2011 International Boys' School Coalition Conference

The City of London School, London, UK

What's the Right Answer? Doubt, Uncertainty, and Provisional Truth in Science
Session C: Tuesday, July 12, 11:00 A.M. – 12 Noon
by Rick Dower and Peter Hyde
The Roxbury Latin School, West Roxbury, Massachusetts, USA

The PowerPoint slides, graphing spreadsheets, and related documents containing student exercises (and teacher solutions) are available at
https://public.me.com/petershyde .

The Science and Values document gives an exercise for students to consider the importance of doubt and unanswered questions in science.

The Pi Lab documents (-stu and -tch) are student and teacher, respectively, versions of the exercise for determining pi both from experimental measurements and from mathematical calculations.

The Uncert (-stu and -tch) documents are exercises in the process of calculating uncertainties derived from uncertainties in measured quantities.

The Uncert Prob (-stu and -tch) documents contain exercises in uncertainty calculations.

References for the PowerPoint slides:
Feynman quotes are from the 1955 autumn meeting of the National Academy of Sciences published in R. P. Feynman, *"What Do You Care What Other People Think?" Further Adventures of a Curious Character*, Bantam Books, New York, 1989, pp. 240-248.

Ptolemy's refraction data are from M. R. Cohen and I.E. Drabkin, *A Source Book in Greek Science*, Harvard University Press, 1948.

Descartes' refraction figure is from *Discourse on Method, Optics, Geometry, and Meteorology*, P. J. Olscamp, trans., Hackett Publishing Co., 2001.

The Kepler quote is in A. Koestler, *The Sleepwalkers*, Grosset and Dunlap, New York, 1963, p. 322. Another translation appears in J. Kepler, *Astronomia Nova*, W. Donahue trans., Cambridge University Press, 1992, p. 286.

The Galileo quote is in G. Galilei, *Two New Sciences*, H. Crew and A. De Salvio, trans., reprinted by Dover Publications, Inc., New York, originally published by The MacMillan Company, 1914, p. 62.

Newton's Rules are in *The Principia: Mathematical Principles of Natural Philosophy*, I. B. Cohen, Anne Whitman, J. Budenz trans., University of California Press, 1999.