

Survey on Evolution—Instructor’s Key

This survey contains statements about evolution. **Do you think a professional biologist would answer true or false?** You do not have to agree with the statement for it to be “true” as you think biologists see it. Your answers will be confidential and will not affect your grade. The purpose of this survey is to determine the class’ level of understanding on this topic.

For each of the following statements, choose one of the following:

A = TRUE
B = FALSE

- 1) A Evolution is a scientifically valid theory.
- 2) B Evolution is primarily concerned with the origin of humans.
Humans are but one species (albeit a very-well studied species). The science of evolution is concerned with the origin of all species.
- 3) A Organisms existing today are the result of evolutionary processes that have occurred over millions of years.
- 4) A There is a considerable body of data that supports evolutionary theory.
- 5) B According to evolutionary theory, people came from monkeys a long time ago.
Humans share a common ancestor with monkeys, and even more recently, with the great apes.
- 6) B Evolution was first proposed and explained by Charles Darwin.
The idea of evolution (shared ancestry of all living organisms) had been around for quite a while before Darwin (e.g. Erasmus Darwin, Lamarck). Darwin’s major contributions were amassing a copious amount of evidence for evolution, as well as proposing a major mechanism (or cause) of evolution, natural selection.
- 7) A Modern humans are the product of evolutionary processes that have occurred over millions of years.
- 8) B Evolution is also known as “natural selection.”
Natural selection is a cause of evolution.
- 9) A Evolution is not something that happened only in the past; it is happening now.
- 10) B The theory of evolution is based on speculation and not valid scientific observation and testing.

- 11) B Evolution is a totally random process, a series of “accidents.”
Not even close. There are random aspects of evolution: genetic mutations (the cause of all variation) are random, genetic drift (a mechanism of evolution) is random. However, the most important mechanism of evolution, natural selection, is the opposite of random. It is “deterministic” in the sense that the genetic variants that are most suited for a particular environment are the ones that survive and reproduce, contributing more offspring to the next population. This is not random.
- 12) B Evolution is something that happens to individual organisms.
Contrary to what Hollywood would have you believe, individuals cannot evolve (or “devolve” for that matter). Populations of genetically variable individuals evolve.
- 13) B Evolution is just a theory.
- 14) A The many transitional fossils found in the fossil record provide evidence for evolution.
Many, many, many, many, many. The fossil record was very incomplete in Darwin’s time. It is still very incomplete (it will never be “complete”), but we now have many transitional fossils that do support evolution.
- 15) A Biological, medical and agricultural research is increasingly based on evolutionary theory.
Absolutely! This is one important reason why it is critical for students to understand evolution.
- 16) A Evolution has been tested and challenged many times, but has always been supported by the results.
There has been no credible evidence disputing the idea of shared ancestry.
- 17) B Evolution increases structure and order, but that goes against Newton’s Second Law of Thermodynamics.
The Second Law only applies to closed systems; it does not apply to organisms, which get energy, etc. from the external environment (i.e. living organisms are open systems).
- 18) A The formation of complex structures, like the human eye, can be readily explained by mutation and natural selection.