

Biology 103 and Biology 104

Discovery Questions

All answers can be found in your book or the appropriate website. Exam questions (not quiz questions) will come from these discovery questions. If you have a problem understanding one of my questions, please come by, but I will not answer these questions for you.

Chapter 1. Introduction.

Science, non-science, and pseudoscience.

1. How is dishonesty reduced in science?
2. Are opinions allowed in science?
3. What does the book mean when it says that a “scientist is a healthy skeptic”?
4. Which of the following are considered “science” or “non-science”?
 - a. astronomy
 - b. biology
 - c. history
 - d. sociology
 - e. religion
5. What is pseudoscience? Give an example of pseudoscience.
6. Limitations of science: What does it mean when the book says that “science is self correcting”?
7. Significance of Biology: Name and discuss three reasons that understanding biology has been beneficial to mankind.
8. Consequences of not understanding Biology. Name and discuss three reasons that a poor understanding of Biology has been detrimental to mankind.
9. Visit http://muse.tau.ac.il/museum/galileo/prohibition_helioce.html
 - a. Explain Galileo’s heliocentric (Copernican; “helio” = sun) theory. Explain the competing Geocentric “theory” (“geo” = earth). BE CAREFUL: the website initially confuses two terms, so remember Heliocentric = Copernican.
 - b. Why is Galileo’s heliocentric theory a good example of how science should work? Why is geocentric not a “theory” by scientific standards?
 - c. Where did Galileo meet resistance to his theory? Why?
 - d. In the 1620 book, what correction/compromise was required in order for Copernican theory to be published?

Chapter 9. Sexual Reproduction (and courting).

1. p. 330. When two individuals of the opposite sex are trying to find one another, they use signals. These signals allow the individuals to identify three things about the other individual. What are they?
2. When signaling, why is species identification such an important trait?
3. Why does the female Gypsy moth use pheromone? Why was the pheromone for the Gypsy moth synthesized?
4. Not in the book...think. In a grasslands, would a bird more likely use visual displays or auditory calls to attract mates? In a densely wooded forest, would a bird more likely use visual displays or auditory calls to attract a mate?
4. p. 332-333. Define territory. Signaling can also occur between members of territories. Why is this? Why is the red winged blackbird a good example of this. Male red winged blackbirds without territories suffer in what way?
5. When I play with my dog, he begins to show “aggressive behaviors” toward me when I take her bone. First she shows her teeth and growls. If I continue to play with her, she will not bite me, but instead will bite and run with the nearest stationary object (a sock or shoe). This is an example of _____? What is the purpose of this behavior during a “territorial scuffle”.

Chapter 11. Diversity within species.

1. Legal Implications: Why is the “red wolf” a good example of the difficulty of defining a species?
2. Ethics and Humans: What is the eugenics law? Why are the ideas of eugenics flawed? How has history proved that abiding by eugenic law it has a tragic ending?

End unit exam I.

Begin unit exam II

Chapter 12. Evolution.

1. Name and discuss the three common misunderstandings of natural selection.
2. visit <http://www.athro.com/evo/pthumb.html>
 - a. How many claws do Pandas have? How many claws does a typical bear have?
 - b. Is the “panda’s thumb” really a thumb? What two pieces of evidence says that it is not?
 - c. Why would natural selection favor Pandas with the enlarged bone (the thumb)?
 - d. Are bears and Pandas closely related species?

Chapter 13. Speciation.

1. No readings from your text book.
2. Visit <http://www.panspermia.org/sexual.htm>
 - a. Which group seemed to evolve (change) more through geologic time: prokaryotic cells (bacteria) or eukaryotic cells? What type of organisms are eukaryotic cells?
 - b. What biologist championed the idea that prokaryotic cells were incorporated into other prokaryotic cells forming more complex organisms (essentially eukaryotic cells)?
 - c. Is there any scientific evidence that this “endosymbiosis” (see question b) theory could really occur?
 - d. Why did Darwin consider the evolution of a new species a “tricky problem”?
 - e. How do present day geneticists explain how the creation of a new species may occur?
 - f. Viruses can bring additional genetic information to cells. What is the “germ line” of cells found within multi-cellular life? Why must a virus infect the germ line of cells in order for it to stimulate evolution to occur?

Chapter 14. Ecosystem Organization.

1. p. 267 and p. 298. Please observe a complex food web pattern.
2. p. 312-316. Can human populations continue to increase forever? Name five reasons that human population size will eventually slow or stop? How fast is population increasing compared to how fast we can produce grain? What is the estimated human world-wide population size in 2050? Give an explanation using energy resources of why all people in the world could not attain the US standard of living? Why can’t many man-made waste products be effectively decomposed of by the natural decomposers? Will women with more education typically have more or less children?
3. What is the wan xi shao campaign in China? In 1978, what additional program was initiated by the Chinese government to control population?

Chapter 15. Community Interactions.

1. What is biomagnification? How does DDT affect animals? On the food web found on p. 298, determine which trophic levels have the highest concentration of DDT.
2. visit <http://www.eco-action.org/dt/beerswil.html> Read this essay based upon an essay called the Rivet Poppers by P. and A Ehrlich.
 - a. After that natural cataclysmic event destroyed the dinosaurs, how long did it take to reestablish biological diversity?
 - b. “Jesus did not live in a desert, he was a man of the _____”. Wow, that makes you think about all of those movies featuring Jesus in a desert.
 - c. The author uses analogies to explain the importance of biodiversity. He explains that the biosphere is like a _____.
 - d. Each rivet found in the hull is supposed to be what?
 - e. Who are ignoring the “rivet poppers”?
 - f. If the rivet poppers are not stopped, what is the predicted end?

End Unit Exam II.

Begin Unit Exam III.

Chapter 8. Asexual reproduction (mitosis)

1. No questions.

Senescence and death (no chapter in the book)

1. visit http://whyfiles.org/057aging/lo_cal.html
 - a. What is caloric restriction?
 - b. name some organisms that caloric restriction experiments have been conducted upon.
 - c. Has research on primates and caloric restriction been encouraging? Why?

* click on “happy” at the bottom of the page... and then click “starve tumors” at the bottom of that page to answer this question.

- d. How does caloric restriction affect cancer (tumors)?

Chapter 10. Genetics.

1. Visit <http://biology.clc.uc.edu/courses/bio105/geneprob.htm>
 - a. do all monohybrid and dihybrid crosses, do not attempt other problems.