The Rainforest

ZOOGUIDES volume 4

TEACHERS NOTES

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NTRODUCTION

The ZooGuide™ series of software from REMedia provides a resource for K-12 teachers and librarians on life science topics. This Teacher's Guide offers suggestions, activities, and references for integrating The Rainforest ZooGuide into your curriculum. Other titles in the series include:

Butterflies of the World
Whales and Dolphins
Mammals of Africa
World of Reptiles
Life in the Desert
Animals in Danger
Natural History of Yellowstone

Use this program:

- as an encyclopedic reference;
- to teach major biological concepts such as Ecology, Biodiversity, Zoology, and Evolution; and
- to understand and appreciate the delicate balance between man and the rest of nature.

What is in this Guide

The Rainforest Teacher's Guide offers suggestions for incorporating the accompanying CD-ROM into Life Science and Biology classes. These ideas are divided into two general levels, K-6 and 7-12. Feel free to adapt any of the activities to meet your specific curricular goals (eg, You may want to use a suggestion for a K-6 group that was written at a 7-12 level or vice versa).

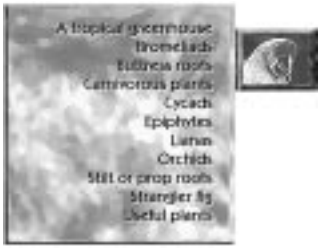
In addition, this guide provides information on incorporating the various sections of the program to complete activities and makes The Rainforest a richer reference than an encyclopedia is. Read from a chapter, look at and listen to movies and use the chapters on various groups of animals and plants that live in the world's rainforests to gain a more complete understanding of the issues discussed.

Finally, use this Teacher's Guide as a quick reference for the data provided in the ZooGuide. A list of helpful reference materials is provided so that your students can do more in-depth research once the program has sparked their imagination and interest.

USING THE RAINFOREST ZOOGUIDE

Navigating

There are “chapter” buttons on the left and right hand sides of your screen. Visit any of the chapters to access various kinds of information. To see the title of a chapter, move your mouse pointer over the chapter name. The current chapter is highlighted darker than the other chapters. When you are in a chapter, moving the mouse pointer over the current chapter button will display a list of the chapter’s contents.

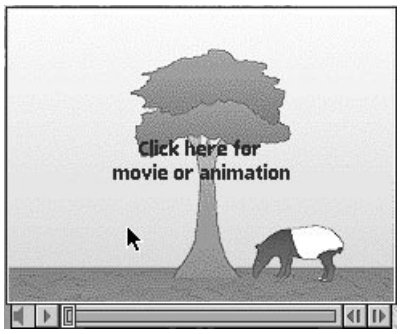


Click on the topic or species you are interested in and you will go to the relevent section of the current chapter

To choose a different chapter, click once on any of the other chapter buttons.

Playing Movies/Animations

Chapter topics have text and are accompanied by a movie, animation, or slide show.



To access these multimedia features, click once on the picture and press the play button. Use the other buttons located under the picture to control the volume, to pause, or to jump forward or backward in the movie.

Viewing Photographs and Pictures

There are pictures accompanying the text for many of the individual animal and plant species. Some of the individual species also contain photographs and or movies. Photographs which can be expanded by clicking on each one. To return to the smaller view of the picture, click on it again.

Getting Help

There is on screen help available in the ZooGuide. To access it, click once on the title bar at the top center of the screen. The help information uses text and graphics to explain the functions of the different sections of the program. Click on the title bar again to return to the program.

Other Buttons

There are four other buttons in the viewing window. They allow you to:

print the text or photograph on the current page of this ZooGuide,

get an index of all the terms and topics contained in the program,

take a quiz for each chapter in the ZooGuide, and exit the program.

Click once on a button to activate it.

INTEGRATING PARTS OF THE ZOOGUIDE

The Rainforest ZooGuide has several zones of student-program interaction. They can be used singly or integrated to create more in-depth explorations of the program. For example, if students are interested in finding out about unique animals and plants that live in montane rainforests, they can look them up in the chapters describing different animal and plant groups. This provides more in-depth information than if you use only one part or the other of the ZooGuide. It also provides a context for launching into additional research using references listed at the end of this Teacher's Guide.

K-6 classes may want to use the parts of the program individually especially with younger students, increasing the integration with more interested or older students. The pictures, movies, and animation are probably the most useful parts of the program at this level. They provide interesting facts and attention grabbing footage.

7-12 classes can explore the chapters, text, graphics and individual species information separately or together depending on your focus. The activities included in this guide give other examples of how to integrate the parts of the ZooGuide to create projects and lessons that will motivate your students. It also provides suggestions for integrating The Rainforest into your Life Science or Biology curriculum.

ACTIVITIES FOR K-6 TEACHERS

This section of the Teacher's Guide offers 15 activities and ideas for integrating The Rainforest ZooGuide into your life science curriculum. The activities range from an introduction to rainforests to discussions of biodiversity and habitat destruction. Each activity lists the topic covered, the sources of information it will use, materials you will need, a step-by-step description of the activity, and discussion questions to help you conclude and find out what your students have learned in the process. Modify or edit these activities to tailor them to your specific needs. Also look at the grades 7-12 activities for other ideas and ways to use the ZooGuide with your students.

K-6 Activity 1:

TOPIC: Introduction to Rainforests

SOURCES: 'Introduction' chatper /'What are rainforests?' subtopic in The Rainforest ZooGuide

MATERIALS: World Map
Pen or pencil
Colored pens, markers, or crayons

ACTIVITY: In this activity students will answer questions related to the movie on rainforests and locate the world's tropical rainforests on a map.

Begin this activity by reading the information provided in the What are Rainforests? section of the Introduction chapter of the ZooGuide. Then hand out the questions printed on the next page and ask students to work in groups or alone to answer them using the information provided in the movie.

The questions and their answers are given below:

1. What are three important jobs rainforests perform?
   - They release oxygen into the air.
   - They absorb carbon dioxide, reducing "greenhouse gases.
   - They provide homes for more than 50% of the worlds animals and plants.

2. What are some things you can learn from this CD?
   - Rainforest ecology
   - Where rainforests are located
   - Threats to rainforests
   - Diversity of plants and animals living in rainforests

3. How are rainforests classified (grouped)?
   - By temperature
   - By rainfall
   - By soil type
   - By altitude
   - By the kinds of trees (evergreen or semi-deciduous)

4. How much of the earth's land is rainforest?
   -Less than 7%

5. What is a primary rainforest?
   - It is an undisturbed rainforest.

6. What is another name for a secondary rainforest?
   - A secondary rainforest is also a jungle.

7. What are the three kinds of rainforests?
   - Montane
   - Lowland
   - Mangrove

DISCUSSION: Review the answers to the above questions as a group and clarify any mistakes students made in their answers. Show students a world map or globe and ask them where rainforests are located based on the information provided in this section of the ZooGuide. Discuss the following questions.

1. Why do you think that most rainforests are found near the equator?

2. Do we have tropical rainforests in the mainland United States? Why not?

3. What do you want to learn about rainforests from this ZooGuide?

Introduction to Rainforests Worksheet

Name:

Date:

1. What are three important jobs rainforests perform?

2. What are some things you can learn from this CD?

3. How are rainforests classified (grouped)?

4. How much of the earth's land is rainforest?

5. What is a primary rainforest?

6. What is another name for a secondary rainforest?

7. What are the three kinds of rainforests?

K-6 Activity 2:

TOPIC: Rainforest Layers

SOURCES: 'Introduction' chapter/'Rainforest Layers' subtopic in The Rainforest ZooGuide
Species Index in The Rainforest ZooGuide
References listed at the end of this Guide

MATERIALS: Drawing paper and colored construction paper
colored pens, crayons, or markers
Magazines with animal pictures
Scissors and glue

ACTIVITY: In this activity students will name the four layers of a rainforest, identify animals and plants found there and construct a model of a rainforest on paper.

Begin this activity by reading and watching the information provided in the Rainforest Layers section of the Introduction chapter of the ZooGuide. It lists various animals and plants that inhabit the four layers of the forest.

Students should gather information to use when they construct their drawings of a rainforest either as a whole group, in small groups, or individually. They should note the following information.

1. What are the names of the four layers of the rainforest?

2. Get pictures of at least 3 animals that live in each layer. Find pictures of animals shown in the ZooGuide in nature magazines and clip and paste them into your drawing.

3. What kinds of plants are found in each layer? What do their leaves, trunks, and roots look like?

Once students have gathered this information they are ready to create their own rainforest using construction paper, colored pens, printed pictures, etc. Make a mural and label the parts of the forest as well as the animals you included in each layer.

DISCUSSION: Now that students have made their own model of a rainforest, you can discuss as a group the following questions.

1. Why do monkeys live in the canopy and not the ground?

2. What special features do trees need to live in the emergent layer? Why?

3. Which layer of the rainforest gets the most sunlight? Which layer gets the least sunlight?

4. In which layer of the rainforest do you think that pigs and elephants live? Why?

K-6 Activity 3:

TOPIC: People in the Rainforest

SOURCES: 'Introduction' chapter /'Custodians of the forest' subtopic in The Rainforest ZooGuide
'Peoples' chapter in The Rainforest ZooGuide
References listed in this Guide

MATERIALS: Writing paper
Pen or pencil

ACTIVITY: In this activity students will learn about the indigenous people of the rainforests and compare them with the indigenous people of the United States.

Begin this activity by watching and reading the information provided in the Custodians of the Rainforest section of the ZooGuide. It discusses how native people of the rainforests are dying out or leaving behind their culture to adopt western ways of living. Discuss the pros and cons of these changes. Answer the following questions as a group.

1. What is lost when indigenous people become modernized?

2. What threatens the lives and livelihoods of these people?

3. How are the indigenous people of the rainforests like the natives of North and South America that were here before Columbus came?

4. What should be done to help indigenous people keep their way of life and their knowledge of the rainforests?

Now look at the Peoples chapter in the ZooGuide. This chapter offers information about the people who live in the rainforests and how they make a living there. Students can gather data on which to base a story about a native tribe. They can include information about where the tribe lives, how they get food, what their social structure is like, etc. Use other resources listed at the end of this Guide to help find this information. Stories can be about any topic you, as a class, choose. Be creative and let students read their stories to each other.

DISCUSSION: To conclude this activity, students can discuss their stories and answer the following questions.

1. How can you help indigenous people of the rainforests?

2. Why is it important to preserve the rainforests and tribal cultures found there?

3. What have you learned from the example of what happened to the indigenous people of the United States?

K-6 Activity 4:

TOPIC: The Rainforest Store

SOURCE: 'Introduction' chapter/'What do the rainforests give us?' subtopic in The Rainforest ZooGuide

MATERIALS: Various product packages
Paper
Markers, colored pencils, crayons
Scissors and glue

ACTIVITY: In this activity students will make a display of various products that come from the rainforests and create their own packaging and advertisement to promote and sell a brand of rainforest product.

The What do the rainforests give us? section of the Introduction chapter in the ZooGuide contains a "village" with shops that students can select to enter. Each shop contains a number of items which come from the rainforests. When they click on an item a box appears describing what it is and what it is used for in everyday life.

Let your students explore the shops and bring in product containers from home that represent rainforest products. Students can make an informative display in your classroom or the cafeteria with labels that explain where each product originates (Asia, Africa, South America, etc.) and how often it is used by students in your school. Make a chart of products and ask students in the school to check off which items they have at home. Add up their marks and estimate how much of each kind of product is used by them. Add this to the display.

Using rainforest resources like rubber, fruits, nuts, and oils has two advantages over using rainforest tree wood and eating rainforest grown beef. First, they are sustainable resources, meaning that you can continue to get them over a long period of time. Second, gathering these products doesn't do permanent damage to the rainforests like deforestation and clear cutting do. Discuss these issues with your students as a preamble to an ad campaign in which they will be responsible for promoting one of the sustainable resource products from the rainforests.

Students can choose from the following options.

1. They can invent a new product label and name to promote a rainforest product.

2. They can make a commercial promoting a product.

3. They can create an ad campaign with posters and special offers on products.

DISCUSSION: Conclude this activity and project by discussing the following questions.

1. Which of the rainforest products surprised you the most? Why?

2. How can you help save the rainforests from destruction based on what you have learned from this activity?

3. What can you do to encourage other students to save rainforests?

K-6 Activity 5:

TOPIC: The Rain Cycle

SOURCES: 'Ecology' chapter/'Climate' subtopic in The Rainforest ZooGuide
Your science textbook
References listed in this Guide

MATERIALS: Paper
Pen or pencil
Markers, colored pens, or crayons

ACTIVITY: In this activity students will explore rainforest climates and connect the rain cycle with the abundance of rain these areas of land receive.

Students can begin this activity by reading and watching the information presented in the Climate section of the Ecology chapter in the ZooGuide. It discusses where tropical rainforests are located, why they are so warm and why they get so much rainfall throughout the year. Students can answer the following questions to help them understand the rain cycle process.

1. Where are tropical rainforests located?

2. What is the sun's role in the rain cycle?

3. Where does the water come from to form clouds?

4. What makes the clouds rain?

5. What happens to the rain water after it falls on the forest?

When students have answered these questions and you have discussed their answers as a group, they are ready to construct a rain cycle diagram.

Use paper and colored markers, pens, or crayons to draw a rainforest rain cycle diagram. It should include four parts:

1. clouds and how they form,

2. the sun and warm temperature indicator,

3. a water source (ocean, lake, river, etc.), and

4. rain being absorbed by the plants in the rainforest.

Use arrows and labels to show how each part is connected to the other parts of the drawing.

Older students can include information about how water is absorbed by plant roots and brought up to the leaves where some of it is lost by evaporation to the air. This water helps form new clouds and more rain.

DISCUSSION: When students have finished their drawings and labeled the parts you can discuss the following questions as a group.

1. Why is the rain cycle called a “closed system”?

2. The rain cycle works everywhere on earth. Why do you think that rainforests get so much rain each year?

3. Which part of the rain cycle do you think is the most important? Why?

K-6 Activity 6:

TOPIC: Biodiversity

SOURCES: ‘Ecology’ chapter/’Biodiversity’ subtopic in The Rainforest ZooGuide
Species Index in The Rainforest ZooGuide
References listed in this Guide

MATERIALS: Paper
Pen or pencil

ACTIVITY: In this activity students will define biodiversity and explore the reasons why rainforests are so biodiverse.

Rainforests are treasure houses of biodiversity. The text and slide shown in the Biodiversity section of the Ecology chapter in the ZooGuide talks about the wide range of species found in the world’s rainforests. Students should read and watch this information. When they have done so, discuss what they think biodiversity means.

Ask students to discuss the following questions once you feel they understand the concept of biodiversity.

1. Why do you think that rainforests are the most biodiverse places on earth? (They have good conditions like warmth, moisture, availability of food, etc. that foster a rich diversity of life.)

2. If rainforests are the most biodiverse places on earth, where do you think the least biodiverse places are? (Polar or desert regions, because they lack moisture, food, and comfortable temperatures for most kinds of life.)

3. Is the region you live in very biodiverse or not very biodiverse? Why? (Answers will vary.)

4. What are some of the environmental factors that foster biodiversity? (Abundant sunlight, moisture, lots of food sources, and a variety of habitats foster biodiversity.)

DISCUSSION: As a group discuss the answers to the above questions. If students are still having difficulty understanding how abundant and diverse life is in the rainforests, have them peruse the Species Index (the buttons on the right side of the ZooGuide page) to see how many different kinds of animals and plants live there.

K-6 Activity 7:

TOPIC: Exploring the World's Rainforests

SOURCES: 'Maps' chapter in the Rainforest ZooGuide
Plant and Animal Species Index in the Rainforest ZooGuide

MATERIALS: Paper
Pen or Pencil

ACTIVITY: In this activity students will explore the rainforests of the world by using the maps provided in this ZooGuide. There are two large maps; the New World Map and the Old World Map. Each map contains detailed maps of rainforest regions that you can access by clicking on a boxed in area. Once students have chosen a region to explore, they can click on the "newspaper" icon on that screen to read a story about it.

Students should choose at least one region from each larger map (Old and New World), read the story accompanying it, and research the plants or animals mentioned in the Species Index on the right side of the screen. They can prepare a short report on what they have learned to share with the class.

Once students have presented their reports alone or in groups, they can answer the following general questions about the world's rainforests using the maps for assistance.

1. Which world continent has the most rainforest?

2. Use estimation skills to figure out which rainforest has been most damaged by deforestation.

3. Where are most of the world's rainforests located? Why?

4. Where are most mangrove rainforests found?

DISCUSSION: Review the answers to the above questions as a group and discuss the following.

1. What will happen if rainforest destruction continues? (Hint: Think about the impact to people, plants, animals, and the climate.)
2. Why are there some regions along the equator that are not covered by rainforests?
3. Which rainforest would you save if you could? Why?

K-6 Activity 8:

TOPIC: Central American Deforestation

SOURCES: 'Maps/Central America and Caribbean' chapter in the Rainforest ZooGuide
Plant and Animal Species Index in the Rainforest ZooGuide
References listed in this Guide

MATERIALS: Blackline maps of Central America and the Caribbean
Colored pens, pencils, or crayons
Paper
Pen or pencil

ACTIVITY: In this activity students will create a map of the rainforests of Central America and the Caribbean showing where rainforests were 100 years ago and where they are now. They will use this information as the basis for a discussion about deforestation and the many reasons it occurs. They will also discuss the consequences of deforestation such as Global Warming, habitat destruction, and endangered species.

Begin this activity by viewing the Central America and Caribbean maps in the Maps chapter of the Rainforest ZooGuide. They show each region with its rainforests clearly marked. On your maps draw the regions that were once covered with rainforests (shown in brown on the ZooGuide maps). Color them green. Then use a black or other dark colored marker to cross out the areas that have been destroyed by deforestation. How much of the green is left?

Ask your students to estimate how much of the original rainforests are left today. Do some research and find out how much rainforest is lost everyday in these areas. What are the reasons for deforestation?

DISCUSSION: Have a discussion about the pros and cons of rainforest destruction. Use the following questions to help start the process.

1. Why do people in Central America and the Caribbean cut down rainforests?
2. What effects does rainforest destruction have on the global environment?
3. How is rainforest destruction in these areas similar to the deforestation that occurred in North America in the last 200 years?
4. What can be done to save the remaining rainforests and their animal inhabitants?

K-6 Activity 9:

TOPIC: Trees

SOURCES: 'Maps-India' chapter in The Rainforest ZooGuide
Plant Species Index in The Rainforest ZooGuide
References listed in this guide

MATERIALS: Drawing paper
Colored pens, pencils, or crayons
Magazines showing trees and tree products

ACTIVITY: In this activity students will catalog resources we get from trees. This will allow them to see the value of trees as living organisms, not just as wood for furniture, fires, and homes.

Look at the map of India in the Maps chapter of the ZooGuide. It contains a "newspaper" article that says "A tree is like ten sons." What does this mean? What are ten things shown that we get from trees? Ask your students to name some additional things that come from **living** trees.

Now that you have discussed what trees provide us, have students draw a typical rainforest tree (or a specific one using the Plants Species Index on the right side of the ZooGuide screen). They can color the tree's parts and label the types of products that come from each part. They can include fruits, habitats for other plants and animals, bark for paper, sap for rubber production, etc. As an alternative to drawing everything, students can find pictures in magazines to cut out and add to their pictures.

Display student drawings along with the list of items that rainforest trees provide on a bulletin board. Use it to review what they have learned from this ZooGuide.

DISCUSSION: What have your students learned from this activity? To find out, discuss the following questions as a group.

1. Do trees have a bigger or smaller job in the rainforest than you thought before doing this activity?

2. Why are trees important to animals and other plants in the rainforest?

3. What can you do to help save rainforest trees?

K-6 Activity 10:

TOPIC: Rainforest Debate

SOURCES: 'Debates' chapter in the Rainforest ZooGuide
References listed in this guide

MATERIALS: Large sheets of paper for listing pros and cons
Markers

ACTIVITY: In this activity students will debate one of the issues mentioned in the Debates chapter of the Rainforest ZooGuide.

Debates offer students a valuable opportunity to consider various arguments, support their side, and look at the issue from alternative points of view. Begin this activity by selecting one of the issues mentioned in the Debates chapter as the basis for an in-class debate. Divide the class into two groups, one for the issue and one against it. Use references found in your local or school library to support your team's view.

Students can use large sheets of paper to write down their main points for the debate. They should form well structured arguments on at least 5 points related to their issue. They should be aware of the opposing team's 5 points so they can prepare rebuttals for each.

When students have prepared themselves, they can have a debate in front of another class, a group of parents, or a group of faculty. You can act as moderator and set time limits for each point in the debate as well as rebuttal times. When the debate is over, ask the "audience" which side they feel presented the best arguments and why. Then have students analyze their performances based on this outcome.

DISCUSSION: What did your students learn from this debate? To find out discuss the following questions as a group.

1. Summarize your group's position on the issue you chose.

2. Summarize the position of the other group.

3. Why are debates a good way to discuss an issue?

4. What would you do differently if you could redo this debate? Why?

K-6 Activity 11:

TOPIC: Saving the Rainforests

SOURCES: 'Debates' chapter/'Pressures on the Rainforests' subtopic in the Rainforest ZooGuide
'Debates' chapter/'What can we do' subtopic in the Rainforest ZooGuide
References listed in this guide

MATERIALS: Paper (poster and regular sized)
Pen or pencil
Copier

ACTIVITY: In this activity students will create a word puzzle game to teach other students at your school some of the things that can be done to save the rainforests of the world. In the process, they will list and explain several ways to do this.

Begin this activity by asking students the following questions:

1. List five things that you think are the most important threats to the world's rainforests and why.

2. List five things that you think are the most important things to do to save the world's rainforests and why.

3. Imagine that you are the president of a country with rainforests that are being cut down. How would you save these rainforests?

Organize their answers on a large sheet of poster paper. Then look at the information presented in the Pressures on the Rainforests and What can we do sections of the Debates chapter in the ZooGuide. These discuss problems and solutions that students can compare with the ones they listed above. Add any ideas that your students didn't think of and begin to brainstorm ideas for a word puzzle that incorporates these solutions.

The word puzzle could be a cross-word puzzle, a fill-in the blank puzzle, a picture-gram puzzle, etc. Once you have settled on a format for the puzzle, students can work in groups to create clues for each word in the puzzle. They should get their ideas together and make the puzzle on a regular sized piece of paper that can be photocopied. When they are satisfied with the way it looks, make copies to hand out to other classes, or make copies available in the school library or office. Offer a prize to the student or class that gets the most correct answers.

DISCUSSION: Discuss the following when your students have completed this project.

1. What did you learn about saving the rainforests from this activity?

2. Did any of your word puzzle clues stump other students? Which ones and why?

3. What did other students learn about saving rainforests?

4. you think the word puzzle was a good way to get other students to learn about the rainforests? Why or why not?

K-6 Activity 12:

TOPIC: Rainforest Plants and Animals

SOURCES: Animals Species Index in the Rainforest ZooGuide
Plants Species Index in the Rainforest ZooGuide

MATERIALS: Paper
Pen or pencil
Markers, crayons, or colored pencils
Environmental magazines
Scissors and glue

ACTIVITY: In this activity students will explore the Animal and Plant Species Indexes in the ZooGuide. They can choose from among the following list of projects, work in groups or alone, and present their findings to the class in an oral presentation with visual aids.

Project 1: Choose a tree, a bird, and an insect that live in the rainforest. How is each adapted for life in the rainforest? Draw each one or find its picture in a magazine and cut it out. Label the adaptations on your poster and discuss them with the class in your presentation.

Project 2: Draw a rainforest scene. Hide some of your favorite plants and animals in the picture (either drawn or cut from a magazine). Can other students find the hidden plants and animals? Which rainforest animals and plants use camouflage to protect themselves in the rainforests? Present your drawing and the information you found to the class.

Project 3: Visit your local zoo and make a list of animals and plants that come from rainforests. This list may be very extensive. To make it more manageable, concentrate on African, Asian, or American rainforest species only. Draw or cut out pictures of some of the animals and plants you saw, label them and present what you learned to the class in your presentation.

DISCUSSION: Discuss the results of your students' projects by sharing answers to the following questions.

1. Why are there so many different kinds of animals and plants in the rainforests?
2. What did you learn about one plant and one animal that lives in the rainforest?
3. Brainstorm an idea for a fourth project to add to the ones above for future classes.

K-6 Activity 13:

TOPIC: Research Paper

SOURCES: The Rainforest ZooGuide
References listed in this guide

MATERIALS: Paper
Pen or pencil
Markers, colored pens, or crayons

ACTIVITY: In this activity students will use the Rainforest ZooGuide to research one plant and one animal that lives there. The paper should be at least one page long for each species and can include drawings or other illustrations. Each research paper should answer or address the following questions.

1. In what kind of rainforest are your animal and plant found? (Montane, Mangrove, or Lowland rainforest)

2. How are the animal and plant adapted for life in the rainforest?

3. What products, if any do people get from the animal and plant you chose?

4
   a. Are the plant and animal endangered?
   b. Why?
   c. What can be done to save them from extinction?

5. Describe the animal and plant you chose, including its habitat and food sources.

6. Discuss reproduction for the plant and animal. How many offspring does it have? When does it reproduce? How long does the animal take care of its babies?

DISCUSSION: Students can present their findings in a summary of their research paper to the class. Fellow students should be encouraged to ask questions based on what was presented. When everyone has discussed his/her paper, the whole group can get together and discuss similarities and differences between the animals and plants they chose. Discussion can focus on diversity of species found in the world's rainforests.

K-6 Activity 14:

TOPIC: Endangered Species

SOURCES: 'Animals' chapter/'Mammals' subtopic/Species Index in the Rainforest ZooGuide
References listed in this guide

MATERIALS: Computer word processor
Magazine pictures
Scissors and glue
Printer paper

ACTIVITY: In this activity students will create a newsletter informing fellow school-mates about endangered rainforest species such as the mountain gorilla, Malayan tapir, and the pygmy hippopotamus.

In order to develop a newsletter concerning endangered species students will have to do the following:

1. research several endangered animals;
2. discover why they are endangered (i.e., loss of habitat, hunting, etc.); and
3. develop possible solutions to save them from extinction.

These findings can then be included in the newsletter in interesting ways. The newsletter should be informative and fun to read. Include articles, pictures to color, games that teach facts, and/or a suggestions column. Brainstorm other ideas for things to include in the newsletter to make it more interesting to fellow students at school. You may want to divide your class into groups that either create their own versions of a newsletter or work on different aspects of a single one. This project could be an ongoing one in which your students create a quarterly or monthly update to the newsletter.

When you have chosen what to include, use a word processing program to layout the newsletter and print copies to distribute to other students in the school. Ask for feedback on the contents and post solutions to puzzles and games you have included. You could have a contest to see who made the nicest drawing, if you have included a coloring section. Be creative and have fun with the newsletter, even though it deals with a serious topic. Your students can become crusaders for the save the animals campaign.

DISCUSSION: Since this project concerns making a successful newsletter, you can discuss with your students how well you achieved your goals.

1. Did other students find the newsletter informative and interesting?

2. What could you have done to make the newsletter more readable?

3. What other topics could your newsletter have addressed?

4. What did you learn from making this newsletter?

K-6 Activity 15:

TOPIC: Review of the Rainforest ZooGuide

SOURCE: The Rainforest ZooGuide

MATERIALS: Crayons, markers, or colored pencils
Scissors and tape
8.5” x 11” paper

ACTIVITY: In this activity students will answer questions using the Rainforest ZooGuide. Their answers will then be used to decode a picture, cut it and reassemble it to get a surprise image from the CD. They can then color the picture and display it on a bulletin board in the classroom. The scrambled picture has a word or number on the back of each square that corresponds to the questions below. As students find the correct answers they can order the squares on a 4 x 6 grid to make a picture of a rainforest. You can divide the class into 6 groups each responsible for four questions or let students work in pairs or alone to answer all of the questions. The questions and answers are given below and a list of the questions only is on the following page. This activity is an excellent way to review the contents of the ZooGuide.

1. How many rainforest products are shown in the candy store? (‘Introduction’ Chapter) - **7**

2. What kind of nuts come from rainforests? (‘Introduction’ & ‘Maps’ Chapters) - **brazils and cashews**

3. Which type of rainforest is found in Bombay, India? (‘Introduction’ and ‘Maps’ Chapter) - **mangrove**

4. What are native rainforest people called? (‘Introduction’ Chapter) - **indigenous**

5. What is the process that plants use to make food? (‘Ecology’ Chapter) - **photosynthesis**

6. How many lemur species have become extinct? (‘Maps’ Chapter) - **14**

7. Which country has the most rainforest? (‘Maps’ Chapter) - **Brazil**

8. Name a mineral mined in the rainforests. (‘Debates’ Chapter) - **gold**

7	BRAZILS AND CASHEWS	MANGROVE	INDIGE-	PHOTOSYNTHESIS	14
BRAZIL	GOLD	6	WICKER	5%	500 MILLION
SHAMAN	BOWS AND ARROWS	2	8	LEAFCUTTER	GILLS
CONSTRICTION	HARPY EAGLE	LEOPARD	SLOTH	ORCHID	INSECTS

9. How many acres of land are needed to raise one cow? (‘Debates’ Chapter) - **6**

10. Name a sustainable rainforest resource. (‘Debates’ Chapter) - **wicker**

11. How much of the world’s rainforest is protected? (‘Debates’ Chapter) - **5%**

12. How many native people live in the rainforests? (‘Peoples’ Chapter) - **500 million**

13. What is a native medicine man called? (‘Peoples’ Chapter) - **shaman**

14. What weapon do rainforest hunters use? (‘Peoples’ Chapter)-**bows and arrows**

15. How many flying wings does a beetle have? (‘Insects’ Chapter) - **2**

16. How many legs do spiders have? (‘Insects’ Chapter) - **8**

17. Name an ant that lives in rainforests. (‘Insects’ Chapter)’- **leafcutter**

18. What do fish use to breath? (‘Fish’ Chapter) - **gills**

19. How do pythons kill? (‘Reptiles’ Chapter) - **constriction**

20. Name a rainforest bird that lives in the canopy. (‘Birds’ Chapter) - **Harpy eagle**

21. Name a rainforest cat. (‘Mammals’ Chapter) - **leopard**

22. Name an edentate. (‘Mammals’ Chapter) - **sloth**

23. Name a parasitic rainforest plant. (‘Plants’ Chapter) - **orchid**

24. What do carnivorous plants eat? (‘Plants’ Chapter) - **insects**

DISCUSSION: Discuss any questions students didn’t get correct.

Rainforest ZooGuide Review Questions

Name:

Date:

1. How many rainforest products are shown in the candy store? ('Introduction' Chapter)

2. What kind of nuts come from rainforests? ('Introduction' & 'Maps' Chapters)
   a. peanuts b. brazils & cashews c. almonds

3. Which type of rainforest is found in Bombay, India? ('Introduction' and 'Maps' Chapter)
   a. Montane b. Mangrove c. Lowland

4. What are native rainforest people called? ('Introduction' Chapter)
   a. indians b. innate c. indigenous

5. What is the process that plants use to make food? ('Ecology' Chapter)
   a. photosynthesis b. digestion c. carbon dioxide

6. How many lemur species have become extinct? ('Maps' Chapter)

7. Which country has the most rainforest? ('Maps' Chapter)

8. Name a mineral mined in the rainforests. ('Debates' Chapter)

9. How many acres of land are needed to raise one cow? ('Debates' Chapter)

10. Name a sustainable rainforest resource. ('Debates' Chapter)

11. How much of the world's rainforest is protected? ('Debates' Chapter)
    a. 5% b. 10% c. 15%

12. How many native people live in the rainforests? ('Peoples' Chapter)

13. What is a native medicine man called? ('Peoples' Chapter)

14. What weapon do rainforest hunters use? ('Peoples' Chapter)

15. How many flying wings does a beetle have? ('Insects' Chapter)

16. How many legs do spiders have? (‘Insects’ Chapter)

17. Name an ant that lives in rainforests. (‘Insects’ Chapter)

18. What do fish use to breath? (‘Fish’ Chapter)

19. How do pythons kill? (‘Reptiles’ Chapter)

20. Name a rainforest bird that lives in the canopy. (‘Birds’ Chapter)
    a. Harpy eagle b. hummingbird c. frogmouth

21. Name a rainforest cat. (‘Mammals’ Chapter)
    a. lion b. cougar c. leopard

22. Name an edentate. (‘Mammals’ Chapter)

23. Name a parasitic rainforest plant. (‘Plants’ Chapter)

24. What do carnivorous plants eat? (‘Plants’ Chapter)

ACTIVITIES FOR 7-12 TEACHERS

This section of the Teacher's Guide offers 15 activities and ideas for integrating The Rainforest ZooGuide into your Biology curriculum. The activities range from creating a trivia game to understanding complex social issues related to deforestation. Each activity lists the topic covered, the sources of information used, a step-by-step description of the activity, and a conclusion section with questions to help you find out what your students have learned in the process. Modify, delete, or edit these activities to tailor them to your specific needs. You can also want to look at the K-6 activities for other ideas and ways to use the ZooGuide with your students.

7-12 Activity 1:

TOPIC: Introduction to Rainforests

SOURCES: Introduction-What are rainforests? chapter in The Rainforest ZooGuide

ACTIVITY: In this activity students will answer questions related to the movie on rainforests and locate the world's tropical rainforests on a map. Begin this activity by reading the information provided in the What are Rainforests? section of the Introduction chapter of the ZooGuide. Then hand out the questions printed on the next page and ask students to work in groups or alone to answer them using the information provided in the movie.
The questions and their answers are given below:

1. What are three important jobs rainforests perform?
   - They release oxygen into the air.
   - They absorb carbon dioxide, reducing "greenhouse" gases.
   - They provide homes for more than 50% of the worlds animals and plants.

2. What are some things you can learn from this CD?
   - Rainforest ecology
   - Where rainforests are located
   - Threats to rainforests
   - Diversity of plants and animals living in rainforests

3. How are rainforests classified?
   - By temperature
   - By rainfall
   - By soil type
   - By altitude
   - By the kinds of trees (evergreen or semi-deciduous)

4. How much of the earth's land is rainforest?
   -Less than 7%

5. What is a primary rainforest?
   - It is an undisturbed rainforest.

6. What is another name for a secondary rainforest?
   - A secondary rainforest is also a jungle.

7. What are the three kinds of rainforests?
   - Montane
   - Lowland
   - Mangrove

CONCLUSIONS: Review the answers to the above questions as a group and clarify any mistakes students made in their answers. Show students a world map or globe and ask them where rainforests are located based on the information provided in this section of the ZooGuide. Discuss the following questions.

1. Why do you think that most rainforests are found near the equator?

2. Do we have tropical rainforests in the mainland United States? Why not?

3. What do you want to learn about rainforests from this ZooGuide?

Introduction to Rainforests Worksheet

Name:

Date:

1. What are three important jobs rainforests perform?

2. What are some things you can learn from this CD?

3. How are rainforests classified?

4. How much of the earth’s land is rainforest?

5. What is a primary rainforest?

6. What is another name for a secondary rainforest?

7. What are the three kinds of rainforests?

7-12 Activity 2:

TOPIC: Rainforest Layers

SOURCES: 'Introduction' chapter/Rainforest Layers subtopic in The Rainforest ZooGuide
Species Index in The Rainforest ZooGuide
References listed at the end of this Guide

ACTIVITY: In this activity students will name the four layers of a rainforest, identify animals and plants found there and construct a model of a rainforest.

Begin this activity by reading and watching the information provided in the Rainforest Layers section of the Introduction chapter of the ZooGuide. It lists various animals and plants that inhabit the four layers of the forest.

Students should gather information to use when they construct their drawings of a rainforest either in small groups or individually. They should note the following information.

1. What are the names of the four layers of the rainforest?

2. Get pictures of at least 3 animals that live in each layer from a nature magazine. Use the Species Indexes to help you find examples.

3. What kinds of plants are found in each layer? Include accurate drawings of representative kinds in your drawing.

Once students have gathered this information they are ready to create their own rainforest mural with labeled parts of the forest as well as the animals and plants included in each layer.

CONCLUSIONS: Now that students have made their own model of a rainforest, you can conclude this activity by answering the following questions as a group.

1. Why do monkeys live in the canopy and not the ground?
2. What special features do trees need to live in the emergent layer? Why?
3. Which layer of the rainforest gets the most sunlight? Which layer gets the least sunlight?
4. In which layer of the rainforest do you think that pigs and elephants live? Why?

7-12 Activity 3:

TOPIC: Rainforest Soil

SOURCES: 'Ecology' chapter/'Soil' subtopic in The Rainforest ZooGuide
Plant Species Index in The Rainforest ZooGuide
References listed in this guide

ACTIVITY: In this activity students will create models of rainforest soil and deciduous forest soil. They will compare the effects of rain, plant, and animal activity on the nutrient content of each.

Use this activity when studying Ecology or Botany.

Begin this activity by reading and watching the information presented in the Soil section of the Ecology chapter in the ZooGuide. This section discusses how rainforest soil differs from deciduous soil and what happens when rainforest trees are cut down.

Students can work in groups to create small models of rainforest and deciduous soil. They should include the humus and clay/under layers. The models should simulate rainfall conditions typical of each place, root systems, etc. Students should be able to demonstrate using their models why rainforest soil is so shallow and nutrient poor.

Once their models are working, each group can give a demonstration and discuss one aspect of the critical importance of soil to each system. For example, one group could discuss decomposition in each system, another could discuss root depth optimums for each model, etc. There are two sections in the Plants Species Index about roots that may help students in their presentations.

CONCLUSIONS: When each group of students has given their demonstration and discussed their particular aspect of rainforest soil ecology, the whole class can answer the following questions.

1. Why do people mistakenly think that rainforest soil is rich?

2. How is rainforest ecology balanced to accommodate the lack of rich deep soil?

3. What happens to the soil when rainforests are cut down? How is this similar to soil erosion on farmland? What can be done to reduce this trend?

7-12 Activity 4:

TOPIC: Rainforests and Global Warming

SOURCES: 'Ecology' chapter/'Gases and the greenhouse effect' subtopic in The Rainforest ZooGuide
'Debates' chapter in The Rainforest ZooGuide
References listed in this guide

ACTIVITY: In this activity students will identify the main points relating deforestation and global warming. They will propose ways to prevent further damage to the environment based on information provided in the Debates chapter of the ZooGuide.

Use this activity when studying the environment, ecology, and botany.

View the information presented in the Gases and the Greenhouse Effect section of the ZooGuide. It discusses the connection between global warming and deforestation practices. There are three main points that students should get from this information:

1. increased carbon dioxide levels in the atmosphere increases the greenhouse effect,
2. trees store carbon dioxide, and
3. burning trees releases carbon dioxide.

Ask students to list these ideas when they have read and viewed the ZooGuide information. Then ask them the following questions. They can base their answers on their own knowledge or information the get from the Debates chapter.

1. Why do people living in countries with rainforests cut them down?
2. What are some of the issues faced by people that make deforestation a common practice?
3. Why isn't it enough to tell them and their governments that deforestation may be seriously effecting the world's climate?
4. What are some possible solutions to the problem of deforestation?
5. What, other than stopping deforestation, can be done to effect global warming?
6. What can you do to make a difference?

CONCLUSIONS: Conclude this activity by discussing answers to the above questions as a group. Students can develop projects in answer to the last question to really make a difference in their community.

7-12 Activity 5:

TOPIC: Biodiversity

SOURCES: 'Ecology' chapter/'Biodiversity' subtopic in The Rainforest ZooGuide
Species Index in The Rainforest ZooGuide
References listed in this Guide

ACTIVITY: In this activity students will define biodiversity and explore the reasons why rainforests are so biodiverse.

Rainforests are treasure houses of biodiversity. The text and slide shown in the Biodiversity section of the Ecology chapter in the ZooGuide talks about the wide range of species found in the world's rainforests. Students should read and watch this information. When they have done so, discuss what they think biodiversity means.

Ask students to discuss the following questions once you feel they understand the concept of biodiversity.

1. Why do you think that rainforests are the most biodiverse places on earth? (They have good conditions like warmth, moisture, availability of food, etc. that foster a rich diversity of life.)

2. If rainforests are the most biodiverse places on earth, where do you think the least biodiverse places are? (Polar or desert regions, because they lack moisture, food, and comfortable temperatures for most kinds of life.)

3. Describe the region you live in terms of biodiversity. How does it compare to a rainforest? (Answers will vary.)

4. What are some of the environmental factors that foster biodiversity? (Abundant sunlight, moisture, lots of food sources, and a variety of habitats foster biodiversity.)

CONCLUSIONS: As a group discuss the answers to the above questions. If students are still having difficulty understanding how abundant and diverse life is in the rainforests, have them peruse the Species Index (the buttons on the right side of the ZooGuide page) to see how many different kinds of animals and plants live there.

7-12 Activity 6:

TOPIC: Exploring the World's Rainforests

SOURCES: 'Maps' chapter in The Rainforest ZooGuide
Plant and Animal Species Index in The Rainforest ZooGuide

ACTIVITY: In this activity students will explore the rainforests of the world by using the maps provided in this ZooGuide. There are two large maps; the New World Map and the Old World Map. Each one contains detailed maps of rainforest regions that you can access by clicking on a boxed in area. Once students have chosen a region to explore, they can click on the "newspaper" icon on that screen to read a story about it.

Students should choose at least one region from each larger map (Old and New World), read the story accompanying it, and research the plants or animals mentioned in the Species Index on the right side of the screen. They can prepare a short report on what they have learned to share with the class.

Once students have presented their reports alone or in groups, they can answer the following general questions about the world's rainforests using the maps for assistance.

1. Which world continent has the most rainforest?

2. Use estimation skills to figure out which rainforest has been most damaged by deforestation.

3. Where are most of the world's rainforests located? Why?

4. Where are most mangrove rainforests found? Why?

CONCLUSIONS: Review the answers to the above questions as a group and discuss the following.

1. What will happen if rainforest destruction continues? (Hint: Think about the impact to people, plants, animals, and the climate.)

2. Why are there some regions along the equator that are not covered by rainforests?

3. Which rainforest would you save if you could? Why?

7-12 Activity 7:

TOPIC: Central American Deforestation

SOURCES: 'Maps-Central America and Caribbean' chapter in The Rainforest ZooGuide
Plant and Animal Species Index in The Rainforest ZooGuide
References listed in this Guide

ACTIVITY: In this activity students will create a map of the rainforests of Central America and the Caribbean showing where rainforests were 100 years ago and where they are now. They will use this information as the basis for a discussion about deforestation and the many reasons it occurs. They will also discuss the consequences of deforestation such as global warming, habitat destruction, and endangered species.

Begin this activity by viewing the Central America and Caribbean maps in the Maps chapter of The Rainforest ZooGuide. They show each region with its rainforests clearly marked. On your maps draw the regions that were once covered with rainforests (shown in brown on the ZooGuide maps). Color them green. Then use a black or other dark colored marker to cross out the areas that have been destroyed by deforestation. How much of the green is left?

Ask your students to estimate how much of the original rainforests are left today. Do some research and find out how much rainforest is lost everyday in these areas. What are the reasons for deforestation in this area? Are there other reasons for deforestation? What are they?

CONCLUSIONS: To conclude this activity discuss the pros and cons of rainforest destruction. Use the following questions to help start the process.

1. Do people in Central America and the Caribbean cut down rainforests?

2. What effects does rainforest destruction have on the global environment?

3. How is rainforest destruction in these areas similar to the deforestation that occurred in North America in the last 200 years?

4. What can be done to save the remaining rainforests and their animal inhabitants?

7-12 Activity 8:

TOPIC: Chico Mendes

SOURCES: 'Maps-Western South America' chapter in The Rainforest ZooGuide
'Debates' chapter/'Cattle Ranching' subtopic in The Rainforest ZooGuide
References found in your local or school library

ACTIVITY: In this activity students will gain an understanding of the pressures and struggles that occur when people want to use rainforests' natural resources in different ways. They will do this using the Chico Mendes story which explains the conflict between cattle ranchers and rubber tree tappers in South America's rainforests.

Begin this activity by reading the information provided in the sections of the ZooGuide indicated above. Use this information as a launching ground for further research and discussion about this controversy.

The TV docudrama "The Burning Season" also discusses Chico Mendes and his struggles to protect the rainforests. Try to get a copy of this movie to view in class to help students understand the issues involved. Then answer the following questions as a group.

1. For what was Chico Mendes fighting?

2. What is the basic conflict between rubber tappers and cattle ranchers? Is there a peaceful solution to it? What is it?

3. What other pressures are there to cut down the rainforests?

4. Why is Chico Mendes' struggle a good example of the rainforest resources conflict?

CONCLUSIONS: End this activity by discussing the answers above as a group and making a list of some of the ways that people can use the rainforests without destroying them as Chico Mendes did.

7-12 Activity 9:

TOPIC: Rainforest Debate

SOURCES: 'Debates' chapter in the Rainforest ZooGuide
References listed in this guide

ACTIVITY: In this activity students will debate one of the issues discussed in the Debates chapter of the Rainforest ZooGuide.

Debates offer students a valuable opportunity to consider various arguments, support their side, and look at the issues from alternative points of view. Begin this activity by selecting one of the issues mentioned in the Debates chapter as the basis for an in-class debate. Divide the class into two groups, one for the issue and one against it. Students can use references found in your local or school library to support your side's view.

Use large sheets of paper to organize main points for the debate. Students should form well structured arguments on at least 5 points related to their issue. They should be aware of the opposing side's 5 points so they can prepare rebuttals for each.

When students have prepared themselves, they can have a debate in front of another class or a group of faculty. You can act as moderator and set time limits for each point in the debate as well as rebuttal times. When the debate is over, ask the "audience" which side they feel presented the best arguments and why. Then have students analyze their performances based on this outcome.

CONCLUSIONS: What did your students learn from this debate? To find out discuss the following questions as a group.

1. Summarize your group's position on the issue you chose.

2. Summarize the position of the other group.

3. Why are debates a good way to discuss an issue?

4. What would you do differently if you could redo this debate? Why?

7-12 Activity 10:

TOPIC: Saving the Rainforests

SOURCES: 'Debates' chapter/'Pressures on the Rainforests' subtopic in the Rainforest ZooGuide
'Debates' chapter/'What can we do?' subtopic in the Rainforest ZooGuide
References listed in this guide

ACTIVITY: In this activity students will create a word puzzle game to teach other students at your school some of the things that can be done to save the rainforests of the world. In the process, they will list and explain several ways to do this.

Begin this activity by asking students the following questions:

1. List five things that you think are the most important threats to the world's rainforests and why.

2. List five things that you think are the most important to do to save the world's rainforests and why.

3. Imagine that you are the president of a country with rainforests that are being cut down. How would you save these rainforests?

Organize their answers on a large sheet of poster paper. Then look at the information presented in the Pressures on the Rainforests and What can we do? sections of the Debates chapter in the ZooGuide. These discuss problems and solutions that students can compare with the ones they listed above. Add any ideas that your students didn't think of and begin to brainstorm ideas for a word puzzle that incorporates these solutions.

The word puzzle could be a cross-word puzzle, a fill-in the blank puzzle, a picture-gram puzzle, etc. Once you have settled on a format for the puzzle, students can work in groups to create clues for each word in the puzzle. They should get their ideas together and make the puzzle on a regular sized piece of paper that can be photocopied. When they are satisfied with the way it looks, make copies to hand out to other classes, or make copies available in the school library or office. Offer a prize to the student or class that gets the most correct answers.

CONCLUSIONS: To conclude this project answer the following questions as group.

1. What did you learn about saving the rainforests from this activity?

2. Did any of your word puzzle clues stump other students? Which ones and why?

3. What did other students learn about saving rainforests?

4. Do you think the word puzzle was a good way to get other students to learn about the rainforests? Why or why not?

5. Suggest alternative ways to disseminate this kind of information in a format that other students would willingly learn from.

7-12 Activity 11:

TOPIC: Rainforest Plants and Animals

SOURCES: Animals Species Index in The Rainforest ZooGuide
Plants Species Index in The Rainforest ZooGuide

ACTIVITY: In this activity students will explore the Animal and Plant Species Indexes in the ZooGuide. They can choose from among the following list of projects, work in groups or alone, and present their findings to the class in an oral presentation with visual aids.

Project 1: Choose a tree, a bird, and an insect that live in the rainforest. How is each adapted for life in the rainforest? Draw each one or find its picture in a magazine and cut it out. Label the adaptations on your poster and discuss them with the class in your presentation.

Project 2: Draw a rainforest scene including camouflaged rainforest animals and plants (either drawn or cut from a magazine). Can other students identify the hidden plants and animals? Why do animals and plants use camouflage? Present your drawing and the information you found to the class.

Project 3: Visit your local zoo and make a list of animals and plants that come from rainforests. This list may be very extensive. To make it more manageable, concentrate on African, Asian, or American rainforest species only. Draw or cut out pictures of some of the animals and plants you saw, label them and present what you learned to the class in your presentation. Include information about endangerment, captive breeding, etc.

CONCLUSIONS: Conclude this activity with oral presentations and question and answer sessions. Then review the following questions as a whole class.

1. Why are there so many different kinds of animals and plants in the rainforests?

2. What did you learn about one plant and one animal that lives in the rainforest?

3. Brainstorm an idea for a fourth project to add to the ones above for future classes.

7-12 Activity 12:

TOPIC: Research Paper

SOURCES: The Rainforest ZooGuide
References listed in this guide

ACTIVITY: In this activity students will use the Rainforest ZooGuide to research one plant and one animal that lives there. The paper should be at least two pages long for each species and can include drawings or other illustrations. Each research paper should answer or address the following questions.

1. In what kind of rainforest are your animal and plant found? (Montane, Mangrove, or Lowland rainforest)

2. How are the animal and plant adapted for life in the rainforest (ie, how do they deal with the large amounts of rain, predators, encroachment, etc.)?

3. What products, if any, do people get from the animal and plant you chose?

4 a. Are the plant and animal endangered?
4 b. Why?
4 c. What can be done to save them from extinction?

5. Describe the animal and plant you chose, including its habitat and food sources.

6. Discuss reproduction for the plant and animal. How many offspring does it have? When does it reproduce? How long does the animal take care of its offspring?

CONCLUSIONS: Students can present their findings in an oral summary to the class. Fellow students should be encouraged to ask questions based on what was presented. When everyone has discussed his/her paper, the whole group can get together and discuss similarities and differences between the animals and plants they chose. Discussion can focus on diversity of species found in the world's rainforests.

7-12 Activity 13:

TOPIC: Endangered Species

SOURCES: Animals-Mammals Species Index in The Rainforest ZooGuide
Plants Species Index in The Rainforest ZooGuide
References listed in this guide

ACTIVITY: In this activity students will create a newsletter informing fellow school-mates about endangered rainforest species such as the mountain gorilla, Malayan tapir, and the pygmy hippopotamus.

In order to develop a newsletter concerning endangered species students will have to do the following:

1. research several endangered animals and plants;
2. discover why they are endangered (i.e., loss of habitat, hunting, etc.); and
3. develop possible solutions to save them from extinction.

These findings can then be included in the newsletter in interesting ways. The newsletter should be informative and fun to read. Include articles, pictures, games that teach facts, and/or a suggestions column. Brainstorm other ideas to include in the newsletter to make it more interesting to fellow students at school. You may want to divide your class into groups that either create their own versions of a newsletter or work on different aspects of a single one. This project could be an ongoing one in which your students create a quarterly or monthly update to the newsletter.

When you have chosen what to include, use a word processing program to layout the newsletter and print copies to distribute to other students in the school. Ask for feedback on the contents and post solutions to puzzles and games you have included. You could have a contest to see who knows the most about rainforest ecology after reading your newsletter. Be creative and have fun with the newsletter, even though it deals with a serious topic. Your students can become crusaders for the save the animals campaign.

CONCLUSIONS: Since this project concerns making a successful newsletter, you can conclude it by discussing how well you achieved your goals.

1. Did other students find the newsletter informative and interesting?
2. What could you have done to make the newsletter more readable?
3. What other topics could your newsletter have addressed?
4. What did you learn from making this newsletter?

7-12 Activity 14:

TOPIC: Parasitic Plants

SOURCES: The Rainforest ZooGuide
Plant Species Index in the Rainforest ZooGuide
References listed in this guide

ACTIVITY: In this activity students will research parasitic plants of the world's rainforests to learn about these unique and highly adapted organisms.

Use this activity when studying Ecology, Botany, and Evolution.

There are many types of parasitic plants found the world over. Many of them inhabit rainforests because of the limited availability of sunlight and nutrients. Students should peruse the Plants Species Index for examples of parasitic plants (i.e., orchids, strangler figs, etc.), then do further research in their local or school library to gain an understanding of these interesting plants.

The following questions can be answered orally as a group or in essay format by the students when they have completed their research.

1. How do parasitic plants evolve?

2. Why are there so many different kinds in rainforests?

3. What other kinds of competition exist among rainforest plants?

4. Do all parasitic plants kill or do harm to their host plants? Why or why not?

5. Give an example of how a parasitic plant survives using its host plant.

CONCLUSIONS: Students can conclude this activity by reviewing their answers to the above questions. How are parasitic plants adapted for life in the rainforests?

7-12 Activity 15:

TOPIC: Review of The Rainforest ZooGuide

SOURCE: The Rainforest ZooGuide

ACTIVITY: In this activity students will create questions from the various chapters of the ZooGuide and play a “Jeopardy”-like game to review its contents using their questions.

Begin this activity by dividing your class into five groups, each focusing their question development on one of the five chapters in the ZooGuide. Each group should create 10 questions of varying difficulty for the game. They should include the answers as well.

Once students have created their questions they can write them on index cards with the answers written on the back of each one. Collect the cards and decide on point values for each. Then the whole class can play the game in their groups, only being allowed to answer questions from one of the four categories they didn’t research.

Below are some sample questions that can be generated from the ZooGuide. Use this game to review the CD or to assess what your students know about rainforest ecology.

1. How many rainforest products are shown in the candy store? (Introduction Chapter)-**7**
2. What is the process that plants use to make food? (Ecology Chapter)-**photosynthesis**
3. How many lemur species have become extinct? (Maps Chapter)-**14**
4. Name a sustainable rainforest resource. (Debates Chapter)-**wicker**
5. What is a native medicine man called? (Peoples Chapter)-**shaman**

CONCLUSIONS: After you have played the game, discuss the following assessment questions.

1. Which group of questions was the most difficult? Why?

2. How could you change the game to make it more fun to play?

References:

The references listed in this section are for use with the K-6 and 7-12 activities found in this guide. The references listed here were found in a local public library and represent a small portion of the books and videotapes that are available on this topic. If you cannot find a specific reference listed below, try to find a book with similar content in your school or local library.

Caufield, C., *In the Rainforest*; Knopf, 1985.

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