

Fourth Grade



- What Would Halloween be like Without the Ecuadorian Rainforest?
- Why Does the Cacao Tree Need a Tropical Rainforest to Grow?
- How is a Frog Able to Swim in the Trees?
- The Tropical Supermarket

Lesson 1

4

What Would Halloween be like Without the Ecuadorian Rainforest?

Ecuadorian Rainforest

Concept

Rainforests are home to an extraordinary number of plant types, including some of our favorite foods. Students will understand that food comes from faraway places and, as a result, has hidden costs associated with its production. Students will understand the relationship between farming practices and the environment that surrounds farms. Students will research sustainable practices of cocoa farming that help protect the quality of environments while producing essential ingredients for food products. Students will understand the work of conservation research teams who work to assure quality of life for humans and other species.

Essential Question

What would Halloween be like without the Ecuadorian rainforest?

Introduction

Informational Introduction For the Teacher

This lesson guides students in an exploration of sustainable agricultural practices directly related to the lives of people living in the rainforest. The connection is made through chocolate and cocoa farming. By engaging students in a study of the origins of chocolate, we will introduce the impact of increased need/want for chocolate on the environment where it is grown and species that surround those farms. The unit focuses specifically on the Chachi people, who protect their forest from destruction by sustainably harvesting cocoa. The Chachi participate with the Rainforest Alliance in developing sustainable farming techniques that conserve the rainforest while providing the local people with a means for earning an income.

Informational Introduction For the Student

Go into almost any backpack in your school and you will find empty chocolate wrappers or chocolate treats waiting to be eaten. Chocolate is a favorite candy of children in America and all over the world. Halloween is a holiday that increases the sale of chocolate. Where does all this chocolate come from? Who produces the ingredients for this treat? As the desire for more chocolate increase, farming of chocolate increase. What effect does chocolate farming have on the landscape, the people and the different animals that live around



those farms? What happens when trees are cut down in an area that is rich in biodiversity and replaced with farms that grow only cacao plants? How might these changes affect our lives so far away?

Step 1: Connect (the concept to prior knowledge)

Challenge

Students are given a number of typical Halloween treats and work in groups to determine which foods

Lesson 1

4

What Would Halloween be like Without the Ecuadorian Rainforest?

came from the rainforest (chocolate) and which came from temperate regions (apples, popcorn). Students examine ingredient lists on candy wrappers and brainstorm the origin of these food items. After creating two groups, students imagine what Halloween would be like without chocolate.

Materials

- chocolate candies
- temperate regional sweets (honey, popcorn, fruit)
- paper, pencils

Procedure

1. Teachers will need to gather enough chocolate candies and temperate regional sweet food (honey, popcorn, fruit) to divide among students.
2. Divide the class into small groups (3–4) and have them make columns on large sheets of paper headed by each candy item.
3. Reading the ingredients, have students list the ingredients under each candy type.
4. Have students make guesses about where these items originate.

Step 2: Literature/Discuss (give expert information book; ask questions)

Challenge

Students will discover the wide range of places that supply ingredients for simple candies.

Materials

- internet access
- charts from Step 1
- Ecuador slideshow (www.rainforest-alliance.org/pictures/choco-ecuador-kids)
- "From the Bean to the Bar: Chocolate Slideshow," available at www.rainforest-alliance.org/pictures/chocolate-from-bean-to-bar
- sweets from Step 1

Procedure

1. To learn more about food origins, have students do an Internet search on the ingredients of one chocolate and one non-chocolate candy.

2. Using the large charts with their guesses, students list the origin of the food ingredients next to the guesses made on their charts.
3. To learn more about chocolate food origins, students view a slideshow about Ecuador and how chocolate is grown and follow the production line from the bean to the chocolate bar.
4. Students note which foods come from tropical rainforest areas and revisit their original treats, reconsider their group choices, and identify which ones would not exist if rainforests disappeared.

Step 3A: Practice (math and learning centers)

Challenge

Students will compare and contrast the origins of the ingredients in their candy choices and calculate the expense of its travel to their desks. They will choose a candy that traveled the least number of miles and one that traveled the most.

Materials

- paper, pencils
- art supplies

Procedure

1. Students create maps on large sheets of paper illustrating the origins of their treats, marking whether they are local or exotic in origin, and highlighting the distance between their home and the farms.
2. Students calculate the total miles it took for their Halloween treats to get from the farms where they were grown to their bags.
3. Students multiply the number of miles by 0.38 to calculate a rough cost for this travel in dollars. Mark this expense on the maps.
4. Students compare and contrast the miles and the expense of each item.

Lesson 1

4

What Would Halloween be like Without the Ecuadorian Rainforest?

Step 3B: Create (performance tasks related to standard indicators)

Challenge

Students create a bag of treats from local areas and compare it to the typical Halloween treats they receive.

Materials

- poster-sized paper
- treats from tropical and local areas

Procedure

1. Students create a bag of treats that are designated as local in origin.
2. Students write a paragraph that describes the impact of the different treats on the environment. Students should refer to the distance and resulting expense to transport local treats and compare these amounts to the chocolate candies.
3. Students write a short story that relates the “life” of a chocolate candy, tracing its origins and production. Because chocolate usually doesn't grow in temperate zones, ask the children to comment on chocolate that is grown sustainably and chocolate that may damage the long-term health of a tropical place of origin.

4. Students create a new “origins” label for candy that states/relates the real cost of a candy that comes from a tropical location. Reference to sustainable production versus non-sustainable production should appear on the labels.

Step 4: Present (edit work/students orally present projects)

Challenge

Students invite other students and teachers to “trick-or-treat” in their classroom. Students explain the difference between the treats, highlighting the different plants growing in tropical rainforests and temperate areas.

Materials

- labels from Step 3B

Procedure

Students attach new labels to candy that comes from distant places so that visiting students can read the story of its production.

Lesson 1

Assessment Rubric

4

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

Assessment Guidelines	3=P (Proficient)	2=S (Satisfactory)	1 = NW (Needs Work)
Student shows understanding of the multiple ingredients and multiple origins of ingredients that are contained in candy.			
Student researches and identifies the origins of ingredients by temperate or tropical classifications.			
Student measures on maps the distance ingredients must travel to be processed into candy.			
Student creates a map that indicates the distances ingredients travel from their source through production and dissemination in markets.			
Student creates labels that delineate the production costs of candy, indicating the hidden costs and making them explicit.			
Student gives a two-minute oral presentation on the differences in cost between locally-grown foods and foods that travel long distances.			

Lesson 2

4

Why Does the Cacao Tree Need a Tropical Rainforest to Grow?

Ecuadorian Rainforest

Concept

Cacao plants have specific requirements to survive. Plants thrive naturally in different biomes. Growing conditions and requirements can be affected by human activity.

Essential Question

Why does the cacao tree need a tropical rainforest to grow?

Introduction

Informational Introduction For the Teacher

Biomes are large areas that have the same general climate conditions (extremes of temperature and amount of rainfall), plant life and animal life. Within biomes there are smaller bioregions that may have special characteristics, such as mountains, rivers, lakes, canyons and other physical features that can influence plant and animal life. Knowing these differences, one begins to understand the importance of keeping all biomes intact so that biodiversity is maintained.

Step 1: Connect (the concept to prior knowledge)

Challenge

Where does chocolate come from? Students describe the story of a chocolate bar, including harvesting, processing, packaging and shipping.

Materials

- research tools (internet, encyclopedia)

Procedure

- Students are introduced to a concept map before writing their stories. As a whole class, with the teacher recording on the board, students learn to brainstorm answers to the question: Where does a chocolate bar come from? Put the words "chocolate bar" in the center of a piece of paper and begin to record all the different responses to the question. Prompts might include:
 - origin of ingredients
 - production/manufacturing sites



- different sources of transportation
 - stores where it was bought
 - packaging and its origins, etc.
- Have each student write a short story from the perspective of the chocolate bar.

Resources might include: "From the Bean to the Bar: Chocolate Slideshow" (www.rainforest-alliance.org/pictures/chocolate-from-bean-to-bar): this presentation takes you on a delicious journey that follows the production of a chocolate bar from the bean to your supermarket; The Sweet Science of Chocolate (www.exploratorium.edu/chocolate): this website provides background information on the origins of chocolate, describes how to process cocoa beans and make chocolate bars and discusses the possible health benefits of eating chocolate;

Lesson 2

4

Why Does the Cacao Tree Need a Tropical Rainforest to Grow?

"About Cacao Trees, Pods and Seeds" (www.chocolate.org/choctree.html and home.howstuffworks.com/chocolate1.htm): these sites give an overview of what the cacao tree looks like and what part of the tree chocolate is derived from.

Step 2: Literature/Discuss (give expert information book; ask questions)

Challenge

What do cacao trees need to survive? Students will research cacao trees, focusing on the conditions necessary for growing the crop.

Materials

- story: *Romel's Rainforest Home*, a Rainforest Alliance story
- paper, pencils

Procedure

1. Read aloud *Romel's Rainforest Home*, a Rainforest Alliance original story about a Chachi boy who lives in the northwest corner of Ecuador. Discuss the different living conditions of the rainforest that Romel and his family experience.
2. Have students talk about the conditions that exist in Romel's country that are necessary for the growth of the cacao tree.
3. Have students write a short biome story that describes the conditions of the rainforest from the cacao tree's perspective. What does the world look like from the perspective of the cacao tree? What does the tree experience each day?

Step 3A: Practice (math and learning centers)

Challenge

Why can't we grow our own chocolate? Students compare the environmental conditions in their local region to the conditions in which cacao trees grow naturally. Students create charts and maps to organize their findings and highlight the environmental differences between temperate forests and tropical rainforests.

Materials

- large chart paper
- markers

Procedure

1. Teachers create a large chart for the front of the classroom that will include the aspects of different biomes. A biome is a group of ecosystems that have similar climate and plant species. Select two or three examples of different biomes to be filled in as examples for students. These might include arctic areas, desert, temperate zones and tropic zones. The chart should include:
 - climate
 - plant life
 - animal life
 - space for student observations
2. Discuss the differences in biomes around the world and how those biomes provide just the right conditions for certain kinds of plants and animals to survive. The chart should give an overview of the Earth's biomes.
3. Create a chart that can be filled in by students that describes their biome and more specifically, their bioregion. A bioregion is an area whose limits are naturally defined by features such as mountain ranges or ecosystems. This chart will be filled in by individual students and edited in small groups to further describe the place where they live. The chart should include climate, plant life, animal life and student observations.
4. Using the description from *Romel's Rainforest Home*, fill in a chart that contains what you know about the rainforest.

Step 3B: Create (performance tasks related to standard indicators)

Challenge

Students will compare and contrast the growing conditions of a temperate tree and the cacao tree.

Materials

- art supplies (construction paper, glue, markers, etc.)

Lesson 2

4

Why Does the Cacao Tree Need a Tropical Rainforest to Grow?

Procedure

1. Half of the students in the classroom should create 3D models of cacao trees, including chocolate pods, the surrounding forest and evidence of human and other animal activity. Labels of the growing conditions (climate, rain amounts, sun, pollinators, etc.) should be placed around the tree.
2. The other half of the classroom should create a 3D model of a local tree including the seed pods, surrounding plant life, evidence of animal and human activity as well as the growing conditions.

Materials

- 3D cacao tree models from Step 3B

Procedure

Students will display their models and write a short description of the differences among the temperate and tropical trees. This should include an observation about why each of the trees might thrive or fail in the other biome.

Step 4: Present (edit work/students orally present projects)

Challenge

Students present their models to their peers, explaining how their tree depends on the conditions created by the tropical rainforest or temperate forest biome. After, students combine their models to create a larger tropical rainforest or temperate forest.

Lesson 2

Assessment Rubric

4

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

Assessment Guidelines	3=P (Proficient)	2=S (Satisfactory)	1 = NW (Needs Work)
Student understands the origin of ingredients, production sites, different sources of transportation, store sites, packaging and raw materials, and can develop a concept map to represent these paths.			
Student shifts perspectives and writes a fictional or nonfiction story of the chocolate bar production, including all aspects from the concept map.			
Student researches and identifies all aspects necessary for the healthy production of cocoa beans and compiles these in a research paper.			
Student researches and charts the rainfall and temperature of rainforest conditions in Ecuador.			
Student works well with a team and creates a biome map of their local region and compares it to the Ecuadorian rainforest.			

Lesson 2

Assessment Rubric

4

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

Assessment Guidelines	3=P (Proficient)	2=S (Satisfactory)	1 = NW (Needs Work)
Student creates a 3D model that is labeled with the necessary growing conditions for cocoa, including aspects of soil, temperature, rainfall, pollination, ripening schedule and sunlight.			
Student effectively explains his/her model to peers.			

Lesson 3

4

How is a Frog Able to Swim in the Trees?

Ecuadorian Rainforest

Concept

Many plants and animals have developed unique systems of interdependence. These systems are essential for their survival.

Essential Question

How is a frog able to swim in the trees?

Step 1: Connect (the concept to prior knowledge)

Challenge

Students examine the different aspects of their day-to-day survival. For example, how do they adapt to temperature changes? What do they eat? What do they drink? How do they travel from place to place?

Materials

- Ecuador slideshow, available at the Resource Index

Procedure

- Each student draws a picture or lists the things that he/she most needs for survival in their particular region of the country. This can include physical conditions like food and types of shelter. It might also include emotional things like friends and safety. It should take into account the regional climate, rainfall, seasons, etc.
- Students watch the Ecuador slideshow from the Rainforest Alliance to get a feel for the bioregional characteristics of the tropical rainforest.
- Have students revise the list of their daily survival activities as if they were going to go to the rainforest to live. Would their needs be the same in the rainforest as in their current home?

Additional reference: The Secrets of the Tropical Rainforest: Hot and Humid and Teeming with Life by Jean Hamilton

Step 2: Literature/Discuss (give expert information book; ask questions)



Challenge

Students investigate and analyze the different ways that plants and animals are interdependent in different bioregions.

Materials

- book: *Plants and Planteaters* by Michael Chinery, or another book about bromeliads
- "The Poison-Arrow Frog and the Bromeliad," available at www.rainforest-alliance.org/curricula/poison-frog

Procedure

- Students select a plant or animal from their local bioregion and make a chart that lists all the things that animal or plant depends on in the environment (bees, water, soil, wind, etc.).
- Students learn about bromeliads and discuss the concept of interdependence and survival needs for

Lesson 3

4

How is a Frog Able to Swim in the Trees?

the bromeliad in the tropical biome and particular bioregion of the plant's location.

3. Teachers bring in different examples of bromeliads (purchased at a local nursery) or photographs of bromeliads if plants are not available. Students examine examples of bromeliads from a nursery. Students discuss the similarities and differences between the bromeliad and the plant species selected for observation from their own bioregion.
4. Read aloud *Plants and Planteaters* by Michael Chinery, or another book on bromeliads and tree frogs.

Step 3A: Practice (math and learning centers)

Challenge

Students decide what is necessary to their survival and what could be removed from their systems of survival without causing any harm.

Materials

- paper, pencils

Procedure

1. To better understand their level of dependence on certain systems in their home, students "take apart" their homes and identify the major systems involved.
2. Students analyze where the energy that is used to power these systems (hot water, air conditioning, heat, refrigeration, lighting, etc.) comes from.
3. Students discuss which "survival" systems they might do without and the reasons why.
4. Connect the concept to species survival. Refer to the example of the bromeliad and tree frog in Step 2. Ask students to consider if any part of the bromeliad/tree frog system can be removed without harming one of the organisms.

Step 3B: Create (performance tasks related to standard indicators)

Challenge

Students consider the phrase, "Chachi people consider the rainforest a living being."

Materials

- Ecuador slideshow, species profiles and story, available at the Resource Index

Procedure

1. Students research the Rainforest Alliance resources related to the Ecuadorian rainforest. Students discuss the different ways groups of people might think about land and its resources and consider different approaches to land use.
2. Students write an essay that explores the way they think about the place where they live. Students should address the way they think about aspects of the land. For example, what places do they consider usable? Which places would they consider special? What are consumable resources in the place where you live? What aspects of the land would you consider off-limits to development?

Step 4: Present (edit work/students orally present projects)

Challenge

Students consider the effects of removing certain plants or animals from their bioregion on their survival or quality of life.

Procedure

1. Students write a story that traces the effect of removing bees from their landscape. Or what would happen if all the trees were removed?
2. From Romel's point of view, students think about and discuss what might happen in the rainforest if the tall trees were removed? What if the land was cleared near a river?
3. Discuss with the class the idea of sustainable management of land, in which wood and other forest products can be harvested in a way that keeps the entire forest intact.
4. Have students consider managing the land so that essential characteristics are left intact while others are used for resources.
5. For more information and case studies of companies which are involved in sustainable land management, visit the Profiles in Sustainability page.

Lesson 3

Assessment Rubric

4

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

Assessment Guidelines	3=P (Proficient)	2=S (Satisfactory)	1 = NW (Needs Work)
Student identifies the conditions necessary for their survival in their local habitat and revises their list according to living within a rainforest habitat.			
Student researches the life conditions of a bromeliad and identifies the similarities and differences of this tropical plant to two plants from their local area.			
Student identifies the aspects of their living environment that are necessary as compared those that are desirable but unnecessary.			
Student writes an essay providing an explanation for the concept of the environment as a living being.			
Student writes a story tracing the removal of bees from their landscape the resulting changes to the land.			

Lesson 4

The Tropical Supermarket

4

Ecuadorian Rainforest

Concept

Everything has a source. When we consume products from the shelves of supermarkets, we are intricately connected to the ecosystem in which the natural resources originated and to the lives of those people who produced them.

Essential Question

Whose lives are we eating?

Step 1: Connect (the concept to prior knowledge)

Challenge

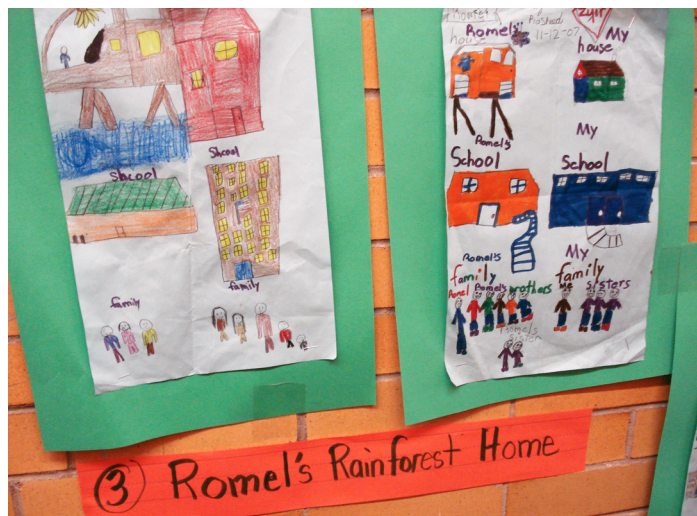
Students will understand that farmers organize their lives around growing, harvesting and delivering products to markets for other people to enjoy.

Materials

- locally-produced food, brought in by students
- local map

Procedure

1. Students identify and bring in to school a food that is produced locally. It may be a vegetable, fruit, honey, grain, meat, etc.
2. Using a map of the local area, locate where these foods are grown, how much land each takes to grow, how time each takes to grow and what kinds of ingredients are necessary for its production. For example, how much rainfall, temperature, fertilizer or feed, soil, etc.
3. Students study a local food producer (this will be different for each geographical area). Have the producer come into the classroom or have children visit the local farm/garden to discuss how much of their time and energy goes into producing the item of study.
4. Have students write a report of the food item and all the ingredients that go into its production, including the time of the farmer.



Step 2: Literature/Discuss (give expert information book; ask questions)

Challenge

Students will understand that many lives of people in Ecuador are part of their chocolate.

Materials

- story: *Romel's Rainforest Home*, a Rainforest Alliance story, available at www.rainforest-alliance.org/pictures/romels-rainforest-home

Procedure

1. Read *Romel's Rainforest Home*, a Rainforest Alliance story. Use the pictures in the story to compare and contrast the students and communities the students know to those that Romel knows.
2. Read the Chachi Community Profile, available from

Lesson 4

The Tropical Supermarket

4

the Resource Index, to share information with students about the Chachi and the social and environmental benefits of growing cocoa in the shade. Discuss:

- What food products are the same or different in Romel's community from what you find in your supermarket?
- How is Romel's life the same and/or different from yours?
- How is his home different?
- How is the school different?
- Do you do chores at home? Are they the same as Romel's?
- How much time do you think Romel spends helping produce cocoa beans?
- Did you learn anything new about cocoa beans after reading the story?

Step 3A: Practice (math and learning centers)

Challenge

Students will calculate the amount of space necessary to produce chocolate for their classroom.

Materials

- paper, pencils
- "Chocolate Trees" teacher page (as a reference)

Procedure

1. Research how much space is needed to grow 10, 20, 30 or 100 cacao plants.
2. How big will Romel's farm have to be to supply enough chocolate for your classroom?
3. How much space will it take to supply chocolate for 20 classrooms?
4. How many acres of Ecuadorian rainforest are left?
5. Romel's family grows cocoa in the shade of the rainforest. How many acres of rainforest will have to be cut down if a farmer decides not to use shade-grown cocoa techniques in order to triple the amount of chocolate being produced now?
6. How many acres would that leave for protected rainforest?

Step 3B: Create (performance tasks related to standard indicators)

Challenge

Students understand the difference between the impact of shade-grown cocoa beans and plantation cocoa production.

Procedure

1. Students research different types of growing practices for cocoa.
2. Students read the Profiles in Sustainability and Conservation and Development sites.
3. Students give 2–3 minute speeches pretending they are Romel's uncle, the president of San Salvador, to explain the benefits of growing cocoa beans using sustainable farming practices.

Step 4: Present (edit work/students orally present projects)

Challenge

Students describe the benefits of shade-grown/sustainable growing practices to manufacturing companies who buy cocoa beans from Ecuador.

Procedure

1. Students develop research papers that describe the process and benefits of sustainable practices in the rainforest of Ecuador, especially regarding cocoa beans.
2. Students create an alternative buying strategy for manufacturers that supports the use of sustainable growing techniques by showing how much of the rainforest can be saved and highlighting the value of preserving its integrity for the lives of plants, animals and Chachi communities.

Lesson 4

Assessment Rubric

4

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

Assessment Guidelines	3=P (Proficient)	2=S (Satisfactory)	1 = NW (Needs Work)
Student creates a portrait, through his/her report, of a local food through its production and understands the relationship of the grower to the process.			
Student compares and contrasts their daily lives to the lives of the Chachi Indians.			
Student calculates the amount of physical space necessary for the production of cocoa using two different farming techniques.			
Student researches and orally delivers information on sustainable cocoa farming.			
Papers will include a description of the sustainable farming techniques and its benefits to the rainforest environment and conservation.			

Fourth Grade



Supplementary Materials

- **Teacher Summary**
- **Resources**
- **National Standards**



Ecuador, like most Latin American countries, has experienced short and intense economic boosts based on intense exploitation of natural resources highly valued in the U.S. and Europe. As such, in the 70s it experienced an oil palm boom. Later the timber industry focused on the forests, and in the 90s, the shrimp industry replaced the mangrove ecosystems with pools to export cheap shrimp to the U.S. In many cases, foreign companies bought rights to community resources without fully explaining the long-term impacts to local residents. Only a very few communities were able to resist the "easy" money these sales represented.

Because of strong cultural associations with the forest, some groups have avoided clearing theirs to grow crops. They have organized themselves as cooperatives and associations, interested not only in production but in protecting the environment in which they live. One of these groups, the Chachi of northeastern Ecuador, in partnership with Conservación y Desarrollo (Conservation & Development, C&D)—a Rainforest Alliance partner—are seeking to protect their remaining coastal forests and mangroves from further development while raising the standard of living in this exceptionally poor community.

The Chocó forest, a lowland coastal rainforest, is an environment that is crucial for rainforest conservation, and sustains the coastal mangrove system—itsself unique and endangered. Mangroves are of great importance because they carry out many ecological functions (water filtration, land stabilization, protection from tropical storms) and serve as habitat and nursery grounds for many species of birds, fish and other wildlife. Mangroves are the great filtration systems of the coast, filtering

water from upstream farms and cities before dumping it into the ocean. The red mangrove (*Rhizophora mangle*), for example, is a medium-sized tree found in tidal areas and offshore islands. Leaves are elliptical and leathery with a shiny deep green color above and pale underside, and its flowers are yellow. But its most noticeable feature is the interlocking network of prop-roots that rise from the trunk and branches to shallowly penetrate the soil. Red mangroves help to ensure that sand is not washed away by the relentless tide. The black mangrove (*Avicennia germinans*) is characterized by medium-sized trees with oblong leaves often encrusted with salt, and a system of upward-growing pencil roots that radiate out from the tree.

Since 1992, Conservation & Development, as a non-governmental organization, has collaborated with government agencies and the private sector to promote sustainable development and rational uses of natural resources. With offices in Quito and Guayaquil, their primary objective is raising public consciousness about rational resource management. In 1997, with support from the United Kingdom's Earth Love Fund, C&D began to assist small coffee, cocoa and banana cooperatives to improve their systems of production and management by establishing fair trade systems, acquiring useful and timely technology, and complying with environmental guidelines for sustainability.

Their latest initiative, with the community of Las Esmeraldas, will focus on using these same techniques to improve the environment, quality and production of traditional shade cocoa forests. Las Esmeraldas is part of the Ecuadorian portion of the Chocó, a region of dense,



moist forests bordering the Pacific coast all the way to Panama. This ecosystem includes the Cayapas Mataje Mangrove Reserve, the Cotacachi Cayapas Ecological Reserve and the Awa Indigenous Reserve. The Chocó forests, which have already been reduced to six percent of their former extent, support an estimated 9,000 plant and animal species, including more than 800 bird species, 235 mammal species and 210 reptile species. But these forests are more than just home to wildlife. They are the supermarkets for local families. Small farmers use the forest as the source of fruits, medicines, firewood and fibers, helping them to survive. The Chachi of Las Esmeraldas have long recognized the importance of retaining intact forests from which they can harvest natural medicines, like pain-relievers, antibiotics and herbs. The forests provide families with mangos, papayas, bananas, citrus, guava and other vitamin-rich fruits. The mangroves provide protein for the families, in the form of shrimp, crab, fish and other aquatic wildlife. And, since these communities lack electricity, the forest provides their primary source of fuel—trees. When each of these things is harvested in a conscientious and coordinated manner, the forest is able to sustain both the Chachi and its abundant wildlife.

Unfortunately, not all of the neighboring communities are still as connected to the forests as the residents of Las Esmeraldas. All around them old-growth forest ecosystems are giving way to mono-crops. Oil palm, bananas and soybeans pose an increasingly large threat to the remaining lowland tropical rainforests. Along the coast, mangroves are being cleared for shrimp ponds. While shrimp are naturally found among the roots of the mangroves, commercial production requires the creation of

large pools where the shrimp are raised. These pools are major sources of pollution and disease, contaminating wild populations of shrimp.

Often, poor farmers are unable to think about their impact on the environment because of harsh economic realities. C&D realized that if they were going to ask farmers to care about wildlife, they would have to help them live better lives. In a partnership with government ministries, C&D worked with El Progreso (Progress), a producers association, providing an increase of 50 to 100 percent in crop production in two years. "Fair trade" is a way of helping farmers to remove the middlemen who often keep most of the profits from the sale of cocoa and coffee for international markets. And by helping farmers acquire simple technological innovations, like solar dryers, C&D was able to improve both productivity and quality on these farms. This allowed the farmers to begin to implement environmental safeguards that would have been too costly with their previous system. Similarly, certification standards for cocoa were developed and applied as part of the Rainforest Alliance and Conservation Agriculture Network program. The general principles include the protection of natural ecosystems and wildlife, soil and water conservation, minimal use of pesticides and fertilizers and the promotion of worker health and safety.

Ecuador's native cocoa, which grows under the forest canopy, is "aroma" cocoa with a special flavor that is highly prized in the chocolate industry. For most of the 20th century, Ecuador was considered the gold standard for cocoa production. Cocoa grown under the rainforest cover is very good habitat for wildlife, and in fact can be

as diverse in species as a healthy forest. Unfortunately, in the 1980s, farmers began to transform their forested farms into full-sun high-input systems, losing much of their quality in the process. Prices plummeted and farmers have still not recovered.

A major part of C&D's initial effort was to reestablish a system for quality in Ecuador to attract major chocolate buyers. In their new processing centers, C&D staff trained cocoa classifiers to separate the beans by quality, making them more valuable to buyers. C&D not only provides current market information to farmers so they

are able to get fair prices, but has established revolving funds so that farmers can get credit to buy supplies, therefore quickly paying back their loans and gaining control over their finances. This has helped to end the cycle of debt that is so prevalent among small farmers the world over.

With help from C&D, the farmers and families of Las Esmeraldas are rekindling their relationship with the forest, while teaching their neighbors that being good stewards can be profitable.



1



2



3

Resource Index

Check out this page for additional supplemental materials that complement these dynamic units and to access many of the resources listed below.

www.rainforest-alliance.org/curricula/resources

Slideshow (1)

The Curriculum site provides a slideshow and script about Ecuador that includes background information about the animals, people and landscape of this region. The slideshow can be download for viewing in the classroom, printed out and read as a story, or viewed online with the students.

www.rainforest-alliance.org/pictures/choco-ecuador-kids

From the Bean to the Bar: Chocolate Slideshow

Where does chocolate come from? Take a journey that follows the production of a chocolate bar from the bean to your supermarket. The slideshow can be downloaded for viewing in the classroom, printed out and read as a story, or viewed online with the students.

www.rainforest-alliance.org/pictures/chocolate-from-bean-to-bar

Unit-Specific Story (2)

The Rainforest Alliance has developed an original story with this unit, *Romel's Rainforest Home*, which is available in English, Spanish and Portuguese. The story is available to download and print or can be viewed onscreen.

www.rainforest-alliance.org/pictures/romels-rainforest-home

Species Profiles (3)

The species profiles include photos, habitat, foraging behavior, group relationships, threats and many more facts.

- bromeliad

- ocelot
- great curassow
- capuchin monkey
- three-toed sloth

www.rainforest-alliance.org/species

Rainforest Poster

Download and print out this colorful two-page poster, which is available for you to use in explaining the layers of the rainforest, its products and the environmental threats facing many rainforests around the world.

Inside the Canopy – structure and species of the rainforest

www.rainforest-alliance.org/publications/inside-the-rainforest-canopy

The Sweet Science of Chocolate

This website provides background information on the origins of chocolate, describes how to process cocoa beans and make chocolate bars and discusses the possible health benefits of eating chocolate.

www.exploratorium.edu/chocolate

Hershey's Factory Tour

This website takes you through the path that Hershey's chocolate takes from the forest to the factory.

www.thehersheycompany.com/about-hershey/our-story/making-our-chocolate.aspx

About Cacao Trees, Pods and Seeds

These sites give an overview of what the cacao tree looks like and what part of the tree chocolate is derived from.

www.chocolate.org/choctree.html
recipes.howstuffworks.com/chocolate1.htm

Rainforest Products

Check out a summary of products found in our homes and supermarkets that either originated in tropical

forests or are currently produced there.

www.rainforest-alliance.org/articles/tropical-forests-in-our-daily-lives

Conservación y Desarrollo (Conservation & Development)

Check out this online resource for more information about how Conservación y Desarrollo, the Rainforest Alliance's partner group in Ecuador, is helping the Chachi protect their precious ecosystems.

www.ccd.ec

Certificate of Accomplishment

Print out colorful rainforest certificates for your students to commemorate their completion of these units.

www.rainforest-alliance.org/curricula/certificate-of-participation

Writing

Standard 4

Level 2: Grade 3–5

- Gathers and uses information for research purposes (encyclopedias, dictionaries, electronic media)
- Uses multiple representations of information (maps, charts, diagrams, tables) to find information for research topics.
- Uses strategies to compile information into written reports or summaries

Reading

Standard 6

Level 2: Grade 3–5

- Uses reading skills and strategies to understand and interpret a variety of literacy texts
- Makes connections between characters or simple events in a literary work and people or events in his or her own life

Standard 7

Level 2: Grade 3–5

- Uses reading skills and strategies to understand a variety of informational texts
- Summarizes and paraphrases information in texts
- Uses prior knowledge and experience to understand and respond to new information

Listening and Speaking

Standard 8

Level 2: Grade 3–5

- Contributes to group discussions
- Asks questions in class
- Responds to questions and comments
- Listens to classmates and adults
- Makes basic oral presentations to class
- Organizes ideas for oral presentations

Thinking and Reasoning

Standard 1

Level 2: Grade 3–5

- Uses facts from books, articles and databases to support an argument
- Recognizes when a comparison is not fair because important characteristics are not the same

Standard 3

Level 2: Grade 3–5

- Makes comparisons between countries in terms of relatively concrete characteristics (size, population, products)

Standard 5

Level 2: Grade 3–5

- Identifies issues and problems in the school or community that one might help solve

Mathematics

Standard 1

Level 2: Grade 3–5

- Uses a variety of strategies to understand problem situations
- Represents problems situations in a variety of forms

Standard 3

Level 2: Grade 3–5

- Solves real-world problems involving number operations

Standard 4

Level 2: Grade 3–5

- Understands the basic measures of perimeter, area, volume and circumference
- Selects and uses appropriate tools for given measurement situations
- Understands relationships between measures
- Uses specific strategies to estimate quantities and measurements

Standard 9

Level 2: Grade 3–5

- Understands that mathematical ideas and concepts can be represented concretely, graphically and symbolically

Life Sciences

Standard 1

Level 2: Grade 3–5

- Understands atmospheric processes and the water cycle

Standard 4

Level 2: Grade 3–5

- Knows that the characteristics of an organism can be described in terms of a combination of traits; some traits are inherited and others result from interactions with the environment

Standard 5

Level 2: Grade 3–5

- Knows that living organisms have distinct structures and body systems that serve specific functions in growth, survival and reproduction (body structures for walking, flying or swimming)

Standard 6

Level 2: Grade 3–5

- Knows the organization of simple food chains and food webs
- Knows the transfer of energy
- Knows that changes in the environment can have different effects on different organisms
- Knows that all organisms (including humans) cause changes in their environments and these changes can be beneficial or detrimental

Standard 7

Level 2: Grade 3–5

- Understands the concept of extinction and its importance in biological evolution
- Knows ways that living things can be classified

Standard 9

Level 2: Grade 3–5

- Understands the sources and properties of energy

Standard 11

Level 2: Grade 3–5

- Knows that good scientific explanations are based on evidence (observations) and scientific knowledge
- Knows that scientist make the results of their investigations public

Standard 12

Level 2: Grade 3–5

- Plans and conducts simple investigations
- Uses appropriate tools and simple equipment

Standard 13

Level 2: Grade 3–5

- Knows that people of all ages, background and groups have made contributions to science and technology throughout history