Introduction

i2P • Biodiversity

"Destroying rainforest for economic gain is like burning a Renaissance painting to cook a meal"

- Edward O. Wilson

AMAZON

It's big, it's bold, it's beautiful. The Amazon!

Impossible2possible (i2P) has chosen the lush jungle terrain of the Brazilian Amazon in South America, replete with countless varieties of plants and animals and home to a wealth of cultural traditions to celebrate, educate and learn about biodiversity. What better way to embrace the United Nation's International Year of Biodiversity, than to explore and share this magnificent mosaic of ecosystems with our learning community.

INTO THE RAINFOREST

Over a ten day period, the i2P team, including four Youth Ambassadors, will trek through the dense Amazon rainforest. The expedition will follow the Tapajós River towards Santarém, located in northern Brazil. In the company of Brazilian ecologist Gil Serique, the team will visit several communities along the forest route, and share lessons about biodiversity with local people. What is learned will be transmitted back to the i2P learning community through the interactive website and live satellite calls to participating schools. Complementing the expedition is a campaign on the part of the i2P Extraordinary Acts program to raise funds to build a school in a local village called Flona do Tapajos.

Figure 1: The Amazon Basin in yellow. The route of the Tapajós River in purple (source: kmusser)

Figure 2: Satellite image of South America. The Amazon Rainforest is the carpet of green dominating the upper half of the continent (source: NASA)

Biodiversity

The Amazon rainforest is without a doubt one of the most magical places on Earth. It is a repository of natural wealth; home to a web of complex ecosystems that cover over a billion acres in Brazil, Venezuela, Columbia, Ecuador and Peru (see: Rainforest). Tropical rainforests support the greatest diversity of living organisms on Earth. Although they cover less than two percent of Earth's surface, they house an estimated 50 percent of all life on the planet (see: Life on Earth). This makes the Amazon the perfect place to better understand the role that biodiversity plays in sustaining life on earth. The more we learn and share our knowledge about this wondrous resource, the better prepared we will be to protect it.

Brazil

If you choose only one word to describe Brazil, it would be diversity. The variety of landscapes, climate, flora, fauna, and lifestyles is enormous. Brazil is the largest country in South America. To the east, Brazil borders the Atlantic Ocean. To the north, west and south it borders virtually every other South American country. Northern Brazil is dominated by the Amazon River, whose headwaters lie high in the Andes Mountains in Peru and flow east to the Atlantic Ocean. Along the way, more than a thousand *tributaries* join the river causing it to swell its size. The Amazon River is the largest river on earth. It is is approximately 6566 km in length and 330 km wide at its mouth, and flows through seven different countries: Peru, Venezuela, Ecuador, Columbia, Bolivia, Guyana and Brazil. Nearly one fifth of the world's free flowing fresh water runs through this river basin which covers nearly half of Brazil (see: Amazon). It is so deep that large

Did You Know?

Facts about Brazil:

- Population: 192,272,890 (5th largest in world)
- Size: 8,514,877 km2 (5th largest country in world)
- Capital city: Brasilia
- Language: Portuguese
- Life expectancy: 71.69 years (est. 2005)

sea vessels can journey up the river for over 1500 kilometres, Justifying the moniker the “ocean river”.

Climate

The climate of Brazil varies greatly from region to region. In the Amazon basin, temperatures range from 24º C (75º F) to 32º C (90º F), and it rains all year round. Average annual rainfall can reach up to 1.9 m (6.5 ft)! This type of climate is called equatorial (see: tropical rainforest climate), and is found around the world along the equator.

The River

At one time, the Amazon River flowed westward into the Pacific Ocean. 15 million years ago a collision between two tectonic plates (the South American plate and the Nazca plate) resulted in the creation of the Andes Mountains. This blocked the flow of the river, forcing it to back up, creating a huge inland sea. Over time, the water worked its way through the sandstone crust eventually finding a route eastward to the Atlantic Ocean. Once the inland sea was drained the fertile soil left behind gave birth to the Amazon Rainforest as we know it today (see: Amazon Rainforest).

Figure 3: A cross marks the origin of the Amazon River in the Andes Mountains at Nevedo Mismi (source: Jialiang Ga)

Discovery

In 1494, there was a dispute between the European nations Spain and Portugal which the Pope as head of the Catholic church was asked to resolve. At the time both nations were competing to build global trading empires, and the competition for new land around the world

was drawing them closer to armed conflict. The Pope settled the dispute by drawing a line down the middle of the Atlantic Ocean. Spain would take land to the west, while Portugal would seek new lands to the east.

The following year, the Portuguese asked if the line could be moved farther west. The Pope agreed and this provided Portugal access to the eastern bulge of Brazil. Five years later Brazil was officially discovered by the Portuguese navigator Pedro Álvares Cabral. Cabral was apparently on an expedition to find the western route to India when a storm blew him off course. The Portuguese would eventually claim half the continent.

People of the Amazon

Figure 4: Member of an indian tribe from the north-east of Brazil, in traditional dress (source: Agência Brasil)

Research in the Amazon Basin has revealed evidence of indigenous people dating back twenty thousand years. When the Europeans first arrived five hundred years ago, an estimated 10 million people were scattered through the Amazon Basin. They were organized into tribes with different customs, different forms of organization, and different languages. Today only an estimated 250,000 native Amazonians remain.

Despite the decrease in population, the cultural diversity of the region is still very rich. Native Amazonians are comprised of 215 ethnic groups with 170 distinct languages. Nation-wide, they live in 526 territories, which together compose an area of 190 million acres. There may be as many as 70 indigenous groups still living in the depths of the Amazon rainforest that have never had contact with the outside world (see: lost tribes).

Sadly, many indigenous tribes have disappeared in the past two centuries, provoked by colonization, habitat destruction, disease, forced

Student Exercise

Please watch the remarkable video on uncontacted tribes of the Amazon at:

Lost Tribes

the video runs 2 minutes and 52 seconds

labour and war. The fate of these tribes is a concern for many reasons, not least of which, because they have rich cultural traditions and an intimate knowledge of rainforest ecology (see: indigenous). The traditional knowledge of these peoples can have pragmatic application in a 'modern' world, providing natural sources for many of the drugs that we use today to treat illnesses such as cancer, AIDS, diabetes, Alzheimer's disease and arthritis, to name a few. In fact approximately 25% of all drugs are derived from rainforest ingredients. What is interesting to note is that scientists have only tested 1% of tropical plants (see: medicine)!

A single Amazonian tribe may use more than 200 species of plants for medicinal purposes. Very few tribes have been subject to a complete ethnobotanical analysis of their plant knowledge, and most medicine men and shamans remaining in the rainforests today are very elderly. When a medicine man dies without passing his knowledge to the next generation, the tribe and the world can lose thousands of years of irreplaceable knowledge about medicinal plants (see: knowledge).

The Rainforest

The Amazon rainforest, by virtue of its immense size and biomass, effects the world's climate balance and ecology in ways we don't yet completely understand. Twenty percent of the oxygen we breathe is produced by the vast biomass of vegetation in the Amazon. On a daily basis one fifth of the world's carbon dioxide is converted into oxygen as the Amazon rainforest photosynthesizes, earning it the

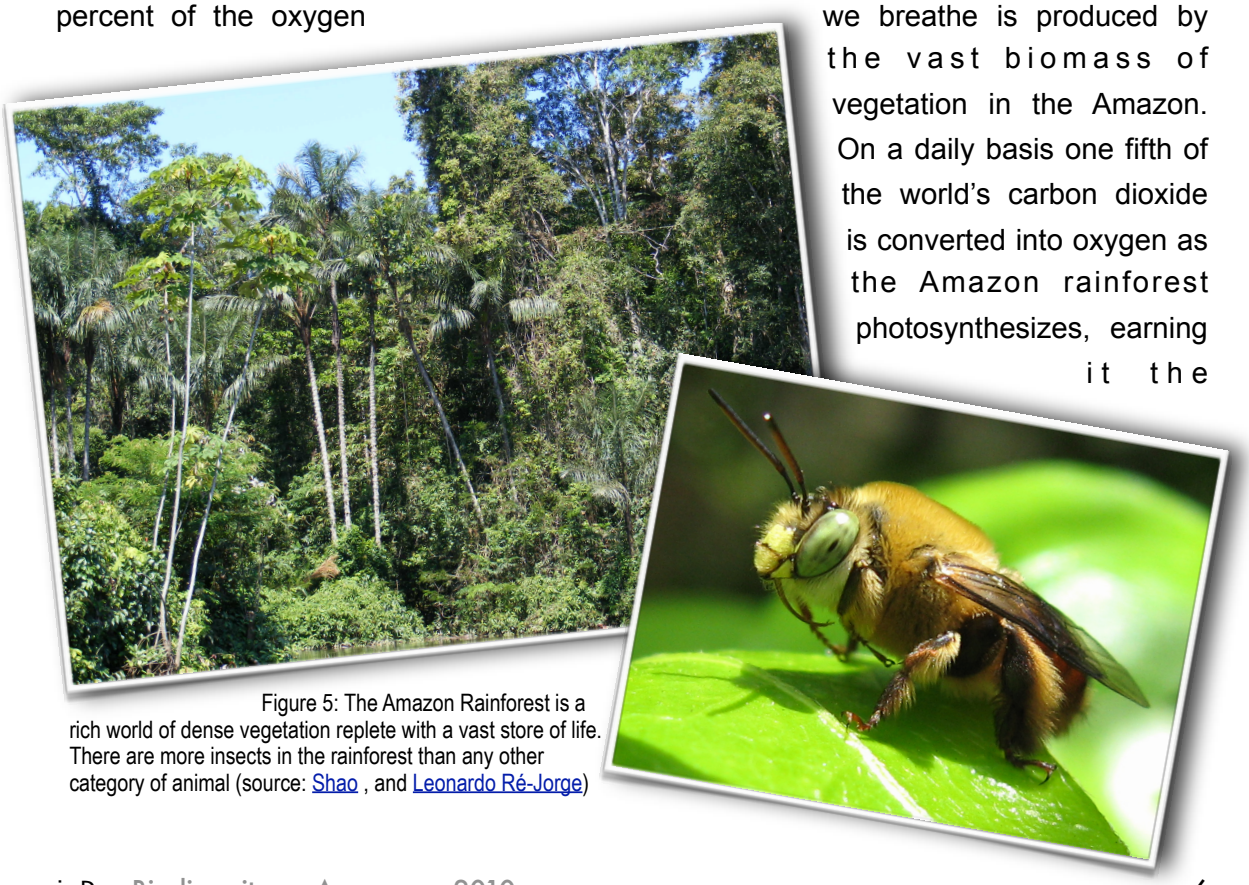

Figure 5: The Amazon Rainforest is a rich world of dense vegetation replete with a vast store of life. There are more insects in the rainforest than any other category of animal (source: Shao , and Leonardo Ré-Jorge)

Did You Know?

Anacondas are giant snakes that make their home in the Amazon Rainforest and are part of the Boa Constrictor family. Anacondas live near rivers, lakes and swamps and like to live alone. The average size of one of an Anaconda is 6.1 m (20 feet) long and 148.5 kg. (300 pounds).

see: Anaconda

moniker the “lungs of our planet”.

This hot dense forest is home to an untold wealth of animals and plants. The Amazon holds millions of vital plant and animal species, many of which have not been identified. However, the tropical rainforest is being destroyed at an alarming rate. Rainforest habitat in being cut back to make way for for agricultural land, mining and fishing operations, petroleum exploration, and logging. These threats are provoked by population growth, expanding commodity markets, infrastructure development, insecure land and natural resources, tenure, and distorted policy incentives. An estimated 200,000 acres and 130 species of plants and animals are being destroyed daily (see: destruction). Scientists predict that at the current rate, the entire Amazon will be gone within 40 to 50 years. It is imperative that we recognize and understand the value of this habitat.

The Amazon Expedition

The United Nations has declared 2010 the International Year of Biodiversity. They call upon all nations, and all peoples to unite in an effort to preserve the rich and vast array of life on the planet; life that affords us a delicate balance of collective health and prosperity. In partnership with the United Nations (see: United Nations) i2P has chosen to visit the richest habitat on Earth, the Amazon Rainforest, to explore and celebrate biodiversity. The core of the education resource accompanying the expedition is laid out in a series of 9 education modules that address the following issues:

1. An introduction to the concept of biodiversity and its central role in the preservation of life on Earth.
2. How the Earth came to be host to such a vast number of life forms.
3. Why the distribution of life forms on Earth is not equal.
4. The relationship between Human Health and biodiversity
5. What the current threats are to the biological diversity of the planet
6. How human migration has impacted global biodiversity.

7. The impact genetic engineering is having on biodiversity.
8. Why the current rate of species extinction is greater now than ever before.
9. Looking forward: strategies to preserve Biodiversity

Student Exercise

How many countries in South America do not border on Brazil? Please consider the following map:

South America

Note: there are some very small countries. For list of countries see:

South American Countries

Complementing these modules are standard i2P interactive web based learning tools, as well as the i2P Exploratory Pilot Program featured on the website. Please join classrooms across the world for this journey of discovery to the Amazon; an exploration of the world of biodiversity in the richest ecosystem in the world.