

*AirWaterGas Sustainability Research Network
2014 Education and Outreach Community Grant Request*

Baseline Air Quality Monitoring by Pagosa Springs High School

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San Bernardino, CA – 2006 JD Kurz

Project Description

As a science teacher at Pagosa Springs High School, one of my top goals is to provide my students with relevant and authentic research opportunities. I teach a class called Global Science, which is a natural resource-based elective, using a problem-based learning model. Students identify a local natural resource question and then design a study to investigate and answer the question. Once the students finish collecting and analyzing their data, they present their findings in the local newspaper or at a community meeting.

My Global Science students currently monitor the water quality and riverbed stability of the San Juan River, daily precipitation (CoCoRaHS), as well as forest health indicators at a nearby open space park. I'd like to add air quality to my students' list of long-term monitoring opportunities. In addition, I want to collaborate with the Advanced Computer Science class at the high school. These students will build and assemble the air quality monitors once the equipment arrives.

Despite the small size of our community, the air quality in downtown Pagosa Springs is noticeably poor during temperature inversions. I'd like to deploy 2 air quality monitors: one in the downtown area and another in the uptown area, where temperature inversions are far less frequent. I'd also like to have a 3rd air quality monitor available should another air quality-related question arise. In addition to investigating air temperature and air quality relationships, the stationary air quality monitors will provide year-round baseline air quality data for our community. The air quality monitors will also allow us to quantify impacts of forest fires (natural and controlled burns) on the local air quality.

Global Science students will maintain and analyze the air quality database and present the findings at a community presentation. The following year, a new Global Science class will take over the baseline monitoring and present new findings as they arise.

Equipment will be ordered in March 2015 and assembled by the Advanced Computer Science students during April and May. The air quality monitors will be deployed at the end of May 2015. Students will present the early findings related to temperature inversions at a community meeting in the spring of 2016.

Project Partners

Pagosa Springs High School is the lead organization. Global Science teacher, JD Kurz, will develop and implement a problem-based learning unit surrounding the air quality monitors, and facilitate students in the collection and presentation of long-term air quality monitoring data. Jesse Morehouse, Advanced Computer Science teacher, will task his students with assembling the air quality monitors. Global Science students will upload data, maintain a long-term air quality database, and present findings annually at a community meeting or publish a short article in the local newspaper.

Audience

The Pagosa Springs High School Global Science class is the primary intended audience. The Pagosa Springs and Archuleta County community is the second intended audience as they will have the opportunity to attend presentations or read articles in the paper that relate to the local air quality.

Intended Outcomes

The main intended outcome is to provide students with the opportunity to be a part of a long-term air quality monitoring program. In the process, they will learn about the factors that influence the air quality and have the opportunity to propose solutions to air quality problems or reduce future impacts to our air. The second intended outcome is to collaborate with the Advanced Computer Science class and provide them with an authentic task. The last intended outcome is to provide our community with a long-term air quality database and opportunities to learn more about our air quality. Success will be evaluated based upon the students' completion of the air quality unit, which will include a presentation of the results at a community meeting.

Breakdown of Funds

Item	Quantity	Cost	Sub-Total
UPOD Air Quality Monitors	3	\$500	\$1500
Curriculum Development	1	\$500	\$500
Total			\$2000

Tax Exempt Number

Archuleta County School District 50 Joint
98-03366-0000

Utilizing AirWaterGas Faculty and Students

I would like to utilize the expertise of AirWaterGas students in our initial study design as well as intermittent help interpreting data and possible technical assistance.

Deliverables

JD Kurz, Pagosa Springs High School Global Science Teacher, will develop a problem-based learning lesson outline, which could be replicated in other communities. We will also provide a video of the Global Science students' community presentation.