

To: Candy Hansen, CITD Director

From: Brandy Anglen, CITD Grant Recipient

Re: CITD funded travel to the Galapagos Islands, Ecuador

Ten Things Learned or Accomplished Through Travel

CITD grant money helped fund my travel experience to the Galapagos Islands from April 1, 2009 to April 10, 2009. The State Center Community College District has approved a new study abroad program to Ecuador and the Galapagos Islands for summer 2010, of which I am a lead instructor. This trip will serve two purposes: to help me prepare for this exciting new international program and to gather new educational materials to incorporate into existing geology curriculum at Fresno City College. Following are some of the things I learned or accomplished.

- 1) Cotopaxi Volcano, located south of Quito, Ecuador, is the highest elevation active volcano in the world. It is a large explosive stratovolcano that has been created by the Nazca Plate (part of the Earth's crust beneath the eastern Pacific Ocean) being forced beneath the South American Plate. It last erupted in the 1960's, creating volcanic mudslides that inundated many villages in the area.
- 2) Upon arrival in the Galapagos Islands from Quito, I first visited Las Bachas Beach, located on the northern shore of Santa Cruz Island, one of 16 main islands that make up the archipelago. Here I learned that the Galapagos Islands have native populations of flamingos that migrate from island to island following the availability of brine shrimp in saltwater lagoons.
- 3) Immediately north of Santa Cruz Island is two small islets, named Daphne Major and Daphne Minor. The latter has a completely flat surface which was the result of repeated bombing practice conducted by the United States military during its occupation of the islands during World War II.
- 4) The next island we visited was Genovesa Island. I learned here that Genovesa is the result of a collapsed volcanic crater. Due to its volcanic origins, it has two distinct types of basaltic lava. Each type of lava has a different appearance due to its gas content as it was being erupted. One type of lava, named pahoehoe, is smooth and rope-like while the other type, called aa, has a granular appearance.

- 5) Many of the islands have endemic populations of soft-spined cactus, while other islands have stiff-spined cactus. I learned that the different types of cactus that evolved on each island was determined by the presence or absence of giant tortoises. The cactus is a primary food source for these large animals. If a particular island had endemic tortoises, it evolved stiff spines to protect itself. On islands without tortoises, the same species of cactus evolved soft spines since it had no need for protection. This is one of the many observations Charles Darwin made here in the early 1800's that ultimately led to his scientific proposal of evolution.
- 6) On Bartolome Island, I visited Pinnacle Rock, one of the most recognizable landmarks of the Galapagos Islands. One of the most distinguishable features of this island is the presence of a large, fresh lava flow. I learned that this flow was created in 1872 and added over 100 square kilometer of new land area to the islands. It was characterized by a low gas content, created large pahoehoe flows similar to those on Genovesa Island.
- 7) The Galapagos Islands has an endemic population of penguins, even though the islands are located on the equator. The Galapagos Penguin are one of the smaller species of penguins and can survive here due to deep ocean currents that bring cold, deep, nutrient-rich water to the surface. They are the northern-most dwelling penguin in the world.
- 8) The Charles Darwin Station, located on Santa Cruz Island, is an organization that was established. I learned that the Station has an aggressive breeding program to help save the highly endangered land tortoises that are endemic to the Galapagos Islands. These animals were nearly hunted to extinction by early sailors who used them as a food source. Of the initial 12 species of tortoises, two have gone extinct and there is only one male surviving of a third species. This research station has captured many of the remaining individuals to establish successful breeding program. Their goal is to re-establish native populations of tortoises on the islands in the future.
- 9) Another of the islands I visited was Espanola, one of the southernmost islands. Espanola Island is the oldest island in the archipelago, approximately 17 million

years old. The lava flows that created this island had a higher gas content so the resulting lava formations were composed of aa. I also learned that once a year, the waved albatross arrive on Espanola for their mating and raising of young chicks. This is the only place in the world where the waved albatross nests.

- 10) During the entire trip, I learned valuable information for comfortable travel in Ecuador and the Galapagos Islands. I flew into Quito, the capital of Ecuador. The city is at over 9,000 feet elevation above sea level. Due to the dramatic change in elevation during the relatively short flight from the United States, most travelers suffer from altitude sickness. The symptoms include severe nausea, vomiting, painful headaches, and fever. I suffered from this ailment during my first day in Ecuador. Fortunately, there is prescription medicine that can be used to prevent altitude sickness. I will encourage students on the study abroad trip to take this medicine to make sure they enjoy their first days in Ecuador. In addition, since the Galapagos Islands are located directly on the equator, proper clothing and sun protection is critical to enjoying the trip. There were two other passengers on my trip who failed to take precautions, like wearing a hat and sunscreen, and suffered from sun poisoning on the first day in the islands and were unable to enjoy the remainder of the trip. I will insist that students take the proper precautions to protect themselves from the strong sun while on the trip next summer.