

## Problems 1

- (1) PCBs, or polychlorinated biphenyls, are group of chemical compounds produced as a byproduct of industrial and chemical manufacturing.
  - (a) Do you think you would you be more prone to accept a claim that maternal exposure to PCBs causes developmental abnormality in human embryos, or that exposure posed no such risk?
  - (b) What types of evidence would you want to see before believing one claim or the other?
  - (c) Do you think that both claims should be held to the same standard of proof?
- (2) Since the preceding problem presented no evidence one way or the other of the potential toxic or benign effects of PCBs, what is the source of any differences in your tendency to believe one claim over the other? Consider the following possibilities and whatever other factors you consider relevant.
  - (a) prior knowledge (a vague memory) of PCB's
  - (b) a bias against chemicals in general
  - (c) a bias against chemicals produced by industry
  - (d) A bias against "byproducts"
  - (e) A desire for protective standards
  - (f) A bias in favor of productive economic activity
  - (g) A belief that risks should be born by those who profit from them.
  - (h) A distrust of government or regulation.
- (3) If you do not believe that both claims should be held to the same standard of proof, what is the source any differences in how you believe evidence in favor of a toxic effect and evidence against toxic effects should be weighed?
- (4) How would you characterize the models at the heart of modern molecular genetics? Of cellular biology? Can you name or briefly describe some of them? To what extent are the core models of modern biology usally taught (at the undergraduate level) conceptually, graphically, or mathematically?
- (5) What do you think are the "core models" of modern physics? Are they usually taught conceptually, mathematically, or in some other form?
- (6) For each of the following academic disciplines, Identify at least three models that lie at the core of the discipline, and consider the extent to which they are usually taught to undergraduates conceptually, graphically, or mathematically.

Discipline	Basic Models	How Taught?		
		Concepts	Graphics	Math
Molecular genetics	One Gene- One Protein			
	Base Pair matching			
	RNA Codons			
Physics	Newtonian Mechanics			
	Waves, light and sound			
	Quantum Mechanics			
Economics	Microeconomics			
	Macroeconomics			

Ecology	Competition			
	Predation			
	Food webs			
Chemistry	Thermodynamics			
	Equilibrium			
	Electron Orbital Theory			