

General Biology: Cells and Molecules  
Homework Assignment #2

**DUE on Tuesday, Aug 2<sup>nd</sup>**

ALL homework pages MUST be stapled. Please don't fold over the corners etc. You may type or handwrite your answers. Please make your handwriting as legible as possible.

1. Resistance to antibiotics is a continual problem that is mostly attributed to use when not appropriate (i.e. a doctor prescribes antibiotics for a cold that is the result of a viral infection. Antibiotics only target bacterial infections and as such, prescribing them for colds does not help). In terms of natural selection, what acts as the agent to select for new antibiotic resistance? How does the new trait (resistance) arise?
2. The northern spotted owl is threatened with extinction in the Pacific Northwest. Some people argue that a minimum of several hundred reproducing individuals would be necessary in order to maintain a viable population. Preserving the habitat for this number of breeding pairs would prevent logging in much of the remaining old-growth forest. Other people argue that we can log the rest of the old-growth forest while keeping the breeding pairs of owls in captivity, where they could reproduce and avoid extinction. Compare the underlying assumptions of these two arguments by stating your opinion(s) and supporting it.
3. The current world cheetah population has little genetic variation while the Bengal tigers, with a population size roughly the same as the cheetahs, has considerable genetic variation. Which population has a greater capacity to adjust to environmental changes brought about largely through human activities in their range? Explain.
4. Which of the following best explains why population bottlenecks (see figure 23.8 page 468) are the major cause of seriously endangered species? For your choice(s), explain why.
  - a. The population size is reduced below effective size.
  - b. The chance survivors may not be representative of the original population in terms of variability.
  - c. The chance survivors may be more homozygous than their ancestors.
  - d. The chance survivors may harbor a higher frequency of harmful genes than their ancestors did.
  - e. All of the choices are correct.