

Introduction

A Walk Through Time is a scale model of geologic time constructed in the form of a walkway. Segments in the walkway will be proportional in length to periods of time in the local geologic column. Large rocks, representative of their geologic periods will be placed on either side of the walkway as the path winds through geologic history. To enhance understanding of geologic principles and processes, a plaque with a descriptive paragraph as well as a graphic representation of the flora and fauna of its time will accompany each period. Students will learn geology, math, graphic design, research, writing, problem solving, and leadership skills as they work with representatives from the City of Broomfield and the Geological Society of America. Not only will A Walk Through Time provide an interactive visit into our geologic past and a glimpse of that influence on our lives today, but also it will leave a work of art and a lasting legacy to the community of Broomfield.

Abstract

Imagine a walk through time where your feet touch the same rocks that a trilobite crawled upon over 600 million years ago! Step forward on the sea floor that existed beneath the giant Devonian fishes. Tread the surface where the Jurassic Apatosaurus made huge bulges in the mud as it walked through what are now Denver suburbs. Move toward the present where the giant woolly mammoth roamed, a mere 11,000 years ago. These are just a few of the steps that you will take in A Walk Through Time. This scale model of geologic time is phase one of a proposed long term project between Broomfield Heights Middle School, the City of Broomfield and the Geological Society of America to create an outdoor science museum that will be used by Broomfield schools and the community at large. Instead of simply reading about geologic history in the Denver area, students and the community will build a 3-dimensional interactive exhibit based upon a local stratigraphic column.

Constructed in the form of a walkway, each layer in the column will be proportional in length to the time that it depicts. Large rocks, representative of their geologic periods will be placed on either side of the walkway as the path winds through geologic history. To enhance understanding of geologic principles and processes, a plaque with a descriptive paragraph as well as a graphic representation of the flora and fauna of its time, will accompany each period. Not only will students learn geology, math, graphic design, research, writing, problem solving, and leadership skills as they create A Walk Through Time, but also they will leave a legacy for future students and adults to learn about our rich geologic history.

Representatives from the City of Broomfield and the Geological Society of America will assist students as they build their vision of A Walk Through Time. Our project will be evaluated three times throughout the year to assure that it is completed on time and on budget. In addition, we will have a public impact evaluation before and after the project is completed.

To preserve the Earth and human-kind, we must understand our beginnings and our history, our landscape and our resources. When completed, A Walk Through Time will help to provide this understanding and create a work of art that the community of Broomfield will be proud to share!

Description

The seeds for A Walk Through Time will be planted early in our project. Under the guidance of our Project Director, interdisciplinary teams of 155 students, will study geology in their eighth grade Earth Science class during the spring and fall terms of 1998. Students will learn about minerals and rocks; weathering, erosion and deposition; fossils, and geologic history; and they will study maps and mapping. As students learn these concepts, they will be able to play a leadership role in the planning and construction of A Walk Through Time. Once they understand the significance of their part in this major project, they will recruit students from other grades, teams, and subject areas from Broomfield Heights Middle School as well as students from other Broomfield schools.

The site for A Walk Through Time allows for a path approximately 350 feet long. As students better understand geologic time, they will use their math skills to create a plan for the path. They must determine what time periods to include in their walkway and the length of each walkway segment on the ground that proportionately represents a time period. They must research the availability and resiliency of rocks that represent each time period and determine what kind of plant and animal fossils should be represented in the walkway. Students must realize that there are gaps in the geologic time record and decide how to represent this information in the walkway. Since rocks will be placed to form an aesthetically pleasant outdoor sculpture, students must work closely with art teachers. Furthermore, students must know, understand and work within the project budget.

In addition to the physical layout, students must plan and design the signs that identify and explain A Walk Through Time. They must decide how many signs are needed, where to locate signs, what materials to use (some signs must be brass so that future students can make rubbings) and what graphics and written information to include in each sign. With the guidance of science, art, and language arts teachers, students will produce the information that guides future students and community members through A Walk Through Time. Before completing the final walkway design, students will create a questionnaire to survey the public's understanding of the geologic setting including the ideas and concepts to be emphasized in the exhibit.

The City of Broomfield will play a prominent role in creating A Walk Through Time. Without their considerable support, this project would not be possible. In addition to providing the Open Space land, the City of Broomfield has generously agreed to help supervise students and staff at Broomfield Heights during project construction, provide construction supplies, and help with collecting and hauling rock samples. Furthermore, the City of Broomfield has agreed to work jointly with the Boulder Valley School District to maintain the pathway. Students will help with construction whenever the task is appropriate for their age and maturity. A Walk Through Time will connect to a City of Broomfield open space trail at both ends of the time line. The spectacular view of the Rocky Mountains from the proposed location of A Walk Through Time provide the perfect connection between our walkway and the regional geologic setting. Future maintenance of A Walk Through Time will be a joint effort between the Boulder Valley School District and the City of Broomfield.

The Geological Society of America, through the expert advice of Liz Knapp, will continue to provide technical advice and guidance as our project develops. A Walk Through Time will serve as an interactive exhibit where students of all ages can learn by touching the rocks to feel the difference in texture between sedimentary, metamorphic and igneous rocks. They will see the differences and similarities in grain size and walk among rocks inhabited by the creatures preserved in the strata. Observers will learn more detail about the strata from signs with both images and written information about creatures who left behind their evidence. Most importantly, observers will learn how these rocks and land forms affect us today.

When complete, students and teachers from Broomfield Schools, employees from the City of Broomfield, community members and members of the press will be invited to the dedication. A final questionnaire will be distributed to both students and community members to evaluate their understanding of our geologic setting. Students will continue to serve as docents for guided tours on the walkway.

Not only will A Walk Through Time provide an interactive visit into our geologic past and a glimpse of that influence on our lives today, but also it will leave a work of art and a lasting legacy to the community of Broomfield.

Rationale

Twenty-five years ago, our Project Director had a vision of creating an outdoor science exhibit so students could be more directly connected to the physical world. It was considered in the design of our school and in the City of Broomfield's recent acquisition of a right-of-way for a nature trail. The vision has been cultivated over time and is manifested in A Walk Through Time. This interactive exhibit will provide opportunities for students to apply what they have learned and engage in educational challenges that are not typically experienced in the classroom setting. Students need to understand the relevancy of what they are learning and how it applies to something tangible in their lives. This "real-life" learning opportunity and its interdisciplinary approach will provide many avenues for students and teachers to actively participate in the study of geology and the physical sciences on school grounds. Furthermore, it addresses the National Science Education Standards in at least one area for each of the Content Standards:

1. Abilities to do and understand scientific inquiry.
2. Properties and changes of properties.
3. Diversity and adaptations of organisms.
4. Structure of the Earth's systems and history.
5. Populations, natural hazards, resources, and environments.
6. Risks, benefits.
7. The nature of science.

Students need to develop a passion and a curiosity for learning that will last a lifetime. From this project, innovations will naturally occur in many different curricular areas as A Walk Through Time summons us as educators and interested citizens to stir the fire within a child to learn.

Potential Impact

Since geologists say, "The present is the key to the past.", one of our goals is to have students understand the concept of geologic history by exploring what literally lies beneath their feet. This includes the study of geologic time, rocks and minerals, fossil flora and fauna, the processes of erosion and deposition, as well as the inferences that can be drawn from these concepts and how geology impacts the life and sustenance of the Broomfield community. As students create a physical scale model of geologic time, they will heighten their understanding of geology, geologic history, and their environment. They will better conceptualize geologic time by creating and walking through the permanent trail that represents geologic time periods, researching and overseeing the trail's development, and supporting its continued evolution and contribution to the school.

Another goal is to foster collaboration within the Boulder Valley Schools of Broomfield and our community at large. The Geological Society of America, the City of Broomfield, area businesses, parents, and students will be integral partners during the project's development and its continued maintenance. Teachers from all of the area schools will be involved in the design and implementation of the curricular components. As a result of *A Walk Through Time*, approximately 3,100 students, the combined enrollment of our area schools, will be impacted by this project each year, along with members of the Broomfield community of 35,000 people.

Evaluation Plan

The evaluation will be divided into three major parts. First, an "in-progress" assessment will occur at least three times throughout the year to assure that *A Walk Through Time* is not only completed on time and on budget, but also that the proposed goals are being achieved. Using the Project Calendar and Proposed Budget as a checklist, *A Walk Through Time* will be evaluated during September 1998, January 1999, and April 1999.

Second, in addition to checking the progress of our project, we want to evaluate student learning experiences. Not only should students be gaining basic knowledge about geology and geologic history, but they should be applying and integrating multiple skills such as mathematics and mapping skills (analytical), artistic and writing skills (interpretation), budget management, and team-building skills. The "in-progress" evaluation will be conducted by the assistant principal who is familiar with the project but not involved in the day-to-day process.

Third, students will conduct a "public impact" evaluation. Between August and December, 1998, students will develop a questionnaire to survey the public's understanding of our geologic setting. They will administer the questionnaire to a sampling of students in grades K-12 and community members. When *A Walk Through Time* is completed, students will administer the same questionnaire to a sampling of students and community members after they have learned about our geologic setting from *A Walk Through Time*. Students will compare the results of the two questionnaires and prepare a brief report on the results.