Data Interpretation Exercise – Due in class on Wednesday February 20

IMPORTANT: PLEASE ANSWER THESE QUESTIONS ON A SEPARATE SHEET OF PAPER. HAND IN HARD COPY ONLY. EMAILS NOT ACCEPTED.

1. A major study of coral reefs comparing reefs before and after the early 1980s showed a major difference in coral reef structure.

What does this diagram demonstrate? What does it mean to have a bottom community dominated by corals as opposed to bottom algae. Why would such a shift occur? In other words, why would bottom algae be common when they were formerly rather rare?
2. Rocky shores are often exposed to strong sun. Many organisms exposed to the heat mobilize intracellular heat shock proteins, HSPs, which aid in the prevention of the loss of function of enzymes by maintaining their three-dimensional structure. One study looked the concentration of HSPs in limpets living on open flat rocks and within cracks. Why did they get this result?

![Graph showing the concentration of HSPs in limpets living in crevices and flat areas.]

3. Here is an experiment that was done. This study was done on fiddler crabs, where a female approaches a male who waves his larger claw. A male was hidden away so a female could only see the male's reflection in one mirror side by side with another reflection that made the male appear to be larger in the mirror.

![Diagram of the arena for testing male-female interaction.]

Fig. 1. Arena for testing response of females to reflected images of different size. Numbers (other than the 100°) are distances in cm.

The investigator looked at the choice made by females and these are the results:
Here are some questions about this result:

What did the investigator find?

Why would such a result be found. In other words why would such a result have arisen in a natural system?

4. Here is a recent study of species diversity with latitude in species of fiddler crabs of the genus *Uca*. The investigator used GIS techniques to find temperature and plotted in three regions around the world the relationship between species number and temperature. So these points can be from sites hundreds or even thousands of km apart.

Answer these questions, which require some thought.

What is this graph telling you? Be specific.
Why would there be more species in one region than another? Give two general reasons (hint: one reason might be ecological and one might be evolutionary).

Why would there be a relationship between temperature and the number of species?