

Read each question carefully and ask if a question seems unclear. If possible, answer each question in the space provided, but you may continue on the back. If you use a drawing as part of your answer, be sure to also include a written explanation. The 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 being asked. If you add incorrect extraneous information, points will be deducted. The points for each question are noted in parentheses totaling 60 points. Exams in non-permanent ink will **not** be eligible for a regrade.

1. Which function do plant hormones (like systemin) play in responding to the environment: perception, integration, **or** response? Why? (10 pts)
Integration. Plant hormones move from the site of perception to signal the response. The strength/quantity of the different hormones determine what the response will be.
2. Compared to dim light, would bright light cause more polarization or more depolarization in your rods and cones? Why? (10 pts)
More polarization. Light causes rods and cones to become polar, which means they stop releasing inhibitory neurotransmitters, and the downstream neurons send a signal to the brain.
3. Would grizzly bears get more nutrients from the food that they eat by lengthening or shortening their digestive system? Why? (10 pts)
Lengthen. Grizzly bears eat many plants, but have a short, carnivore-like digestive system. So making a longer digestive system would mean that the bears would get more nutrients from the plants that they eat.
4. Would having a greater than average number of offspring lower the chances of survival for male grizzly bears, female grizzly bears, or both? Why? (10 pts)
Females. Grizzlies are non-monogamous. Females care for the young, and males do not.
5. Depending on the type of genetic modification, the use of genetically modified crops can lead to both increased or decreased contamination of waterways. Give one example of how genetically modified crops can lead to increased contamination of waterways, and give one example of how genetically modified crops can lead to decreased contamination of waterways. (10 pts)
Several answers are possible: Increased contamination from the use of herbicide (Round-up) resistant crops because the herbicides can be sprayed during the growing season OR from the BT modified crops falling into waterways. Decreased contamination from BT modified crops that make plants toxic to some insects so less pesticides need to be sprayed.
6. You are defending Mack who is accused of murder. DNA from some blood found in Mack's car was cut with a restriction enzyme and gives a pattern of 5 bands. DNA from the victim is cut with a **different** restriction enzyme and also gives a pattern with 5 bands. How would you invalidate this seemingly damning evidence against Mack? (10 pts)
Using different restriction enzymes means the comparison is not valid. Different restriction enzymes cut the DNA at different DNA sequences. So if the DNA was from the same person, you would expect to see different patterns when using different restriction enzymes. OR The number of bands are the same, but the sizes are different indicating that the DNA is from two different people.