

1.
 - a) Assume that the human population reached 3 billion in 1960 and 6 billion in 2000. What does an exponential model imply about the date in which the population will reach 12 billion? 24 billion? What is the average annual growth rate?
 - b) Visit <http://www.nationmaster.com/> and compare population growth rates of certain countries, and compare this with the level of economic prosperity of these countries. Click on 'Advanced View' between the green boxes in the top center of the page. Then select for example 'Africa' on the left and select the category 'Economy' on the right. In the second box select 'More economy Stats' in the box below. (Leave the optional boxes empty). Hit 'Go' to get a list of categories at the bottom of the page and select 'Population below poverty line'. Then repeat the process for Africa with 'Population Growth Rate' in the category 'People'. Compare this with the same data from other regions. Be sure to present information on a dozen different countries either graphically or as a table.
 - c) How pessimistic should we be about the fate of our planet? Balance your discussion between the statistical evidence in b) and the fact that the population projection in a) is only a model.
2. It is well known that smoking causes lung cancer. Or is it? This conclusion had been reached through data showing that someone is more likely to get lung cancer if they smoke than if they do not smoke. Correlation however does not prove cause. It is necessary to go further and to try and discount all other possibilities. One approach is to follow the ideas of the philosopher John S Mill. <http://www.philosophypages.com/lg/e14.htm> These are known as Mill's Methods.

Speculate on how conclusions about smoking causing lung cancer may have been reached via one or more of the Method of Agreement, Method of Difference, Joint Method of Agreement and Difference, Method of Concomitant Variation and the Method of Residues.

[Modern science has given 'proof' of causality.]