Homework: Units 330-001 Everyone turns in answers to questions 1-7.

1. Basic concepts of kin selection and inclusive fitness

a. Define kin selection and inclusive fitness.

b. Haldane remarks in a pub that he would sacrifice himself for relatives. Asked how many relatives were enough, he answered, "I am willing to die for two brothers, four uncles or eight cousins". Explain his answer,

c. How might kin selection explain the extreme altruism observed in bees and wasp societies?

2. Give one example of how individuals can access relatedness.

3. Is there no selfish behavior in kin selected societies? (hint: meerkats)

4. What are selfish herds or why do sometimes unrelated and apparently not altruistic group?

5. Why do most evolutionists believe group selection is a weak evolutionary force usually swamped out by individual concerns (selection)?

6. Justify the conditions necessary for reciprocal altruism among totally unrelated individuals. Why would cheaters need to be recognized for example?

7. Why do you suppose reciprocal altruism is thought to be a potential important selective force in human societies?

On papers: A-H last names read and answer questions for bee-eaters. I-Q last names read and answer questions for naked mole rats. R-Z last names answer questions on vampire bats. Be as specific as you can, most of this material will be covered in a matching question on the final.

The bee-eaters and naked mole rats.

**Bee-eaters.**

a. What is the extended family in bee-eaters?

b. Who are the helpers and how do they help?

c. Why would one sex be more willing to help?

d. What sex usually leaves the nest and why?

e. What role do parents play?

f. What are the female's basic options regarding pairing?

g. What are the female's options if her own nest fails?

**Naked mole rates**

1. What are naked mole rats?  Describe their ecology as well as social system.
2. What factors are thought to be important in the evolution of altruistic society in general?
3. Why are females more related to one another in haploid/diploid systems?
4. What factors (such as inbreeding and geographical isolation) are expected to be important in mole rats, termites and other non-haploid/diploid systems?
5. What information is given by comparative data on mole rats?
6. Be able to compare the factors important in the evolution of eusociality in haploid/diploid systems (bees) versus non-haploid/diploid systems (termites and naked mole rats).

**Are vampire bat societies reciprocal altruistic societies?**

1. How did the investigators recognize individuals? Is there any evidence bats recognize other individual bats.
2. Describe the clusters within the larger bat society.
3. Who moves the most, males or females?
4. Do individuals prefer the company of certain conspecifics? Are these always relatives?
5. What are the ecological factors that mitigate for reciprocal altruism among non-relatives in bat societies? Or what is the cost benefit system to blood sharing?