in America!

M I'm famished. Do you mind if I probe this mud for a while and catch some yummy little bugs? It's been a loooong trip.

T Oh, please do -- you'll find plenty to eat along this stream. We can still talk.

M How good to find a sandpiper that looks just like my sister! What is your name?

T My friends call me "Teeter-tail" because I like to bob my tail up and down.

M I do that all the time too, but because of my spots, I'm called "Mancho".

T It's nice to meet you Mancho. I'm studying to be a scientist-bird! Did you know you are now in a temperate rain forest. Have you ever been in one before?

M Hmmm -- not a temperate rain forest. But my home in Puerto Rico is a **tropical** rain forest.

T Well - it sounds like they both get lots of rain. Here, we get up to twelve feet in one year!

M That sounds about the same as in Puerto Rico. It's rainy most of the year, but February and March are our "drier" seasons.

T I'm not here in February and March. I don't get here in Alaska until April.

M Gee, how come Teeter? Where do you travel from?

T I'm a smart bird -- It gets cold here in the fall and winter! No yummy bugs to eat and there is snow all over! I winter in southern California, a 3,000 mile, two-week flight.

M Brrr! I'm cold right now!! I nest each year in Pennsylvania.

T Wow! Pennsylvania -- that sounds pretty exotic! How much of that flight is over water? Do you get any rest along the way?

M It's 1,000 miles to the first rest. Boy, it's a long trip--I have to fatten up to make it.

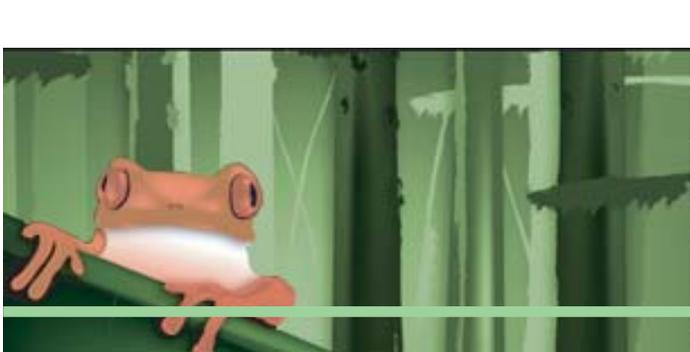
T I fly through rain forests in the Olympic and Tongass National Forests to get here.

M Well, my home in Puerto Rico is the only tropical rain forest in the United States!

T What makes it tropical?

M The sun comes up and passes directly over it during the summer. There is no cold season!

T Do you have these twenty-hour days there? During the summer in Alaska, we get almost no sleep--it's just eat, eat, eat!



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M These days **are** long. On the Caribbean they get no longer than 14 hours.

T What is the temperature in your forest? It's 50 degrees now, but it ranges from 30 to 70 degrees.

M BRRRR! It's cold here! In Puerto Rico it's always 60 to 85 degrees.

T This is soooo fascinating -- please tell me **all** about your Puerto Rican home. How big is the Caribbean National Forest?

M It's a mountain 3,500 feet high, with about 28,000 acres, all rain forests.

T Gee whiz! that's sort of small -- the three National Forests that I travel through have **23 MILLION** acres--and about one-fifth of that is rain forest!

M Wow! All of Puerto Rico is only a little more than 2 million acres!

T What are the trees like in your tropical rain forest?

M They're beautiful! Some emergent trees poke out above the canopy. These big, old trees can be 120 feet tall, 9 feet around, and may be 500 years old. They may have been seedlings when Columbus came by!

T We have some special trees in the temperate rain forest too. Ours can be up to 200 feet tall and twelve feet around. Our oldest trees can be 800 years old!

M How many tree species are there in these rain forests?

T Pretty much the trees you see here are what we have all over. I've learned all 20 species!! Like Sitka spruce, western hemlock, redcedar, alder....

M Woah there Teeter! Only 20 species in 23 million acres??!!?? The Caribbean has TEN times that number -- 240 tree species. That's more than all the other National Forests together!

T Wow! On 28,000 acres! I guess they call that biodiversity!!

M Our tropical rain forest has mosses and lichens on the trees, just like yours. And, we have ferns that grow to 50 feet tall -- and a cactus that hangs from trees!

T I'm amazed!! Our two forests are very different. What about the animals? I'm interested in hawks especially!

M Smart bird Teeter! Yes, we have redtails hawks, merlins, and peregrine falcons during the same time that I'm there.

T Wow! We have those same three here, and eagles too! You can never be **too** careful.

M Many of the animals I live with are 'endemic'.

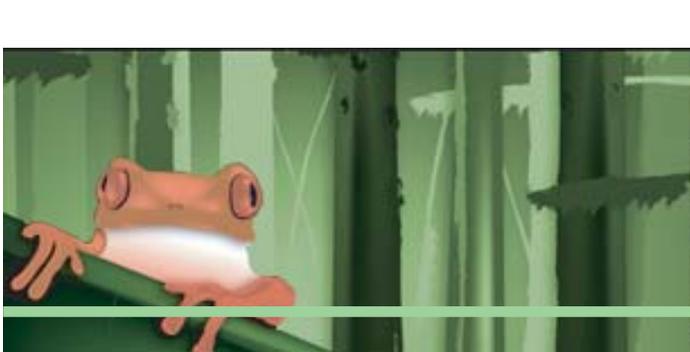
T I've never heard that word. What does it mean?

M It must be an island thing! Endemic animals are those that live in one place, and nowhere else in the world. We have lots of endemic species in Puerto Rico. There's a beautiful green kingfisher we call *San Pedrito*, and a woodpecker we call *carpintero*.

T Gee - you learn something new every day! I don't think we have any 'endemic' animals in our rain forest.

M We even have a parrot!!

T Oooh -- I've heard of parrots! They must be pretty, flying in green flocks and squawking over the forest.



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M They **are** beautiful! But the sad thing is that there are only 50 Puerto Rican parrots left in the wild. Because they only live in Puerto Rico, and their rain forest home is shrinking, they've been disappearing. We say they're 'endangered'. Humans are trying very hard to save them and their forest homes.

T Gee, the forest is home to so many plants and animals. Our rain forests also have an endangered species, a little sea bird called a marbled murrelet.

M Our rain forest's biggest animal is a 6-foot boa constrictor—a non-poisonous snake that climbs trees and squeezes its prey to death!

T Oh -- we have some pretty big critters here! Elk and cougars in the Pacific Northwest and brown bears and moose in Alaska!

M I'll tell my mate if I see them! Since we are on an island our animals are smaller. I have to watch out for two nasty introduced predators -- the mongoose and feral cats!! Frankly, I'd take a brown bear any day!!

T Oooh -- I'll have nightmares about those now. Have people lived in your rain forest for long?

M We're told of two cultures, long gone, that lived on the coastal edge of the forest.

T In the Olympic National Forest there are 13 tribes today! In Alaska, many people still live in the forest and get their food, shelter and livelihood there.

M In the past, our rain forest plants and trees have been used for foods, medicines, tools, and boat and house building.

T Ours still are! The tribes that live near these forests use them continually.

M Where I live, they no longer cut trees. Doesn't cutting trees spoil your rain forest?

T They cut only in small patches. In most places the forest grows back quickly. In some places humans actually regenerate the forest through planting and thinning.

M The Caribbean has a proposed rain forest wilderness area -- it will cover almost 1/3 of the National Forest! Do your forests have special places like that?

T Yep! Each National Forest has many areas that they call "Wilderness" -- places where humans leave little impact and nature runs wild. We sandpipers depend on how well humans care for the National Forests.

M Without the National Forest I would not know whether to go to Puerto Rico.

T This has been **sooo** wonderful Mancho. I have learned a lot about tropical rain forests. Are you staying?

M I'd love to Teeter - but I have to be getting home. I hope my mate is waiting for me. I have lots to tell her when I get back.

T Mancho, I wish you a good trip--go as you came, to the east and avoid dry country!

M Teeter, I hope we meet again; I have friends who would like to see your rain forest.

T You know, it's getting pretty crowded in southern California—perhaps I should try the Caribbean sometime!

M Nuestra casa es tu casa! (Our home is yours) "Ciao Amiga!"

