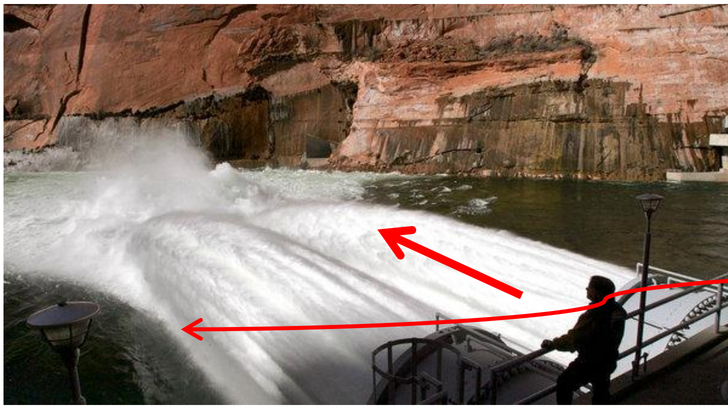
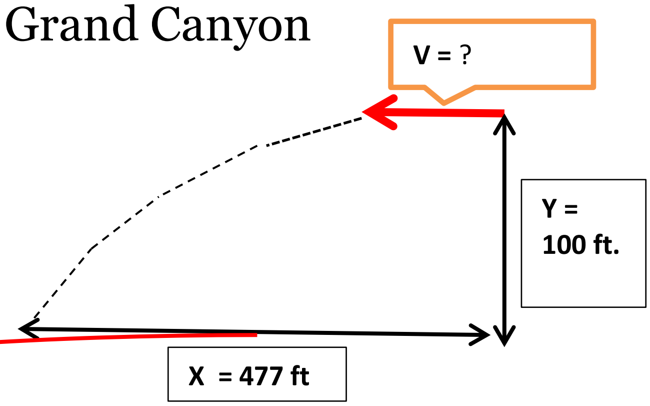
PROJECTILE MOTION Unit 9 Dr. John P. Cise, Professor of Physics, Austin Com. College,1212 Rio Grande St., Austin Tx 78701 jpcise@austincc.edu & NYTimes May 24,2012 by Felicity Barringer

Dam's Flow Limit Loosened to Feed Grand Canyon





Periodic flow increases at the Glen Canyon Dam, on the Colorado River, will help replenish sediment in ecosystems downstream.
The Interior Department announced a plan on Wednesday to allow periodic increases in the flow of Colorado River water through the Grand Canyon, alleviating the environmental disruption caused by the construction of the Glen Canyon Dam in Arizona in the 1960s.

INTRODUCTION: **Water comes out of the base of Glen Canyon Dam(570 feet of height) and gets projected(see graphic) 477 ft horizontally after falling 100 ft.**
QUESTION: **Find speed of water(V) as it gets projected from the huge pipes below dam?**
ANSWER: **~ 191 ft/s**
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EXTRA: **By Bernoulli's Law of energy in fluid flow Potential energy of water = kinetic energy at out flow.** $1/2\rho V^2 = \rho\, g\, h$ **where ρ = density of fluid. The depth of water in the dam is 570 ft.**
QUESTION EXTRA: **Find V using Bernoulli's Law?**

The secretary of the interior, Ken Salazar, said the plan would allow the river's managers to release excess water — more than twice as much as average flows — through and over the hydroelectric dam at will to help propel silt and sediment downstream into the canyon. By mimicking the river's original dynamics, Interior Department officials said, the flows could help restore the backwater ecosystems in which native fish are most at home.
The goal is partly to enhance sandbars that create backwaters for an endangered fish, the humpback chub. The excess sand also nourishes beaches used by wildlife, hikers and rafters.
"The triggering conditions are related to the amount of sediment in the system," he said. When heavy rains occur in the Paria River watershed, which drains rocky territory in southwestern Utah, they frequently flush tons of silt into the Colorado, which the Paria meets below the dam.
The flexible flow plan will remain in effect through 2020. While normal flows through the turbines of the Glen Canyon Dam range from 8,000 to **22,500 cubic feet per second**, the high-flow events could reach 45,000 cubic feet per second and last anywhere from one hour to four days.
At the highest flow, there is too much water to go through the hydroelectric turbines, and the excess is funneled over the dam.