

1. Would you expect the blood in your lungs to be more acidic in the summer or winter? Why? (8 pts)
Winter, there are fewer living plants in the winter, and therefore less CO₂ is being pulled out of the atmosphere and into plants. So CO₂ levels are higher in winter which means that less CO₂ can diffuse out of the lungs, and more CO₂ in the blood leads to more carbonic acid.

2. You want to minimize the loss of plant produced energy when you eat a cow (a primary consumer). On your ranch you have a juvenile, a young adult, and an older adult. Which cow would you eat to minimize the loss of plant produced energy? Why? (8 pts)
The young adult cow. The older adult has stopped growing a long time ago, and so it has been consuming much energy for metabolic functions, but not putting much energy into growth. The juvenile cow is too small, and has not finished growing. The young adult cow has just finished growing, and it is at the most efficient time to get the most of the plant energy without the cow using much more energy for metabolic activities.

3. You have just eaten some whole wheat bread that contains only complex sugars. Would you find any simple sugars in your stomach? Why or why not? (8 pts)
Yes, amylase in saliva has chemically digested some of the complex sugar to simple sugars.

4. Fred the grizzly bear is the same size as you are. You and Fred both eat the same plants, the same quantity of plants, and burn the same number of calories, but you gain more weight than Fred. Why? (8 pts)
The human digestive system is more like a herbivore digestive system, so we can extract more nutrients from plants. The short carnivore-like bear digestive system will not be able to extract as many nutrients from the plants.

5. The cubs of a female grizzly bear stay with their mother until the fall and then they leave, and therefore their mother is unable to reproduce that year. Why? (8 pts)
fertilization occurs in the summer. If the cubs were still with her and she was lactating in the summer, she was not fertile.

6. Island Mack is 100 km², and island Brown is 500 km². Island Mack has twice as many species as island Brown. A) Why is this surprising? (4 pts) B) How is this possible? (4 pts)
A) Biodiversity is commonly positively correlated with area. B) but in this case island Mack must have more resources.

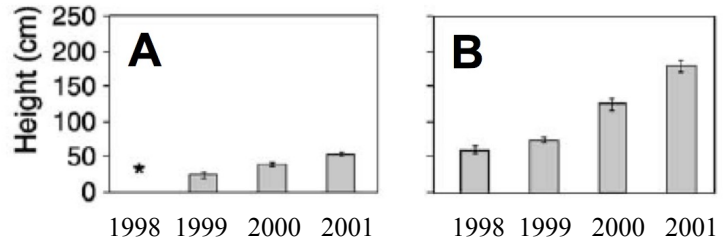
7. You are studying a herd of yak (primary consumers) that live in an area free from predators. Their population had been rapidly increasing, but then it declines. No new predator was introduced, and the climate has not significantly changed during this time. Why did the population of yak decline? (8 pts)
They increased to above their carrying capacity, and now the population is shrinking due to either a lack of resources, a build-up of waste, or both.

8. A flood has severely altered a prairie habitat. You are concerned about some prairie dogs that live in the prairie. Immediately after the flood, there are some prairie dogs. When you return ten years later, the prairie is recovering, but the prairie dogs are gone. Why did the prairie dogs disappear? (8 pts)
They could not survive, obtain the necessary resources, during succession.

9. In Chernobyl there is a large paved area that was part of an amusement park. Is the succession occurring in this paved lot more like primary or secondary succession? Why? (8 pts)
Primary, this area lacks soil, etc and most other biological resources. If plants are growing through cracks in the pavement, then it could be secondary succession with the plants using resources that were trapped below the pavement.

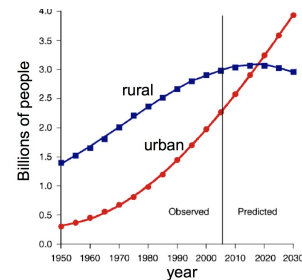
10. Both wolves and grizzly bears are secondary consumers. Would you expect to find more wolves or more grizzly bears in Yellowstone NP? Why? (8 pts)
Wolves. Each wolf is smaller, and therefore more wolves can exist in a given area using the same resources as fewer bears. OR Since wolves hunt as a pack they can kill more prey and would have more resources available to them.

11. This graph is from a study on plant heights in Yellowstone NP riparian habitats after wolves were reintroduced. Which graph represents **high** risk sites? Why? (10 pts)



B. this is where plant heights increase indicating that the elk are avoiding this area due to the increased risk of predation from wolves.

12. A) Why does this graph imply that the loss of tropical biodiversity may begin to slow down?
 B) Would you expect to see a major recovery in biodiversity over the next 20 years? Why or why not? (10 pts)
*A) Decreased rural populations may mean fewer resources will be extracted from these areas and disturbed areas can return to a wild state.
 B) Succession takes a long time, maybe 100+/- years, so major recoveries of biodiversity will occur farther in the future.*



Bonus: Only **one** of the following questions will count: (3 pts)

a) Your plane has crashed at the foot of a retreating glacier. You know you need to eat some proteins, but there are no animals nearby to eat. You are injured and cannot walk very far. Where would you be most likely to find something to eat that was high in protein? What would you eat, and where would you be most likely to find it?
Move towards the ground uncovered a few years ago, where you begin to see vascular plants. Many of these early plants are legumes, which are rich in proteins.

b) Did you watch the “Toxic Garbage Island” movie?
Check sign-in sheet.