



## Becoming Citizen Scientists by Sabrina Carlson

On September 7, 2016 the 40 students of Mr. Ross's and Mrs. Chapman's 5th grade class from Flagstaff Junior Academy along with their teachers and one paraprofessional visited Little Spring near Flagstaff.

Little Spring is one of a number of springs in the San Francisco Volcanic Field being monitored by the Springs Stewardship Institute; a partnership between the Museum of Northern Arizona and Northern Arizona University. The goal of this 20-year-long study, which is only just beginning, is to gather data on the health and condition of these springs to monitor for change as the 4FRI (4 Forest Restoration Initiative) is implemented and completed. The springs are numerous and the volume of data required will be enormous. This is why the project has created a data collection app and is actively recruiting citizen scientists to assist with the project.

Before leaving school, the students were briefed on the project, what we would be looking for, and why this work is both real science and really important. It was difficult for the students to grasp the scale of a project like this and why citizen scientists would be needed at all. Regardless, they were excited to be a part of something so meaningful.

We parked at the gate as far down Little Spring Road as we could, and hiked the mile into the site. Once there, we divided the group in half. One half of the class took a hike with Mrs. Chapman and Ms. Carrie up to Bismark Lake (near the San Francisco Peaks Passage of the Arizona Trail). Once at the Bismarck Lake, they created nature art inspired by Andy Goldsworthy. Using natural, found objects the students sculpted creations and then took photos of them to create a display at school. They hiked 3.5 miles roundtrip to find the perfect site for their art work.



Scientists at work!

The other half of the class further divided in half again. We wanted the students to all have the chance to collect data for the Springs Stewardship project while minimizing the number of students gathered around the actual wetland at any one time. One small group of students came with me to take readings of temperature, flow rate, salinity, geomorphic condition, and human impact.

The devices we brought recorded measurements in increments that didn't match the data the project required. While in the field we practiced base ten conversions to change "parts per million" into "parts per thousand" and "milliliters per minute" into liters per second. Whew! It was a lot of work AND a lot of fun!

The other, smaller group of students worked with Mr. Ross to take a biotic inventory of plant species. Little Spring is the site of the historic camp of naturalist C. Hart Merriam. In the late 1800's Merriam sought out a mountain of high altitude with low desert nearby to study the plant and

animal species at various elevations and look for common species. Mt. Humphrey's fit the bill perfectly, and Little Spring provided the water needed by Merriam and his horses. It was through his work in this area that he developed the archetype known as Merriam's Life Zones, still used today to describe and predict the types of flora, fauna, moisture and temperatures will be found in places around the world.

The student's working with Mr. Ross imagined themselves as members of Merriam's team, looking carefully at the shapes of leaves, colors of flowers, and other identifying factors. In some cases these budding naturalists were able to find the plant in a book and identify it. In other cases, simply drawing the plant and noting how it was different from the other was the task at hand.

Everyone was impressed by the incredible diversity in this part of the forest and how much work and time must have gone into cataloging every plant and animal in the area. Suddenly the need for citizen scientist became much clearer.

By the time Mrs. Chapman's group returned for lunch it was nearly time to head back to school. There was no practical way we could have the two big groups swap and still return at the appointed time. Instead, we decided to take good science and make it even better science. We will bring this class back to Little Spring toward the end of the school year to study it again, getting another data point and comparing our own data from different seasons.

A great day filled with fun and learning!



Collecting water to measure the flow rate.



This Seeds of Stewardship outing made possible with support from:

