Before You Go

Monteverde and Santa Elena Cloud Forest

Reserva Nacional Santa Elena

A dense shroud of mist blankets the tight canopy. Golden flecks of sun penetrate the leafy ceiling and dapple the forest floor. Succulent epiphytic plants cling to soggy branches, absorbing drops of moisture or particles of organic material from the air. Crooked trees stunted by the harsh climate and high elevation cower away from the frigid wind. A sparkling purple-throated mountain-gem buzzes past, stopping momentarily to scrutinize these strange new visitors who have entered his enigmatic realm. A dung beetle busily drives a spherical gift for a potential mate. A pair of rainbow-billed toucans clack their beaks together on a high branch. An industrious rodent gathers nuts and seeds to take back to its lair. A speckled racer slithers across the damp leaf litter in pursuit of an unsuspecting ground anole.

The cloud forest is a mysterious place and is now under pressure throughout its tropical American range due to the advance of the logging industry, . Home to many species of animals and plants, particularly epiphytes like orchids, the perpetually humid cloud forest is the ideal habitat for sustaining life. In this climate and elevation, plants engage in a rigorous struggle for sunlight and nutrients. Epiphytes have abandoned their connection to the earth, gaining the freedom to propagate themselves high in the arching branches of canopy trees. By collecting organic debris, rain and mist from the air in watertight cisterns, they no longer need the soil and can grow closer to the sunlight. These miniature collections of moisture and nutrients provide food, water and shelter for a diverse array of arboreal animals. Pollinated by insects and hummingbirds, their tiny seeds are dispersed by wind. Thus, complex interactions between organisms occur within a single plant. Epiphytes of all varieties stud the branches of old cloud forest trees and on a single tree in this habitat, there may be more than 35 other species of plants, more than in an entire typical North American forest.

The rugged, rocky terrain cleaved by icy streams and muddy banks has hampered the onslaught of human development near Monteverde and Santa Elena. For now, this pristine environment has found temporary refuge in its inhospitability. Relatively little is known about cloud forest organisms simply because it is so difficult to reach those that have found a vacant niche deep in a rocky gorge or high in a soggy tree crown. However, expanding human population is mounting pressure on even montane cloud forest and excessive tracts are being cut to make room for urban developments and cattle ranches. Farmers quickly discover that without the protective roots of trees, the nutrients of the soil are soon washed away by the rains, leaving the land barren and depleted. In their natural and fully developed state, cloud forests have many uses for humans and global climate and their removal could result in disastrous consequences.

The EcoTeach bus will haul the students along the Pacific slope of the Cordillera de Tilarán. Before reaching the old gold rush town of Las Juntas on the Río Abangares, the group will stop for their first view of the Golfo De Nicoya and its scattered islands and the infinite Pacific Ocean. The paved road ends as soon as the bus diverges from the Pan American Highway. Then it's 22 miles (35 km) rambling over rock-strewn earthen road to the small tourist town of Santa Elena. This is the epicenter of all of the adventure and ecological activities within the nearby Reservas Santa Elena and Monteverde. Dotting the hillsides leading up to Monteverde are a series of cattle ranches and other small agricultural endeavors. As the group nears the dual reserves, the cleared pastures disappear among thick forest which hug even the steepest rock faces. This area is famous for its admirable track record of conservation. In addition to the two prominent areas are numerous private reserves which form a contiguous corridor of forest, a vital refuge for wandering animals. Along the way, the bus ambles along steep hillsides which plunge down into valleys carved by river rapids. Clinging to the mountainsides and drifting into the valleys is the opaque white fog that gives this forest its name. At an elevation of 3,500 feet (1,065 m), you feel as though you are above the clouds, a truly enchanting and magical effect.

Information on Cloud Forests

Cloud forest is a specific type of rainforest that is only found at high elevations. In the case of the Monteverde area, which straddles the Cordillera de Tilarán, the cloud forest extends from about 4,920 feet (1,500m) on the Pacific slope and 4,430 feet (1,350m) on the Atlantic slope up 6,070 feet (1,850m) to the mountain range peaks. As a result, temperatures are usually much cooler than lowland rainforest, but annual rainfall is comparable. As a result of its location within mountainous terrain, numerous microclimates are formed by minute differences in elevation and air currents. Cloud forests can be even more humid than rainforests because of the massive accumulation of moisture that perpetually hangs in the air among this unique habitat and because they are moist throughout the year, they are typified by extraordinarily lush vegetation. The combination of high humidity and direct sunlight allows an astounding diversity of plants to thrive. A defining feature of cloud forests is epiphytes, or air plants, which are plants that grow on other plants and derive their nutrients and moisture from the air, rather than from the soil. Due to this phenomenon, plant diversity in cloud forests is exceptionally high. Monteverde alone contains 3021 species of vascular plants, including:

Mist shrouds the cloud forest canopy

- **755** tree species
- **878** epiphyte species
  including **420** kinds of orchids
- at least **358** fern species

One of the first plants to colonize an area are bryophytes (mosses, liverworts, and hornworts), which can grow on rocks, other plants or on the soil. Epiphytes, true air plants, are not specific parasites of their host tree because they do not directly sap nutrients and water from it, however, they can debilitate their hosts by blocking out vital sunlight our weighing down weak branches to breaking point. One type of epiphyte, the bromeliad, has thick, spiny leaves that form a tight vessel at the base. This catches falling water and organic debris and converts it into useful compounds. Some bromeliads grow to enormous proportions and collect up to 10 gallons of water. Certainly, this can be enough weight to tear a rotting branch from an old tree. Vines, a type of hemiepiphyte, take root in the soil but take advantage of the rigid trunks of trees to climb towards sunlight. Upon reaching the canopy, they sprawl across the crowns of neighboring trees, forming a network bound together by strong, elastic stems. When one tree falls for whatever reason, this vine lattice may bring down several other trees and suddenly open a clearing where sunlight finally reaches the forest floor. Together, the tangle of plants in the cloud forest provides food and shelter for a wide variety of animals.

Epiphtes abound in the cool, humid cloud forest

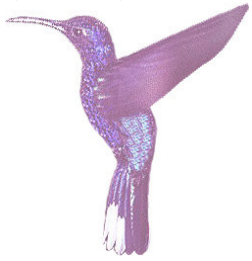
Information on Cloud Forests

One common plant that takes advantage of other plants to gain proximity to the sun is the strangler fig. As its name implies, this aggressive and merciless plant completely envelopes and suffocates its host tree. A large strangler fig produces thousands of sweet, succulent fruits filled with tiny seeds that attract frugivorous mammals like monkeys and coatis, and birds like toucans and trogons. As these animals rarely descend to the lower levels of the forest, they are likely to defecate the still-intact seeds in the crown of another tree. There, the seeds germinate and gain energy from the sun and the water and fallen organic matter found in the crown of its host tree. Gradually, they extend one tap root down along the host tree trunk to the forest floor. This takes root and the fig becomes a hemiepiphyte. Using the nutrients found on the forest floor, the young strangler fig produces more roots that extend down to the soil, slowly grow and fuse together and branches expand to absorb sunlight. Eventually, the strangler grows so immense that it blocks out the sun from its host and constricts its trunk until it is no longer able to transfer water and nutrients from the soil. After the host tree dies, wood-boring beetles and termites dismantle its remains, leaving a hollow cavity inside the strangler fig. This cavity then provides shelter for insects, snakes and bats.

Like rainforests, cloud forests are characterized by notoriously poor soil quality. The intense competition for nutrients between plants prevents minerals from leaching deep into the soil as in temperate forests. In fact, up to 75% of all nutrients in cloud forest soil are found in the upper 6 inches (15 cm). Most trees have formed a symbiosis with a special fungus that lives in nodules on the roots. In return for carbohydrates, this fungus works to break down dead and decaying matter and transfer the usable nutrients into the host tree. Thus, fungi return dead organic material to living plants before it has a chance to seep into the soil. As a result, the roots of cloud forest trees are generally not very deep. Some species reinforce their unstable base structure through the formation of broad buttress roots. These roots diverge from the trunk of the tree several feet above the forest floor in order to form a wide foundation. Coiled snakes and busy insects can often be found in the shelter of these roots. The forest floor is home to many insects that eat microscopic organic matter between the dry leaf litter. A host of other insects, spiders and millipedes stalk the leaves in pursuit of small insect prey. Ovenbirds turn, toss and glean small arthropods on the forest floor as well.

A brilliant jewel scarab beetle

The great majority of living creatures, however, are found in the canopy of the forest. In fact, some two-thirds of all cloud forest animals never descend to the forest floor. Tree frogs nurse their tadpoles in the captive water of bromeliads. Fuzzy bees collect pollen from orchids and distribute it amongst other members of the same species. Howler monkeys forage for leaves, flowers and fruits from a diverse array of tree species. Insects, however, are the most diverse cloud forest animals, with tens of thousands species in the leafy treetops (40% of which are beetles and over 5000 moth species counted thus far). 121 species of mammals are found in Monteverde, 68 of which are bats (over half), important pollinators of many cloud forest plants. The only mammal capable of true flight, bats are the most diverse mammal in the forest because they have extremely specialize feeding habits. Some have evolved to feed on flower nectar and pollen, others on fruit, some on beetles whose footsteps they can actually hear and some on fish, which they find by echolocation!



Information on Monteverde

The community of Monteverde was founded by a group of Quaker families from Tennessee, USA looking for a peaceful place to settle and practice their faith. The pacifist status of Costa Rica drew them to this neutral country, where they settled in 1951. They purchased 3,455 acres (1,400 ha) of land in Monteverde and began dairy farming there. Today, their Monteverde brand cheese is famous throughout the country. They set aside a third of their territory as protected forest, particularly as a means of safeguarding their water supply in the headwaters of the Río Guacimal. Since then, the protected area has been expanded to encompass over 24,680 acres (10,000 ha) of pristine forest. In 1974, the Quaker community leased the land to the Tropical Science Center, the organization responsible for guarding the forests. The area is special and world renowned for its remarkable diversity and its many unique and endangered species.

The Reserva Biológica Monteverde straddles the Cordillera de Tilarán in the northwestern region of Costa Rica. Currents moving west from the Caribbean carry moisture laden air, which cools and condenses as it is forced up the flanks of the mountains. At the top of this ridge, it meets weather currents from the Pacific Ocean that block its progress near the mountain peaks. That is why there are often thick, white clouds hovering over the forested mountains, although in some places, the winds aggressively push cool, damp air over the peaks. Under these conditions, trees are not able to support great heights. In fact, cloud forest trees are only about 100 feet (30 m) tall high, in comparison to the 125-160-foot (40-50-m) giants of lowland rainforest. In higher elevations of particularly harsh climes, dwarf or elfin forest prevails. Here, trees grow to no more than 16-33 feet (5-10 m). In one of the spookiest natural environments on earth, stunted, crooked trees brace themselves against the cruel wind. It is obvious to tell the direction of the wind even when it is not blowing because the majority of the branches will grow from one side of the trees in that area.

Although the principal weather currents affecting the Monteverde cloud forests originate in the Caribbean Sea, the highlands see more pronounced seasonal variation than the Caribbean lowlands. The dry season lasts from January to May; a typical day is mostly sunny with only patchy clouds. The months immediately preceding and following the dry season bring an increase in misty rain and cloud cover. In the rainy season (July through October), there is often a heavy, white cloud cover and sporadic rain. It rarely rains very hard, but rather maintains a constant, heavy drizzle. Trails during this time can by very muddy, rubber boots will be provided if necessary. The average temperature is about 65°F (18.5°C) and varies only by a few degrees through the changing seasons. However, it is possible for temperatures to fall below 50°F (10°C) particularly at night. Because there is little seasonal temperature variation, different species of trees produce fruit throughout the year, thus sustaining life for the countless birds, mammals and insects that depend on fruit to supplement their diet.

Focus on Hummingbirds

There are many fascinating animals that make the cloud forest their home. One of the most interesting, widespread and easy to find is the hummingbird. The Trochilidae family stands out among other avian families in that it contains the smallest and most mobile birds in the world. In fact, the smallest bird in the world is the bumblebee hummingbird of western Cuban rainforests, which weighs less than a dime. Of the 51 species of hummingbirds found in Costa Rica, 34 are residents or migrants in the Monteverde area. This habitat is ideal for them because it contains many nectar-producing flowers and small insects. Contrary to popular belief, hummingbirds do not eat only nectar. The sugary substance alone does not contain enough protein and minerals to sustain life for a bird. The primary component of the hummingbird diet is small arthropods, like insects and spiders, which they glean from leaves and branches during masterful and precision flight. The high-sugar content of nectar provides the short-term energy needed to maintain the highest metabolism of any bird. With a wing beat of about 60 beats per second and a heart rate of up to 4,800 beats per minute, the tiny hummingbird burns calories extremely rapidly. They are typically metallic green, but color varies among species. Some possess vibrant gorgets - gaudy, flowing crown or neck feathers - while the males of most species have brilliant metallic throat feathers, often erected before the female as part of its courtship display. Clever names are testament to their corresponding outrageous colors. Species such as the violet saberwing (the largest hummingbird in Costa Rica), the purple-throated mountain-gem, the magenta-throated woodstar and the green violet-ear are common in the Monteverde area.

The largest hummingbird in Monteverde, the violet saberwing is often seen at feeders

Similar to many butterflies, the hummingbirds' attractive feathers radiate iridescent or physical color. In other words, the feathers do not contain pigment and thus appear black unless viewed from the proper angle with the sun. Rays from the sun reflect off microscopic angled surfaces to appear metallic magenta, sapphire or violet. One group of hummingbirds, the hermits, typically have subdued green and tan coloration which allows them to blend in with their understory habitat. Canopy species on the other hand exhibit brilliant metallic colors of all ranges of the spectrum to attract mates.

Iridescent feathers can clearly be seen on the purple-throated mountain gem

While they may be small, many hummingbirds are very aggressive. They vigorously defend feeding territories, down to individual flowers, from intruding members of any hummingbird species and their nests against potential predators, no matter how large. They are important pollinators of cloud forest plants because they form what are called traplines between flowers. In search of sugary nectar to boost their energy while hunting small insects, hummingbirds rocket from flower to flower, thus effectively transferring pollen and cross-fertilizing plants. In flight, hummingbirds are unparalleled by other birds. A swivel joint in their shoulder allows them to generate flight power in the upstroke as well as the downstroke, making them the only birds in the world that can fly backwards. This is a handy ability, as they accurately probe narrow flowers and flit between others close by in a matter of seconds. It is mesmerizing to watch them buzz between flowers in constant motion, able to hover in one place while their wings remain a blur. Even while perched on a branch, they are not able to sit still; their heads nervously twitch back and forth while their tails pump up and down.

Hummingbird bills are specialized to feed on certain flowers; their length and curvature correspond to the exact dimensions of specific flower species. Flowers that are pollinated by hummingbirds are easily recognized by their narrow tubular structure and bright colors, often of red, yellow and orange, the most attractive to hummingbirds. Hung strategically near hotels and galleries throughout the Monteverde area are hummingbird feeders in these colors filled with sugar solution that attract a variety of understory and canopy species.

Threats and Conservation

The twin threats to cloud forests in Costa Rica and indeed, throughout tropical America, come from deforestation and climate change. Cattle ranching is particularly destructive to the environment because vast expanses of land are required to sustain significant populations of livestock. Native trees are chopped down and often burned without even extracting the variety of useful and valuable materials that can be derived from trees such as lumber, fruit, nuts and medicine. For example, the anti-malarial medicine quinine is derived from the bark of the cloud forest tree, Cinchona. There may be many more useful chemical compounds to be discovered that may cure lethal diseases and bring much needed economic support to developing nations, but forests are being destroyed before pharmacologists can discover the chemical properties and uses of natural remedies. Besides the obvious negative side effects of the destruction of trees and the removal of sources of food and shelter for multitudes of animals, the destruction of cloud forests has additional negative consequences for the natural environment. As mentioned above, the great majority of available nutrients in the soil are found in only the uppermost surface levels. Tree roots and their symbiotic mycorrhizal fungi are essential in binding the nutrients to the soil so that they may be recycled into the complicated food chain. When trees are removed, the rains wash away the nutrients on the soil surface into the rivers. Not only does this then deplete the soil of nutrients (maybe indefinitely), but it leads to the clouding and pollution of the rivers, killing aquatic plants and animals even hundreds of miles away. Because the Monteverde Reserve spans the continental divide, protection of the watersheds in the area ensures the cleanliness of waters flowing throughout northern Costa Rica and southern Nicaragua.

Global warming is leading to the heating and drying of the planet. Constant humidity at or near 100% sustains a great variety of plants, animals and fungi that are found only in the cloud forest. Some tropical ecologists believe that an assortment of cloud forest plants that depend on high humidity fall victim to the drying of the local environment from global warming. Furthermore, it is thought that the recent dramatic population decreases suffered by many amphibian species is due to climate change which is disturbing the delicate balance of temperature and humidity upon which frogs, toads and salamanders depend. In 1987 alone, 20 of 50 frog species disappeared from Monteverde ecologist Alan Pounds' study area, and other mass extinctions occurred in 1994 and 1997. Endemic to Monteverde, the strikingly beautiful golden toad (*Bufo periglenes*) was last spotted almost 15 years ago and is now thought to be extinct. The warming and drying of cloud forests also allows for the influx of foreign species which may harm the local flora and fauna. Each plant and animal is well adapted to its specific environment. As an environment changes and becomes inhabitable for other species, they migrate into the area and put pressure on the already existing species through direct predation, competition for food and shelter.

Conservation Initiatives

Conservation efforts are underway in the area, the most notable of which is the patrol of the protected areas. The establishment of protected reserves and the funds to employ guards monitor these areas to prevent hunting, poaching and logging is generated by revenues from ecotourism. Especially in Costa Rica, visitors from across the globe flock to well protected and maintained areas like Monteverde to take in the breathtaking natural surroundings. Carefully managed ecotourist ventures benefit the local environment by funding conservation, reforestation and environmental education programs. In an attempt to augment the struggling resplendent quetzal and three-wattled bellbird populations, biologists are introducing and monitoring artificial nest habitats. Concordantly, several local conservation organizations are planting native trees as a way of reforesting the areas that were once felled for agricultural development. The Escuela Creativa (Creative School) provides local children with an education firmly based in environmental education and conservation. Through support from the Nature Conservancy, this non-profit school manages 104 acres of pristine cloud forest

Endangered Animals

Endangered Mammals

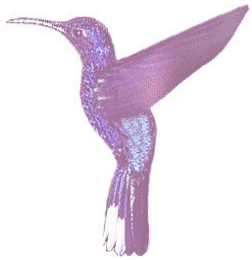
A large number of other endangered animals, under pressure due to habitat loss and hunting for food and pet trade, are found in the Monteverde Cloud Forest Reserve. Some endangered Monteverde mammals include all three monkey species found in the area - the white-faced capuchin (*Cebus capucinus*), the mantled howler monkey (*Alouatta paliata*) and the Central American spider monkey (*Ateles geoffroyi*), the Hoffman's two-toed sloth (*Choloepus hoffmanni*), the neotropical otter (*Lutra longicaudis*), the raccoon-like olingo (*Bassaricyon gabbii*), Baird's tapir (*Tapirus bairdii*) and the white-lipped (*Tayassu pecari*) and the collared peccaries (*Tayassu tajacu*). All six species of Costa Rican cats are endangered and all are found in Monteverde: the ocelot (*Leopardus pardalis*), the margay (*Leopardus wiedii*), the jaguar (*Panthera onca*), the jaguarundi (*Herpailurus yaguarondi*), the puma (*Felis concolor*) and the trigillo (*Leopardus tigrina*). The top predators on the food chain are always the first to suffer disturbances to the environment because of the inefficiency of energy transfer. Every living creature contains a certain amount of compounds that may be converted to energy by its consumer. Plants are the first step of the food chain because they are responsible for fixing available energy in the form of sunlight and dead organic material. This energy is transferred to herbivores, say a caterpillar. However, much energy is lost in digestion, so only about 10% of the available energy is converted. In turn, the bird that eats the caterpillar only converts about 10% of its energy or 1% of that of the plant. The snake that eats the bird only retains 10% of the energy available in the bird (or 0.1% of that of the plant). Finally, the ocelot that eats the snake only manages to extract 0.01% of the energy contained in the plant. That is why any given ecosystem can only support a very limited number of top predators. Big cats like the jaguar are particular victims because they rely upon large prey such as the collared peccary and the paca (*Paca agouti*), cloud forest mammals that are also highly prized by hunters for their meat. Furthermore, large predators require ample feeding grounds to find adequate prey. Forests that are continuously cut back to make room for cattle ranches will eventually not be big enough to sustain animals like the jaguar. With the loss of the top predators, populations of their prey animals can grow unchecked, which causes a knock-on effect for other populations of organisms. Excessive amounts of rodents, for example, result in the destruction of a great many plants. In other words, upsetting the delicate balance of nature tends to have drastic side effects.

Boisterous white-faced capuchin monkeys abound in Monteverde's forests

The beautiful resplendant quetzal is one of Monteverde's endangered residents

Endangered Birds

It is the incredible bird diversity that makes Monteverde famous. In fact, 425 species can be found within the reserves, about 90 of which make seasonal visits as part of their migration. Many species depend on the humid, high-elevation environment for survival and are suffering as a result of habitat loss, among them, the fiery-throated hummingbird (*Panterpe insignis*), the collared redstart (*Myioborus torquatus*), the three-wattled bellbird (*Procnias tricarunculata*) and the ruddy treerunner (*Margarornis rubiginosus*). Endangered birds include parrots that are captured by poachers for sale on the international black market. Game birds like the crested guan (*Penelope purpurascens*) and the black guan (*Chamaepetes unicolor*) face increasing pressure due to hunting. Perhaps the most well-known bird in Costa Rica, the resplendent quetzal (*Pharomachrus mocinno*), is endangered due to habitat loss and hunting for pet trade. A member of the Trogonidae family, this bird is famous for the bright vermillion breast and streaming metallic green tail feathers of the male. Only a few hundred of these birds remain, scattered throughout cloud forests of Central America.



About Santa Elena & Activities

What goes on at Reserva Santa Elena?

Originally, members of the Santa Elena community planned on using the surrounding primary cloud forest land for agricultural research and education, but this venture was unsuccessful. In 1989, the community of Santa Elena decided to apportion 765 acres (310 ha) of pristine, montane cloud forest as protected land, entrusted to the Santa Elena High School. Coupled with a Canadian non-profit organization, Youth Challenge International, the community formally opened the Reserve Santa Elena in 1992 as a means of generating revenue for the local people and cooperating to protect one of nature's treasures, montane cloud forest. The park is composed of 8 miles (12 km) of trails and a canopy observation tower. In addition to funding trail maintenance and park guards, entrance fees supply educational materials to local schools like Santa Elena High School. Over the last decade, the reserve has attracted a wealthy of visitors, particularly birders, from around the globe to share in the ecological wealth of this virgin forest. The reserve is not a nationally protected area, but falls under the protection of the Arenal Conservation Area. In other words, the local community receives no federal funding to protect and maintain the park, but relies on support from visitors and donations.

Activities

The road from the Panamerican Highway near Las Juntas is rough and rocky. It rolls along the steep gorge carved out by the Río Lagarto, a rocky stream that originates in the heights of the Cordillera de Tilarán in Monteverde Cloud Forest and tumbles dramatically down nearly 4,000 feet (1,220 m) into the Nicoya Gulf. The student group will get its first taste of cloud forest through views into the deep Largato valley. Upon arrival in Santa Elena, students from the community high school will meet the EcoTeach group for a guided tour of the Reserva Santa Elena. Here you may see colorful birds like hummingbirds, snakes, frogs, insects, raccoons and rodents. Other possibilities include coatis, peccaries and the resplendent quetzal. Certain sightings are fascinating insects and many determined epiphytes. Of all forest types, it is perhaps the most difficult to spot wildlife in the cloud forest because of all the levels of protection offered to animals there, as well as the mist and darkness of the forest interior that may inhibit visibility. It is essential to keep in mind however, that despite the amount of animal sightings that the group has, the cloud forest is teeming with life. What you see depends a great deal on luck. To give yourself a better idea of just how many different animals are scuttling around the forest, listen very carefully. You will hear bird calls, insect chatter and leaves rustling in trees and on the ground, sure signs that animals are all around you.

The next day is a long one, so get a good night's sleep, while dozing off to the hum and babble of crickets and frogs.

In the morning, the group will travel to the world famous Sky Trek canopy tour. Along the way, you will pass through several forest types and agricultural clearings. It is possible to see a wide variety of birds including the boisterous keel-billed toucan (*Ramphastos sulfuratus*), the all green emerald toucanette (*Aulacorhynchus prasinus*), the social brown jay (*Cyanocorax morio*), the patient blue-crowned motmot (*Momotus momota*) and an assortment of raptors, flycatchers and hummingbirds. Keep your eyes and ears open and have your binoculars ready.

Activites (cont.) & Accomodation

Now onto what may be the most exhilarating and thrilling activity on the EcoTeach tour, ziplining. Friendly and safety-conscious, English-speaking guides will give students an introduction and instructions to the best known ziplines in Costa Rica. Then, each member of the group will be fitted with harnesses, helmets and gloves and be given a sturdy steel pulley. Guides lead the group up to the first cable, supported by a steel tower wrapped by a spiral staircase. The first cable is shorter, lower and slower than all the rest, so you get a brief and comfortable introduction to a new method of flying. The cables soar at different lengths, speeds and heights, some among the lichen-laden branches of the primary cloud forest and some high above its canopy between adjacent mountaintops. In addition to the cable rides, there are 1.5 miles (2.5 km) of trails, two suspension bridges spanning rocky streams surrounded by lush forest and a 68-foot (22-m) observation tower positioned atop one of the hills. On a clear, day it is possible to see the Golfo de Nicoya, the Guanacaste region and four volcanoes of the Guanacaste Mountain Range (Arenal, Tenorio, Miravalles, and Rincón de la Vieja). This is an unforgettable experience that will allow you an up-close encounter with the cloud forest canopy in complete safety.

After lunch, the group will visit various attractions in the Monteverde area. Although Monteverde is indicated on most maps, it is not a town per se, but rather a string of shops, galleries and wildlife gardens lining the rocky road between the town of Santa Elena and the Monteverde Reserve. An afternoon tour of the area includes a visit to the Monteverde cheese factory where you may get a chance to observe the production of the famous Monte Rico and other cheeses and purchase any of the locally made products. The group will also visit some of the local art and crafts galleries including the Hummingbird Gallery and CASEM. The Hummingbird Gallery exhibits the prominent wildlife photographs of Patricia and Michael Fogden and the elegant woodwork of local artist Wilson Arce Mendez. Also for sale at the gallery are handicrafts such as bead curtains, jewelry, carved figures, candles and wind chimes as well as informative books and videos. CASEM (Committee of Artisans of Santa Elena and Monteverde) is a unique cooperative of female artists of the area. Started in 1982 by eight women from the community, this organization has since blossomed and now comprises over 140 women and ten men. Many of the items for sale are hand-made and use natural materials from the surrounding forests. Among the products available are stuffed animals representing local fauna, wall hangings, embroidery, clothes and sounds of the cloud forest on CD. Support of CASEM benefits local families and encourages further training of committee members.

Accommodation

After a day sloshing through the mud of cloud forest trails or trotting over rocky paths on horseback, the group will welcome two nights in a comfortable lodge. Rooms are equipped with hot (gas-heated water) and cozy beds, a welcome relief to chilly mountain nights. Together, the sights and sounds of the cloud forest lull its guests into comfort, peace and appreciation for the wonders of nature.

Special Tips

It rains almost 12 feet (4m) per year in Monteverde, be prepared to get wet. This means light-weight, quick-drying clothes like those made of nylon or polypropylene and thin wool material for cold nights. It is advisable to bring a light-weight, full length poncho for rainy walks. These keep you dry while allowing side ventilation to keep you cool. Rain pants can be worn over shorts or pants to keep your legs dry. If you follow the subsequent advice on choosing binoculars, you will be rewarded with a close-up view of colorful, exotic birds.

Binoculars

For many people, binoculars are very intimidating, both in function and in price, but this does not have to be the case. If you are not interested in investing a lot of money in something you don't think you will use more than a few times, there are nonetheless some extremely cheap, Compact binoculars are recommended for traveling; pick one that has a sturdy rubber casing that will allow it to survive accidents.

When looking for a new pair of binoculars, the most important thing is that they are comfortable on your face and in your hands. Bring the barrels closer together or farther apart so that your range of vision becomes one circle - rather than two conjoined circles like in the movies. Try ones with different magnifications and apertures and decide what works the best for you. If the magnification is too great (and/or the aperture too small), you may see a blurred image when your hand shakes. Some more expensive binoculars are designed so that the image remains clear. Your eyes have lenses that focus by themselves when one eye is closed, but when they are both open, they function as a single unit. Thus, the focus of your left eye on a certain object may change depending on whether your right eye is open or closed. You should keep both eyes open when focusing your binoculars because you will want them both open to view the object. There is usually a dial around one eyepiece that controls that eye and one in the center that alters both. Adjust the dials that controls both first, then the single eye adjuster, keeping both eyes open the entire time. If you wear glasses and prefer to keep them on, fold down the eye flaps so that you can bring the binocular lenses flush with your glasses. Binocular lenses are adjustable (unlike your glasses), so you can likely bring them within focus without your glasses on. This results in better viewing because you are able to put the eye flaps snugly around the eye, cutting out interfering light from the sides.

Using Binoculars

Now that you are familiar with how your binoculars work, it's time to use them. Try focusing on objects at different distances away. Try to remember in which direction (clockwise or counter-clockwise) you adjust the focus for closer things and farther things. Count the spokes on a wheel hub or the veins on a leaf. Read a faraway license plate or street sign. Identify all of the colors in a flower. Now, find a moving object, a squirrel, a bird and a plane. Bring the binoculars to just below your eyes and angle the lengths of the barrels towards the object. Now, bring them over your eyes. Do not put the binoculars over your eyes before turning them towards the object. Because of the blurring of the object when the binoculars are in motion, this is very difficult to do. It will take you several tries before you are able to do it, but this will help you in the long run. Viewing wildlife in the rainforest is a particular challenge, not only because most of the exciting sightings are moving, but also because it is usually dark. Finding a small or distant bird can be tricky because there are no landmarks to give you bearing. To a newcomer in the rainforest, the layers of branches and leaves will all look the same. Keep practicing with your binoculars until you feel comfortably able to pick up a small moving object in the trees.