BIOLOGY I: HOW ANIMALS WORK
RESEARCH IDEAS

1. physiology

how does temperature affect physiological function
- e.g. temp. acclimation affects many functions
- e.g. heart rate in Daphnia, cockroaches
- e.g. respiratory rate in fish, tadpoles
- e.g. metabolism in any ectotherm
- e.g. call rate in crickets

how does temperature affect development
- e.g. is metamorphosis affected by temp (lotsa different insects; aquatic, terrestrial
- e.g. hatching in brine shrimp versus temp

pH affects on animals
- e.g. distribution, mortality of invertebrates
- e.g. development of brine shrimp or aquatic insects

light cycle, quality of light
- e.g. do animals prefer certain wavelengths (color) of light
- e.g. does light cycle influence temp. tolerance, development

pollutants
- e.g. oil, cigarette smoke, ethanol, other drugs? on heart rate, mortality

moisture
- e.g. distribution

quality of substrate and distribution

humidity
- e.g. water loss rates of various insects or amphibians under diff. conditions or different parts of life cycle

2. ecology

microhabitat preferences of animals
- e.g. gradients of temp, salinity, moisture, pH, light

competition between closely related species of beetles, what is a niche?

diversity of animals in different environments
- e.g. macro invertebrates from forest vs. corn field
- e.g. small mammal population in forest vs. edge vs. field

3. scale

how big are cells?

consequences of growth
- e.g. if the mass of an animal doubles what happens to its heart rate, respir rate, metabolism, jump distance

growth in humans – what % is head to leg in various age groups versus other animals like *Limulus*, ?

4. reproduction and selection

select phenotypes in *Drosophila* mating experiments

5. behavior

e.g. taxis in animals (orienting toward or away from environmental variable)

e.g. aggressive behavior in crickets, Siamese fighting fish, crayfish

e.g. how does an animal spend its time

Siamese fighting fish: use magnifying mirrors. Live fish more provocative than mirrors so maybe use live fish but put colored filters between fish so fish look like fish but different colors.

Ant pheromone trails:

ant pheromone trail

see if ants follow trail even if food elsewhere?
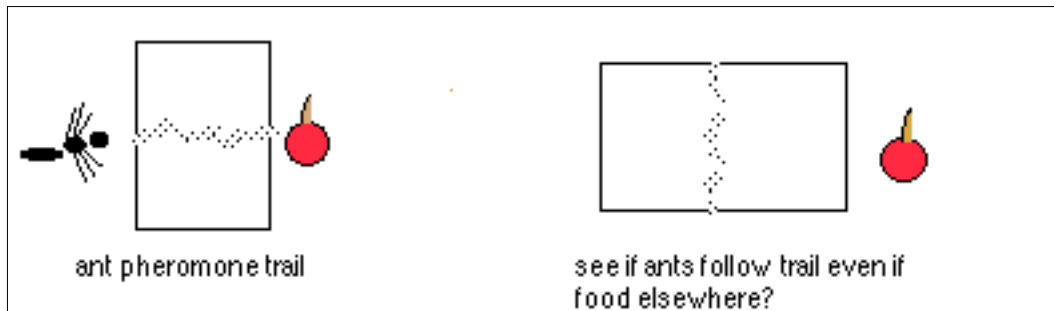
individual distance and adults versus kids
parent-offspring conflict?
student seating maps in diff courses in 148
tadpole sib recognition
bumble bee forage-time on different plants

student seating maps in diff courses in 148