

Just Ask the Kids: Climate Resilience Engagement through Dirty Snow Citizen Science Inquiry Investigations in Alaska and Montana

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Abstract

With shore-fast sea ice disappearing along the coast of the Chukchi Sea causing winds with deep snow drifts, variable snowpack in Bristol Bay in Alaska, and winters without snow in West Central Montana, youth from these areas have personal stories of environmental changes witnessed firsthand. In a virtual “Dirty Snow” citizen science STEM engagement program that met weekly for 5-weeks, middle and high school youth across different time zones and cultures shared such snow stories, implemented a protocol to measure light absorbing particles (LAPs) in snow, and conducted their own Global Learning and Observations to Benefit the Environment (GLOBE) snowpack and pH investigations. Teachers, parents and researchers teamed up to support students as they asked their own questions about how LAPs affect their local communities and measured, collected, filtered, and analyzed snow samples. Students learned that LAPs in snow affect the Earth’s climate system by reducing snow reflectivity, affecting albedo. On a local scale, LAPs capture heat energy leading to snow loss. Students wondered if LAPs also affect water quality. Middle school students from Shishmaref, Alaska (located on an island in the Chukchi Sea) selected snow sampling locations in areas important to their community’s resilience to climate change, such as the sole water supply lagoon. The Shishmaref students shared their results with their community, showcased their project in both the GLOBE International Virtual Science Symposium and a tribal climate resilience webinar, and have been featured in the July 2021 Association of Women in Science Magazine issue on sustainability and innovation. In this session, we will share the lessons learned from multiple perspectives - including surveyed youth participants - on conducting a remote synchronous and asynchronous STEM and climate resilience engagement on a short timescale.

ED55H-06: Just Ask the Kids: Climate Resilience Engagement through Dirty Snow Citizen Science Inquiry Investigations in Alaska and Montana

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 UNIVERSITY OF ALASKA FAIRBANKS(1), SHISHMAREF SCHOOL(2), UNIVERSITY OF COLORADO(3), ARCTIC and EARTH STEM INTEGRATING GLOBE and NASA(1,2,4)

Listening to Students' Climate Concerns
 In my classes, I heard that the kids were concerned about their daily life and how they live with anxiety, how they live with a concern for fresh water, I heard their concern for the marine mammals around us. When I heard them say that they had those concerns, they also had ideas in what they wanted to do.
 -Naluk, Roben Itchoak

Students Sharing Science across the GLOBE
 Norman Stenek and Trevor Eningowuk submitted a report and this poster to the 2021 GLOBE International Virtual Science Symposium.

Shishmaref Panelists Present at Conference
 Eighth graders Norman Stenek and Trevor Eningowuk, along with their teacher Roben Itchoak were panelists at the Community and Citizen Science in the Far North Arctic Research Consortium of the U.S. (ARCUS) in October, 2021.

Sharing Snow Stories and Asking Questions
 Roben Itchoak's approach of listening to students' ideas meshed well with the Arctic and Earth SIGNs Learning Framework, which includes sharing personal stories and honoring knowledge of indigenous Elders (Spelman et al. 2018).
 The Dirty Snow team co-designed a 5-week "Dirty Snow Science" synchronous virtual course around sharing stories, listening to students' ideas and modeling the question formulation technique, an inquiry practice by the Right Question Institute.

Dirty Snow Virtual Inquiry

Class 2

- Stories of "Field Falls"
- Learn how to measure snowpack, collect & filter snow
- Make Hypotheses

Siblings Study Snow Science in Montana

DIRTY SNOW IN SHISHMAREF
 BY NORMAN STENEK AND TREVOR ENINGOWUK
 ROBEN ITCHOAK, GLOBE TEACHER

ABSTRACT
 The abstract was written by the students and their teacher. It describes the problem, the research questions, the methods used, the results, and the conclusions.

RESEARCH QUESTIONS
 The students wanted to know how much snow there was in Shishmaref, Alaska, and how it was changing over time.

RESEARCH METHODS
 The students used a snow gauge to measure the snowpack. They also collected snow samples and filtered them to see what was in the snow.

RESULTS & DISCUSSION
 The results show that the snowpack in Shishmaref is getting thinner over time. This is a problem because the snow is important for the community. The students discussed their findings and what they could do to help.

CONCLUSIONS
 The students concluded that the snowpack in Shishmaref is getting thinner over time. They also learned that snow is important for the community and that they can help by measuring and collecting snow.

INTRODUCTION
 The students started by learning about snow and why it is important. They then went outside to measure the snowpack.

BIBLIOGRAPHY
 The students listed the books and websites they used for their research.

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Photo Credit: Roben Itchoak



Youth Authors on Poster

Trevor Eningowuk and **Norman Stenek** of Shishmaref, Alaska and **Freya Elias** of Helena, Montana. These youth share their reflections and inquiry investigations with permission on this poster.

Abstract Authors

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