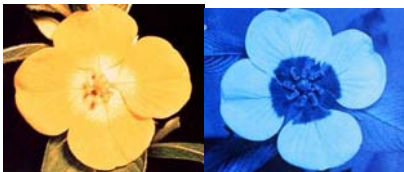


Study Guide for First Examination (*some* questions will come directly or indirectly from this list)

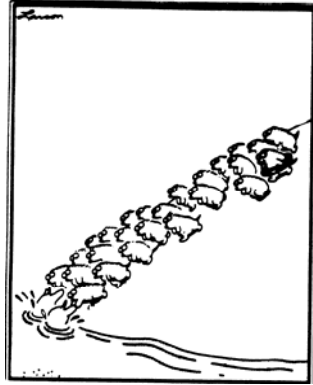
1. Explain why more than one receptor type is needed to have color vision.
2. Why should a honey bee need to detect the plane of polarization of light?
3. How does a honey bee detect the plane of polarization of light?
4. What are the alternative hypotheses concerning the role of individual pheromone components and the complete pheromone blend in sex pheromone communication? Which hypothesis was supported by the data? What are proximate and ultimate explanations for this result?
5. Explain how labeled lines and integration are involved in pheromone blend discrimination.
6. How do blister beetle larvae get to a nest of their host bees?
7. What experiments would you design to test the hypothesis that aggressive chemical mimicry is involved in the interaction between blister beetle larvae and bees?
8. Provide specific evidence that supports the proposition that both peripheral (sensory) and central (CNS) inputs influence ecdysis in crickets.
9. Describe spatial learning in the beewolf and imprinting in geese. Are there any similarities between these two examples of learning in these two distinct species?
10. Explain how spatial and temporal integration are involved in the response of a blow fly to mixtures of salt and sugar water.
11. What cuticular modifications are associated with taste, touch, hearing, olfaction and vision?
12. Describe a contribution to insect or animal behavior made by Niko Tinbergen, Karl von Frisch, Konrad Lorenz, Kenneth Roeder, and Vincent Dethier.
13. How (proximate explanation) and why (ultimate explanation) do these flowers look (left) different to us and a honey bee (right)? Color versions were shown in class.



14. Distinguish between pheromone, allomone, kairomone, and synomone and give an example of each.

15. Write a sentence about courtship of fruit flies that is outrageously anthropomorphic.

16. How does this cartoon by Gary Larson illustrate a problem with group selection?



17. How does a moth determine which way to fly when there is a bat approaching?

18. Given that receptor potentials are not propagated along axons, why are they critical to behavior?

19. What are two alternative hypotheses concerning why moths produce ultrasonic clicks? How would you test these hypotheses?

20. What aspect of communication is the basis for reproductive isolation amongst species of crickets?

21. Compare and contrast color vision in insects and humans.

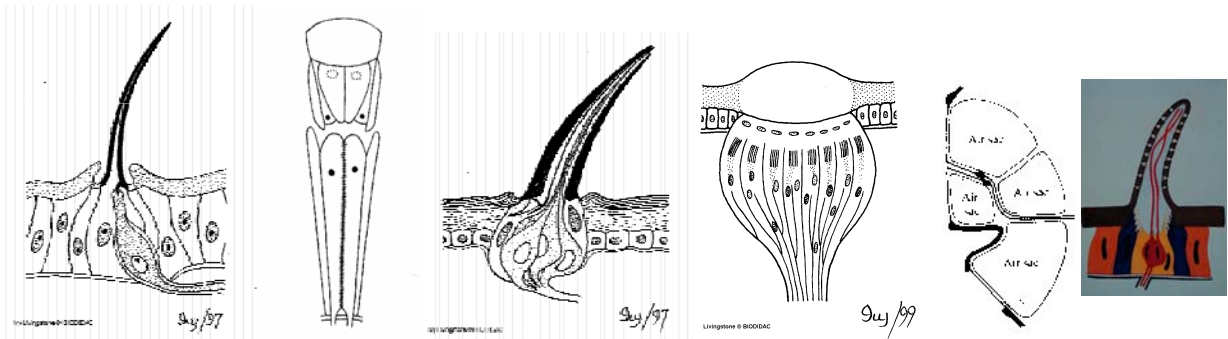
22. Why should the kairomonal detection system of a specialist and generalist herbivore be different and how are they different?

23. Why are male crickets more frequently parasitized by the fly larvae of *Ormia ochracea* than females?

24. Compare and contrast the objectives, methods and assumptions of behaviorism and ethology.

25. Name a different insect that uses each combination of signal and receptor systems in communication:

- male stridulation, female tympanic response
- male tymbal sound, female subgenual organ
- female pheromone, female multiporous hair
- female pheromone, male multiporous hair
- male and female pheromones, male and female multiporous pegs
- male tymbal sound, female tympanic membrane
- female wing vibrations, male Johnston's organ



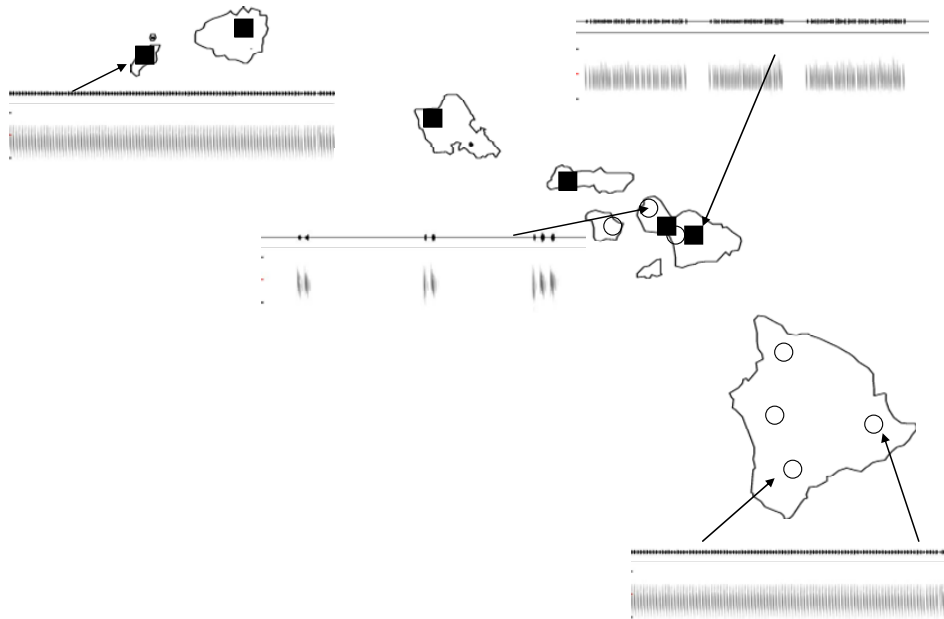
26. In the illustrations above can you label neurons, dendrites, rhodopsin, ocellus, ommatidia, tympanum, multiporous hair, olfactory receptor, lens, gustatory receptor, mechanosensory receptor, pigment cell, and tympanic membrane.

27. Why study insect behavior? You should be able to give me a prioritized list and be able to defend your priorities.

28. Draw action potentials (as vertical lines) on the horizontal lines below that would be consistent with the presence of a bat below and to the left of the moth. The bat is very close (less than 1 m).

	Wings up	Wings down
Right A1	_____	_____
Left A1	_____	_____
Right A2	_____	_____
Left A2	_____	_____

29. Suppose these cricket songs were recorded from three different islands in Hawaii. Is this pattern of cricket songs of *Cricketa imaginaria* (circles) and *Cricketa falsifia* (squares) consistent with a pattern of reproductive character displacement. What led to this pattern?



30. One scientist observed that the female Oriental fruit moth extruded a pheromone gland. This act was followed by a male flying upwind. The male landed beside the female and displayed a scent brush. The scent released from this brush acted as stimulus that caused the female to approach and touch the male. He spun around and attempted to copulate three times. All of these actions occurred in less than 9 seconds as shown below. You should be able to apply the terms latency, duration and interval to the following information. For example, what is the duration of male flight? What is the latency of “female touches male?” What is the interval between copulatory attempts?

