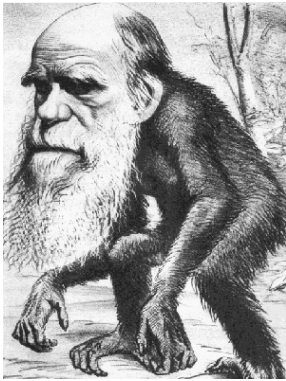


## Exam #1



...a traveler should be a botanist, for in all views plants form the chief embellishment.

Charles Darwin  
*Voyage of the Beagle*

**General Instructions:** All right travelers – it's time to embellish this exam with all sorts of botanical goodies. Please write your name on the test booklet. Please sign the Honor Pledge at the end of the exam - assuming of course, that you have complied with its terms. Unless otherwise indicated, questions are worth one point. Note that in some cases you have a choice of which questions to answer. **May the Force be with you!**

**Finish-the-Sentence Questions:** Complete the following sentences. It is often helpful and wise to provide an example. **(Answer any 12)**

1. Science is . . . .
2. A paradigm is. . . .
3. Falsifiable means . . . .
4. An example of an acquired trait is . . . .
5. A vestigial organ is . . . .
6. Two ways you can distinguish a male pelvis from a female pelvis are . . . .
7. A fairy ring is . . . .
8. According to the Doctrine of Signatures. . . .
9. Thigmomorphogenesis is . . . .

10. An epiphyte is . . . .

11. Endemic refers to . . . .

12. Scarification is . . . .

13. Gout is . . . .

14. Allelopathy is . . . .

15. Three features/characteristics of a plant are . . . .

**Multiple Choice Questions:** *Darken the single, best choice in the appropriate place on the answer sheet.*

1. Cells lacking a nucleus are found in the Kingdom:
  - a. Animalae (animals)
  - b. Fungi (mushrooms and molds)
  - c. Monera (bacteria)
  - d. Plantae (plants)
  - e. Protista (protozoans)
2. A plant that produces flowers and seeds is termed a(n):
  - a. algae
  - b. angiosperm
  - c. fern
  - d. gymnosperm
  - e. moss
3. A plant used to treat gout is:
  - a. colchicum
  - b. snakeroot
  - c. tomato
  - d. tambalocoque (Calvaria)
  - e. willow
4. Observational (or descriptive) science involves a control group and experimental group.
  - a. False
  - b. True
5. Arrange the following stages of the scientific method in the correct sequence.
  1. observation
  2. experiment
  3. hypothesis
  4. conclusion
  5. results
  - a. 1, 2, 3, 4, 5
  - b. 3, 5, 1, 3, 5
  - c. 2, 4, 1, 3, 5
  - d. 1, 3, 2, 5, 4
  - e. 1, 2, 5, 3, 4

6. Which of the following statements is TRUE?
- The earth is about 20,000 years old
  - Evolution is incapable of being scientifically tested
  - Humans exist today in the same form in which they always have
  - Evolution generates testable predictions with respect to the characteristics of life
  - Evolution is based on speculation and not valid scientific observation and testing
7. Which of the following is NOT a part of Darwin's theory of natural selection?
- individuals in a population vary
  - organisms tend to over-reproduce themselves
  - there are limited resources for which individuals compete
  - variations possessed by individuals of a population are inherited
  - modifications an organism acquires during its lifetime are passed to its offspring
8. Tom Jones nearly died in a swimming accident on a beach. He believes that God saved him from drowning, rather than some natural occurrence. This is an example of...
- causalism
  - mechanism
  - teleology
  - vitalism
9. If Tom Jones believes that he had been destined since birth to have this accident on the beach, then it would be a good example of...
- causalism
  - mechanism
  - teleology
  - vitalism
10. Fossils found in the lowest (oldest) geological strata are generally the most:
- advanced
  - complex
  - primitive (simplest)
  - specialized
  - widespread
11. According to the theory of catastrophism:
- The earth is very old
  - new species developed from the survivors of catastrophes
  - the earth's history is shaped by a series of catastrophic geological events
  - more species were alive at beginning of the world than are now present.
  - The earth's surface gradually changes by slow processes such as weathering.
12. According to Lamarck, the characteristics of organisms changed because of:
- chance
  - special acts of creation
  - extinction of competitors
  - an innate drive for perfection and need
13. According to Darwin's theory of natural selection:
- Populations tend to overproduce
  - Variation in individuals is inheritable
  - Limited resources put limits on population growth
  - Some individuals are better adapted to the rigors of competition
  - all of the above are consistent with natural selection

14. Which of the following structures are *analogous* but not *homologous* to each other?
- wing of a bird and the wing of a bat
  - the claw (digit) of a dog and the toe (digit) of a human
  - wing of a bird and the wing of a butterfly
  - the flipper of a whale and the arm of a human
15. Which of the following paradigms would have been prevalent before 1800?
- the earth is old
  - species evolve
  - scripture as science
  - disease has an organic cause
  - all of the above were paradigms common before 1800
16. When they were first sold, aerosol insecticides like DDT were highly effective in killing flies and mosquitoes. Today, more than 30 years later, a much smaller proportion of these insects die when sprayed. The reason fewer insects are being killed is:
- mosquitoes that survive spraying develop an immunity to the insecticide
  - many mosquitoes today are descendants of mosquitoes with insecticide-resistant characteristics
  - mosquitoes are deliberately adapting themselves to this man-made change in the environment
  - the original spraying has caused a permanent mutation, giving the insects genetic resistance to the spray
  - all of the above When DDT was first introduced, insects were very susceptible to it.
17. The development of resistance to DDT by insects was the result of:
- special creation
  - a mutation induced by DDT
  - the high reproductive potential of insects
  - the inheritance of acquired characteristics
  - natural selection for insects that had genes for resistance
18. "Natural selection" and "evolution" are two terms that are sometimes confused. What is the relation between natural selection and evolution?
- They are the same thing.
  - Any phenomenon that causes evolution is natural selection.
  - Natural selection is one of several causes of evolution.
  - When natural selection is occurring, evolution is not, and vice versa.
19. The breeding of plants and animals by humans is called \_\_\_\_\_.
- natural selection
  - sexual recombination
  - founder effect
  - artificial selection
  - neutral variation
20. The observation that seemingly dissimilar organisms, such as hummingbirds, humans, and whales, have similar skeletal structures. This most directly suggested to biologists that:
- only the best-adapted organisms can survive
  - advantageous changes can be passed along to offspring
  - most evolution occurs rapidly following a mass extinction
  - dissimilar organisms might have evolved from a distant, common ancestor
  - all of the above

***Evolution/Creation: How would a scientist answer the following questions?***

21. The Catholic Church denies the existence of evolution.  
a. False      b. True
22. Both evolution and creationism are scientifically valid theories.  
a. False      b. True
23. Evolution is only a theory, not a fact.  
a. False      b. True
24. Evolution is falsifiable.  
a. False      b. True

***Pseudoscience: How would a botanist answer the following questions?***

25. Plants can feel pain  
a. False      b. True
26. Prayers make a plant grow better  
a. False      b. True
27. Initials carved into a tree move upward as the tree grows  
a. False      b. True
28. Plants have the longest life span and are the largest of any organisms on earth  
a. False      b. True
29. To insure success a root crop should be planted when the moon is full.  
a. False      b. True
30. A female has more ribs than a male  
a. true      b. false

**Matching Question: Match each of the following with the appropriate person**

- |            |               |            |
|------------|---------------|------------|
| a. Darwin  | c. Dobzhansky | e. Lamarck |
| b. Malthus | d. Wallace    | f. Saupe   |

- \_\_\_\_\_ 1. wrote "Essay on the Principle of Population"
- \_\_\_\_\_ 2. developed idea of evolution by natural selection (2 responses)
- \_\_\_\_\_ 3.
- \_\_\_\_\_ 4. "Nothing in biology makes sense except in the light of evolution"
- \_\_\_\_\_ 5. theory of inheritance by acquired characteristics
- \_\_\_\_\_ 6. theology and medicine were aborted professions
- \_\_\_\_\_ 7. wrote "*On the Origin of Species*"
- \_\_\_\_\_ 8. spent considerable time in South America
- \_\_\_\_\_ 9. said that people will outstrip resources
- \_\_\_\_\_ 10. **BONUS QUESTION:** Brilliant botanist (has won several Nobel prizes but modesty prevented him from accepting them). Often mistaken for Brad Pitt.

***how are the traveler's doing? You're more than halfway to your final destination. Keep up the good work!***

**Tomato Effect Question:** Summarize, in your own words, "the tomato effect." Then select one of the following – colchicine, gold, aspirin, ergot alkaloids – and explain what condition(s) it was used to treat, its effectiveness, why it was abandoned, and why it is cited as an example of the tomato effect. (5 pts)

**Milksickness Question:** *Alright travelers, you have another adventure. Using complete sentences, answer the following. (5 points)*

Write a short essay about white snakeroot and milksickness. Among the ideas to include are: What are the symptoms of milksickness? What caused this disease? Why were mostly pioneers not city dwellers affected? Why did it mostly affect children? Describe evidence that supports the identification of the plant as white snakeroot. Why did many people refuse to accept that milksickness was caused by white snakeroot?

**Case Study in Evolution:** *Ahoy travelers, here is something that you might have expected on your journey (3 pts each).*

Strains of several human pathogens (disease-causing organisms) are no longer killed by our standard antibiotics. At one time, antibiotics would cure these infections, but these drugs are now ineffective and these multiple-drug resistant strains threaten to become a significant problem. Explain, using each of the following perspectives, why the population of bacteria were once susceptible (killed by) the antibiotics, but are not (are resistant) any more.

1. Natural Selection.
2. Lamarck.
3. Special Creation (*please don't just answer, "just because"*).

**Short Answer Questions:** Travelers, here are more questions to embellish (3 pts each)

1. There is a separation of the site of orgasm and the site of intercourse in human females. Explain why, from a strictly adaptationist viewpoint this separation is unexpected. Then, explain why this situation exists.
  
  
  
  
  
  
  
  
  
  
2. Gould argues that an ideal design is a lousy argument for evolution. What does he mean by ideal design and why are imperfections or contrivances proof of evolution?

**Science Question.** Using the story about Semmelweis **OR** Dodo's, answer the following questions:

1. What was the question of this scientific investigation?
  
  
  
  
  
  
  
  
  
  
2. Identify the hypothesis.
  
  
  
  
  
  
  
  
  
  
3. Identify one alternative hypothesis.
  
  
  
  
  
  
  
  
  
  
4. What "experiment" was done to test the hypothesis?
  
  
  
  
  
  
  
  
  
  
5. What was the result of the experiment?
  
  
  
  
  
  
  
  
  
  
6. What was the conclusion?

**Congratulations, you made it!!!! You've completed your first BIOL 106 Exam.**

<p><b>Pledge:</b> I have neither given nor received help when taking this exam. signature _____ date _____</p>
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*I consider an exam to be an athletic event for the mind. Just like an athlete on the day of an athletic competition, I provide an opportunity for you to warm up and cool down. At the beginning of the exam there is a quote and some other goofy stuff to "warm up on." To cool your brain off after the exam, I have included some additional questions at the end of the exam. You can earn points for any Bonus Questions, the other questions are for fun only. I will respond to any comments you make.*

**BONUS QUESTION:** *Earn one bonus point for each correct response. No points are deducted for incorrect responses.*

1. What is a haustorium?
2. Where is Mauritius?
3. What is quiescence?

**GENIUS QUESTION:** *Automatic "A" on the test and Ph.D degree to the university of your choice. No partial credit.*

Diagram the entire evolutionary tree of humans. For all ancestors, include scientific names, common names, and favorite TV shows.

**TRIVIA QUESTION:** *Aren't they all? (For fun only)*

What is Darwin's birthday? How old would he be if he were alive today?

**OBVIOUS ANSWER QUESTION:** *Correct answers will win a sticker!*

The best professor at CSB/SJU is:

- a. Dr. Saupe
- b. Surfer Steve
- c. Amy's & Erin's favorite dad
- d. is named on p. 1, upper left hand corner of this exam
- e. all of the above

