Possible questions and issues
(These will be updated. Keep checking for new ones.)

Group 1: Evolution

When are mother and fetus in conflict?


Why menstruate?


Why do some females reproduce more than others?

Reeve, H. K. et al. 1990. DNA ‘fingerprinting’ reveals high levels of inbreeding in colonies of the eusocial naked mole-rat. PNAS 87: 2496-2500

Why do some females produce more sons than others?


Why do not all pathogens evolve to be nice?

Does low genetic relatedness select for high parasite virulence?


Did sex evolve to counter parasites?


Did plants and insects coevolve?

EHRLICH PR, RAVEN PH: BUTTERFLIES AND PLANTS - A STUDY IN COEVOlUTION. EVOLUTION 18 (4): 586-608 1964 (background)

What is the problem with group selection?


Why is evolution sometimes slow and sometimes fast?


What are evolutionary constraints and what role do they play in evolution?

In whose interest do pillbugs change sex?


Do plants carry an especially large genetic load?


Do founder effects accelerate speciation?


Is Muller’s Ratchet a sufficient explanation for senescence?


Do findings on C. elegans support the evolutionary theory of aging?


Are mutations random or directed?

What is phylogenetic information?


What is the closest phenotype to genotype? What phenotypes are most closely linked to genotypes?


What is a microbial species?

Is horizontal gene transfer dangerous?

How can we assess whether it is selection or constraints that determine the absence of certain organismal morphologies?

What role does phenotypic plasticity play in the origin of new traits in organisms?
Group 2: Ecology

Why do some organisms undergo a metamorphosis during their life history while others do not?


How does chaos arise in population dynamics?


Can ecosystems move fast enough to keep up with global change?


Do forests store enough CO2 to moderate global change?


Does increased carbon dioxide have indirect effects on plants and their interactions with insects?

Do predator-prey interactions produce surprising dynamics?


Is the biosphere comparable to an organism?


Do researchers contribute to the extinction of threatened species?

Ginsberg, J. R. et al. 1995. Local extinction! in a small and declining population: wild dogs in the Serengeti. Proc. R. Soc. 262: 221-228

Why do rodent populations cycle?


Is there cooperation between plants?


Through what mechanisms do plant species compete?

Can hierarchical models describe ecological reality?


How do bees choose flowers?


Is there a way to determine what makes grouse populations cycle?


Is the 3/2 self-thinning rule the strongest ecological law or a simple accident?


Are there ‘emergent properties’ in communities and ecosystems?


Do trees “talk” to each other?

Bruin, J. et al. 1992. Plants are better protected against spider-mites after exposure to volatiles from infested conspecifics. Experientia 48: 525-529
Why is the world green (or lake blue)?


What determines food-chain length?

Group 3: Behavior

Do sexually selected traits signal the possession of “good genes”?


Are male traits genetically connected to female preferences?


Are sexiness and choosiness genetically linked?


Is there really any connection between symmetry and mate choice, or is the literature biased?


Why are there leks?


Do females select males for their ability to resist pathogens and parasites?


**Do humans choose mates with complementary immune genes?**


**How can we detect whether sperm from different males are competing within a female?**


**Are there non-fertilizing, Kamikaze sperm?**


**Under what conditions do the sexes switch roles?**


**What does it mean to be truly social?**


**How do bees and ants find their way through the environment?**


Open Yale courses
When is the Prisoner’s Dilemma useful?

Axelrod and Dion, 1988. The further evolution of cooperation. Science 242: 1385-1390
Noe, R. 1990. A veto game played by baboons: a challenge to the use of the prisoner’s dilemma as a paradigm for reciprocity and cooperation. Anim. Behav. 39: 78-90

Have viruses solved the Prisoner’s Dilemma?


When should offspring be neglected or even killed?


Is infanticide an example of conflict between the sexes?


Who has the upper hand in mating?