

Practice Questions for first test, BIO 203, Fall 2015

- 1 Discuss evidence for the pattern of evolution.
- 2 Describe a speciation example involving vicariance. Try to think of your own example rather than one from lecture.
- 3 Contrast the ideas of evolution as a process, vs. evolution as a pattern.
- 4 Describe the components of a good species description.
- 5 You are at a party and you know that 60 of the 200 people at that party are evil. What is the probability that the first two people you meet are evil?
- 6 What is adaptation? Give examples of adaptation as a process, and as a trait.
- 7 You discover a new species of lizard, genus *Polychrus*, and decide to name this species after legendary actor and insane TV pitchman Gary Busey. What name do you give this species?
- 8 Describe an example of a sympatric speciation event.
- 9 Describe the selective forces operating on apple maggots in the United States. What kind of selection is operating?
- 10 What is a ring species? Give an example.
- 11 What is a holotype?
- 12 Describe the relationship between the evolutionary species concept and the other species concepts we discussed. How are they similar? How are they different?
- 13 Critique the following statement: "Humans are higher organisms that are more advanced than lower organisms such as frogs."
- 14 Many anatomical features seem poorly 'designed' for their use by organisms. Explain why natural selection does not produce 'perfect' organisms. Give examples.
- 15 Describe an example (real or contrived) where a genetic bottleneck occurs. What is a genetic bottleneck?
- 16 What is a "diploid" organism?
- 17 Describe the assumptions of the Hardy-Weinberg relationship. These assumptions usually do not hold up in real life, so what is the point of using Hardy-Weinberg?
- 18 List some people who published papers on evolution by natural selection before Darwin.

19 Imagine that current NBA player Elfrid Payton argues the following:

"We can test most biological phenomena, such as the activity of an enzyme, by performing scientific experiments for which we can observe the results. But evolution supposedly occurred over millions of years so we can't observe evolution happening. Evolution, therefore is not a scientific theory but a matter of conjecture."

Present evidence that supports or refutes Jordan's argument.

20 A population of 2000 mice on an island includes 40% white-furred individuals, 50% brown-furred individuals, and 10% black-furred individuals. A storm hits the island and decimates the population, leaving about 100 individuals, of which 75 are brown and 25 are white. The fur color of this population remains stable at about 75% brown and 25% white over the next several generations.

--has evolution occurred? If so, by what process(es)?

--has natural selection occurred? Why or why not?

--Is the population in Hardy-Weinberg equilibrium? a) yes b) no c) can't tell. Explain your answer.

21 Describe Aristotle's views on classifying organisms.

22 What is "natural theology" and how was it applied to explaining biological diversity?

23 Who is Robert Chambers and what does he have to do with the study of evolution?

24 List some people who supported the idea of evolution before Darwin. Also list texts and/or ideas that are associated with each person.

25 How did ideas from geology and human population growth affect Darwin's thinking about natural selection.

26 Describe and contrast catastrophism, uniformitarianism, and gradualism, and list authors associated with each idea.

27 How did Darwin's travels affect his ideas about evolution?

28 Which of the following best applies to Darwin's idea of evolution by natural selection?

a Darwin intuited his idea in a flash of brilliance befitting a smart person well-versed in abstract principles of logic.

b Darwin's idea was a creeping realization that developed from the culture of the time and his own experiences.

Support your argument with evidence.

29 Describe Alfred Russel Wallace's contributions to evolutionary thought.

30 Describe Charles Darwin's contributions to evolutionary thought.

31 Briefly describe the contents and arguments of the first four chapters of Darwin's 'Origin of Species.'

32 A diploid population has 456 individuals of with genotype AA, 814 individuals with genotype Aa, and 208 individuals of genotype aa.

What are the allele frequencies of this population?

Is this population in Hardy-Weinberg equilibrium? If yes, explain how you came to this conclusion. If no suggest some processes that may have caused a deviation from Hardy-Weinberg processes.

33 Both genetic drift and natural selection can cause evolution. How are these processes different? Give an example of each process.

35 Contrast directional, stabilizing, and disruptive selection. Come up with an example of each (preferably a real example; contrived is OK if you understand why the example works).

36 What is a founder effect? How could this occur in nature?

37 Contrast the Biological and Lineage species concepts.

38 "Humans and chimps may be considered different species because all adult humans can walk upright and all chimps are knuckle-walkers."

What species interpretation is being applied with this statement? Is this view of species 'conceptual' or 'operational/criterion'?

39 How are species identified in practice? Why not use the lineage/evolutionary concept to identify species?

40 What are genes?

41 Discuss some mechanisms of prezygotic isolation. Give examples of each.

42 If a diploid population includes 700 A alleles and 300 B alleles for a given locus, what is the proportion of homozygotes under Hardy-Weinberg equilibrium?