Exploring the Rainforest

Multiple Intelligences & Cooperative Learning Activities

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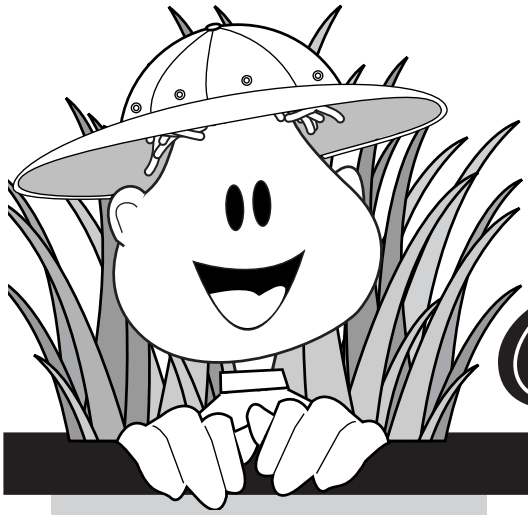
EDUCATION



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Introduction

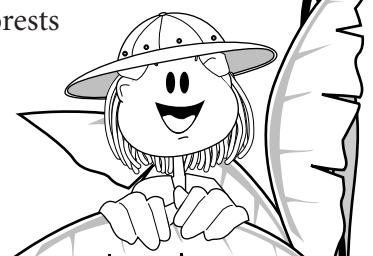
Why study the rainforest?

Despite the fact that some of us will never see tropical rainforests, we experience their impact on a daily basis. Rainforests cover less than 7% of the earth's surface, yet they are rightly called the "lungs of the earth". The dense vegetation provides oxygen to the entire planet. The tropics fuel our global weather system with rising currents of warm moist air. In addition, many of the products that we enjoy in Australia, from pineapples to wicker chairs, were discovered or originally produced in the rainforest. Millions of species of plants and animals make their home in the rainforest, many of which may provide humankind with medical cures or important scientific insights.

Australia has many different types of rainforest including cool temperate, temperate, dry, subtropical and tropical rainforests. Australia's Wet Tropics rightfully earned their recognition as a World Heritage Area in 1988 as one of Earth's most outstanding, important and diverse habitats. These rainforests, including the famous Daintree, provide an unparalleled living record of the ecological and evolutionary processes that shaped the flora and fauna of Australia and contain the oldest continually surviving tropical rainforest on Earth.

Tropical rainforests hold a fascination for children that is almost unmatched. Children seem to have an unlimited capacity for reading about the rainforests, watching videos of the amazing animals and plants, writing stories and solving rainforest maths problems. Fortunately, Australia is one of the few places in the developed world where rainforests are available for public enjoyment, global conservation and research. As such, Australia has a duty to lead the world in rainforest science and sustainable rainforest management. This includes incorporating the study of rainforests into our education curriculum from an early age.

Teaching students to be concerned about our earth is a curriculum objective at every year level. The widespread destruction of tropical forests will change the climate throughout the world. By studying the rainforest, students learn that plants, animals and

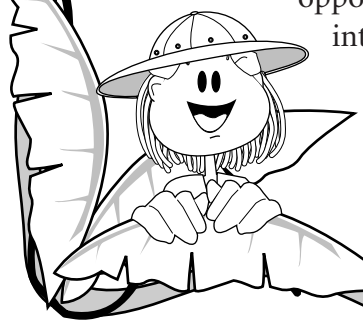


people must all share the planet and its resources.

Why use an integrated thematic approach?

Life is not arbitrarily divided into chunks — this is maths, this is science, this is reading. Outside of the school environment, we approach new learning by integrating our past knowledge and a variety of skills. When we become interested in a topic, we read about it, analyse data, solve problems, discuss its impact on society, and perhaps even write letters expressing our views. When we are extremely interested in a new topic (say, learning about Brazil in preparation for a vacation to that country), we become totally immersed in the learning process. Our discoveries in one area fuel our interest in other related topics.

Why not tap into this natural approach to learning as we teach students in the classroom? Instead of reading a story about rainforests and then solving maths word problems involving a trip to the supermarket, why not use one theme as a focus for all studies? Why not integrate the curriculum so that a discovery in one content area sparks a question to be investigated in another?



Tropical rainforests provide a wealth of opportunity for this type of integration. The science connections are obvious — studying the interaction of plants and animals, the oxygen cycle, human's impact on the environment, and so on. What may not be as obvious is the multitude of other curriculum areas that can be tied in.

The outpouring of information on this topic in recent years has been phenomenal. Type the word "rainforest" into any Internet search engine and you'll find a tremendous amount up-to-date information at your fingertips. Most major rainforest conservation organisations have created Web sites that are both entertaining and informative. Furthermore, by visiting those sites you can find links to other rainforest information on the web. A great place to start is the Rainforest Action Network (see the Rainforest Resources starting on page 187).

In addition, a visit to the local bookshop reveals dozens of other print and nonprint resources on rainforest topics. You'll find wonderful children's fiction and nonfiction books, both read alouds and read alones. To help you find just the right book, an annotated bibliography of children's literature is located within the Rainforest Resources (page 187). Many of the lessons in this book have a "literature link" suggested, but often you can substitute another book if the one listed is not available.

In addition to science and literature, your rainforest exploration can easily extend into maths, health, humanities, English and the arts. Studying about medical mysteries of the rainforest, solving word problems, writing stories, examining

cultural differences and creating puppet shows are examples of the many exciting activities that await your class.

Why cooperative learning?

If you are already using cooperative learning, you know that cooperative learning is a powerful teaching technique that students happen to love. Over 600 formal research studies have demonstrated benefits that run the gamut from improved academic achievement to better social skills and attitudes toward school. Being a part of a learning team is infinitely more exciting than a solitary excursion into academia. And when the classroom is an exciting place to be, students are motivated to work hard and accept increasingly difficult educational challenges. In addition, students in cooperative classrooms develop an appreciation for other learning styles and ways of thinking.

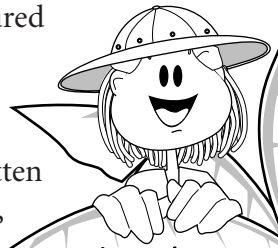
Imagine visiting two classrooms. Both are studying the rainforest. Step into the first classroom . . . shhh! Students seated in rows are reading an article entitled "What Are Rainforests?" Immediately after they finish reading the teacher assigns five questions to answer in preparation for the class discussion. Students are absorbed in academic pursuits, but the lesson is hardly designed to instill a love of learning.

Step into the next classroom and the difference is immediately apparent. Students in teams of four are assigned a specific rainforest layer, such as the Canopy or Forest Floor. Each team member moves to a different corner of the room to meet with others who will become "experts" on that topic. The experts read about their topic and discuss the major concepts together. Each person draws a diagram of their rainforest layer to help them teach what they have learned. They return to their original teams and assemble their drawings into a layered diagram of the rainforest. As they work, they discuss what they learned about each layer. Through cooperative learning, studying the rainforest becomes an experience students will long remember.

Fortunately, you don't have to spend hours planning awesome cooperative lessons . . . this book is your key to success! In this book, you will find three dozen exciting activities designed to make your rainforest unit an unforgettable adventure.

What are structures?

The key to successful cooperative learning is proper implementation. And the best way to implement cooperative learning is to use cooperative learning strategies, or structures. Structures are step-by-step methods used to ensure that cooperative learning doesn't dissolve into groupwork. If activities are not properly structured, one person may end up doing all the work while the rest of the team enjoys a free ride. Well-structured cooperative activities require some type of individual accountability either through a written response, assigned roles,



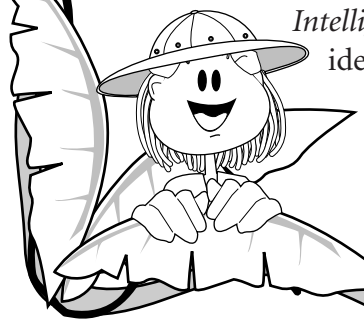
colour-coding or performance in front of a group. By using structures to build activities, all students are required to fully participate in each and every activity.

Structures have names such as Think-Pair-Share, Jigsaw, RoundTable and RoundRobin. The activities in this book rely on structures, but you don't need to know the structure names to be successful with the activities. The activity directions are straightforward and assume no prior knowledge of specific cooperative techniques.

A brief structure reference is given in the appendix to this book. If you would like more detailed and comprehensive structure descriptions, read Dr. Spencer Kagan's book, *Cooperative Learning.* This is the ultimate handbook to implementing the structural approach. The book is available through ***Hawker Brownlow Education www.hbe.com.au***

Why multiple intelligences?

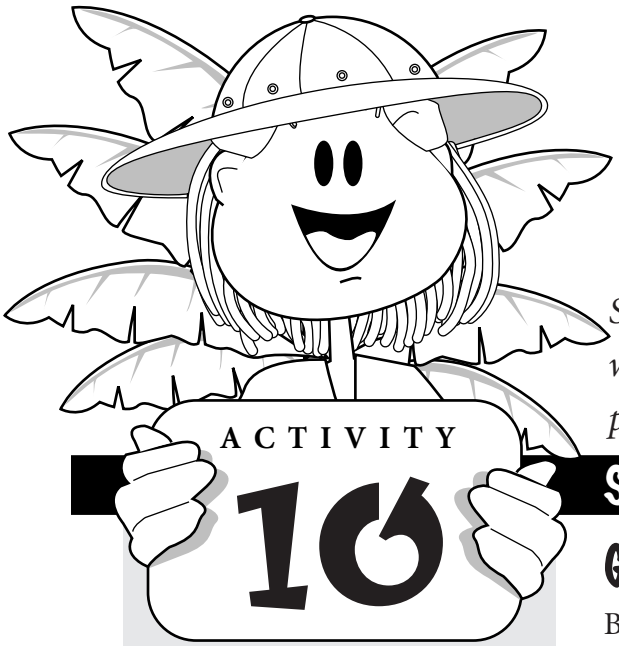
People are beginning to recognise something that teachers have instinctively known for many years: intelligence is not one-dimensional. Dr. Howard Gardner pioneered this body of research in 1983 with the release of his book, *Frames of Mind: The Theory of Multiple Intelligences.* The two basic ideas central to his theory are: 1) Intelligence is not fixed; we have the ability to develop intellectual capacity, and 2) There are many ways to be smart. There are at least eight different kinds of intelligence, ranging from Logical/Mathematical ability to Interpersonal intelligence. For a description of each of the eight intelligences, refer to the Eight Intelligences At-A-Glance chart (page ix).



As a long-time proponent of cooperative learning, Spencer Kagan immediately recognised the significance of Howard Gardner's theory. When implemented properly, cooperative learning techniques naturally incorporate many different intelligences. In fact, it would be almost impossible to utilise MI theory effectively *without* cooperative learning. Dr. Kagan and his son Miguel applied MI theory to cooperative learning practice and created a comprehensive handbook for teachers entitled *Multiple Intelligences: The Complete MI Book.* Within this book, they challenge educators to accept three visions with regards to implementing MI theory.

Vision 1: Matching. Teachers can enhance learning by ***matching*** instructional strategies with how students learn best. Traditional academic settings primarily rely on Logical/Mathematical and Verbal/Linguistic teaching strategies. Students who learn best in other ways will benefit from multiple approaches to instruction.

Vision 2: Stretching. The new view of intelligence offers hope for improving all of our intellectual capabilities. By using a wide variety of instructional approaches, teachers can ***stretch*** students to develop a



ACTIVITY 16

Comparing Climates

Students work in pairs to graph monthly rainforest weather data. They compare that data to weather patterns in their own community.

Cooperative Structures

- **Pairs Compare**
- **Think-Pair-Share**

Content Areas

- Mathematics
- Science
- Humanities

Materials

- **Weather Data** worksheet (1 per pair)
- **Comparing Precipitation** graph (1 per pair)
- **Comparing Temperature** graph (1 per pair)
- Coloured pencils (1 box per team)
- 1 Transparency of each blank graph
- Transparency pens in 2 colours

Multiple Intelligences

- **Verbal/Linguistic**
- **Logical/Mathematical**
- **Visual/Spatial**
- **Interpersonal**
- **Intrapersonal**

Steps . . .

Getting Ready

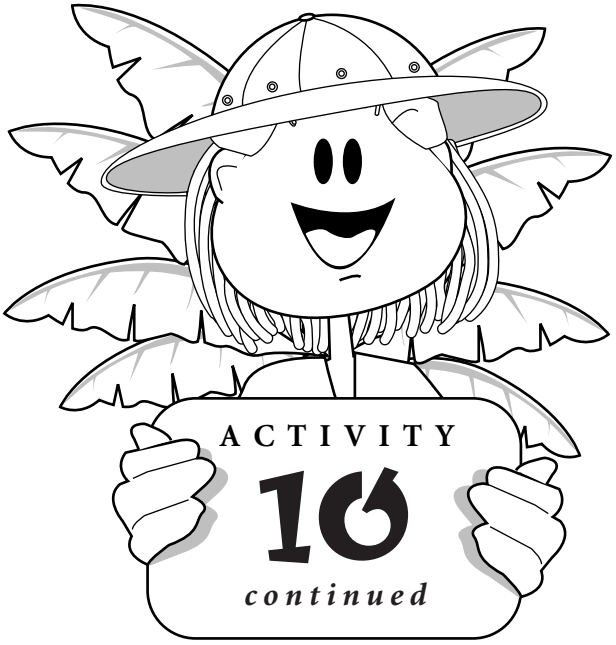
Before starting this activity, locate the necessary weather data for your city and a rainforest city. You will need the monthly precipitation and temperature averages for each location. The easiest method of finding this information is to visit the WorldClimate Web site at *www.worldclimate.com* which provides weather data for thousands of cities. Complete the blank Weather Data charts before duplicating them for your class. If you are unable to obtain this information, you may want to use the weather data for Melbourne, Australia and Jakarta, Indonesia which is provided on a sample chart.

1. Think-Pair-Share

"What do you think the climate of a rainforest is like? How hot or cold would you expect it to be compared to where we live? What kind of rainfall would you expect?" Allow a few moments of individual think time, and then have students pair with a partner to discuss the questions. Finally, call on students to share their ideas with the class.

2. Introduce Activity

Divide each team of four into pairs. Give each pair one Weather Data worksheet, one Comparing Precipitation graph and two different coloured pencils. Place the overhead transparency of the Precipitation Graph on the overhead projector. *"Let's find out how the climate of the tropical rainforest compares with our climate. Today you are going to work with a partner to create climate graphs from the information found on these charts. Let's start by comparing the precipitation in our area to that of a rainforest in Indonesia."* Indonesia is the location of the most extensive rainforest in Asia. If a map is available, ask students to locate Jakarta.



Comparing Climates

3. Graph Local Precipitation

"Each of you take a coloured pencil and fill in one of the boxes in the graph key. Today you will create a double bar graph comparing the rainfall in Indonesia to the rainfall we receive. One person will read out the precipitation data for our area first. The other person will draw and colour the bars according to the colour key below the graph." Demonstrate how to colour the bar showing local January precipitation. Monitor and assist where needed. Be sure students are leaving room for the second bar on each month.

4. Graph Rainforest Precipitation

"Now switch roles. The other person will call out the rainforest precipitation data and his or her partner will colour the bars in a different colour according to the key." Demonstrate using the other colour on the overhead transparency.

5. Pairs Compare Graphs

After everyone has completed their double bar graphs say, *"Compare your graph with your teammates. Do they look the same? What have you learned about the rainfall in our area as compared to the rainforest?"*

6. Graph Local Temperatures

Place the Comparing Temperature overhead transparency on the projector. Give each pair a Comparing Temperature graph. Say, *"Now you and your partner will create a double line graph to compare our average monthly temperature to temperatures in the rainforest. Use two different coloured pencils to colour the key at the bottom of the graph. One person will call out the monthly local temperatures while his or her partner plots the points and connects them with straight lines."* Demonstrate with one colour on the overhead transparency.

7. Graph Rainforest Temperatures

"Now switch roles as you did before. One person calls out the rainforest temperatures while the other person plots the points and connects them. Be sure to use a different colour pencil. Don't worry if the two lines cross." Demonstrate on the overhead transparency.

8. Pairs Compare Graphs

"Compare your double line graph with the one created by your teammates. Do they look the same? What did you learn about temperatures in the rainforest as compared to our temperatures?"

9. Think-Pair-Share

"Why do you think rainforest climates are different from ours? What might cause those differences?" Allow think time and then pair students to discuss the questions. Finally, have

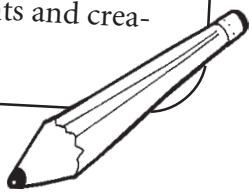
students share their thoughts with the class. Be sure to discuss factors such as distance from the equator and amount of vegetation.

Variation

Students Research Data - If Internet computers are available in your classroom or a lab setting, distribute blank Weather Data charts and let students work in teams to visit the WorldClimate Web site and record the data on their own.

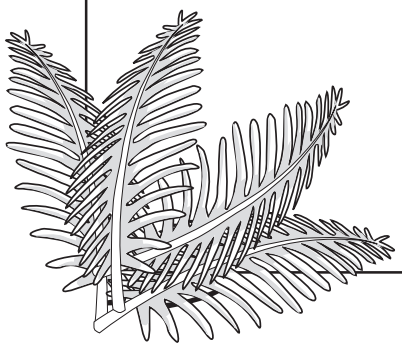
Journal Idea

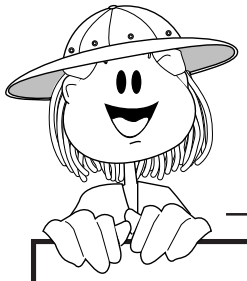
Have students summarise what they learned about the climate of the rainforest. Are there seasons in the tropics? Ask them to imagine that winter came to the rainforest. How would this affect the plants and creatures that live there?



Alternative Activity

For students who live in the tropics, you may want to use climate data from a temperate rainforest, e.g. New Zealand, to complete this activity. Encourage students to recognise the unique nature of these forests.

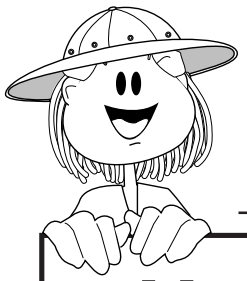




Local
Weather Data

Melbourne, VIC

Month	Average Precipitation (millimetres)	Average Temperature (°C)
January	48	20
February	47	20
March	52	18
April	58	15
May	58	12
June	49	10
July	49	10
August	50	11
September	59	12
October	67	14
November	60	16
December	59	18

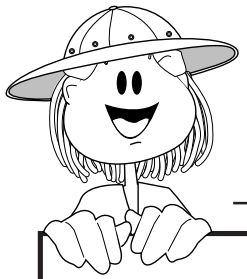


Rainforest
Weather Data

Jakarta, Indonesia

Month	Average Precipitation (millimetres)	Average Temperature (°C)
January	341	26
February	302	26
March	210	26
April	135	27
May	108	27
June	90	27
July	59	27
August	48	27
September	69	27
October	106	27
November	139	27
December	207	26

Source: *worldclimate.com*



Local
Weather Data

Month	Average Precipitation (millimetres)	Average Temperature (°C)
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February		
March		
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September		
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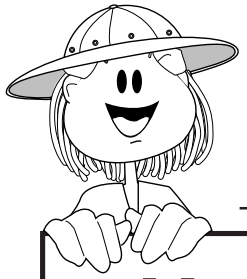
December		



Rainforest
Weather Data

Month	Average Precipitation (millimetres)	Average Temperature (°C)
January		
February		
March		
April		
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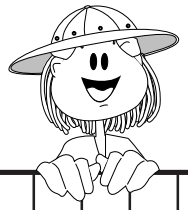
June		
July		
August		
September		
October		
November		
December		

Comparing  Precipitation

440
400
360
320
280
240
200
160
120
80
40
0

Jan | Feb | Mar | Apr | May | Jun | July | Aug | Sep | Oct | Nov | Dec

Key Local ☐ Rainforest ☐