CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Keeton C. Nerhan

Project Number
J1126

Project Title
Building a Better Dam

Abstract

Objectives/Goals
The overall concept of this project is to determine if the size and shape of rock used in a rock fill dam will affect the permeability and saturation of the dam.

Methods/Materials
In order to accomplish this, several dams of various rock configurations were constructed using rock varying in texture and ranging in size from 1/8" to 3/4". A clay liner was placed at the bottom and sides of the dam in order to stop any water from penetrating in those areas. A specific amount of water was then poured towards each of the dams and timed to test the rock's holding power. The run-off water was measured to determine how much water was retained in the dam. The results were achieved by calculating the amount of water retained in the rock and the time it took the water to pass through the dam.

Results
After measuring the times and amounts of water retained in the dam, it was determined that the dam using a variety of smooth rock ranging from 1/8" to 3/4" was the best over-all design.

Conclusions/Discussion
Building a dam with smooth rocks of various sizes allowed for the least amount of permeation. This was a surprise as the greater amount of surface area on the rough rock would seem to have allowed for less permeation. The dams constructed completely with 1/8" rock retained the most water. This occurred because of the close proximity of the rock to each other, leaving little space for the water to escape. Further research could be conducted to test different types of rock such as volcanic, limestone, etc. The ability of dams to be effective can be determined by the materials used in their construction.

Summary Statement
The varied size and shape of rock determines the permeability and saturation of rock fill dams.

Help Received
All rock was donated by Lyngso Materials, Inc., My mother drove me to various locations and paid for other materials, my teacher Mr. Dolyniuk gave me class time to prepare this project. My inspiration was from my grandfather who designed and built the tallest dam in India in 1959.