Dr. Reichler's Bio 311D Exam #4 April 28, 2010 Print Name: KEY

Read each question carefully and don't hesitate to ask if a question seems unclear. If possible, answer each question in the space provided, but if needed, continue on the back. If you use a drawing as part of your answer, be sure to also include a written explanation. These questions have specific answers, although for some, more than one answer is possible. To receive full credit you must clearly and fully answer the question. Each question is worth 10 points for a total of 100 points.

1. *A. boisei*, a human ancestor, had molars (the teeth in the back of the mouth) with an area of about 756 mm^2 while modern humans have molars of about 334 mm^2, what does this tell us about *A. boisei*'s diet compared to the modern human diet?
The larger molars indicate a greater consumption of plants. Larger molars are needed to help grind the tough, cellulose encased, plant cells.

2. Would you expect a calorie restriction diet to be more effective in prolonging life in male or female grizzly bears? Why?
Females. They put much more energy into reproduction; males do not help raise the young. So the females have more energy that they can conserve by not reproducing.

3. If you are the same size as an emu (a bird) and both of you are running as fast as you can, whose blood in the pulmonary vein (leading from the lungs to the heart) would be more acidic? Why?
Human. The emus have more efficient exhalation of air in the lungs, almost complete exchange while humans cannot completely exhcnage the air in their lungs with each exhalation, so there is less CO_2 in the emu's lungs which means that more CO_2 can diffuse out of their lungs thereby causing a greater increase in pH.

4. George has problems with swelling (fluid buildup) in his feet, and neither walking nor massage helps reduce the swelling. Why? Where is the problem, and what is the problem?
In the one way valves of his lymph vessels. Since there is no pressure pushing the interstitial fluid into the lymph vessels, these lymph vessels rely on muscle movement and one way valves to squeeze the lymph fluid back to the heart.

5. Mountain lions and wolves are both secondary consumers. After the introduction of mountain lions, would the number of wolves in an area increase, decrease, or stay the same? Why?
It depends on the competition between them. Any one answer is fine: If they compete for the same resources, the wolves may decrease. If they compete for the same resources, but the wolves are better at acquiring the resources, so the mountain lions cannot last, there will be no change in wolf numbers. If the mountain lions and wolves do not eat the same food, if they do not share the same niche, there will not be a difference in wolf numbers.

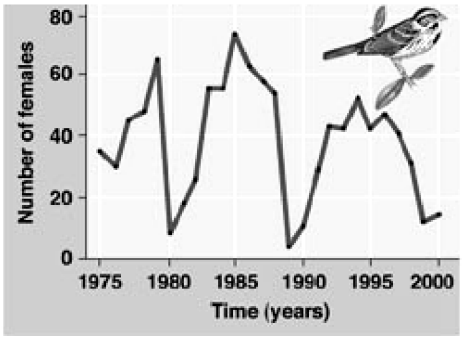
6. Sheep F is very active and is constantly moving while sheep Q is lazy and does not move much. If these sheep consume the same calories each day, which will provide more energy when eaten? Why?
Sheep Q. It is using less of the energy it consumes. It is putting more of that energy into growth. So there is more energy available when you eat sheep Q.

7. Describe how the carrying capacity of a single species could be very high while the biodiversity where this species lives could be very low?
There is a lot of a resource, but it is not distributed diversely. In other words, there are plentiful resources, but few niches.

8. Would monitoring the number of grizzly bears be a good measure of how many primary consumers (herbivores) exist in an area? Why or why not?
No. The grizzly bears have a varied diet, so changes in primary consumers may not be reflected in grizzly bear numbers.

9. If you were reintroducing grizzly bears to an area, would it help to use the "soft" release method used for wolves in Yellowstone NP? Why or why not?
No. They do not live in packs, and so do not need to form a pack prior to release. They also do not need to be as concerned with the territorial behavior of other grizzlies, so the 'soft' release is not needed to convince them that they are safe from other grizzlies.

10. Add **two** lines (multi-point lines can be used) that would explain the changes in the number of these birds. One that would alter the birds' carrying capacity, and one that would not alter their carrying capacity. For each line that you add, explain what it is, and why it would affect the number of birds.
(Note: The graph shows the number of females. For the purpose of this question, assume that the ratio of females to males is equal and does not change.)



Many possible answers. For affecting only the number of birds, but not carrying capacity- predators (the line would be similar to the number of birds), a disease (would be the opposite of the number of birds)
For affecting the number and carrying capacity of the birds- A resource like water, food, other nutrients (the line would be similar to the number of birds), waste removal (the line would be similar to the number of birds)