



Apr 25th, 10:30 AM - 4:30 PM

## Gravitational Field Inside the Earth: What You Would Weigh in a Mine Shaft

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Bootz, Diane; Kambouroglou, George; Sonntag, Kevin; and Jaggi, Faculty Advisor, Narendra, "Gravitational Field Inside the Earth: What You Would Weigh in a Mine Shaft" (1992). *John Wesley Powell Student Research Conference*. 52.  
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**GRAVITATIONAL FIELD INSIDE THE EARTH:  
WHAT YOU WOULD WEIGH IN A MINE SHAFT**

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Many undergraduate physics textbooks show that the gravitational field ( $g$ ) DECREASES linearly as one moves from the surface to the center of the spherical earth. Experiments, however, have demonstrated that there is an initial INCREASE in  $g$  as one moves down in a mine shaft. A model of the earth was constructed to understand this discrepancy. The model consists of concentric spherical shells of different densities. The gravitational field is determined as a function of the radius. Instead of decreasing monotonically as the uniform density model predicts, the multiple shell model predicts that  $g$  first increases to a maximum beneath the surface before linearly decreasing. This result is in pleasant agreement with the experimental data.