

Chapter 2: IN THE BEGINNING . . .

TRUE/FALSE

- 2.1 Scientists agree that the universe began with a "big bang."
T
p. 23
- 2.2 Life on earth began on dry land and moved into the oceans.
F
p. 25
- 2.3 The advantage of mammals was that they were larger than the reptiles.
F
p. 32
- 2.4 Mammals took to the trees as a result of climatic changes on earth.
T
p. 32
- 2.5 Prosimians developed grasping hands with which they hung onto branches.
T
p. 32
- 2.6 The first hominid appeared on earth some 90 million years ago.
F
p. 33
- 2.7 Humans evolved in a straight line from prosimian to Ramapithecus.
F
p. 32
- 2.8 Homo sapiens is the ancestor of our own species.
F
p. 33
- 2.9 Cro-Magnon humans have given us the stereotype of the "caveman."
F
p. 38
- 2.10 Until the invention of agriculture, humans survived by hunting and gathering.
F
p. 38
- 2.11 Biological and cultural evolution proceeded separately.
F
p. 40
- 2.12 Walking on two feet instead of four was a successful adaptation for humans to their environment.
T
p. 4

- 2.13 When human mothers began to walk on two feet, they became less effective food providers because they had to hold on to their babies.
F
p. 40
- 2.14 All manner of social processes developed from biological changes in our pre-human ancestors.
T
p. 40
- 2.15 Organization into troops, tribes, and tribal confederations became necessary with the increase in numbers.
T
p. 40
- 2.16 The discovery of fire contributed to the development of language and religion.
T
p. 40
- 2.17 Human nature and the way of life of people emerged in tandem with biological developments.
T
pp. 40-41
- 2.18 The theory of evolution proposes that species change to adapt to changing environments.
T
p. 27
- 2.19 The biblical view is one of immutable creation.
T
p. 26
- 2.20 The 19th century introduced a questioning attitude that made the work of Darwin and Mendel acceptable.
T
p. 26
- 2.21 Darwin maintained that species were changeable, that they evolved into more successful forms, and that the less successful forms became extinct.
T
p. 27
- 2.22 The mechanism at work in evolution is natural selection.
T
p. 26
- 2.23 Gregor Mendel said that the traits of each parent are blended in the offspring.
F
p. 28
- 2.24 Natural selection is a process in which all of an individual's traits are passed on to his/her offspring.
F
p. 27

- 2.25 A trait that helps in survival is at first acquired at random.
T
p. 27
- 2.26 The science that studies heredity is evolution.
F
p. 28
- 2.27 Chromosomes are organized into genes.
F
p. 28
- 2.28 The genetic blueprints are contained in the cell nucleus.
T
p. 28
- 2.29 A person's genotype is his/her visible traits.
F
p. 30
- 2.30 An offspring receives two genes for each trait, one from each parent.
T
p. 28
- 2.31 Genes are made up of a complex biochemical substance.
T
p. 28
- 2.32 Permanent changes in genetic material are called gene flow.
F
p. 30
- 2.33 Gene flow is the movement of genes from one breeding population to another.
T
p. 30
- 2.34 Genetic drift causes changes in the gene pool.
T
p. 30
- 2.35 Speciation is the evolution of one species from another.
T
pp. 30-31
- 2.36 Variation among humans occurs because of heredity.
T
p. 28
- 2.37 There are a definite number of races in the world.
F
p. 31

2.38 A race is a breeding population in which a number of inherited traits appears with great frequency.

T

p. 31

2.39 The traits that differ among breeding populations are adaptations to a specific environment at a certain stage of evolution.

T

p. 31

MULTIPLE CHOICE

2.1 Evolution refers to:

- a. The gradual development of living organisms over time
- b. the development of humans from early forms of hominids
- c. the process of genetic flow and mutation
- d. the beginning of technology in human history

a

p. 27

2.2 Definite Homo sapiens fossils date back approximately:

- a. 12 billion years
- b. 75, 000 years
- c. 1 million years
- d. 2000 years

b

p. 36

2.3 To which of the following categories do humans belong?

- a. animalia
- b. chordata
- c. vertebrata
- d. hominidae
- e. all of the above

e

p. 33

2.4 Which of the following hominids has living descendants?

- a. Homo Boisei
- b. Australopithecus robustus
- c. Australopithecus Africanus
- d. Possibly Neanderthals

d

p. 37

- 2.5 The fossil remains of the Neanderthals have been found:
- a. only in western Europe
 - b. in North Africa
 - c. in the Fertile Crescent
 - d. on all continents except Oceania and the Americas

d

p. 36

- 2.6 The Cro-Magnon are:
- a. an African tribe contemporary to the Neanderthal
 - b. definitely classified as Homo sapiens sapiens
 - c. what is meant by the stereotype of a caveman
 - d. the inventors of agriculture

b

p. 38

- 2.7 It is thought that Homo sapiens sapiens first arrived in the Americas by way of the:
- a. Panama Canal
 - b. Fertile Crescent
 - c. Bering Strait
 - d. Persian Gulf

c

p. 38

- 2.8 Which statement is true?
- a. The earth is the center of the universe
 - b. The Milky Way galaxy is the largest in the universe
 - c. The Big Bang theory is the only possible explanation for the origin of the universe
 - d. all of the above
 - e. none of the above

e

p. 23

- 2.9 The first form of life was probably :
- a. created by the interaction of chemicals in existence in the "primordial soup" that was the Earth
 - b. one-celled organism on land
 - c. multi-celled organism on both land and in water
 - d. multi-celled organism in the air

a

p. 24

- 2.10 Which early thinkers believed that life changed by adapting to different environments?
- a. Christian thinkers
 - b. Greek and Roman thinkers
 - c. followers of Biblical writings
 - d. all of the above
 - e. none of the above

b

p. 25

- 2.11 During the 17th and 18th centuries, events and trends led to an emphasis on:
- a. stability
 - b. lack of critical thinking
 - c. change
 - d. none of the above
 - e. all of the above

c

p. 26

- 2.12 Darwin's famous work, The Origin of the Species, stated that:
- a. species do change
 - b. change results from adaptation to the environment
 - c. natural selection is the basis of evolutionary change
 - d. all of the above
 - e. none of the above

d

pp. 27-28

- 2.13 Natural selection refers to:
- a. lack of adaptation
 - b. having a trait or traits useful in a change of environment
 - c. creationism
 - d. none of the above

b

p. 27

- 2.14 Darwin's theory lacked an explanation of:
- a. how traits were transmitted to offspring
 - b. environmental influences
 - c. how species changed
 - d. why chimps did not evolve into humans

a

p. 26

- 2.15 Gregor Mendel's experiments indicated that traits:
- a. would disappear completely
 - b. were blended
 - c. were either dominant or recessive
 - d. would repeat themselves in every third generation

c

p. 28

- 2.16 The original size of the universe, according to the Big Bang theory, was:
- a. unthinkable in its vastness
 - b. submicroscopic
 - c. about that of a grapefruit
 - d. no larger than our solar system

b

p. 23

- 2.17 The chemical basis of the gene consists of:
- a. ABC
 - b. BBD
 - c. DNA
 - d. DOC

c
p. 28

- 2.18 Regarding chromosomes, it is true that:
- a. they are found in the nucleus of a cell
 - b. humans have 46 of them
 - c. each parent contributes half of them to the offspring
 - d. none of the above
 - e. all of the above

e
p. 28

- 2.19 Change in a gene caused by a change in its chemical composition is called:
- a. mutation
 - b. gene drift
 - c. gene flow
 - d. speciation

a
pp. 28-29

- 2.20 Change in the gene frequency when traits are lost by chance in a small population is referred to as:
- a. gene flow
 - b. gene presence
 - c. gene drift
 - d. gene theft

c
p. 30

- 2.21 The movement of genes from one population to another is:
- a. gene flow
 - b. mutation
 - c. speciation
 - d. gene loss

a
p. 30

- 2.22 Speciation refers to:
- a. one species becoming larger
 - b. a species separating into new species that cannot interbreed with one another
 - c. the development of the human species
 - d. the disappearance of a species

b
p. 30

- 2.23 Human evolution is:
- a. based only on biochemical changes
 - b. also related to cultural factors like mating customs
 - c. not related to any genetic factors
 - d. a figment of the creationists' imagination

b

p. 31

- 2.24 The first major primate adaptation was to:
- a. mountains
 - b. trees
 - c. water
 - d. deserts

b

p. 32

- 2.25 Hominids are primates that exhibit:
- a. bipedal locomotion
 - b. tool making
 - c. fire
 - d. none of the above
 - e. all of the above

a

p. 33

- 2.26 Studies of human fossils and molecular evidence:
- a. agree that hominids appeared 14 million years ago
 - b. differ in that fossil studies show humans to be only 4 million years old
 - c. show that hominids appeared between 7 and 5 million years ago
 - d. prove that humans were created only six thousand years ago

c

p. 33

- 2.27 Australopithecus robustus, Australopithecus africanus and Australopithecus boisei had these traits in common:
- a. very tall bodies
 - b. macrobiotic diet
 - c. they coexisted by exploiting different resources
 - d. ability to write

c

p. 34

- 2.28 Precursors of modern humans:
- a. had language
 - b. had teeth like present-day apes
 - c. hunted alone
 - d. lived in an urban setting

a

p. 36

- 2.29 Neanderthals:
- a. had tall bodies but thin skulls
 - b. exhibited no brow ridges
 - c. buried their dead
 - d. had organized religion

c

pp. 36-37

- 2.30 The hominid that lived in France 35,000 years ago and painted cave walls was:
- a. Homo habilis
 - b. Homo erectus
 - c. Cro-Magnon
 - d. Piltdown Man
 - e. all of the above

c

p. 38

- 2.31 Agriculture developed:
- a. only in the Near East
 - b. only in Central America
 - c. in several areas independently
 - d. only in Palestine

c

pp. 38-39

- 2.32 Agriculture stimulated:
- a. population growth
 - b. permanent settlements
 - c. warfare
 - d. none of the above
 - e. all of the above

e

p. 39

- 2.33 The enlargement of the human brain is related to:
- a. a long period of human infant dependency
 - b. increasingly complex behavior
 - c. greater dependence on learning
 - d. none of the above
 - e. all of the above

e

p. 40

- 2.34 Human females are unusual among primates in that they have:
- a. estrus
 - b. continual sexual receptivity
 - c. less intelligence than human males
 - d. larger brains than human males

b

p. 40

2.35 Humans are unusual in that adults:

- a. share food
- b. care for infants
- c. eat meat
- d. are social
- e. all of the above

a

p. 40

2.36 Molecular biologists:

- a. have found that we differ substantially from the apes in genetic makeup
- b. have shown that we are very close to chimps in genetic makeup
- c. state that humans are really kinds of monkeys
- d. have made little progress in determining our relationship to apes

b

p. 34

2.37 The ancestors of crabs, lobsters, and insects deserve credit for:

- a. providing food for the first humans
- b. forcing humans to leave the warm waters of the oceans
- c. being the first creatures to seek life on dry land
- d. forming the first proteins

c

p. 25

2.38 Mammals:

- a. made their appearance on earth some 65 to 55 million years ago
- b. fed at night to stay out of the way of gigantic reptiles
- c. became accustomed to be active in cool temperatures
- d. all of the above

d

p. 31

2.39 Humans, monkeys, and apes are all:

- a. mammals
- b. primates
- c. arthropods
- d. **BOTH** mammals and primates

d

p. 31

2.40 In the evolutionary process:

- a. every organism progresses through a number of definite stages
- b. random characteristics prove to be successful in adaptation
- c. monkeys eventually become human
- d. small-brained animals invariably become large brained

b

p. 27

- 2.41 All the visible or apparent traits of an individual constitute that individual's:
- a. phenotype
 - b. genotype
 - c. chromosome
 - d. nucleus

a

p. 30

- 2.42 A population whose members are capable of breeding among themselves but are incapable of breeding with other populations is a:
- a. gene pool
 - b. race
 - c. hybrid stock
 - d. species

d

p. 31

- 2.43 Permanent changes in genetic material are referred to as:
- a. speciation
 - b. races
 - c. mutations
 - d. hybridizations

c

p. 30

- 2.44 Protoplasm:
- a. is the basic building block of life
 - b. refers to the first living things, probably microorganisms
 - c. is found in fossil remains
 - d. is a kind of complex protein

b

p. 24

- 2.45 Monkeys, apes, and humans all belong to the same order of:
- a. prosimians
 - b. hominids
 - c. pithecines
 - d. primates

d

p. 33

- 2.46 Agriculture:
- a. marks the beginning of permanent settlements
 - b. was brought to Europe from the New World
 - c. originated in Africa
 - d. failed to spread to other areas until communication techniques improved

a

p. 38

- 2.47 All primates share an important social characteristic:
a. organization into troops with hierarchies of dominance
b. organization into tribes and confederations
c. reciprocal altruism
d. the incest taboo
- a**
p. 40
- 2.48 The discovery of agriculture had one of the following results:
a. the amount of protein in the human diet decreased, leading to a decrease in brain size
b. Homo sapiens became warm blooded
c. humans began to bury their dead
d. surpluses of food developed, allowing people to concentrate on the development of social structure
- d**
p. 39
- 2.49 Gregor Mendel is known for having contributed to the science of:
a. biochemistry
b. evolution
c. genetics
d. mathematics
- c**
p. 28
- 2.50 Darwin's view of nature stipulated that:
a. the biggest and strongest species survive
b. successful species annihilate lesser species
c. species compete for living space and resources
d. there is an abundance of resources for all
- c**
p. 27
- 2.51 The "modern synthesis" refers to:
a. a combination of Karl von Linne's work with that of Charles Darwin
b. Judeo-Christian evolutionism
c. the combining of Darwinian theory with Mendelian genetics
d. the application of Darwin's theory to the evolution of human societies
- c**
p. 28
- 2.52 Cytogenetics is concerned with:
a. natural selection
b. the transmission of genes across generations
c. biochemical and cellular events
d. all of the above
- c**
p. 28

- 2.53 A group of individuals who breed with one another because they live in the same general territory is called:
- a. a sub-species
 - b. an inbreeding population
 - c. a hybrid population
 - d. ramapithecines

b
p. 29

- 2.54 Ramapithecus refers to fossil remains of:
- a. ground dwelling hominoids
 - b. tree dwelling hominoids
 - c. ground dwelling hominids
 - d. tree dwelling hominids

a
p. 32

- 2.55 Based on molecular analysis, it appears that the split between hominoid and hominid occurred:
- a. 13 million years ago
 - b. between 6 and 4 million years ago
 - c. no more than two million years ago
 - d. 15 million years ago

b
p. 32

- 2.56 The chances of mutation occurring in a gene are about:
- a. five in 1,000,000
 - b. one in 100,000
 - c. one in 10,000
 - d. one in 1,000

a
p. 30

- 2.57 Gene mutation may occur through:
- a. radiation
 - b. chemical reactions
 - c. heat
 - d. all of the above

d
p. 30

- 2.58 The family name for human beings and their ancestors, Australopithecus and Homo erectus, is:
- a. Anthroidea
 - b. Hominoidea
 - c. Hominidae
 - d. Homo Sapiens

c
p. 33

- 2.59 The earliest hard evidence of human presence in the New World goes back:
- a. 12,000 years
 - b. 40,000 years
 - c. 100,000 years
 - d. 300,000 years

a

p. 38

- 2.60 The world's very first farmers are thought to have inhabited:
- a. a 2,000 mile arc from the Persian Gulf to what are today Israel and Jordan
 - b. the central plains of North America
 - c. Central America, south of the Yucatan peninsula
 - d. Central Asia, from the Altai Mountains to the Tibetan Plateau

a

p. 38

- 2.61 At the hominid stage, walking upright:
- a. led to the enlargement of the brain
 - b. facilitated gestation and child bearing
 - c. made it easier to sight predators and prey
 - d. made it easier to carry tools

c

p. 34

- 2.62 The helplessness of the newborn human is used to explain:
- a. hunting and gathering societies
 - b. the loss of estrus in human females
 - c. a division of labor based on sex
 - d. the enslavement of women

c

p. 34

- 2.63 Natural selection, when applied to human beings, has tended to favor those individuals who:
- a. acted upon impulse
 - b. were the fiercest fighters
 - c. learned best and remembered longest
 - d. accumulated the greatest surplus

c

pp. 40-41

- 2.64 The two competing theories of the origins of modern humans are called:
- a. "Out of Africa" and "Multiregional"
 - b. "homo erectus" and "Neanderthal"
 - c. "Homo erectus" and "Homo Sapiens"
 - d. "unilineal" and "multilineal"

a

p. 36

- 2.65 "Lucy," a fossilized specimen found in Ethiopia, is thought to be the common ancestor of:
- a. Homo habilis and Homo erectus
 - b. Australopithecus afarensis and Australopithecus boisei
 - c. Australopithecus afarensis and homo sapiens
 - d. Homo sapiens and Homo erectus

c

p. 34

- 2.66 New dating techniques have estimated that a hominid female whose fossilized skeleton was found was:
- a. 5 million years old
 - b. 4.4 million years old
 - c. 8.6 million years old
 - d. 75.000 years old

b

p. 34

- 2.67 All living human groups are classified as:
- a. Homo sapiens
 - b. Homo sapiens sapiens
 - c. Homo incipiens
 - d. Homo erectus

b

p. 36

- 2.68 The three most general categories of living things, after the classification into kingdom, are:
- a. genus, family, and suborder
 - b. phylum, order, and superfamily
 - c. phylum, subphylum, and class
 - d. order, suborder, and superfamily

c

p.33

- 2.69 Homo sapiens sapiens stands for:
- a. order, suborder, and family
 - b. genus, family, and species
 - c. genus, species, and variety
 - d. subclass, suborder, and species

c

p. 33

- 2.70 Apes and humans are part of the same:
- a. superfamily
 - b. family
 - c. genus
 - d. species

a

p. 33

ESSAY QUESTIONS

- 2.1 Recount the scientific explanation of the creation of the universe. How does it differ from the biblical explanation? In what ways is it more difficult to comprehend? Is it possible to reconcile the two explanations? Which explanation do you personally accept? Defend your position.
- 2.2 Summarize the theory of evolution and the process of natural selection. How can racial differences be explained according to natural selection? According to the laws of genetics? Which would produce the most vigorous human being, genetic drift, gene flow, or gene frequency?

Articles of Interest:

Wade, Nicholas. 2010. "Analysis of Neanderthal Genome Points to Interbreeding With Modern Humans." The New York Times. May 7, p. A9. Biologists who analyzed the Neanderthal genetic sequence report that they mated with some modern humans and thus left their genetic imprint in the human genome.

"Synthetic biology: And Man Made Life." 2010. The Economist. May22.
http://www.economist.com/daily/news/displaystory.cfm?story_id=16163154&fsrc=nwl.
The two American biologists who unraveled the DNA sequence of a living organism have now made a bacterium that has an artificial genome, thus creating a living organism with no living ancestors.

"New Creature in an Age of Extinctions." 2009. The New York Times, Sunday, July 26. P. WK1-3. Species do not only become extinct: new ones appear all the time.

"Cleveland Researchers Make History with News of Prehistoric discovery." 2009. The Plain Dealer, October 2, pp. 14A. Anthropologists discover a new upright ancestor, *Ardipithecus ramidus*, believed to have lived 4.4 million years ago, who is rewriting the history of evolution.

Hotz, Robert Lee. "Fossils Shed New Light on Human Origins." 2009. The Wall Street Journal, October 1. Same discovery as discussed above.

Shreeve, Jamie. 2009. "Ardi's Secret: Did Early Humans Start Waling for Sex?" National Geographic.com/News. Again, the same discovery as above, but from a more interesting point of view for students!

Carroll, Sean B. 2010. "Hybrids May Thrive Where Parents Fear to Tread." The New York Times, September 14. P. D2. Some hybrids may presage speciation, according to research reported by a molecular biologist and geneticist. Very interesting addition in discussing evolutionary theory.

Wade, Nicholas. 2010. "Genes of Parents Compete in the Fetus." The New York Times, September 14. P. D5. A mother's and father's genes do not play equal roles in their progeny: some genes of either parent are inactivated because mothers and fathers have different interests in their young.