Name(s)	Project Number
Stephen C. Foster	**J1514**

Project Title

Modeling Planetary Environments in Virtual Reality

Abstract

Objectives/Goals
The purpose of this experiment is to show how air-resistance and gravity affects how a ball bounces on Earth and Mars. Also, to see if this can be molded in virtual realty environment.

Methods/Materials
1- Find data on atmospheric density, needed in the formula for air resistance, and the gravitational pull on Earth and Mars.
2- Create a virtual reality simulation of a ball bouncing on Earth, using the variables of air-resistance and gravity, in the Python programming language.
3- Run the simulation using VRUT (Virtual Reality Utility, a 3D graphics environment specially designed for building and rendering virtual environments).
4- Record coordinates of ball position for 13 seconds, recording every 1/100th of a second.
5- Use the same procedure of steps 3 and 4 with the air resistance and gravity of Mars.
6- Compare the Earth simulation

Results
In my experiment the ball on Mars bounced farther, higher, faster, and for a longer period of time, compared to a similar ball on Earth.

Conclusions/Discussion
The variables of air resistance and gravity effect the bouncing of balls. I was able to sucessfuly model this in virtual reality which enabled me to conduct my experiment in 3D.

Summary Statement

I modeled and compared the gravity and air resistance of Earth and Mars in virtual reality.

Help Received

Learned to use virtual reality software at University of California Santa Barbara under the supervision of Dr. Andy Beal during a summer internship. Borrowed university virtual reality goggles to view the final experiment.