

# Third Grade

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- **Dependence and Interdependence**
- **Surviving in our Ecosystems**
- **If the Forests Could Talk**
- **Rainforests of Ghana**

# Lesson 1

## Dependence and Interdependence

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### Rainforests of Ghana

#### Concept

In every environment, plants and animals depend on each other for food and shelter, protection and community. The survival of different species depends on the health of ecological systems that may be near or far away. The complex relationships within one ecosystem can be hurt when one of the components is threatened or one of the species becomes extinct.

#### Essential Question

Why can't one live without the other?

#### 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 on communities in Ghana that protect their forest from destruction by sustainably harvesting cocoa. These communities 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. Where does all this chocolate come from? Who produces the ingredients for this treat? As the desire for more chocolate increases, farming of chocolate increases. 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 begin to explore what happens when one of the essential players in a dynamic ecological process disappears.

##### Materials

- paper/pencils

##### Procedure

1. Have students list all the different species that are referred to as pets that they interact with or observe each day.



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2. Talk about the relationship that each of these animals has with the human counterpart, paying close attention to reciprocal relationships and dependency (a dog, cat, bird or fish usually depends on a human for their food, water, shelter, health care and companionship).
3. Discuss what might happen to those pets if your family didn't come home for a week. Where would they find food? Water? Would they be lonely?
4. Discuss how we have created these "ecosystems" for our pets and if not maintained, the pet would lack the necessary things needed for survival.  
Note: An ecosystem is made up of living organisms and their habitats (it includes plants, animals, microorganisms, soil, rocks, minerals, water sources and the atmosphere).
5. Ask the students to list the things they need to survive each day.
6. In small groups have students create a diagram (concept map) that describes where each of the things they need for survival comes from. This is called developing a concept map. Put the key word "food" in the middle of a sheet of paper. The kinds of food they commonly eat would make up the second concentric circle around the key word. Then have students brainstorm a list of the places the foods come from by extending outward as new ideas emerge. For example, apples might be the first word on the second level out. Extending out from the word apple, the children might list the different stores they go to for apples. Then in a concentric circle, list where in the store it originates (ex: Apple – Hannaford – Fruit Section – California).
7. When students have exhausted their lists, ask them to imagine trucks disappearing from the scene. What would change? Would their favorite food still be available in the store?
8. Imagine that apple trees do not produce fruit one year. What might disappear from the stores? What if all the cows went on strike? What might not be in the store if cows refused to cooperate with humans? Have students read the labels on their food for one night and list all the food that is dependent on cows.

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

#### Challenge

Students consider how a missing part in an ecological system might upset the balance that is necessary for elements of that system to live.

#### Materials

- art supplies (crayons, stickers/labels)
- book: *The Great Kapok Tree* by Lynne Cherry
- large world map
- smaller map of Brazil

#### Procedure

1. Using a large map, locate the Brazilian rainforest. Move from a large global map to show where the children live to a smaller map of Brazil.
2. Explain that a story called *The Great Kapok Tree* takes place in Brazilian Amazon. Relay facts about the kapok tree that are listed in the species profile.
3. Read Lynne Cherry's *The Great Kapok Tree* aloud and discuss the story with the children.
4. On chart paper, list all the rainforest inhabitants that are mentioned in the book.
5. Discuss how the survival of rainforest plants and animals are interdependent. Identify each inhabitant from the story on a separate sticker/label, so that each student in the class can wear a sticker to eventually act out a part. Inhabitants mentioned in the story include the following: boa constrictor, bee, flower, tree, monkey, soil, toucan, macaw, cock-of-the-rock, tree frog, jaguar, birds, four tree porcupines, several anteaters, a three-toed sloth and a Yanomami child.
6. The child who is acting out the role of the kapok tree will stand in the middle of a circle holding one piece of yarn for each child in class. Each piece should be about six feet long.
7. Reread the story aloud. Whenever a creature in the book's name is mentioned, have the kapok tree child toss one end of a length of yarn to the animal mentioned, while the kapok tree continues to hold onto the other end of each piece of yarn. The yarn symbolizes the tie that these two inhabitants have and how they depend on each other for survival.

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8. At the end of the story, take time to look at the web of interdependence that was created. Have the kapok tree lightly tug on his collection of yarn. Ask the other children to give a thumbs-up if they feel a tug on the yarn. Those that did (which would be everyone) can say thank you to the kapok tree for helping them to survive.
  9. Now, explain that not all people respect the importance of a single tree. Pretend to chop down the kapok tree. The kapok tree falls to the ground. Ask all the other characters to also drop to the ground if their yarn was pulled when the kapok tree fell.
  10. Discuss the impact of cutting down one kapok tree on other plants and animals of the rainforest.
4. After two weeks, students will report on the conditions in their different terrariums. Discuss:
    - How did rainfall affect ecosystem's health?
    - What would be affected in your local neighborhood if no rain fell for a year?
    - What if it rained for a month, what things would change in your area?
  5. Math Task: Using an encyclopedia or the Internet, look up the average rainfall in your local area.
    - List the rainfall for different seasons of the year.
    - Look up the average rainfall for different seasons in the Ghanaian rainforest and compare them.
    - How much more rain falls in the rainforest than in your local area?
    - What do you think would happen to your local area if the rainfall was like that in the Ghanaian rainforest?

### Step 3A: Practice (math and learning centers)

#### Challenge

Students will isolate one factor in an ecosystem and determine how much the loss of that one factor will impact the full ecological system and, as a result, the different species in that ecosystem.

#### Materials

- instructions for making a terrarium ([www.rainforest-alliance.org/kids/terrarium](http://www.rainforest-alliance.org/kids/terrarium))
- large soda bottles (one per group of three or four)
- scissors
- potting soil or soil from outside
- plant seeds or seedlings
- water

#### Procedure

1. In groups of three or four, students will use soil and plants from the local area to design terrariums that represent local ecosystems. Each terrarium will have the same amount of soil and the same plants. The closed terrarium will have plants and soil and water.
2. Students are directed to use water as the determining factor for survival of the plants in their terrarium.
3. Each group will give their terrarium different amounts of water over a two-week period. Some will receive only a teaspoon full of water each, some five teaspoons each day, some a cup of water and some none at all.

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

#### Challenge

Students will be able to identify all the components that are necessary for their survival in their current location.

#### Materials

- poster-sized paper
- markers

#### Procedure

1. Students will create a poster that puts their silhouette in the center of a piece of paper. In spokes that surround the silhouette, students name all of the things that they *need* to survive.
2. With a different-colored marker, have students list all the things they *want* to make their lives comfortable.
3. Putting the posters up in a gallery around the room, students review all the posters and list questions that address the difference between needs and wants.
4. Students will ask questions that address the difference between what people need and what they want to be comfortable. Have students outline the needs in green and their wants in red after the

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discussion if they change in classification after the discussion.

5. In a discussion led by the teacher, students will address what could be crossed off the list and what is necessary to keep for their individual survival on each of the posters. Discuss:
  - What might happen if one of the basic needs is threatened or disappears?
  - How might students react?
  - Would they be able to stay in the place where they live if this component disappeared?
  - How might they adapt?

### Materials

- Needs/Wants poster from Step 3B
- markers

### Procedure

1. Students stand in front of their posters of survival needs and cross off the "wants," explaining why these are not necessary and expressing the need for certain components and why.
2. Students might do this activity in a short written paragraph instead of a public announcement.

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

#### Challenge

Students will present the difference between necessary components of their lives and the ones that are wanted but not necessary for survival.

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## Assessment Rubric

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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 list of survival needs that include examples of nutrition, shelter, water, relationships and safety, and compares their "needs" to their "wants."			
Student can trace, through a concept map, the source/origin of two different needs through raw material, production, dissemination and consumption.			
Student constructs a likeness of a local microclimate and region within a terrarium.			
Student constructs a graph that charts the rainfall in the local ecosystem and compares the results of different amounts of water on survival of microclimates.			

## Lesson 2

# Surviving in our Ecosystems

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### Rainforests of Ghana

#### Concept

Each species has different survival needs. The balance of each ecosystem is a delicate web of interdependence and every species of plant or animal is affected by changes in that balance. Knowing how we as humans are the same and/or different than other species informs us of our role in the larger ecosystem.

#### Essential Question

What do we need to live in the trees?

#### Step 1: Connect (the concept to prior knowledge)

##### Challenge

Students identify the characteristics of a frog and compare them to a human child.

##### Materials

- photos of frogs
- sketch of frog in its environment
- sketch of human in its environment

##### Procedure

###### What makes a frog a frog?

1. Show children pictures of different frog species and discuss the characteristics all frogs share: moist skin, wide mouth, large eyes and nostrils on top of the head, eardrums on sides of the head, long hind legs and long toes.
2. In a discussion led by the teacher, have children talk about how the frog's shape helps it survive. For example, a frog's strong hind legs help it jump, swim or climb to escape predators or catch prey. Eyes and nostrils on top of the head enable a frog to stay underwater and still breathe and see.
3. In a teacher-led discussion, have children talk about the environment that a frog needs to survive. For example, a frog will need moisture to keep its skin from drying out. Frogs need camouflage to hide from predators. Frogs need to be near a food source or be able to draw insects to their environment so as to eat without endangering themselves.



4. Hand out an outline of a frog (or a picture) to small groups of students. Have each group list the characteristics of frogs and the elements of their environment on the paper.

###### What makes a human different from a frog?

1. Put a picture of a human child next to the picture of a tropical tree frog.
2. Discuss the ways that human children are the same or different than the tree frog. For example:
  - Humans are mammals, not amphibians.
  - Human skin adapts to a wider range of moisture but won't last long underwater.
  - Humans have eyes and a nose that is designed for their upright posture and dry environment.

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# Surviving in our Ecosystems

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3. Give students a worksheet with a human figure on one side and a tree frog on the other. Have students describe the best environment for a human to live in and the best environment for a frog to live in based on their physical characteristics.
4. Have students draw a house that a frog might live in.

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

#### Challenge

Students identify a wide range of homes appropriate for a diversity of frogs in both tropical and temperate locations.

#### Materials

- book: *Flashy Fantastic Rainforest Frogs* by Dorothy Hinshaw Patent and Kendahl Jan Jubb
- book: *Frogs: A Chorus of Colors* by John L. Behler and Deborah A. Behler
- paper, art supplies

#### Procedure

1. Read aloud *Flashy Fantastic Rainforest Frogs* by Dorothy Hinshaw Patent and Kendahl Jan Jubb for an in-depth look at various species of rainforest frogs, discussing their habits, life cycle and needs for survival.
2. Compare the home of the red-eyed tree frog and other tropical frogs with the frogs from temperate regions that are described in *Frogs: A Chorus of Colors* by John L. Behler and Deborah A. Behler.
3. Have students draw pictures or cut out/paste pictures of temperate and rainforest frogs on a sheet of paper. Have students identify the differences between the frogs and describe how their homes might be different based on the reading.

*Additional references: Frogs: Inside their Remarkable World by Ellin Belts; Tropical Rainforest: A Golden Guide from St. Martin's Press by Allen Young*

### Step 3A: Practice (math and learning centers)

#### Challenge

Students will learn the interrelationship between bromeliads, tree frogs and rainfall in tropical rainforests.

#### Materials

- Internet access or encyclopedia
- paper, pencils
- bromeliad activity ([www.rainforest-alliance.org/curricula/bromeliad-activity](http://www.rainforest-alliance.org/curricula/bromeliad-activity))
- bromeliad pattern ([www.rainforest-alliance.org/kids/paper-bromeliad](http://www.rainforest-alliance.org/kids/paper-bromeliad))

#### Procedure

1. Using the Web ([weather.com](http://weather.com)) or an encyclopedia, look up the average rainfall in the rainforest of Ghana, as well as the temperate region that children live in.
2. Make a graph reflecting the rainfall. Find the difference between the amounts of rainfall in each country.
3. Find out how much rain must fall in a region for it to be considered tropical or temperate.
4. Calculate how much more rain would have to fall in your area for it to be considered a rainforest.
5. Using the technology resources from the Rainforest Alliance, find links to activities that define the interrelationship between bromeliads and tree frogs: "Bromeliad: A Plant with its own Water Tank ([www.rainforest-alliance.org/curricula/bromeliad-activity](http://www.rainforest-alliance.org/curricula/bromeliad-activity))."
6. Have students research the characteristics of a bromeliad and identify which tree frogs use this as a home.
7. Using the Paper Bromeliad Pattern from the bromeliad activity, have children make their own model of a bromeliad and describe how this is an appropriate home for a tree frog.
8. Children will describe the micro-system of a bromeliad, identifying at least four essential characteristics of this home.

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

#### Challenge

Students will compare and contrast the characteristics of a treehouse for human children in the rainforest with the bromeliad "treehouse" of the frog.



## Lesson 2

# Surviving in our Ecosystems

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### Materials

- book: *How to Build Treehouses, Huts and Forts* by Stiles Designs
- book: *Treehouses You can Actually Build* by Stiles Designs
- book: *Afternoon on the Amazon* by Mary Pope Osbourne
- paper, pencils

### Procedure

1. Discuss the design of a treehouse that might be built in the children's home environment.
2. Read and show *How to Build Treehouses, Huts and Forts* and *Treehouses You can Actually Build* by Stiles Designs.
3. Read aloud the Magic Tree House book *Afternoon on the Amazon* by Mary Pope Osbourne.
4. Have students draw a treehouse that they would like to build using a tree from their local environment.
5. Students each write a short adventure story that uses the local treehouse as a magic doorway that transports them to a treehouse in the rainforest.
6. Draw the treehouse in the rainforest that students are transported to, describing the issues of:
  - where to build
  - finding lumber
  - safety
  - rope bridge
  - emergency escape hatch
  - trolleys, pulleys and swings
  - railings and steps
  - ropes and ladders
  - tree movement
  - tree injury
7. Compare and contrast the rainforest treehouse that is suited for human children with the bromeliad "treehouse" that is suited for the tropical tree frog. Discuss:
  - How would the treehouse in the rainforest be different from the one in your neighborhood?
  - What kind of tree would it be in?
  - What kinds of animals, insects, weather and plants would they encounter from their rainforest treehouse?
  - How is your tropical treehouse different than that of the tree frog?

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

### Challenge

Students describe the survival needs of the tropical tree frog and how the bromeliad provides these needs. Students describe how their rainforest treehouse is different than the bromeliad home and how it provides survival needs for humans.

### Materials

- treehouse drawings from Step 3B

### Procedure

In a gallery display, present the different models of treehouses that have been created by students.

## Lesson 2

### Assessment Rubric

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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 depicts four biological characteristics of each species, tree frogs and humans, comparing and contrasting the reasons for such characteristics based on environmental conditions.			
Student represents the different environments that exist for temperate and tropical frog species through a drawing.			
Student researches and charts the rainfall and resulting environmental conditions in temperate and tropical environments.			
Student constructs a paper bromeliad from the provided model.			
Student constructs or represents pictorially a treehouse for humans suited for both a temperate and tropical environment and compares them to the frog shelters.			

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# Lesson 3

## If the Forests Could Talk

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- "From the Bean to the Bar: Chocolate Slideshow," available at [www.rainforest-alliance.org/pictures/chocolate-from-bean-to-bar](http://www.rainforest-alliance.org/pictures/chocolate-from-bean-to-bar)
- "Track it Back: Chocolate," available in the Rainforest Alliance Kids' Corner ([www.rainforest-alliance.org/interactives/trackitback](http://www.rainforest-alliance.org/interactives/trackitback))
- "Chocolate Trees" teacher page ([www.rainforest-alliance.org/curricula/all-about-chocolate-trees](http://www.rainforest-alliance.org/curricula/all-about-chocolate-trees))
- paper, pencils

### Procedure

1. Read aloud *The Story of Chocolate*.
2. Read the "From the Bean to the Bar: Chocolate Slideshow," available from the Resource Index, to take a delicious journey that follows the production of a chocolate bar from the bean to your supermarket.
3. For a technology connection, play "Track it Back" and have students place the steps of production in the correct order to discover the journey that chocolate takes to get to your supermarket.
4. Discuss with students the interaction of different elements in the rainforest environment and how these might impact the growth and productivity of cacao plants.
5. Have students research the growth cycle and conditions needed for a cacao plant to grow.
6. Draw a diagram of the cocoa growth cycle and conditions answering the questions:
  - How much water does a plant need in a year?
  - What kind of soil is best?
  - Do plants grow better in shade or in full sun?
  - What pollinators come to cacao plants?
  - What is missing from cocoa farms that occur naturally in the forest?
  - What birds use the cacao plant for shelter or food?

*See "Chocolate Trees" teacher page for references regarding these questions.*

### Step 3A: Practice (math and learning centers)

#### Challenge

Students calculate the ratio of chocolate to the productivity of cacao plants and their farmers.

### Materials

- research tools (Internet, encyclopedia)
- "Chocolate Trees" teacher page (as a reference)
- paper, pencils

### Procedure

Students research how many cocoa beans are produced on one cacao plant.

- Calculate how many beans are necessary for one pound of chocolate.
- Calculate how many cacao plants are necessary to supply the chocolate consumed by one student over a week, a month, and a year (students will have to keep a record on their chocolate consumption and estimate the weight in pounds).
- If a cacao plant takes up  $x$  amount of room, how big would a field of cacao plants have to be to supply chocolate to your class?
- Estimate how heavy a bag that carries the number of cocoa beans for one pound of chocolate is.
- Figure out how many pounds a worker in a cocoa field would have to carry in order to supply a pound of chocolate for a student.

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

#### Challenge

Students will understand how their supermarket habits impact the communities in Ghana.

### Materials

- paper
- art supplies

### Procedure

1. Students will create a mock store that sells chocolate of different kinds.
2. Each student in the class will design a package for their chocolate product that shows the amount/weight of the chocolate and lists all the "ingredients" necessary to grow chocolate, or cocoa beans (ex: what insects are necessary, how much rainfall, how much land is required for the number of plants to produce the right amount of beans, etc.).
3. Each label will be illustrated with a picture that shows (either with a map or a drawing) where the cacao plant grows and how it is related to the rainforest in Ghana.



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# If the Forests Could Talk

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4. Students will draw posters for their "store" that advertise shade-grown versus full sun/plantation cocoa and list at the bottom the benefits and problems with each approach to farming.

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

#### **Challenge**

Students have a mock open house for their store and advertise their "products" to other students.

#### **Materials**

- chocolate labels from Step 3B

#### **Procedure**

1. Students organize their packaging by setting up a mock chocolate store for other students to visit.
2. Students write and present commercials/advertisements for their products that they present orally/dramatically in front of the class.

## Lesson 3

### Assessment Rubric

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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 demonstrates an understanding, through his/her poster, of the relationship between local pollinators and plant reproduction and the effects of shrinking insect populations.			
Student draws a diagram of the cacao plant growth cycle that shows the interrelationship among different elements of the rainforest environment on the health and productivity of cacao plants.			
Student calculates the ratio of cocoa beans to the production of locally-consumed chocolate candy.			
Student displays knowledge of "full cost" elements in the production of consumable products like chocolate (raw materials, processing, transportation, marketing) through the created product labels.			
Student creates an oral presentation that illustrates the "full cost" of products consumed on a daily basis.			

# Lesson 4

## Rainforests of Ghana

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### Rainforests of Ghana

#### Concept

By using different methods of growing and harvesting rainforest foods, we can sustain the forest's biodiversity.

#### Essential Question

How can we keep our forests intact and have our chocolate too?

#### Step 1: Connect (the concept to prior knowledge)

##### Challenge

Students consider the different perspectives on the use of resources that are available from different bioregions.

##### Materials

- magazine/newspaper articles about local development projects

##### Procedure

1. Students consider the different uses of a tree. Brainstorm the different ways that a tree might represent value among students and among different interest groups like loggers, farmers, bee keepers and fruit farmers.
2. Teachers prepare students by identifying a local development project that students can relate to. Provide magazine/newspaper articles and/or have local decision-makers communicate the issue with students.
3. Teachers will design a simulation that will have students address the different interests of community members in a particular piece of land. A challenge from the local community is selected by students or by the teacher as a focus for discussion. It might be the future of an empty lot or a farmer's field that is for sale. Stakeholders are interested in using some of the local land for their own purposes. Students are to decide on a solution to which stakeholders are entitled to use the local piece of land. Explain that a stakeholder is a person or group that has a direct interest or stake in a matter.
4. Help students identify the different interest groups and create a personal profile of a representative from each group of stakeholders. Include a representative from the plant and animals present in the bioregion.
5. Students take the roles of different stakeholders and have a debate about their right to use this land for their own purpose.
6. A panel of students who listen to debate and sit in decision-making roles consider the testimony and decide on a land-use plan.



# Lesson 4

## Rainforests of Ghana

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

#### Challenge

Students consider land-use decisions from another perspective, that of rainforest inhabitants.

#### Materials

- Ghana slideshow ([www.rainforest-alliance.org/pictures/ghana-cocoa](http://www.rainforest-alliance.org/pictures/ghana-cocoa))
- Ghana slideshow script
- Teacher Summary

#### Procedure

1. Use the Rainforest Alliance Ghana slideshow to introduce students to Ghana.
2. Students compare and contrast their communities and land-use issues with the communities in Ghana. Students identify the problems present and think about all of the stakeholders involved.
3. Students research Ghana's geography and focus on the different uses of the Ghanaian rainforest. Use the Profiles in Sustainability and "Where We Work" as resources for the discussion.
4. Students research land-use issues and trends in tropical rainforests of Ghana.
5. Have the students enact a role-playing sequence similar to that in Step 1 with a focus on the rainforest of Ghana. Include a chocolate producer and consumer in the process. Questions for discussion:
  - Who is involved in growing chocolate in Ghana?
  - What are the different ways to grow chocolate?
  - Who are the stakeholders?

### Step 3A: Practice (math and learning centers)

#### Challenge

Students integrate their knowledge of chocolate production with the effects on the biodiversity and ecological integrity of the rainforest.

#### Materials

- research tools (Internet, encyclopedia)
- paper, pencils

#### Procedure

1. To begin to understand the demand for chocolate,

students create a survey to discover how much chocolate they eat at home, in their class and in their school.

2. Students research chocolate demand and land-use issues and trends in Ghana's tropical rainforests.
3. Students create word problems to teach others about how much chocolate people consume and how it affects tropical rainforests.

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

#### Challenge

Students shift their perspective from taking care of their own bioregion to taking care of the rainforest.

#### Materials

- paper
- art supplies

#### Procedure

1. Students create scenarios that ensure that the people of Ghana can continue harvesting from the rainforest, cacao trees are made available for chocolate exports and the forest is conserved.
2. Challenge students to create comic strip stories to explain their scenarios.

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

#### Challenge

Students use their knowledge to take action to help conserve the rainforest.

#### Materials

- comic strips from Step 3B

#### Procedure

Students send their comic strips with letters to the Rainforest Alliance to share their knowledge about Ghana's rainforest and their concern for the people of Ghana. The comic strips might include suggestions about how different chocolate producers/manufacturers can ensure we can keep our forests intact and have our chocolate too.



## Lesson 4

### Assessment Rubric

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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 researches, identifies and creates roles for the different stakeholders in a local land-use debate accurately and objectively.			
Student researches and creates roles for a land-use debate within the rainforest of Ghana that includes cocoa farmers.			
Student participates in a role-play that includes a land-use debate between sustainable practice in cocoa farming and plantation/full-sun farmers and other stakeholders.			
Student surveys his/her peers and parents for an estimate of chocolate consumption and understands its impact on tropical rainforests.			
Student writes letter to chocolate candy producers that gives facts about the impact of chocolate production on the rainforest of Ghana and asks them to use sustainable practices.			

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## Supplementary Materials

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





The forested areas of Ghana represent approximately 40 percent of the country's land. Ghana has a variety of different forest types, which are classified based on ecological conditions such as temperature and rainfall. The country boasts biologically diverse tropical rainforests as well as savanna forests.

However, forest loss in Ghana is one of the highest in Africa with more than 90 percent of the rainforest being destroyed in the past 50 years. Activities such as slash-and-burn agriculture, overcutting of firewood, and mining have greatly impacted the forest.

Most of Ghana's remaining forests are located in the Western Region and unfortunately, this is where most deforestation is currently taking place. The reasons are that most of the traditional cocoa farmers—mainly of the Okuapem, Asante, Bono, and Ewe tribes of the Eastern, Ashanti and Brong Ahafo and Volta regions, respectively—have now migrated and concentrated their farming activities in this region, after almost exhausting the conversion of most off-reserve areas in their native regions. However, the soil and other conditions in most parts of the Western Region are not favorable for achieving a high yield of cacao per hectare, which forces farmers to convert more land in an effort to ensure high annual production. Similarly, illegal logging and chain-saw lumbering activities which started in the forests of the Eastern, Ashanti and Central regions are also being intensified in the Western Region.

The 1994 forestry policy and law signaled a departure from past policy, and it was hoped that this would usher in a new era of more sustainable management of

Ghana's forest resources. The law codified collaborative forest management and community-based natural resource management, but also separated tenure rights with ownership of trees reverting to the state and land ownership and rights to use the land retained under a traditional customary tenure system. In the intervening years, private sector investment in the forest sector has grown sharply in both management of forest reserves or concessions and manufacturing capacity. The sector now represents six percent of the country's GDP and 11 percent of its export earning, in third place only behind gold and cacao. Despite, or because of, this boom, forest loss in Ghana totaled 1.9 million hectares between 1990 and 2005, yielding one of the highest deforestation rates in the world at 1.8 percent per year. Most of this forest loss has occurred in the tropical forests due to pressures stemming from low local participation and benefit from forest resources, energy needs (75 percent of Ghana's energy needs are met with fuelwood and charcoal), subsistence agriculture, and agricultural commodities, among other factors. Though less well-documented, the level of degradation of still-standing forests from overcutting, high-grading of the most valuable woods, and illegal logging is thought to be equally significant.

In view of these trends, the Ghanaian government has embarked on a new policy and regulatory initiative in 2002. The Timber Resources Management Act and Regulation strengthened community participation with the requirement that forest reserve operators conclude "social responsibility agreements" and five percent of stump payments reserved for investment in local development projects. However, the basic land/resource structure remained unchanged and the five percent of stumpage





revenues represents a very low percentage of the total value of finished products, most of which are exported to European markets. There is no clear signal that deforestation and degradation trends have yet abated nor has the act and regulation spurred community-based initiatives outside of reserves or certification by operators to international standards. Civil society organizations and other pro-community forest stakeholders contend that the government needs to show added commitment to promotion of community forest management rights by passing legislation to give communities legal rights to manage forest resources. This is based on the positive results of government-supported pilot cases where experiences in community forest management showed positive results in reversing deforestation, restoring the degraded forests, improving biodiversity and sparking local economies.

The Rainforest Alliance's sustainable agriculture division is working with cocoa farmers in the Western and Ashanti regions, and working closely with the government and private sector partners such as the global chocolate and snack company Mars. Mars has committed to getting its entire cocoa supply certified as sustainably produced by 2020. The Rainforest Alliance accepted the company's challenge to bring enough farms up to code so that 100,000 tons of Rainforest Alliance Certified cocoa would be available each year by 2020. The move is an unprecedented milestone for the cocoa industry, farmers and chocolate lovers.

Farmed in the hot and humid lowlands of many tropical countries, cocoa is the main livelihood for millions of

farmers. There are an estimated two million cocoa growers in the western African nations of Cote d'Ivoire and Ghana, which together produce about 80 percent of the world's cocoa supply.

Nearly all cocoa is grown on small family farms that are vulnerable to disease, inclement weather and price fluctuations. The Rainforest Alliance works with cocoa farms of all sizes, and certification ensures that ecosystems and the rights and benefits of workers are protected. Rainforest Alliance Certified farms have met the environmental, social and economic standards of the Sustainable Agriculture Network (SAN), a coalition of local conservation organizations that first set the standard for sustainable farming in rainforest areas in the early 1990s. The SAN standards cover ecosystem conservation, worker rights and safety, wildlife protection, water and soil conservation, agrochemical reduction, decent housing, and legal wages and contracts for workers.

Some experts worry about the future of cocoa farmers, especially in western Africa, where environmental degradation and declining productivity form a vicious circle. Rainforest Alliance field technicians have found that farmers embrace restoration efforts, as they quickly see the benefits of recovering their environment. Labor and safe working conditions are the most troubling social issues. By consulting closely and continually with farmers, local NGOs and other institutions, government agencies and researchers, standard-setting experts from the SAN have adapted the guidelines that were developed and tested on thousands of farms in Latin America to the realities of Africa, Indonesia and Asia.

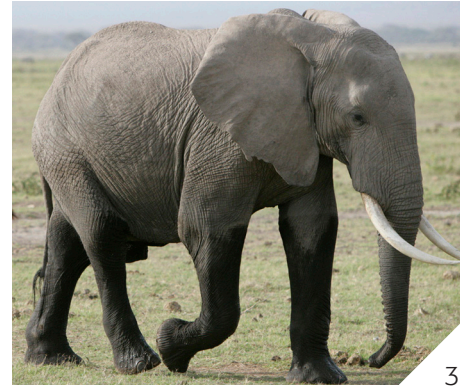




1



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](http://www.rainforest-alliance.org/curricula/resources)

## Slideshow (1)

The Curriculum site provides a slideshow and script about Ghana 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/ghana-cocoa](http://www.rainforest-alliance.org/pictures/ghana-cocoa)

## From the Bean to the Bar: Chocolate Slideshow (2)

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](http://www.rainforest-alliance.org/pictures/chocolate-from-bean-to-bar)

## Species Profiles (3)

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

- African elephant
- African grey parrot
- black-headed paradise flycatcher
- cacao tree
- western red colobus

[www.rainforest-alliance.org/species](http://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](http://www.rainforest-alliance.org/publications/inside-the-rainforest-canopy)

## Terrarium Instructions

Download directions for making a terrarium in your classroom.

[www.rainforest-alliance.org/kids/terrarium](http://www.rainforest-alliance.org/kids/terrarium)

## Rainforest Products

Check out 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.

[www.rainforest-alliance.org/articles/tropical-forests-in-our-daily-lives](http://www.rainforest-alliance.org/articles/tropical-forests-in-our-daily-lives)

## 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](http://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