

## Seeing the Trees and the Forest . . . And Much More

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### INTRODUCTION

Having the two-fold challenge of teaching at-risk students and making world geography relevant to my adolescent students, I envision the need to design a teaching module that utilizes local, accessible educational facilities to advance the development of personal context/meaning. It is my opinion that informal non-school environments offer a vital venue for real learning, especially in gaining an understanding of the dynamic concepts offered in the study of rainforests. It has been my long-term goal and practice to sponsor students on field trips to extend my classroom lesson whenever resources permit. Over the years, I have found that this practice enables me to breathe life into an otherwise boring set of information.

Since many of my students are unfamiliar with Houston's educational resources as well as global political and physical environments, it is a significant challenge to align rainforest learning objectives to create positive educational outcomes. That is why the essential purpose of this unit is to demonstrate how the managing of local resources, namely, Houston museums, can enhance the learning prospects of high school students. With this set of lessons, I also hope to unify and expand upon the rainforest information currently presented in our world geography textbook.

The use of Houston's museums and other informal learning settings in the study of rainforests should assist the students' cognition of learning goals related to human, economic and ecological understandings of the rainforest. A concrete presentation of the rainforest's attributes will give the students an opportunity to construct a sense of relationship to the various rainforest ecological dynamics. Too often the instructional elements of learning about rainforests appear to be an eclectic jumble of recommendations, activities and disconnected efforts (Rillero 2). Our recently adopted world geography text mentions rainforests in twelve separate contexts. Because the text presents rainforest information in a fragmented manner, there is insufficient development of the linkage that would enable the student to grasp the significant interrelationship between human activities, economic development, environmental health and the sustaining of the global rainforest. I have designed this lesson to link the four continent studies of rainforests into unified modules that provide the students with a more wholistic presentation of the crucial purpose served by the rainforest ecosystem.

As a citizen in the 21<sup>st</sup> century, it is critical to "understand how people, places and environments are connected and interdependent" (TAKS Objective 5, HS.8). Furthermore, in order to properly grasp the significance of the role that global rainforests perform in the health of our planet, it is necessary for "the student to understand the types

and patterns of settlement, the factors that affect where people settle, and the processes of settlement over time” (TAKS Objective 2. HS.6). These learning objectives not only drive HISD instructional world geography content, but also impose an exacting level of accountability/mastery for each HISD student.

To assist students in creating a personal understanding of the rainforest’s significance, a study of Houston’s museums and other structures of informal learning environments could provide students with objects of learning and objects of discussion (Crowley, Leinhardt 66). These special learning environments can create opportunities to build integrated understandings of complex spatial features that characterize the discussion of rainforests and their pervasive influence on human activity. Furthermore, a well-planned trip to the museum can not only serve as an extension of rainforest lesson themes, but also present students with a multitude of rainforest learning opportunities and learning modalities.

A large body of literature supports cognitive learning through the application of multiple learning strategies (Teele 118). A museum environment allows students to approach the study of a subject in a multifaceted manner. Students not only see, feel, smell, hear and talk about the rainforest experience; they also receive the opportunity to visualize the teeming life and magnificence associated with the reality of the rainforest. If the proper preparation is made by the teacher to inform students what they are about to witness/experience and demonstrate how the museum experience relates to the context of previous learning activities, the student should be mentally equipped to progress to the next level of understanding/learning.

This learning readiness, accompanied with learning approaches that encompass all nine of the human intelligences (Gardner 1), should stimulate students to accomplish the learning objectives that we are attempting to achieve. An instructional vehicle that I have used in previous field trip studies is a prepared portfolio/notebook that allows students to anticipate the exhibits while allowing them to record their impressions and responses to previously posed academic questions.

Howard Gardner’s multiple intelligences cognitive learning theory suggests that each learner has a unique learning modality preference. This preference or intelligence is applied in new learning situations, advancing the extension of their personal context to integrate the new learning material. By incorporating a visit to a museum in teaching the significant roles served by rainforests, the teacher is providing a learning setting that allows students to apply their preferred learning modality in constructing an understanding of the rainforest ecosystem and its benefits to all humankind.

The exposure to real world examples of the teaching lesson’s subject matter can produce a spark of excitement to the new learning process. In past visits to museums, I have noticed levels of student enthusiasm and learning engagement that were not evident in the typical classroom setting. By conducting structured debriefing sessions, I could

determine that students did observe and react to the museum's exhibits in a productive and discerning manner.

## **UNIT BACKGROUND**

Nature's most brilliantly diverse ecosystem is the rainforest. Whether temperate or tropical, it is the home of thousands of colorful creatures and plants that literally give life to spaceship earth. Without a proactive plan to balance the economic needs of the developing country with the need to preserve and grow the earth's rainforests, the destruction of the rainforests will cripple our planet's ability to replenish the atmosphere with life's most important gas, oxygen. We are beyond the point in time to benignly ignore what is happening to rainforests around the world. It's time to see the forest and the trees, as well as the rainforests' animal and plant life, which provide essential substance to the well-being of life.

In the study of world geography, the subject of rainforests appears in no less than twelve contexts in our text. It is a global theme that directly touches four continents and impacts the entire world. Rainforests occur within a 23.5-degree band north and south of the equator. Their proximity to the equator exposes them to nearly a constant amount of sunlight and solar energy that endows them with idyllic growth conditions. This high-energy setting is responsible for the wondrous ecological functions this biome performs. As my world geography students study this natural wonder, they need to understand how physical environments are shaped by the earth-sun relationship and other physical processes (TEKS 113.34.c.4).

Rainforests make up only six percent of the earth's surface, yet they are home to 50 percent of the world's plant and animal species. The rainforests supply more drug-yielding plants used in medical and drug treatments than any other ecosystem in the world (McKisson 6). It is believed that rainforests hold potential new medicines in countless unnamed species of plants and animals. The harvesting of these new remedies may improve and extend the quality of human life.

In conjunction with the theme of the rainforest's unknown remedies as well as yet-to-be-classified, one-of-a-kind plants and animals, students who study this phenomenon will also be exposed to the fact that rainforests support the world's only remaining primitive peoples. These primitive peoples have survived for centuries in a symbiotic relationship with the rainforest. They have learned to sustain the growth of the rainforest ecosystem while gleaning the necessities of life from its womb. As modern man bulldozes their sacred alter into oblivion, we are displacing these peoples and sending them into extinction.

Not only are we losing the world's scarce primitive peoples, we are also losing the wealth of knowledge possessed by their shamans. The critical role of the tribal shaman or medicine doctor could serve well in identifying remedies for many of modern man's

illnesses. The shaman who uses ancient herbal remedies gathered from wisdom drawn from generations of primitive people who call the rainforest their home serves as an irreplaceable partner in modern man's quest for new discoveries that address life-threatening physical ailments. It has been recorded that in Southeast Asia alone, the traditional healers use 6,500 plants in treatments for malaria, stomach ulcers, syphilis and assorted other disorders (Myers 55).

Mankind's discovery that the rainforest has life forms that could cure many of modern man's ailments has only been a recent event (Mongabay 1). If we do not stop the wanton destruction of rainforests, much of this potential miracle information could be lost. Today, global citizens of the 21<sup>st</sup> century face the critical choice of preserving the rainforests and working with primitive peoples in discovering cures for modern diseases, or continuing to destroy the natural resource that is so vital to global health.

In addition to its medicinal promise, the rainforests' trees and plants serve as the planet's lungs as the leaves of their majestic trees breathe in carbon dioxide and breathe out fresh oxygen into the atmosphere. The absorption of carbon dioxide also incites natural processes to release solar energy back into space, thereby allowing trade winds to balance the levels of heat to the continents in a proper manner. Without the natural conversion of carbon dioxide, the atmosphere traps excess carbon dioxide gases that have the effect of increasing global temperatures.

My objective in creating a unit on the rainforest is centered on a desire to devise a teaching strategy that will create thematic links to study of the human and physical geography of the four continents (three rainforest biome regions) that are home to the rainforest. Another teaching objective is to have the students compare and contrast various physical, economic and social characteristics that determine public policies affecting the conservation of rainforests. This objective is derived from TAKS Objective 3 HS.5, which involves having students compare cultural values associated with socioeconomic stratification and analyze the influence of cultural values on economic behavior.

To structure the orientation to the significance of the rainforest habitat, the teacher begins by offering at least four discovery frameworks to use in the study of rainforests. These frameworks include: (a) structure, (b) location and climate, (c) importance and (d) conservation of resources (Rillero 2). Pointing out that the rainforest features a vertical stratification, the teacher explains the various microclimates and microhabitats that exist in the different layers of a rainforest. A sample rainforest lesson model (Pranis, Chen 15) proposed that teachers use classroom furniture to depict the different levels of a rainforest. They had students stand on chairs to represent the canopy, stand on the ground to reflect the position of the sub-canopy, kneel on the floor to demonstrate the position of the understory and lie on the floor to demonstrate the ground level of a rainforest. A follow-up discussion of what types of animal and plant life thrived in each

rainforest level would allow students to visualize the uniqueness of the rainforest ecosystem.

It should be noted that 21<sup>st</sup> century rainforest literature describes the layers of a rainforest in the following manner: (a) emergent, the uppermost layer of tropical rainforest where the giant trees (150 to 250 feet tall) emerge from the canopy to form an extra umbrella-like layer; (b) canopy, a flat layer of forest formed by tree crowns (60 to 150 feet tall), which is the sector that supports the most wildlife; (c) understory, a layer that contains small trees that will eventually form part of the canopy and (d) forest floor, which lies more than 60 feet below the canopy and contains sparse vegetation (Drienen 2).

Each layer of the rainforest features its own assemblage of plants and animals. The most populated and thickest layer of life is found at the canopy level. Because it is difficult for humans to navigate at this layer, much of the life in this region is unknown and is still being researched. Equally difficult is researching the plant and animal species found at the understory level as the trees in the area are relatively far apart and their branches will not support much weight. Most of what we know about the rainforest is from herb and shrub samples secured from the forest floor (*Journey Into Amazonia*).

In a world geography context, the student should be able to identify the location of tropical rainforests as regions situated between the Tropic of Cancer and the Tropic of Capricorn. A related learning activity to demonstrate this location suggests that students look at a map and place a strip of green cellophane along the equator to visualize the tropical rainforest belt (McKee 26). The largest tropical rainforests are in Brazil (South America), Zaire (Africa) and Indonesia. Other rainforests are found in Southeast Asia, Hawaii, the Caribbean Islands and Australia. The Amazon rainforest is the world's largest, covering an area about two-thirds the size of the continental United States. The Amazon rainforest, when linked to the rainforests of Mexico, Central America and the Caribbean Islands, creates the Amazonia Rainforest region, which is truly a spectacular natural wonder.

To introduce the students to the concept of biodiversity, the teacher could take the class to a nearby open field or "forest" and instruct students to draw and count the different types of living organisms they encounter (Crane 11). The drawings, counting and writing about what they observed on this field trip would become part of a portfolio that they would maintain during their thematic and/or longitudinal study of rainforests.

In using local rainforest resources to construct a variety of concrete learning activities, a student becomes empowered to create a personal understanding of the ecological importance of rainforests and why this resource needs to be conserved. In addition, the teacher-conducted, student-centered preparation for the rainforest field trip should enhance the students' visit to the museum and expose them to the engaging learning potential that museums hold for life-long learning. It is also a feasible teaching strategy

to use a rainforest field trip experience to unite various academic disciplines in a pre-trip strategy that blends different academic paradigms to assess the rainforest's universal importance.

Houston has at least two noteworthy resources that simulate and teach the magnitude of the rainforest. Cockrell Butterfly Center at Houston's Museum of Natural Science and Moody Garden's Rainforest Pyramid (Moody Garden's also has a traveling sight, sound, feel rainforest program for schools in Region IV) offer our community the opportunity to experience the awesome beauty and uniqueness of the rainforest. What better way to teach the rainforest than to have students experience it firsthand? Both local resources demonstrate and explain the role that the rainforest plays in recycling the earth's oxygen while supplying essential ecological support to the world's food chain. In addition, both resources recount the desperate condition in which the world finds the rainforests as their acreage continues to decrease at a rate of 33.8 million acres a year (Roberts, Roper 1998).

As part of the instructional strategies in using the local rainforest resources in teaching the rainforest's unique ecosystem, the student will be confronted with the natural veracity of the rainforest's biosystems. Upon seeing and reflecting upon the rainforest's simulated realities, the students will obtain personal contexts of the natural elements involved in conserving the rainforests.

This newly acquired context, via a field trip to either Houston rainforest resource, will provide students with a sense of responsibility to participate in the ongoing dialogue to conserve this important resource. The personal exposure to the rainforest environment will allow them to speak with understanding and passion as they learn of the complex issues confronting developing countries that are attempting to reconcile their economic needs to the world market for rainforest hardwood timber. In addition, students will gain insights to other issues confronting developing countries and their land use policies regarding rainforests, such as providing land for growing populations and increasing the amount of farmland to grow crops to feed their population.

In addressing the subject material related to the rainforests' homeland via the Houston resources, the teacher would be empowered to provide spatial and/or kinetic learning activities for her students. The larger than life features of the lesson's presentation would provide students with a greater sense of the magnitude associated with the rainforest ecosystem, regardless of what continent one finds them on. By constructing a dynamic reference point for the learner, the teacher would be able to reinforce the importance of the rainforest's role as each country's political and economic geography is explained. Furthermore, as each country's policy justifying the rainforests' destruction is presented, students will gain meaningful insights into the issues compelling developing countries to obliterate the rainforest for the sake of the country's economic/political needs.

The students' academic skills of critical thinking will be enhanced as they evaluate the reasons why the destruction of rainforests is readily accepted by developing countries as

a necessary step in their progression toward economic independence. Aligned with this objective, a second skill that students will master is the ability to design, construct and present written/pictorial exhibitions of their work. In using portfolios and exhibits as artifacts in expressing their understanding of the rainforest issues, the students will create a documented context, enabling them to astutely defend their position.

In the students' first exposure to the rainforest theme, they will view this biome as a single theme that is woven throughout the study of four continents. The development of this theme would begin with a map presentation (overhead transparency of world map, globe, hard copies of world map) followed by a listing of benefits derived from the existence of rainforests. According to the textbook's chronology, the first rainforest lesson (and overview of its ecological benefits to life on earth and list of countries' policies toward rainforest conservation) would be presented during the discussion of Central American countries. At the point of introduction to rainforests, it should be noted that this topic transcends location and human geography and has global implications. The preservation of rainforests is not the domain of a single country; rather, it is a subject that impacts all of humankind. The teacher must decide whether to use this lesson as a single presentation (see Lesson Plan 2) or a longitudinal theme that is given periodic emphasis as the rainforest topic touches on the study of the physical and political geography of diverse countries residing in various continents (see Lesson Plan 1).

It would also be an objective of these lessons to engage the students in a life-long awareness and support for the preservation and conservation of the world's rainforests. Moreover, it would be a secondary objective to encourage students to utilize Houston's museums and other hands-on facilities to broaden their understanding of scientific and geographical issues as they impact our daily lives.

As part of the students' learning activities for the rainforest lesson, the students will learn information and adapt procedures for recording their rainforest observations. After arranging for a field trip or having a rainforest agency instigate a classroom visit, the teacher will provide basic information on the rainforest ecosystem, with references to each site's simulated contents. The students will use the presentation of the pre-visit information to acquire an initial understanding of the issues addressed in the rainforest conservation. Following their field trip visits, the students will use portfolios and student-constructed exhibits to make their arguments detailing the role the rainforest plays in our biosphere. While working in groups, students will discuss specific countries' political and economic motives for managing their rainforests. Students will be encouraged to write Brazil and other developing countries' consulates or embassies in order to gain primary references for their portfolios/exhibits.

The students' consulate contacts can lead to an ongoing discussion on the pragmatic versus the idealistic conditions that lead a developing country to destroy rainforest acreage. Data collected from these primary sources will enable students to design and produce charts indicating real time solutions or deficits of solutions that are occurring

globally in response to the world's need to protect and enhance the benefit of rainforests. Given a country's economic and political realities, the students can design conservation models that they deem viable that would save the country's rainforests from further destruction.

For the latest figures on what is happening to the rainforests being destroyed, I have found that the <[www.mongabay.com](http://www.mongabay.com)> website provides one with excellent up-to-the-month statistics. The fact that rainforests are being destroyed and cannot be replaced should be a major theme in our public life, yet we seem resigned to the fact that this destruction is a state matter and is beyond the jurisdiction or concern of the United States. As teachers, we need to develop awareness that not only are the citizens of earth linked economically and through telecommunication, but that we are also linked environmentally. This is especially true when it comes to the preservation of rainforests.

While rainforests do not thrive in the climate of North America, the citizens of this continent derive specific benefit from their existence. Not only does it provide us with quantities of fresh air (recycled from our pollution, carbon dioxide, caused by fossil fuel-burning devices), the rainforests also hold vast information concerning *miracle* remedies for illnesses the cures for which we have yet to discover. But the medical community needs time and resources to pursue in-depth studies of plant applications used by shamans in their treatment of tribal illnesses and diseases. We need time and more information.

Because the subject of the rainforest destruction is easy to overlook or avoid (since we don't want to interfere with other governments' public policies), students must become engaged in researching and discussing each of the numerous questions raised in the study of rainforests. This topic can be approached via many teaching avenues, which makes it an ideal subject to teach from an interdisciplinary approach (see Lesson Plan 3). With world geography and science teachers leading the way, assorted questions such as the following could serve as teaching lesson focal points in math and language arts as well:

1. What is a tropical rainforest?
2. What is the range of annual rainfall for a tropical rainforest?
3. What is the typical climate of a rainforest?
4. Where are rainforests located?
5. What are the plant and animal species that live in a rainforest?
6. Who are the indigenous people who have lived in the rainforests for centuries?
7. Do their healing traditions hold any benefit to 21<sup>st</sup>-century mankind?
8. What are the unique life systems found in a rainforests, and how to they contribute to modern life on earth?
9. In what ways are tropical rainforests beneficial to air, water, food, biodiversity and healing practices?



10. What economic/human growth alternative can the United States offer to developing countries in order to assist them in preserving the existence of their rainforests?

The application of knowledge can be an important tool in protecting and preserving the tropical rainforest. As passionate as one may become in addressing this topic, the teacher must take the approach that our main teaching objective to provide as much information as possible on the subject and permit students to arrive at different judgments on the issue. Hopefully, if we can provide the students with details surrounding the problems facing rainforests and encourage dialogue on possible solutions, we will have successfully accomplished our teaching goal; namely, that the conservation of natural resources is a responsibility of us all.

As global citizens and conservation minded, freedom-loving democrats, we need to promote understanding and cooperation in preserving the awesome benefits rendered by our world's rainforests. As students, do they understand the symbiotic relationships nurtured by the rainforest as it plays out in the individual (national) as well as the collective (global) environment? As teachers, we must assist our students in visualizing the rainforest's irreplaceable exclusivity and help them see the trees as well as the forest.

## **LESSON PLANS**

### **Lesson Plan 1: Portfolio**

**Objective:** This is a teaching strategy designed to encourage the student to present geographic information in written and visual forms and using geographic terminology correctly (TEKS 113.34.c.22.C.). In addition, this strategy should be used with a multi-intelligence learning approach as each student compiles and creates her own presentation and reflection on the material being presented.

**Materials needed:**

Three-Ring Binder

Tabs

Access to a computer for word processing

Hole punch

Any other materials deemed necessary by the student

The students are instructed that they are to maintain a portfolio that explains the regions and issues facing preservation of the rainforest in the 21<sup>st</sup> century. In preparation for the study of tropical rainforests, the students will create a folder that will have six tabs identifying:

- What the tropical rainforests are
- Where they are found in the world

- Tropical rainforest plants and animals
- Indigenous people of the tropical rainforest
- Significant contributions of the rainforest
- Personal expressions/interpretations of the rainforest's destiny

Beginning with the presentation of biomes (Chapter 3, p. 65), students will be instructed to begin taking notes on the definition of a rainforest within the larger classification of biomes.

As the progression of material advances to the study of Central and South America as well as the Caribbean Islands (Chapters 9 and 11, p. 188, 205, 207, 208, 245-247), the students begin adding more data to their portfolio. In presenting the region's physical and human geography, the teacher will bring an academic focus to the largest rainforest region in the world (the Amazonia Rainforest). Students will be encouraged to record responses to questions posed by the study of the region and the impact the rainforest makes on the human geography of the region. They will also be asked to respond to the economic and political pressures facing those countries that are faced with the apparent need to clear rainforest for population growth reasons.

As students reflect on the global nature of rainforest benefits, they will be confronted with other realities facing nations in Africa (Chapter 18, p. 421-423, 425) and Asia (Chapter 24, p.558) who already have destroyed most of their rainforests for the cause of population expansion. With the study of each region that contains a rainforest, students will be adding information to their portfolio compartments and be encouraged to creatively express their understandings of the human, environmental, and political policy issues challenging the rainforest resource.

## **Lesson Plan 2: Global Significance of the Rainforest**

### ***Objectives:***

This lesson suggests a teaching schema that incorporates the textbook's multiple rainforest presentation into a single presentation that can be presented in a single block or longer, if time and teaching strategy permit. It can serve as an extension of the unit on biomes or a stand alone unit on rainforests which units not only the textbook's discussion on biomes, but also as your students study the continents that host our world's rainforests.

### ***Materials needed:***

Overhead  
 Notebook paper  
 Other materials deemed necessary by the teacher

Lesson Plan 1 explains the sequence of instructional presentations. The main difference is that the teacher is covering most of the material in a condensed fashion, without students maintaining a portfolio on the materials presented.

### **Lesson Plan 3: Thematic Interdisciplinary Lesson**

#### ***Objectives:***

This teaching strategy suggests that you involve other faculty members in constructing a teaching unit on the rainforest. Science teachers should develop teaching themes centering on the botanical and animal aspects of the rainforest. Language arts teachers could have their students develop short stories or poetry that describes some aspect of rainforest life. And math teachers could use the rainforest to teach measurement skills or design story problems, using the rainforest as a setting.

#### ***Materials needed:***

Necessary materials depend on the collaboration needs of each teacher in teaching to this theme. Prior to the lesson's presentation, faculty members representing assorted academic subjects meet to draft rainforest themes that are addressed during the school year and that can be taught concurrently (i.e. life, rain, symbiotic relationships). Once the themes are agreed upon, each teacher develops an instructional outline on how the content will be presented. This outline will be shared with the collaborators, and additional ideas and comments can be integrated into each of the existing instructional outlines that would further compliment each teacher's pedagogical presentation.

Students will be taught this unit during a period of time to be determined by the collaborating teachers. To reinforce the cohesiveness of instruction, some type of joint project can be developed that will serve as this theme's student evaluation instrument.

### **Lesson Plan 4: Pre-Trip Presentation – Extension of Rainforest Lessons**

#### ***Objectives:***

This field study of rainforests allows students to experience first-hand a sampling of the rainforest biome. Both Houston resources have enough rainforest plant and animal life to give each student a sense of the dynamic ecosystem that exists in a rainforest. The key is preparing the students for what they will see and what they need to reflect upon once they arrive at the exhibit. Using the world geography text material as background information, the teacher can prepare the students to observe specific life forms and factors that contribute to the critical roles that rainforests perform in sustaining life on earth. A pre-trip review of background material contained in this paper, along with activities suggested by the textbook, could serve as an in-depth preparation for a field trip to either or both museum facilities. Students should also be guided into extending their understanding of the rainforest ecosystem to include a post-field trip activity that could be ongoing (writing to rainforest country consulates to determine their policies regarding rainforest conservation and reporting updates as information develops) or a one-time group interaction project reflecting on information gathered during the field trip experience.

### ***Moody Gardens***

The Rainforest Exploration program includes close encounters with rainforest animals in a classroom setting, a self-guided visit with the tropical plants and animals of the Moody Gardens Rainforest Pyramid and the viewing of an IMAX film. Total time required of the tour is scheduled for four hours.

Moody Gardens' Education Department also offers their Traveling Rainforest Trunk that takes the rainforest on the road. A Moody Gardens' staff member visits your school with several rainforest animals, plants, music and a trunk overflowing with rainforest artifacts.

Moody Gardens also offers teachers workshops that focus upon the animal and plant life found in a rainforest, and another workshop that provides teachers with an up-close look at frogs and toads.

In my personal review of this resource, I was delighted with the content and sequence of materials presented in the Rainforest Pyramid. As one approaches the main exhibit area, a colorful display of frogs is presented under the title of Indicator Species. This extensive display of frogs gathered from many regions of the world tells the story of how the quantity and health of frogs provide real information on the condition of the global environment.

As one enters the main exhibit area, he feels the humidity in the air as he traverses through the different regions indicated by overhead signs and exemplified by trees and plants collected from that region's rainforest. The different areas of the exhibit include Mountain Butterflies, Rainforest Flowers, African Rainforest, Mayan Plaza and Asian Region. Each of these areas has flowers and wildlife (birds, butterflies, and insects) that reside in the rainforest of that region. The exhibit also tells a comprehensive tale about the vanishing rainforests and what is being done to curtail their demise. The exhibit presents some excellent ideas for classroom projects that could extend the students' involvement with this topic.

### ***Cockrell Butterfly Center (A wing of Houston's Museum of Natural Science)***

A smaller version of the Moody Gardens' exhibit, the Cockrell Butterfly Center begins with a five-minute movie overview in a small cove with sitting for 50 people. In the lobby of the exhibit, each visitor is given a laminated sheet of 36 butterfly species pictorially identified, with their place of origin given. Also in the lobby are samples of insects found in the rainforests. As you enter the exhibit, you sense the humidity that is a constant in the world's rainforests. Once in the exhibit, paths lead you around to various types of vegetation that serve as feeding places for the butterflies. Numerous butterflies swirl around you as you look to your side and upward over your head. Occasionally, butterflies will alight on a plant to pause for whatever reason.

As you wind around the path (there are two circular paths, much shorter than the Moody exhibit), you come to a set of stairs that you climb to reach a higher observation level. This level leads to another exhibit area away from the butterfly environment and back into a main exhibit wing of the museum. In this wing are mounted insects from numerous rainforest areas of the world and from different periods of time – prehistoric to present. As you meander through the aisles with walls and cases of mounted insects, you are reminded of the diversity in the world’s ecosystem and the uniqueness of life. There are maps on the wall to assist the visitor in locating the origin of the individual insect species. As visitors leave, there is an excellent map and a detailed explanation of what is happening to the world’s rainforests. It is a good resource to refer to in assisting students in understanding the rainforest ecosystem and the damage incurred to the environment when rainforests are destroyed.

## **ANNOTATED BIBLIOGRAPHY**

### **Teacher Resources**

#### ***Books and Articles***

*A Place Out of Time: Tropical Rainforests – Their Wonders and the Perils They Face.*  
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[http://www.angelfire.com/oh/the\\_midasnews/feb4art.html](http://www.angelfire.com/oh/the_midasnews/feb4art.html)>  
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