

SBI3U Unit 3 Test: Evolution
(50 Marks Total)

Name: _____

Signature: _____

Marks obtained:

Category	Total Marks	Possible Marks
Knowledge/Understanding (K/U)		10
Thinking/Investigation (T/I)		20
Communication (C)		5
Application (A)		15
Total		50
Percentage		

SECTION 1: Knowledge/Understanding - Multiple Choice (Questions 1-10)*[K/U, 10: 1 each]***Write your section 1 answers here:**

Question	1	2	3	4	5	6	7	8	9	10
Answer										

K/U	T/I	A	C
/10			

****NOTE: FOR SECTIONS 1 WRITE YOUR ANSWERS IN THE TABLES ON THE FIRST PAGE OF THIS TEST****

SECTION 1: Knowledge/Understanding - Multiple Choice (Questions 1-10)

[K/U, 10: 1 each]

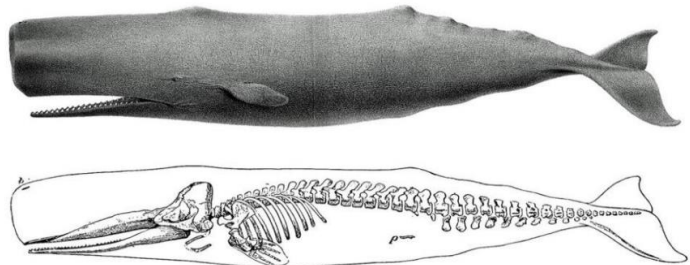
1. What is Natural Selection?
 - a) The ability of an organism to evolve a new trait when needed in the environment.
 - b) The ability of an organism to lose a trait when it is no longer needed.
 - c) The process in which members of a species that are best suited to the environment survive and reproduce at a higher rate than other members of the species
 - d) The theory that organisms change over time
 - e) The theory that nature is more important than nurture

2. How do mutations change populations over time?
 - a) Most mutations are harmful and cause species to become extinct
 - b) Most mutations cause abnormal disease in species
 - c) Mutations generally have no effect on a population since they are simple changes in DNA
 - d) Mutation can produce adaptations in organisms that help them better survive in their environment.
 - e) None of the above

3. The human appendix is a vestigial structure. How is it evidence of evolution?
 - a) It provides evidence that organisms have lost traits as they were no longer needed in the environment
 - b) The human appendix can be analyzed with carbon dating in the body
 - c) It provides evidence that organisms have evolved similar structures that have different functions.
 - d) It provides evidence that humans and apes have a common ancestor
 - e) It provides evidence that the diet of humans has changed in the last 100 year

4. How is natural selection in the evolution of long necks in giraffes *best* explained?
- a) Shorter-necked giraffes were killed by long-necked giraffes.
 - b) Giraffe necks grew longer because of the bone structure of animals.
 - c) Giraffes with longer necks survived because they were better suited to the environment
 - d) Long-necked giraffes mated only with other long-necked giraffes
 - e) None of the above
5. If evolution occurs, we would expect different biogeographical regions with similar environments to:
- a) all contain the same mix of plants and animals
 - b) have land masses that are connected to each other
 - c) each have its own specific mix of plants and animals
 - d) have plants and animals that have similar adaptations
 - e) both (c) and (d)
6. From which of the following areas of study did Darwin and Wallace derive most of their evidence for evolution?
- a) mechanisms of heredity
 - b) comparing the anatomy of different species
 - c) geographic distribution of organisms
 - d) embryology
 - e) animal behavior
7. The fossil record provides direct evidence for common descent because you can
- a) see that types of fossils have changed over time
 - b) sometimes find common ancestors
 - c) trace the ancestry of a particular group
 - d) sometimes find arrangements of bones similar in common ancestors
 - e) all of the above

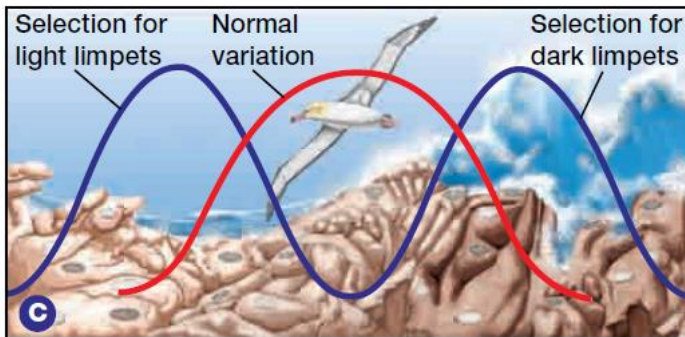
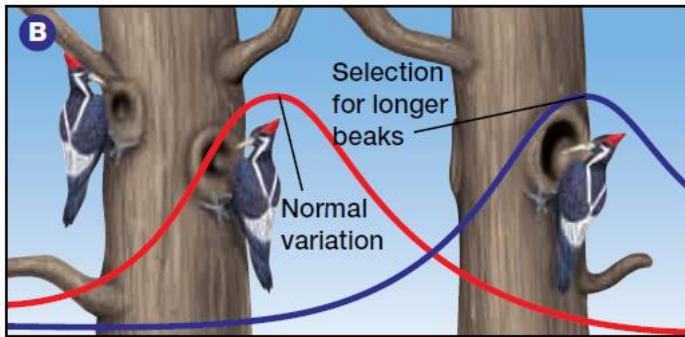
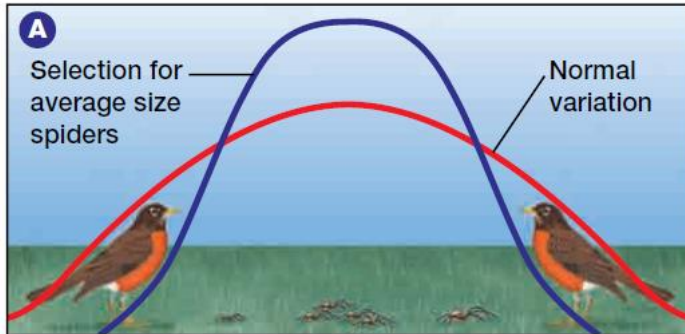
8. Which of the following describes what occurs in genetic drift?
- a) There is a random change in gene frequency within a population that occurs by chance
 - b) Individuals migrate to different places in search of food changing the gene frequency of the population
 - c) Natural selection asserts pressures such that only individuals with good genes can survive
 - d) None of the above
 - e) All of the above
9. Which of the following statements regarding evolution is true?
- a) Evolution anticipates future changes in environment and allows organisms to adapt accordingly.
 - b) There is a distinct origin and end goal.
 - c) There is no overall direction, simply a response to local conditions.
 - d) It is typically observable in a single generation.
 - e) All of the above
10. Sperm whales have vestigial hip bones, and a small percentage of sperm whales also have vestigial hind limbs. Which of the following statements best explains the presence of these vestigial structures in sperm whales?
- a) Sperm whales evolved from ancestors that walked on land.
 - b) Sperm whales are in the process of evolving into land mammals.
 - c) These structures are acquired by each individual sperm whale during its lifetime.
 - d) These structures resulted from sperm whales having a long period of embryonic development.
 - e) None of the above



SECTION 2: Application – Labeling (Question 11)

11. The diagrams on the right illustrate different types of natural selection. The red bell-shaped curves indicate a trait's variation in a population. The blue bell-shaped curves indicate the effect of natural selection. Determine the type of selection occurring in each illustration and provide an explanation for how and/or why that type of selection might be occurring:

[A, 2 each; Total: A, 6]



K/U	T/I	A	C
		/6	

SECTION 3: Thinking/Inquiry & Application – Short Answer (Questions 12 – 18)

[34 total: T/I, 20; A, 9; C, 5]

12. Explain how Darwin's finches provide an excellent example of adaptive radiation. [A, 4]

13. Explain the relationships between natural selection, mutation, fitness, adaptation, and evolution. [T/I, 4]

14. Explain the difference between convergent evolution and homologous structures. [T/I, 4]

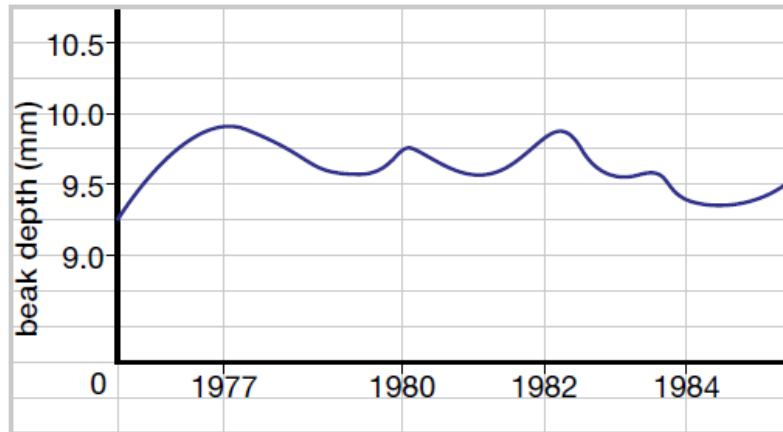
K/U	T/I	A	C
	/8	/4	

15. Draw a diagram to use in your explanation of how fossil records can be used to determine age of organisms that once lived. [C, 5]

16. How would you test the hypothesis that larger finches on the Galápagos Islands had a greater survival rate in wet years than in dry years? What factors would you measure? [T/I, 6]

K/U	T/I	A	C
	/6		/5

17. This graph shows how the average beak size (depth) in a population of ground finch shifted during particularly wet and dry years. 1977, 1980, and 1982 were all drought years; 1984 was a wet year.



- (a)** Interpret these data and explain how they relate to natural selection and the definition of evolution. [T/I, 3]

- (b)** An observer suggested that during drought years all the seeds were large and tough to open. This meant that birds exercised their beaks more, making the beaks stronger. Is this a plausible explanation for these data? Explain your answer. [T/I, 3]

K/U	T/I	A	C
	/6		

18. Explain why most mating is not random. Give an example of non-random mating in plants and in animals. [A, 5]

K/U	T/I	A	C
		/5	