

Project Development	Recommendations	How we applied to our project
1. Identify place-based theme	Identify a locally relevant community issue that provides opportunities to apply techniques of data collection and relates to your curriculum. If the issue is relevant to your community, there will likely be resources and enthusiastic community partners willing to collaborate.	We chose water because it is so relevant to our communities in Northern Idaho. Additionally, there are citizen science organizations to support water quality monitoring, and teacher professional development opportunities to learn about snow science. The topic fit within the curriculum.
2. Become an expert	Participate in teacher professional development that instructs on project and place-based education and NGSS with time to practice techniques for relevant scientific data collection	Attended university sponsored snow science teacher training workshop
3. Find teacher partners	Collaborate with colleagues for potential opportunities to apply techniques of relevant scientific data collection, and provide opportunities for students to share data with colleague's students.	Met with other teachers and developed research plan to incorporate data collection from three different schools and foster connections between students across schools through videoconferences
4. Align with curriculum and standards	Develop tentative plan to incorporate subject matter and field-based opportunities into your course curriculum, align with NGSS, and if necessary, district or state curriculum	Determined how each fieldwork component could fit within each quarter's content objectives. Developed unit tests that asked students to incorporate data from field experience into disciplinary core ideas.
5. Reach out to community partners	Seek outside partners willing to support endeavors of science education related projects. This a great opportunity to make professional relationships with higher education programs, local non-profits, engineering firms, government agencies, and private industries. Look for partners that have outreach goals and targets that align with your yearlong theme.	Worked with: citizen science water quality monitoring program and gained access to monitoring kits; environmental non profit and their community garden, Idaho Fish and Game and their fishing equipment and boats, ski patrol and their snow science expertise, homeowners' association and their creek restoration, local environmental engineering firm and their planting materials, Department of Environmental Quality and Coeur d'Alene Tribe and their local expertise.
6. Seek outside funding, if necessary	Seek funding through your district, grants, or agencies	Sought funding through foundation grants, worked with university and non-profit partners' existing outreach grants.

<p>7. Carry out the plan!</p>	<p>With secured funding, incorporate goals of partners into the theme of the field trips to strengthen relationships. Understand the role that partners want to play in developing a more detailed plan including time allocated for teaching students purpose and skill of techniques chosen for relevant scientific data collection. Once students begin developing projects, reach out to relevant community partners.</p>	<p>Fish and Game had a Take Me Fishing Program to get kids outside to fish. We built water quality monitoring into their program so we could help them meet objectives, and also share in the use of their equipment. Once students developed their project ideas for the Youth Water Summit, we connected students with partners for interviews or for project feedback. We also invited partners to be judges to create more meaningful presentations.</p>
<p>8. Student project development</p>	<p>Throughout the year, when discussing solutions to community issues (for example, on the service-learning trip) engage the students in critical discussions of the ecological, social, and economic advantages and disadvantages of the solutions. This will better prepare them to think critically about the solutions they propose in their projects. Allow students to choose their groups based on topic interest. We would suggest walking students through the rubric so they understand the expectations.</p>	<p>To make PBS accessible to all learners, we provided opportunities for students to work individually or in groups of 2-4, and to choose a communication tool, such as a poster, video, or art project, that they were excited about producing. In the summit abstract writing phase, we provided detailed feedback for students to think critically about the solutions that they proposed. This included weighing the advantages and disadvantages of the solution for different criteria (e.g. feasibility, cost, environmental impact).</p>
<p>9. Host culminating event</p>	<p>Plan a summit for your students to present their final projects. This could be at your town's city council meeting or during a school open house. You could also prompt students to organize a community science event to present their work. Invite community partners to play the role of judges.</p>	<p>We hosted this event in a university setting. We had two judges spend ~15 minutes with each presentation group to listen to the presentation, offer feedback, and ask questions. Each judge team looked at about five projects over a two-hour period. This could be improved by having multiple sets of judges interact with each project, and extending the judging period to three hours. Students wanted more time and interactions with judges and peers to show off their work!</p>