Rainforests Through Time

LESSON PLAN

What Can Be Learned?

This series of activities can help students gain an understanding of the unique history of Tasmania's temperate rainforest. Its origins can be traced back to the ancient supercontinent Gondwana. It was in existence millions of years before eucalypt forests developed. Tasmania is home to some of the last remants of this Gondwanan forest, and the plants that grow here provide us with much information about the past.

Materials Required

- Paper of a suitable size for timelines
- Card for quiz questions
- Maps of Gondwana and current world maps
- Reference books and internet access
- Large labels or coloured paper hats (for Gondwana break-up activity)

The Activity

The background information (included) can be given to the students. Following that, there are six activities listed which can help to develop a greater understanding of the information, concepts and themes.

1. Event Timeline - Place the events detailed in the background information along a timeline.

The timeline can be presented in a workbook or on larger poster paper. Make sure to include some of the oldest known trees and most ancient stands of trees (and their locations).

More information about these can be found on the internet.

Search for photos or pictures to illustrate the timeline (for example: Kings holly, Huon pine, 'Methuselah' the Bristlecone pine, a depiction of Gondwanan forest)

2. Write definitions or explanations for the following:

- Gondwana
- continent
- continental drift
- plate tectonics
- conifer
- clonal colony
- vegetative reproduction
- carbon dating

3. 'Act out' the break-up of Gondwana -

In a large space that represents the globe mark north, south, east and west. Ask for seven volunteers, each to represent a continent/land mass (Australia, South America, Africa, Antarctica, India, New Zealand, Madagascar). Have the students wear large labels or coloured paper hats with continent/land mass names on them. If you want to involve the whole class, groups of students can link arms to form each land mass, and must move together (in the correct direction) as instructed.

Rainforests E-Set suited to lower secondary students.

As the story of the break-up of Gondwana is read out (see page below), the students 'act out' the break-up by moving in the appropriate direction.

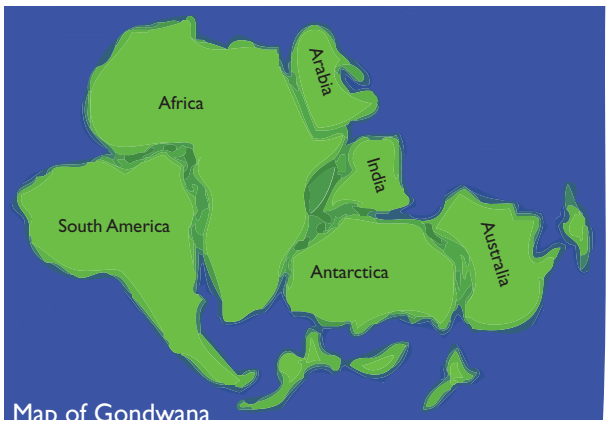
For example: As Antartica moves south it starts shivering. As Australia moves north it starts getting parched and crying out for water.

4. Mapping Gondwana

Provide each student with a map of Gondwana (search the internet) and a current map of the world. Do they recognise any familiar shapes in the supercontinent Gondwana? Ask them to label Gondwana with the names of the countries/ continents as they are called today. Place arrows on the map of Gondwana to show the direction in which each part moved.

Gondwana animation on the Web:

A Windows or Macintosh stand-alone version with clickable controls can be downloaded from:http://kartoweb.itc.nl/gondwana/index.asp



Map of Gondwana

5. What is vegetative reproduction?

Read the information on ancient groups of trees (included) and ask for 4 volunteers to act out vegetative reproduction.

Student one crouches with hands together above head and slowly grows into a tall tree with arms drooping like a Huon pine.

2000 to 3000 years go by and the tree falls to the ground. Student 2 then begins as a seedling

growing out of the fallen tree.

Another couple of thousand years go by and that tree falls. Student 3 then grows out of that tree and so on.

6. Write a quiz

Use the facts and information you have gathered to produce a Rainforest History quiz. Arrange to play the quiz with a classroom of a lower year.

Background Information

Tasmania's Rainforest Through Time...

Gondwana

Our rainforest evolved about a 180 million years ago on the supercontinent of Gondwanal which was covered by moist, lush, prehistoric forests of conifers and giant ferns (being munched on by dinosaurs). 125 million years ago Gondwana began to break apart. This break up was a very slow process.

First, Africa and India began to separate from the continent. Then New Zealand began it's slow journey off to the north east.

Australia, Antartica and South America stayed together for another 80 million years. As South America finally moved off to the west, Antartica and Australia tore apart along what we now call the Great Australian Bight.

Antartica began its slow migration south and became cooler (today only fossils remain to remind us that Gondwanan forests once covered this land). Australia moved northward becoming drier and warmer and its soils more impoverished. Eventually Gondwanan plants were replaced by plants better adapted to these conditions - eucalypts and acacias.

A few places remained wet enough to sustain rainforest and Gondwanan plants. Tasmania's rainforest has international importance because of its abundance of ancient plants with links to Gondwana.

Rainforests Today

Some of these primitive plants such as leatherwood, celery top pine, Huon pine, King Billy pine, pencil pine, sassafras and mountain pepper are found nowhere else on earth. They are endemic to Tasmania.

The man ferns of today are not that different

from the ferns that dinosaurs munched on 180 million years ago. Our conifers have even greater significance as examples of species with extreme longevity and very little evolutionary change. In fact fossil evidence found in the northern hemisphere shows that King Billy and pencil pines may be even older than Gondwana. They are possibly relics from Pangea, the supercontinent that existed 250 million years ago before it broke into the two continents of Gondwana and Laurasia. Today Tasmania is the custodian of these unique and remarkable plants.

Old Trees

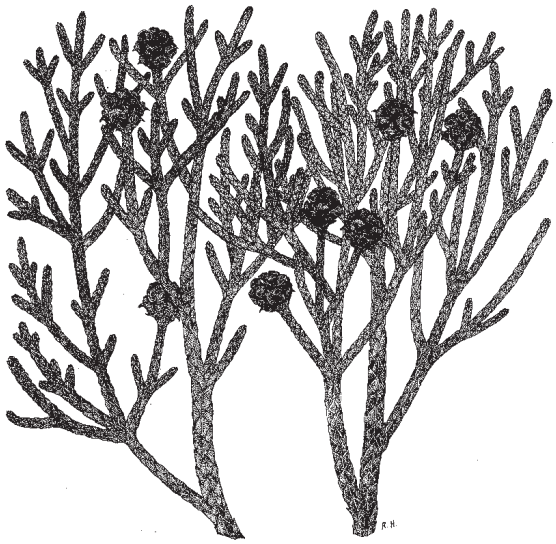
In California, USA, a great basin bristlecone pine (Pinus longaeva) known as "Methuselah" is 4,838 years old - making it the oldest known living plant. Huon pines are the second oldest trees in the world, they are known to live to 3000 years.

Ancient Groups of Trees

In Tasmania's west on Mt Read we have a remarkable stand of Huon pine. 10,000 years ago this stand began from one or a few individual trees. They have gone on reproducing vegetatively ever since. Every tree in this stand is genetically identical and all are males. Remember no individual tree in this stand is 10,000 years old but the stand itself has been in existence for that long, producing clones of itself this entire time. Scientists know the age of the stand because genetically identical pollen has been found at the bottom of the nearby lake which has been carbon dated at 10 500 years.

Tasmania is home to two of the world's most ancient stands of vegetation: the Mt Read Huon Pine colony and the more recently discovered King's holly, in South West Tasmania, which dates back 43,600 years. A huge colony of the sea grass Posidonia oceanica in the Mediterranean Sea could be up to 100,000 years of age. Perhaps Tasmania is home to an even older living organism that is yet to be discovered.

Not only is our rainforest special due to its links to Gondwana and due to its long lived plants, but it is also a source of knowledge. By examining the growth rings of ancient trees we can learn about the climatic conditions over thousands of years. Because our ancient plants have links to plants in the other continents that made up Gondwana they also help scientists understand plate tectonics and continental drift.



Pencil pine

FURTHER INFORMATION

Head Office; 134 Macquarie Street Hobart Tasmania 7000

Department of Environment, Parks Heritage and the Arts

Tasmania