

Mirror Creek Bridge

The value is that this is real. The students budgeted, designed, evaluated and built a real bridge for the benefit of the community.

Curriculum/State Standard

Alaska State Science Standard D) A student should be able to apply scientific knowledge and skills to make reasoned decisions about the use of science and scientific innovations.

Overview

Bridge designs were submitted in the form of a model, a budget and a benefit proposal. The winning design was chosen based on affordability, simplicity, safety and weight with engineering calculations done by the local university engineering department. All students on the team prepared a small building project and practiced hammering 16d nails prior to the bridge construction. Students moved all materials to the remote site and built the bridge in 4 hours.

Objectives

- The students will recommend solutions to everyday problems by applying scientific knowledge and skills.
- The students will evaluate the scientific and social merits of solutions to everyday problems.
- The students will work in cooperation with engineers to design and build an innovative bridge needed for a local community ski trail stream crossing.

Materials

balsa and glue for model bridges, provided by students; lumberyard bundle spacer scraps (stickers) for practice nailing; ACQ treated lumber for bridge: 8 4x12x12'; 27 2x6x16'; 2 2x12x16'; 2 2x10x16'; 2 2x4x12'; 30 lbs. hot dipped galvanized 20d box nails; dedication plates for the bridge and school

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6

GRADE LEVEL



ARTS



LANGUAGE



MATH

Misc

MISCELLANEOUS



SCIENCE



HISTORY



SOCIAL STUDIES

8

CLASSES

\$927

TOTAL BUDGET

“Mirror Creek Bridge” project continued...

Readiness Activity

Students were given a list of the parameters for the bridge; height, weight requirements, cost restrictions, student manageable materials.

Students made bridge models at home to present as solutions to the bridge challenge.

Student bridges competed for efficient design, and ability to meet above criteria.

Students built birdhouses for a cross grade project to hone building skills.

Students practiced nailing 16d nails in 40" 2x4 pieces.

Strategies/Activities

A real community need was identified. A bridge was needed to cross a stream on the new ski trails adjacent to the school.

The request for proposals was developed and given to students as 1 of 5 choices. Other projects that could be chosen included a "Design a Fish" competition where students had to build an anatomically correct salmon and design a cover art proposal for the South Central Alaska Fishing Regulations and "design a community" project where they made a blueprint and model of the ideal community. They also had the option of entering 1 of two national design competitions.

Submitted proposals were judged according to the specified criteria. Engineering calculations were done on the top designs.

Materials were ordered.

Practice construction and nailing sessions were held.

The bridge materials were delivered to the park and kids transported to the site.

The bridge was built.

Culminating Activity

The site preparation work of moving rocks and leveling the abutment area was done on a previous trip to the site. Teachers checked level and marked corner points the night before construction. Materials were delivered at 8:30 am while the first group (33 students) did a final check on the site. The first team moved materials into place, laid down sill plates, set beams and attached rim joists. Then went back to classes. When the second team arrived they verified the layout, positioned the decking and spaced and nailed the decking in place.

Evaluation

Students were evaluated based on meeting design criteria in the proposal phase, with the final bridge design drawing ideas from three different proposals.

The practice activities were self-correcting. The students were very demanding about the quality of their projects.