



Glenwood High School
Physics Department

Personal Task

Unknown Uncertainty

A red ball is selected from a sack containing about 4,000 similar balls of different colours. Most of the balls in the sack seem to be black. All of the balls in the sack were themselves previously drawn, one at a time, from different boxes of balls. The boxes contained an unknown small number of similar balls of sometimes different colours. The boxes were filled from an unknown original source.

With what certainty can you identify what was the ratio of black, red and yellow balls in the original source?

State your assumptions and prepare an argument the final ball *had to be* red, no matter what selections were made previously. *Use all of your knowledge.*

Consider the story told by Cicero about one Diagoras¹, who was shown paintings depicting the portraits of worshippers who prayed and then survived a shipwreck. Diagoras asked, "Where are the pictures of those who prayed, and then drowned?"

Now consider why *Homo Sapiens*, smaller, weaker, and with much smaller brains than the Neanderthals, are the only human species in existence today? *Are they?* How do you know? Where does your knowledge come from? Do you trust the sources? Why?

Look at random processes. Measure the background radiation using a Geiger-Muller tube and counter: plot a graph of counts per minute over an extended period (at least half an hour). Can you fit any lines to the data? Plot it again, this time with the tube orthogonal to the first run. And again. Any correlations? Now predict the count for your original orientation for a one minute period in the future. Test your prediction. Reflect on your results and make personal notes on what this means to you as a human being and a scientist.

I may discuss this with you. Make sure you are able to contribute something.

Further reading / research ideas:

Übermensch	Chaos
Cargo Cult	Mandelbröt
Black Swans	KT Boundary
Genesis Chapter 1	Anthropic principle

Nassim Nicholas Taleb
Newton and Alchemy
Feynman's father
Galileo and the Church

¹This is from Nassim Taleb's book, *The Black Swan*, page 100.