

STORM PEAK LABORATORY 5TH-6TH GRADE CLIMATE AND WEATHER PROGRAM

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Storm Peak Laboratory has created a place-based elementary school program, which has been implemented at five elementary schools in Northwest Colorado. This program encompasses the four underlying philosophy of Benchmark for Science Literacy (AAAS report, 1993) and National Science Education Standards (1995): Real understanding, not factual recall, is the primary goal and developing a desire to be lifelong learners in science is a secondary goal (Lopez and Schultz, 2001). This program will have immediate benefits on the rural Colorado communities served with the Storm Peak Laboratory 5th – 6th Grade Climate and Weather Program. Furthermore, the improvement expected of the program will be disseminated to alpine regions across both Nevada and Colorado, potentially impacting thousands of students.

To engage students from local elementary schools, Storm Peak Laboratory (SPL) has established a weather and climate education program for 5th and 6th Grade Students. The Desert Research Institute (DRI) operates a high elevation facility, SPL, located near Steamboat Springs, Colorado, at an elevation of 10,530 ft. (<http://stormpeak.dri.edu/>). SPL provides an ideal location for long-term research on the interactions of atmospheric aerosol and gas-phase chemistry with cloud and natural radiation environments. SPL includes an office-type laboratory room, a cold room for precipitation and ice sample handling, a 150 m² roof deck for outside sampling equipment, a full kitchen, and two bunk rooms with sleeping space for nine. SPL is easily assessable at the top of the Steamboat Ski Resort, only 25 feet from a chair lift. Overall, SPL provides a practical facility for researchers, teachers, and students of all ages and abilities.

SPL's director, Dr. Hallar, and site manager, Ian McCubbin, initiated the program in 2006 on a volunteer basis as a service to their local community. Due to the overwhelming response of the community (including a newspaper articles, messages and letters from administrators, parents, and teachers) SPL decided to continue the program. To support this, SPL approached the Steamboat Ski and Resort Corporation, US

Forest Service, and Yampatika for assistance and formed an excellent partnership. Yampatika is a non-profit (501(c)3) outdoor environmental education organization in Routt County, Colorado. Although both Yampatika and SPL have each provided more than a decade of local education activities, this is a new partnership.

The SPL program now spans three days for each school and includes five elementary schools. During the first day, a scientist from SPL and educators from Yampatika visit each classroom for two hours to introduce the concepts of climate and weather as well as teach students how to use scientific equipment. The scientist and educators also introduce the driving question of our design project; How and why will the weather change as we ascend the mountain? During the field program on the second day, students measure and record information about temperature, pressure, relative humidity, wind speed, and particle concentration while they travel to SPL via the gondola and chair lifts (in winter) or 4WD Suburbans (in fall). Once at the laboratory, students will meet with both SPL scientists and Yampatika educators to tour the facility, discuss SPL research activities, and explore application of these activities to their curriculum. An alternative snowshoe program at the top of the gondola is offered to students who do not ski, where students have a program on snow science. At the end of the day each student has a data sheet with measurements recorded from 5 locations of different elevations to take back to the classroom. Following the field trip, SPL scientists and Yampatika educators visit the school for a follow-up to help children grasp concepts, represent their data set collected in graphical formats, answer questions, and evaluate students' learning. Currently, approximately 250 students annually participate in the SPL 5th and 6th grade climate education program. This program has now been approved for approximately 420 students next year, now making this program available to all public school children in Routt and Moffat Counties in Northwestern Colorado.

The specific objectives of the program include the following:

- 1) Develop a weather and climate curriculum that teaches skills required by Colorado Student Assessment Program (CSAP).

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2) Provide a hands-on place-based educational experience where students have an opportunity to use scientific equipment including thermometers, anemometers, condensation particles counters, and barometers. Each school will also receive a snow board to make measurement of snow depth all winter, allowing for further inquiry.

3) Provide students a three-day program that consists of an introduction, field program, and follow-up to help students grasp concepts and apply them to other school studies.

4) Provide all participating students with understanding of climate, weather, and snow science.

Each year, South Routt, North Routt, Craig, and Hayden elementary schools participate in the SPL program during September. Since these three schools service rural Colorado, many students do not alpine ski. The elementary schools within the township of Steamboat Springs; Soda Creek, Lowell Whitman and Strawberry Park, will participate in February and March. Steamboat Springs has a strong winter sports program and most students are competent alpine skiers. The program organizers have created a snowshoe program for the students that are unable to alpine ski to SPL.

This place-based elementary school curriculum has been funded from local businesses (i.e. Ace Hardware, Smart Wool, and Steamboat Ski Corporation), local family foundations (The Mellam Family Foundation and the Brown Family Foundation), and a local organization (Rotary Club).



Figure 2: Students collecting and recording temperature, pressure, and humidity data



Figure 3: Students collecting and recording aerosol concentration data



Figure 1: Student Measuring Wind Speed

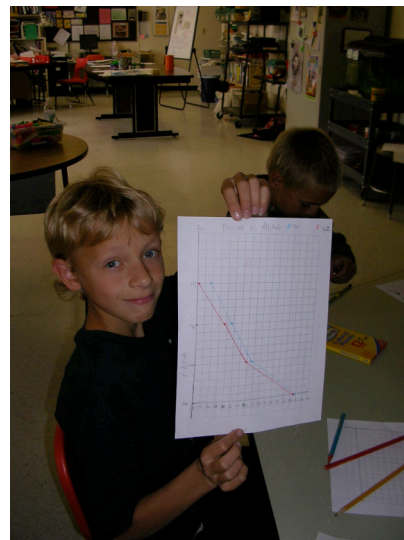


Figure 4: Student back in classroom graphing real meteorological data from field trip