



Unit 1- The Expedition

What is Peru like?

Peru is an incredibly diverse and fascinating country. Its terrain spans humid rainforests, arid deserts, and breathtakingly high mountains. Parts of the country are industrialized and modern, while much is undeveloped and inhabited by indigenous, or native people still living in very primitive conditions.



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<http://www.rainforestfoundationuk.org/s-Peru?highlight=Peru>

Peru is located on the West Coast of South America, bordered by Ecuador and Columbia to the north, Brazil to the east, Bolivia to the southeast, and Chile to the south. The Pacific Ocean is the western border of Peru. The Andes Mountains, ranging from North to South, divide Peru into three general regions: the coastal desert, the Andes Mountains, and the rainforest to the west.

Peruvian History

The history of Peru is rich and colorful and is composed of many cultures. Through archeological digs, it is believed that people crossed the Bering Strait and migrated into North, Central, and South America during the last Ice Age, about 20,000 years ago. The migration to Peru probably took place between 12,000 and 2000 BC when tribes of these people moved farther south and settled throughout Peru.

Some of the Peruvian people migrated to the more temperate regions near the ocean where food from the sea was plentiful. Others settled along the Western slope of the Andes in fertile valleys near rivers. Still others lived in mountain villages. The colorful art of Peru began to appear as the people created more lasting crafts, such as ceramics and weavings. East of the Andes, aboriginal tribes of rainforest dwellers existed along the Amazon and its tributaries.

In the West, the Inca Empire was established by the year 1200 BC. This rich culture unified the people of the coast with the fertile lowlands and spread to the mountainous regions. The modern city of Cuzco emerged as the Inca capital and became the center of commerce and trade for the empire. Temples and pyramids were constructed of carved stone and were used to worship the Inca gods.



Machu Piccu is one of the world's seven wonders. Built during the height of the Incan empire, Machu Piccu is Peru's largest tourist attraction. Machu Piccu is a demonstration of the Incan wealth, ingenuity, and complexity.

The Incas are perhaps best known for a splendid series of canals and roads stretching from Columbia to northern Chile. Ironically, even with its expansive highway system, the Incas did not yet know about the wheel and axle!

The Spanish conquered the magnificent Inca Empire in the early 1500s. The Spanish, seeking wealth and status, had more sophisticated weaponry. However, it was not battle that sealed the fate of the Incas. The Spanish also brought diseases for which the Incas had no immunity. By the mid-1500s, deaths from whooping cough, smallpox, measles, and especially influenza, reduced the Inca population from approximately 32 million to less than 5 million people. To add to the dilemma two brothers, who were rival Inca Emperors, fought each other for control. This weakened the empire drastically and the great Inca Empire was destroyed by 1600.

Peruvian People

The three geographical regions of Peru are a powerful economic and cultural influence on how people live. Many Peruvians along the coastal desert along the western Pacific edge of Peru rely on fishing and other ocean related industries for their livelihood. The inhabitants of the hills and high mountains of the Andes endure cold, and often snowy, winters. Their food is grown on hillsides during the mild months and stored for the harsh winter. In the rainforest to the North, both wet and dry seasons are almost always hot and humid. Natives harvest plants and animals from the forest as well as from the Amazon River and its tributaries. However, many of these native Peruvians travel to higher ground periodically to hunt.



The photos above show Peruvians in traditional dress. What do you notice about their clothing that indicates which region of Peru they are from?

Spanish is the official language of Peru. Yet, many people in their day-to-day conversations use dialects and even other languages to communicate. Quechua is a derivative of the language of the Incas and is common in the Andes. In fact, English words such as puma, llama and condor came from Quechua. Aymara is another common language in the Andes.

As in North America, Peru is a land of immigrant settlers and native cultures. Many of the true native Peruvians are the people of the rainforest. Many different tribes exist and over 30 tribal languages are spoken throughout the rainforest. The primary indigenous forest peoples occupying much of the lowland Amazon basin area include the Ashaninka, Shipibo, Matsigenka and the Nahua. Some tribes living in remote areas remain isolated.

How do people survive in the flooded rainforest?

The native people of the rainforest live very simply, and get most of the things that they need from the forest. They are surrounded by thousands of different types of plants with a myriad of different uses. Many plants are used as medicine while others are good for making canoes, building houses, as well as making rope and thatch for roofs. The bark peeled from one particular tree makes a great floor for people's houses.

People build their houses on stilts so that when the rivers flood, their houses stay dry. They grow yucca, bananas, and other food in small gardens to feed their families, and many families also have chicken, pigs, and cows, which they raise to eat. Fish are also a large part of people's diet, and they catch fish using nets, hook and line, and spears. Many of the types of fish that the people eat are kept as pets in the US in people's fish tanks.

Indigenous people adapt to their surroundings in the flooded forest. Notice that this house, built on stilts, does not have any walls or windows. Why do you think this is?



In Peru, as in other rainforest communities, conflict has arisen as impoverished farmers move into the area and clear land for crops. This migration of farmers from the Andean region into the eastern forest lowlands has caused land wars with indigenous forest peoples. An example of violent conflict between a revolutionary guerrilla movement and the Peruvian authorities affects the Asháninka in the Central Peruvian rainforest. This conflict has caused the death or disappearance of several thousand Asháninka people. Land titles and censuses of Asháninka lands and communities were allegedly destroyed, or became lost. Now Andean colonists are taking advantage of the confusion and have established farmlands. This is yet another danger to the area's delicate rainforest and has caused bitter conflict between the Asháninka and colonists. Other threats to the forest inhabitants come from commercial loggers as well as the exploitation of oil and gas.

Why does the flooded rainforest exist in Peru?

The geographical location of the flooded Peruvian rainforest explains its success. Located at the equator, the forest receives constant, direct sun all year. Additionally, it flanks the world's longest river, the Amazon. This massive river with all its tributaries provides a naturally wet environment, which when coupled with the intensity of the sun, creates the warm, humid climate necessary for a thriving rainforest. Because of these factors, and the protection from the West provided by the high Andes Mountains, the Peruvian rainforest experiences consistent temperatures and ample moisture throughout the year.

The flooded forest does have seasonal changes. While it does not have a spring, summer, fall, and winter, there are periods of the year of regular climate change. To learn more about the flooded forest's seasonal changes, please read Unit III in the curriculum guide.

What is a tropical rainforest?

Wondrous rainforests! Where in the world can you find the majority of the species that inhabit the earth? What makes the rainforest one of the most diverse ecosystems on earth? The tropical rainforest holds the key to understanding some of the mysteries of the natural world. But, what is a tropical rainforest?

Tropical rainforests, situated around the Earth's equator and stretching to the Tropic of Cancer and the Tropic of Capricorn, are typically very warm, wet, and densely wooded. The annual rainfall can exceed 400 inches (1000 centimeters) in some places. The average temperature is around 80 degrees (27 ° C), but near the forest floor, the lack of wind makes this temperature oppressive and quite uncomfortable. Tropical rainforests have layers of foliage that include incredibly tall broad-leafed evergreens, vines, undergrowth, and some sparse groundcover.

The soil of the tropical rainforest is generally very nutrient poor. This is because decomposition of dead organic matter is accomplished quickly and the plants reabsorb the nutrients. Also, the abundant rains tend to wash away any remaining nutrients from the soil. A tropical rainforest analysis shows that 52% of the nutrients are in the plants while only 48% are in the soil. Compare this to an average analysis of an oak forest with 31% in the vegetation and 69% in the soil.

Statistical info from:

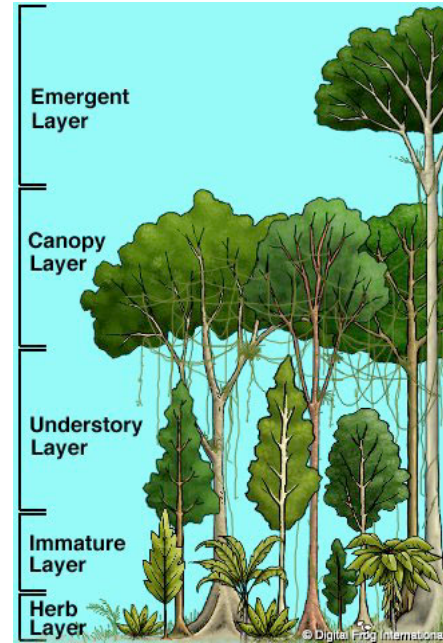
<http://www.hewett.norfolk.sch.uk/curric/NewGeog/Habitats/layers.htm>

Once researchers believed that tropical rainforests were the "lungs of the world" due to the large amount of oxygen they produce. Recently, however, it has been discovered that this is not entirely true. Granted, rainforests produce tremendous amounts of oxygen, but because the soil is so poor, decomposers readily consume this oxygen. These organisms aid in decomposition (breakdown into elementary particles) of the enormous quantities of

dead organic matter of the rainforest. Scientists now believe that decomposition of dead matter consumes about the same amount of oxygen that the living plants produce.

Layers of a Tropical Rainforest

Rainforests are composed of four primary layers. The **emergent** layer includes incredibly tall trees with typically mushroom shaped tops that stretch high above the jungle canopy below. This layer receives full sun and also tremendous wind. The **canopy** is comprised of a dense layer of foliage and is home to the vast majority of the animals of the rainforest. It receives plenty of sun and obtains nutrients from the atmosphere as well as from roots. In fact, some of the plants in the canopy are “air plants” and have no root systems at all! The **understory** is composed of shorter plants. Since it receives less than 5% of the rainforest’s sunlight, these plants are sparser and generally set farther apart. Many common houseplants are found in the dark, wet understory.



Finally, the **forest floor** is nearly always wet. Since less than 5% of the light reaches the forest floor, little grows here except for plants extremely tolerant of dark conditions. The conditions are excellent for rapid decomposition of dead organic matter, releasing nutrients that are quickly absorbed by the plants. This process often leaves the floor relatively bare. The few nutrients not absorbed are often leached, or washed away, by heavy rains, leaving only the nutrient-poor soil common to tropical rainforests. Yet, the floor is filled with life! Invertebrates, especially insects, are prolific. Ground mammals, including humans, are evident as well.

Image from:

<http://www.digitalfrog.com/resources/archives/strata.jpg>

Plants and animals have adapted for survival in all of the layers of the rainforest. The lower two layers of the forest floor are believed to benefit global climates because they absorb much of the heat generated by the sun in tropical regions. When a rainforest is destroyed, this benefit is greatly diminished. If a lot of this heat was to be reflected, it is feared that it would have an intense effect on global wind and rainfall patterns. This could cause droughts or other climate related issues throughout the world. Deforestation also affects the global environment. A common method of deforestation is “slash and burn.” Burning creates carbon dioxide, a leading cause of global warming.

Where will the expedition take us?

Project Peru Itinerary

March 31 - Fly to Lima. (Lima is located on the west central coast. Lima is the capital of Peru)

April 2 - Fly from Lima to Iquitos. (Iquitos is the capital of the department of Loreto, located in the middle of the Peruvian forest, less than 4° south of Ecuador, and next to the left river bank of the Amazon River.)

April 4 - Board riverboat to Monte Bello. (3 to 4 days)

April 7 - Arrive in Monte Bello.

April 8 to 24 – Enter the Pacaya-Samiria National Reserve* and paddle canoes from the headwaters of the Pacaya River to Manco Capac.

April 25 – Stay in Manco Capac

April 26 to May 4- Paddle from Manco Capac down the Yanayacu River to where it joins the Marañon River. Paddle down the Marañon River to Nauta.

May 5 – Take a bus from Nauta to Iquitos

May 6 - Fly from Iquitos to Lima and Lima to home.

* The Pacaya Samiria National Reserve is a national reserve since February 4, 1982, through Law (D.S.) N 016-82-AG, and sometimes called, “The mirror of the jungle,” the Pacaya Samiria National Reserve of Peru is the largest reserve in the country. It includes 2,080,000 hectares (5,139,680 acres) between the Marañon and Ucayali rivers. The reserve dedicates itself to fostering research and protecting all species of wildlife. It is also an avenue for jobs for the local people. Much of the reserve is open to the public and the revenue derived from this use is used to maintain and sustain the reserve. Parts of the reserve and closed to the public, with only a few, carefully selected expeditions allowed. Herein lies the route of our expedition!

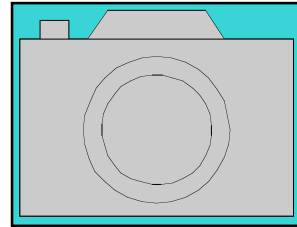
This protected area contains 85 lakes which are the home of 250 species of fish, including piranha, paiche, charapa, vaca marino, and two species of bufeo. Pink and gray fresh-water dolphins, as well as river manatees and giant otters share the rivers. In the jungle and flooded forest of the reserve, seemingly innumerable invertebrates have their homes. Also in this unique reserve, there are at least 132 mammal species (including the otter-like nutria, manati (river manatee) and 13 primates such as the spider monkey and

endangered maquisapa), 449 bird species (including cormorants, king fishers, harpy eagle, white egrets, toucans and macaws), and 250 reptile and amphibian species (including the gigantic anaconda snake).

Additionally, around 847 types of plants grouped in 118 families are found in the reserve. Orchids abound! The Aguaje (*Mauritia flexuosa*), or swamp palm, is among the most common plants in the area. Also, the cedar, cascarilla, mahogany, cacao, the chuchuhuasa, hormiga caspi, huairuro, lupuna, and the machin sapote are widespread.

What will the adventurers take with them?

- **Insect repellent**
- **Special clothing**
- **Binoculars**
- **Camera**
- **Rubber boots for jungle walks**
- **First Aid Kit**
- **Sunscreen**
- **Hat**
- **Trash receptacles**
- **Jungle Hammocks**
- **Pareo- a large piece of fabric resembling a scarf that can function as a towel, garment, or blanket**
- **No plastic or other unnecessary wrapping**
- **Immunizations (International Certificate of Vaccination Card)**



So why are our adventurers interested in the Peruvian rainforest?

As educators, we have a responsibility to help students develop an appreciation of our natural world. Understanding the dynamics of the tropical rainforest offers clues to comprehending the natural world as a whole. Studying the potential effects of deforestation in conjunction with responsible conservation strategies helps students recognize and assess environmental issues. Embedding a sense of responsible stewardship with consideration to economic and social interests will help students make critical decisions in the future.

Questions for Discussion:

For what diseases, found in the Amazon River Basin, are the team vaccinated?

What illnesses or diseases, brought from the US, could be a problem for people living in the Amazon River Basin?

What other things will the team do to help keep healthy on their trip?

How else did the team prepare for the logistics of the trip?

What permits or other documents are needed to complete the trip?

What, if anything, would you bring for the people of the rainforest?

What emergency and/or evacuation procedures are in place?

Further Exploration and Sources

<http://www.rainforestweb.org/> The ultimate rainforest research site!

<http://www.rainforestfoundationuk.org>

<http://www.123vendido.com>

<http://www.virtualexplorers.org>

<http://www.hewett.norfolk.sch.uk/curric/NewGeog/Habitats/layers.htm>

http://www.enjoyperu.com/peru_travel_tours_information/peru_nature_ecology_biodiversity/peru_nature_ecology_biodiversity_national_reserves_pacaya_samiria_national_reserve.html

<http://www.zoomschool.com/rgifs/Rainfstrata.GIF>

http://kids.ran.org/kidscorner/protect/s07_indigenous.html Indigenous People

<http://www.earthfoot.org/guides/cocamas.htm> Contains information about the indigenous people that live in Pacaya Samaria

<http://www.virtualexplorers.org/ARD/People/rain.htm> More info about people of the Amazon and Pacaya Samaria