**1. Evolution is:**

a. A rare event

b. Currently occurring only in scientific laboratories

c. Constantly occurring at the same rate in ALL organisms

d. An inevitable consequence of the nature of organisms

**2. Which describes natural selection?**

a. Some live and some die in each generation

b. Only the largest and strongest survive

c. Random assortment of genes results in better characteristics in the following generations

d. The best adapted individuals survive and reproduce, contributing the most to the next generation

**3. Which of the following is NOT one of the premises on which evolution by natural selection is based?**

a. Organisms usually produce many more offspring than the environment can support.

b. Most natural populations remain approximately the same size through time.

c. Organisms can alter their genes to help them survive in a particular environment.

d. Hereditary differences between organisms can be passed on to their offspring.

**4. Which of the following statements is FALSE?**

a. Convergent evolution demonstrates evolutionary relationships.

b. Homologous structures are the same body parts that are modified in different ways in different lines of descent from a common ancestor.

c. Fossils can show evolutionary changes in bones and teeth.

d. The more similarity in the structure of two proteins from different organisms, the more closely related the organisms are.

**5. Darwin and Wallace first suggested**

a. The idea that evolution might occur.

b. A testable and believable mechanism to explain how evolution might occur.

c. The idea that changes to an organism’s body caused by the environment might be passed on to its offspring.

d. None of the above

**6. Darwin explained the differences in beak shape among Galapagos finches as being the result of**

a. chance events

b. adaptations to eating different foods

c. differences that existed in the colonizing species

d. inheritance of acquired characteristics

**7. Industrial melanism describes the change in moth color from pale to dark after pollution from factories resulted in coating tree trunks with a layer of dark soot. Which statement is true concerning industrial melanism?**

a. After the pollution occurred, moths became dark because soot got on their wings.

b. The dark moths survived better after the pollution because they were not poisoned by the pollutants.

c. Individual moths changed their color in response to the pollution.

d. Some dark moths must have been born in the population even before pollution occurred.

**8. Which of the following is true of evolution?**

a. evolutionary changes increase the ability of a species to survive and reproduce in a specific environment.

b. evolutionary changes increase the ability of a species to survive and reproduce under any circumstances.

c. evolutionary changes result in a species becoming more and more abundant over time.

d. evolutionary changes result in animals becoming larger over time and having larger numbers of offspring.

**9. Which of the following is a basic requirement for natural selection to be an effective evolutionary force?**

a. Individuals must reproduce at a rapid rate.

b. Each population must be limited to a small size.

c. A population must exhibit some genetic variability.

d. All of the above.

**10. Darwin and Wallace were more knowledgeable about \_\_\_ than were most European biologists of their day, which gave them an advantage in understanding how evolution might occur.**

a. heredity

b. sexual reproduction

c. the diversity of life

d. population growth and dynamics

**11. According to natural selection, birds such as cardinals, eagles, and ducks have differently shaped feet due to**

a. random changes in foot structure

b. adaptations to different environments and feeding habits

c. differences inherited from their ancestors

d. inheritance of acquired characteristics

**12. The theory of common descent states that all modern organisms**

a. can change in response to environmental change.

b. are descended from a single ancestral species.

c. can be arranged in a linear order from "least evolved" to "most evolved".

d. have not changed over time

**13. Which of the following is NOT required in order for mimicry to evolve? (Note that models are the toxic or inedible organisms that mimics resemble.)**

a. models and mimics must inhabit the same area

b. models and mimics must eat the same food

c. mimics must be rarer than models

d. all of these requirements must be met for mimicry to evolve

**14. Which of the following is an example of a microevolution?**

a. The evolution of antibiotic resistance in bacteria.

b. The speciation of finches on the Galapagos islands.

c. The increase in size, over time, of fossil horses.

d. The evolution of humans from an ancestral primate.

**15. The process of biological evolution**

a. is not supported by scientific evidence

b. requires biological diversity in a population

c. results in changes in allele frequencies over generations

d. both b and c

**16. Whose letter to Darwin in 1858 describing a similar mechanism of evolution prompted Darwin to finally publish his theory?**

a. Mendel

b. Erasmus Darwin

c. Alfred Russel Wallace

d. Lamarck

**17. Which of the following is indirect evidence in support of the theory of evolution by natural selection?**

a. Improvement of domesticated animals and plants by breeding individuals with desirable traits

b. The fossil record that shows a clear relationship between living and extinct animals

c. homologous structures in different organisms that are dissimilar in form and function but that have underlying structural similarities.

d. all of the above

**18. Which of the following statements is true?**

a. Antibiotics kill all bacterial that they encounter.

b. Antibiotics don’t kill bacteria which have a pre-existing allele allowing them to break down the antibiotic.

c. Antibiotics don’t kill bacteria which can evolve an allele allowing them to break down the antibiotic after they encounter the antibiotic

d. None of these

**19. Artificial selection has given us**

a. the many species of wild cats

b. breeds of domesticated dogs

c. various human societies

d. the many rainforest species

**20. In many cases, one type of organism puts selection pressure on another, so they evolve together. For example, flowers and their pollinators. This is called**

a. artificial selection

b. coevolution

c. random mutation

d. mimicry

**21. Viceroy and monarch butterflies are a good example of**

a. analogy

b. mimicry

c. speciation

d. Melanism

**22. The idea of evolution\_\_\_\_\_Darwin**

a. was originated by

b. was never really considered by

c. destroyed the reputation of

d. was thought of before

**23. Artificial selection has been a big factor in the evolution of:**

a. moths

b. panda bears

c. dogs

d. whales

**24. Which of the following has provided an abundance of evidence that the diversity of life on Earth has changed over time?**

a. population genetics

b. the fossil record

c. natural selection

d. creationism

**25. During a study session about evolution, one of your fellow students remarks, “The giraffe stretched its neck while reaching for higherleaves; its offspring inherited longer necks as a result.” To correct your friend’s misconception, what would you say?**

a. Spontaneous mutations can result in the appearance of new traits.

b. Only favorable adaptations have survival value.

c. Overproduction of offspring leads to a struggle for survival.

d. Characteristics acquired during an organism’s life are not passed on through genes

**26. All of the following statements are related to the ideas of natural selection except which one?**

a. There is heritable variation among individuals.

b. Production of offspring is unrelated to the availability of essential resources.

c. Only a fraction of offspring survive because of competition for limited resources.

d. Unequal reproductive success leads to adaptations.

**27. Natural selection tends to reduce variation in gene pools. What process serves to balance natural selection by creating new alleles?**

a. meiosis

b. sex

c. mutation

d. Migration

**28. Of the following anatomical structures, which is homologous to the wing of a bat?**

a. the dorsal fin of a shark

b. the tail of a kangaroo

c. the wing of a butterfly

d. the arm of a human

**29. It is possible for evolution to be influenced by choices that individuals make concerning which individual to mate with or even whichoffspring to pay more attention to.**

a. true b. false

**30. Mutations of genetic material**

a. are usually harmful

b. are often beneficial

c. usually help an organism adapt more effectively to its environment

d. occur frequently

**31. The core idea of evolutionary "success" is oriented around**

a. intelligence

b. reproduction

c. achievement of a long life

d. better senses

**32. Lamarck's early 1800's theory of evolution is characterized primarily by the idea that**

a. characteristics acquired during life are passed on to offspring

b. evolution is a completely random process

c. most organisms don't produce enough offspring

d. none of these

**33. In the evolution of organisms through time,**

a. species always become bigger, stronger, or faster

b. intelligence continually increases in animal species

c. there is no particular direction to evolutionary change

d. species slowly degenerate

**34. When the allele frequencies within a species change over time, that species is**

a. mutating

b. on its way to extinction

c. evolving

d. none of the above.

**35. Which process enlarges a species’ gene pool?**

a. reproduction

b. mutation

c. evolution

d. Meiosis

**36. Eyes have evolved separately several times during animal evolution.** True/False

**37. Modern whales lack hindlimbs, but have tiny bones in their skeletons which are the remnants of pelvic and leg bones. Which of the following is NOT TRUE concerning this information?**

a. The remnants of pelvic and leg bones in whales are vestigial structures.

b. Modern whales most likely had an ancestor that possessed hindlimbs.

c. This is anatomical evidence in support of the theory of evolution.

d. This is biochemical evidence in support of the theory of evolution.

**38. Which shows the effects of artificial selection?**

a. moths

b. pandas

c. dairy cows

d. cheetahs

**39. Which has the least complicated type of eye?**

a. fish

b. human

c. planarian

d. nautilus

**40. What might you conclude from the observation that the bones in your arm and hand are similar to the bones in a bat's wing?**

a. The bones in the bat's wing are vestigial structures, no longer useful as "arm" bones.

b. The bones in the bat's wing are homologous to your arm and hand bones.

c. Bats lost their thumbs during the course of evolution.

d. The ancestors of humans could fly.

**41. Which of the following is an example of a microevolution?**

a. The evolution of pesticide resistance in grasshoppers.

b. The speciation of finches on the Galapagos islands.

c. The increase in size, over time, of fossil horses.

d. The evolution of humans from an ancestral primate.

**42. When populations with separate ancestors adapt in similar ways to similar environmental constraints (e.g., "flippers" in whales and penguins), it is referred to as**

a. homology

b. natural selection

c. convergent evolution

d. coevolution

**43. Which observation most clearly contradicts Lamarck’s hypothesis that acquired characteristics are inherited?**

a. The cactus plant spread very rapidly when introduced into Australia.

b. Most zebras can fun faster than lions, and their offspring also run faster than lions.

c. Bacteria which are resistant to penicillin have been discovered.

d. The seeds from a pine tree that was bent by the wind grew into tall, straight trees in a sheltered valley.

**44. Which of the following observations or assumptions was NOT part of Darwin’s theory of natural selection?**

a. Traits are inherited as discrete units called genes.

b. Evolution occurs over long periods of time.

c. Populations produce more offspring than the environment can support.

d. Organisms compete for limited resources.

**45. Which owl was most fit?**

a. Owl 1 laid 8 eggs, of which 6 hatched and 5 young successfully left the nest.

b. Owl 2 laid 9 eggs, of which 8 hatched and 3 young successfully left the nest.

c. Owl 3 laid 12 eggs, of which 10 hatched and were all eaten by a squirrel.

d. Owl 4 laid 4 eggs, of which all 4 hatched and all 4 young successfully left the nest.

**46. Which ONE of the following statements is true of evolution:**

a. Evolution by natural selection leads to changes which increase the ability of a population to succeed in the environment in which they find themselves.

b. Evolutionary changes must lead to increased genetic diversity in a population.

c. When a population is evolving, offspring will not resemble their parents.

d. Natural selection can cause inheritable (genetic) changes in an organism.

**47. Which of the following is an acceptable definition of evolution?**

a. a change in the phenotypic makeup of a population

b. a change in the genetic makeup of a population

c. a change in the environmental conditions of a population

d. a change in the species composition of a region

**48. Which of the following environments would select for flight in insects?**

a. a cage with slippery walls that insects can’t climb, and an electrified screen at the top

b. a swamp full of frogs that can see and catch flying insects better than crawling insects

c. a forest full of bats the catch insects in flight

d. a cage with no predators, in which food is provided in high dishes

**49. Organisms can cause themselves to mutate in particular ways to meet environmental challenges.**T/F

**50. Evolution is the theme that ties together all of biology. This is because the process of evolution**

a. explains how organisms become adapted to their environment.

b. explains the diversity of organisms

c. explains why distantly related organisms sometimes resemble one another.

d. all of the above are appropriate answers.

**51. Before Darwin’s work, Lamarck proposed a hypothesis of evolution by inheritance of acquired characteristics. He used the example of how giraffes got long necks, saying that during their lifetimes giraffes stretched their necks as they tried to reach higher and higher leaves. Their necks became longer due to this effort, and the children of these longer-necked giraffes also had longer necks. Those giraffes who did not try to reach the higher leaves starved and died. From our current understanding of evolution, what was the biggest problem with Lamarck’s idea?**

a. The giraffes with short necks died because they couldn’t reach the food as well as those with longer necks

b. the giraffes with longer necks had longer necked children

c. the giraffes that acquired longer necks by stretching had longer necked children

d. Nothing

**52. An example of one of Darwin’s pieces of evidence for natural selection is**

a. in a litter of tiger cubs, some are born larger than others

b. mutations occur when organisms are exposed to UV light

c. the deeper in the ground a fossil is, the older it is

d. DNA sequences can help scientists determine the relationships between species

**53. Darwin was interested in domesticated pigeons because**

a. he was sent one by the captain of the Beagle

b. they were an excellent example of natural selection

c. he liked them

d. they were an excellent example of artificial selection

**54. Specific environmental factors that favor certain characteristics in organisms are called**

a. selecting agents

b. hurricanes

c. mutations

d. disruptive factors

**55. Each of the following phrases describes the process of evolution EXCEPT**

a. changes in allele frequency over time

b. traits acquired by an individual during its lifetime are passed on to its offspring

c. descent with modification

d. progressively more complex forms of life are derived from simpler ancestors

**56. Which evolves?**

a. individuals

b. Populations

c. genes

d. all of these

**57. People have thought and wondered about evolution**

a. since the 18th century

b. since the 19th century

c. since the 20th century

d. since the times of the ancient Greeks

**58. While reading for biology 105 you developed a callus on your index finger from turning so many pages. Someone tells you that your children will now have a greater tendency towards developing callused fingers. This reflects the ideas of**

a. Darwin b. Mendel c. Lamarck d. Watson

**59. The sickle cell trait**

a. is common in people whose ancestors came from areas where malaria was a significant health problem because of a serious bottleneck effect

b. is an example of hybrid vigor

c. can result in an increase in the fitness of people who are heterozygous for the trait

d. results in resistance to malaria among people homozygous for the trait

**60. The gene pool of a species**

a. remains constant over time

b. continually loses alleles

c. is changed by evolution

d. is identical to that of many other species

**61. Death of some individuals due to dehydration in a desert would be an example of \_\_\_\_\_ selection.**

a. natural b. artificial c. sexual d. Parental

**62. Average beak size in one generation of Galapagos finches is associated with**

a. amount of rain the previous year

b. average temperatures the previous year

c. size of predators the previous year

d. the prevalence of ticks and mites the previous year

**63. Which of the following might exert selection pressure on a population of mice?**

a. their predators b. their diseases c. their food d. any of these

**64.When populations descended from the same ancestral group show different adaptations with the same basic underlying structure to them (for example whale flippers and human arms), it is referred to as**

a. homology

b. natural selection

c. analogy

d. Coevolution

**65. If rates of geological processes such as erosion, mountain building, cave formation, etc. occurred in the past similarly tothe way they do now, the Earth must be**

a. hundreds of years old

b. thousands of years old

c. millions of years old

d. billions of years old

**66. Organisms \_\_\_\_\_\_ come up with a mutation needed to cope with an environmental stress after selection pressure of that stress has been applied.**

a. can easily

b. cannot

c. can sometimes

**67. The impressive tail of the peacock**

a. may not be favored by natural selection

b. may provide peahens with an index of the health status prospective mates

c. is most likely a result of the founder effect instead of natural selection

d. both a and b are true

**68. Selection is any process that changes the genetic composition of a population by ensuring that some individuals leave \_\_\_\_\_\_\_\_\_\_ offspring than others.**

a. more b. fewer c. better d. Larger

**69. It is possible to do actual experiments on evolution in a laboratory setting.** T/F

Speciation; Origin and Types of Life

**70. Boa constrictors have tiny pelvic girdles and leg bones within their bodies. Since these structures are nonfunctional, they are called:**

a. vestigial b. analogous c. maladaptive d. Homologous

**71. The process by which unrelated organisms with similar environmental demands evolve superficially similar structures is:**

a. natural selection b. homologous c. convergent evolution d. comparative anatomy

**72. Most new species arise from a common ancestor when**

a. many mutations occur.

b. the ancestral species decides to evolve

c. there is no natural selection

d. populations of the ancestral species become isolated from one another.

**73. What does speciation, the formation of one species from another, usually require?**

a. human intervention

b. billions of years

c. reproductive isolation

d. all of the above

**74. During a speciation event, which normally comes first, geographical isolation or reproductive isolation?**

a. reproductive isolation

b. geographical isolation

c. they both occur at the same time

**75. Which of the following is NOT cited as a source of evidence in favor of the occurrence of macroevolution?**

a. fossils

b. comparative embryology

c. similarity of genes and proteins

d. all of the above are used as evidence

**76. Which is an example of temporal isolation?**

a. a type of fly is ready to mate by the middle of February every year, while a closely related species does not mate until the middle of March.

b. two animals of different species can mate but the fertilized egg never survives to develop.

c. female fruit flies can distinguish males of their species by a special antenna-waving danced. pollen from one plant cannot grow correctly on the flower of a different species

**77. What characteristic of has been created in the laboratory under conditions resembling those of the primitive Earth?**

a. organic molecules

b. cells

c. metabolism

d. none of the above

**78. Which is the correct order of appearance on Earth?**

a. photosynthetic procaryotes, eucaryotes, primordial soup, non-photosynthetic procaryotes

b. primordial soup, non-photosynthetic procaryotes, photosynthetic procaryotes, eucaryotes

c. primordial soup, eucaryotes, photosynthetic prokaryotes, non-photosynthetic procaryotes

d. non-photosynthetic procaryotes, photosynthetic procaryotes, primordial soup, eukaryotes

**80. According to the biological species concept, a species is**

a. a group of individuals which can interbreed and produce fertile offspring.

b. a group of individuals which can interbreed and which live close enough together to actually do so

c. a group of individuals who look very similar

d. a group of individuals who have a common ancestor

**81. Which is an example of behavioral isolation?**

a. a type of fly is ready to mate by the middle of February every year, while a closely related species does not mate until the middle of March.

b. two animals of different species can mate but the fertilized egg never survives to develop.

c. female fruit flies can distinguish males of their species by a special antenna-waving dance.

d. pollen from one plant cannot grow correctly on the flower of a different species.

**82. Endosymbiosis is thought to have been necessary for the evolution of which group?**

a. non-photosynthetic procaryotes b. photosynthetic prokaryotes c. eucaryotes d. all of the above

**83. Which group consists of ancient organisms living in unusual environments such as hot springs,** very salty water, or anaerobic conditions?

a. plantae. b. Bacteria c. fungi d. archaea

**84. Bilateral symmetry, and the tendency to move forward in one direction, led to evolution of**

a. the flow-though digestive system b. stinging tentacles c. segmentation d. the head

**85. The first known (oldest) fossils are of**

a. Plants b. prokaryotic cells c. eukaryotic cells d. small animals

**86. Which of the following is NOT believed to have been a component of the early Earth’s atmosphere?**

a. nitrogen gas (N2) b. hydrogen gas (H2) c. carbon monoxide (CO) d. oxygen gas (O2)

**87. Endosymbionts are**

a. structures residing within our cells which once were free-living bacteria

b. organisms which engulf their food

c. two organisms which help each other survive

d. a type of fungus

**88. Some species of Anopheles mosquito live in brackish water, some in running freshwater, and others in stagnant water. What type of reproductive barrier is separating these different species?**

a. ecological isolation

b. chemical incompatibility

c. behavioral isolation

d. postzygotic isolation

**89. If two groups are reproductively isolated from one another, their members will never meet one another.**

a. true b. False

**90. Which came first in the history of the Earth?**

a. an atmosphere with hydrogen, nitrogen oxides and carbon dioxide, among other compounds

b. an atmosphere based on free oxygen

**91. During the early history of life, which evolved first?**

a. photosynthetic prokaryotes

b. heterotrophic (non-photosynthetic) prokaryotes

c. eukaryotes

d. all evolved at the same time

**92. According to the biological species concept, horses and donkeys could be considered part of** the same species because they can mate and produce healthy, although infertile, offspring.

a. true b. False

**93. In which group did we first see bilateral symmetry?**

a. fish

b. roundworms

c. sponges

d. flatworms

**94. Which of the following is (are) true of species, according to the biological species concept?**

a. Species consist of a group of plants or animals which all look very similar to one another.

b. A species is a group of plants or animals that has the potential to evolve as a unit.

c. A species is a group of plants or animals which can interbreed under natural conditions and produce fertile offspring.

d. Both b and c are true.

**95. Which of the following might be able to lead to reproductive isolation within a species of insect?**

a. If one subpopulation of the insects had larger wings than the other subpopulation.

b. If one subpopulation had larger wings than the other subpopulation, and the subpopulation with larger wings was more successful at escaping from enemies.

c. If one subpopulation had larger wings than the other subpopulation, and the subpopulation with larger wings flew up higher in the trees to mate.

d. All of these would be likely to lead to isolation of the gene pools of the two subpopulations.

**96. If you found a fish fossil, you would determine which species the fossil belonged to based on**

a. the morphological species concept

b. the biological species concept

c. you could use either

d. you could not use either one

**97. About how long ago was the Earth formed?**

a. 10 billion years ago

b. 4.5 billion years ago

c. 4 million years ago

d. 100,000 years ago

**98. Chemicals in the ancient Earth's atmosphere may have been given the energy they needed to react by**

a. volcanic eruption

b. UV light

c. lightning

d. all of the above

**99. Which evolutionary innovation allowed animals to get and process more food faster?**

a. the head

b. segmentation

c. the flow-through digestive system

d. bilateral symmetry

**100. Which evolutionary innovation allowed animals to grow bigger bodies without needing much new information?**

a. the head

b. segmentation

c. the flow-through digestive system

d. bilateral symmetry

**101. In the primordial soup, you might find all EXCEPT which?**

a. organic (cellular) molecules

b. primitive cells

c. toxic substances

d. plants and animals

**102. Photosynthesis, when it first evolved, saved the future of life because**

a. it produced oxygen

b. it produced food molecules

c. it allowed organisms to grow large

d. it used up harmful substances in the environment

**103. Which was the first animal group to evolve flow-through digestion?**

a. jellyfish

b. flatworms

c. roundworms

d. Vertebrates

**104. Vertebrate embryos resemble each other during early development. For example, fish, turtles, chickens, mice and humans all go through a stage where they have tails and gill slits. This suggests that\_\_\_\_.**

a. Early embryonic development doesn't change much.

b. Ancestral vertebrates had genes causing the development of tails and gill slits, and their descendants still retain those genes.

c. Genes which change the developmental pathways in vertebrates arose later in evolution.

d. All of the above.

**105. Bird and insect wings are similar because they carry out the same type of function. However, structurally they are very different. They are examples of**

a. homologous structures

b. convergent evolution

c. mutation

d .acquired characteristics

**106. Oxygen in the atmosphere**

a. has always been present at the same concentration

b. was produced by physical processes soon after the Earth was formed

c. was produced by biological processes after the evolution of life

d. None of the above are true

**107. Homologous structures in two species**

a. have no apparent function

b. are usually very reduced in size

c. indicate that those species share a common ancestor

d. all of the above

**108. What is the most likely effect of killing 80% of a colony of bacteria with a certain antibiotic?**

a. The remaining bacteria will re-grow into a new colony more resistant to the antibiotic

b. The remaining bacteria will die because of the drastic decimation

c. The bacteria will not cause any further infections because their numbers have been drastically reduced

d. The bacteria will try to start a new colony where the antibiotic will not be found

**109. If an organism can make its own food, has cell walls, and can’t move, it is most likely a**

a. Bacteria b. Animal c. plant d. Fungus

**110. What is the defining feature of eukaryotic cells?**

a. ability to photosynthesize

b. possession of a nucleus and other membranous organelles

c. ability to carry out aerobic respiration

d. all of these

**111. It is thought that chloroplasts evolved before mitochondria.**

a. true b. False

**112. Which of the following is least likely to become fossilized?**

a. a jellyfish b. a dinosaur bone c. a clam shell d. Pollen

**113. Which of the following pairs shows convergent evolution?**

a. a bird wing and an insect wing

b. a bird wing and a human arm

c. both pairs

d. neither pair

**114. Which is the broadest (most inclusive) category?**

a. class b. kingdom c. species d. Family

**115. Evidence for the endosymbiotic theory includes the observation that mitochondria**

a. have their own DNA

b. can reproduce independently outside of a cell

c both of these

d. neither of these

**116. Which eukaryotic group evolved first?**

a. animals b. plants c. fungi d. Protests

**117. Which group of animals was first to colonize the land (become terrestrial)?**

a. sponges b. birds c. reptiles d. Amphibians

**118. Which of the following statements about prokaryotes is NOT true?**

a. they lack mitochondria

b. they appear in the fossil record before eukaryotes do

c. the theory of endosymbiosis explains their origin

d. they can be seen only under a microscope

**119. The structural similarities between the flippers of whales and the arms of humans are used to show that:**

a. the human species began life in the ocean

b. humans and whales have a common ancestor

c. whales are older than the human species

d. whales evolved from humans

**120. Galapagos finches**

a. resulted from convergent evolution operating on a variety of dissimilar species to adapt them to similar niches

b. resulted from the effects that population growth and natural selection have on geographically isolated populations

c. resulted from the effects of continuous gene flow between the islands and the mainland over many thousands of years

d. provide a good example of the artificial selection that is common in equatorial areas.

**121. Which evolved first in the history of animal evolution?**

a. segmentation b. flow-through digestive system c. bilateral symmetry

**122. In some plants, pollen from one flower is transferred to the flower of another type, and fertilization occurs. The seeds start to grow but the embryo does not develop right and dies, producing a fruit with unusually small, nonfunctional seeds. This is a**

a. prefertilization barrier to reproduction

b. postfertilization barrier to reproduction

c. neither a nor b

d. it could be either a or b

**123. Which of the following is a homology shared by all living creatures?**

a. 46 chromosomes b. a common genetic code c. hair d. nuclei in cells

**124. A vestigial organ**

a. becomes vestigial because it is not needed, organisms stop using it, and they pass down that disuse to their offspring

b. has no function in an existing species, but is functional in related species, suggesting that its function was lost in the species in which it is vestigial

c. is as functional as the non-vestigial organs in related species, its just smaller

d. never had a function

**125. Which of the following is a vestigial trait in humans?**

a. opposable thumbs b. forearms c. goosebumps d. body hair

**126. Which of the following is true about a vestigial structure or trait?**

a. It does not have a necessary function in more highly evolved organisms, but it did in more ancestral organisms.

b. It did not have a necessary function in more ancestral organisms, but it does in more highly evolved organisms.

c. It has an important function in both more highly evolved and more ancestral organisms.

**127. If two species have each descended from the same common ancestor, then**

a. those species will be identical

b. those species will have no anatomical features in common

c. those species will have DNA sequences in common

d. those species will still exist on Earth today

**128. Similarity between species that is the result of common descent it termed**

a. analogy

b. convergence

c. homology

d. Homoplasy

**128. Which pair is most likely to be associated with speciation?**

a. a changing environment and animals struggling for survival

b. a high mutation rate and reproductive isolation

c. mountains and icebergs d. human impact and global warming

**129. Which gas was NOT used in Miller’s primitive Earth apparatus?**

a. Hydrogen gas (H2)

b. water vapor (H2O)

c. Oxygen gas (O2)

d. all of these were used

**130. Which is easy to see occurring around us?**

a. microevolution b. macroevolution c. both d. Neither

**131. Fossils are used as evidence to show that \_\_\_\_ has occurred.**

a. microevolution b. macroevolution c. both d. Neither

**132. Which is most likely to become fossilized?**

a. teeth b. flowers c. worms d. Eggs

**133. Horses evolution occurred as their habitat was becoming**

a. wetter b. drier c. colder d. Hotter

**134. At one stage in their development, human embryos resemble fish embryos in having gill slits in their necks, and tails.**

a. true b. False

**135. North American cacti resemble South African euphorbs because they**

a. both live in hot, dry deserts

b. are closely related

c. are eaten by similar animals

d. both a and b

**136. Artificial selection was responsible for**

a. extinction of the dinosaurs

b. the evolution of sharks

c. differences between human societies

d. types of fancy pigeons

**137. Primordial soup was found on Earth**

a. soon after it was formed

b. for the first 4 billion years of Earth’s history

c. from the beginning of the Earth until now

d. Never

**138. What do mitochondria and chloroplasts have that suggest they came from endosymbiotic cells?**

a. DNA b. enzymes c. membranes d. cell walls

**139. Which group specializes in complex biochemical abilities?**

a. plants b. bacteria c. animals d. Fungi

**140. Which group consists of eukaryotic single-celled organisms that often form the basis of aquatic ecosystems?**

a. fungi b. plants c. protists d. Animals

**141. Which group consists of multi-cellular organisms with rigid cell walls that absorb food from their environment?**

a. plants b. bacteria c. animals d. Fungi

**142. Which group consists of organisms whose body is formed of thread-like structures called hyphae, and which contribute greatly to forest ecosystem productivity?**

a. plants b. bacteria c. animals d. Fungi

**143. Animals appeared in a burst of evolution called**

a. the Cambrian Explosion

b. the Big Bang

c. the Animal Explosion

d. the Evolutionary Imperative

**144. The theory of uniformitarianism (or gradualism), which stated that geological processes in the past operated the same way that they do today, was important in helping scientists understand and interpret which?**

a. evolution

b. that some species previously found on Earth were no longer here

c. the age of the Earth

d. the origin of species

**145. Monarch butterflies make birds sick; viceroys don't, but they look a lot like monarchs. Viceroys are**

a. mimics b. models c. toxic d. Parasites

**146. Which scientist wondered why God would create a separate species of tortoise for each of 15 different nearby islands?**

a. Alfred Russel Wallace b. Gregor Mendel c. Charles Darwin d. Frances Crick

**147. When populations with different ancestors adapt in the same way to similar environments (for example wings in birds and beetles), it is referred to as**

a. homology b. natural selection c. analogy d. Coevolution

**148. Which of the following is NOT believed to be true of the conditions on Earth before life evolved?**

a. The atmosphere contained many gasses toxic to most life.

b. There were high levels of ultraviolet radiation.

c. Oxygen was present in the atmosphere.

d. Water was absent.

**Human Evolution and Races; Populations**

**149. The statement that "Human populations classified in the same race appear to be more genetically similar than human populations placed in different races." is**

a. true b. false

**150. Which was the first to use fire?**

a. Homo sapiens

b. Homo erectus

c. Homo habilis

d. Australipithicus afarensis

**151. M and N are codominant genes coding for blood proteins. If population A has the genotype frequencies: 55% NN, 10% MN, and 35% MM, does its allele frequency differ from population B which has genotype frequency of 20% NN, 80% MN and 0% MM?**

a. Yes b. No c. you can't tell from this data

152. Which is the most primitive direct human ancestor?a. Homo erectus b. Australopithicus afarensis c. Homo habilis d. Australopithicus boysei 153. Which is true?a. A person from a hot, humid environment is likely to have a flat, wide nose.b. A person whose ancestors adapted to a hot, humid environment is likely to have a flat, wide nose.c. A person from a hot, humid environment is likely to have a long, narrow nose.d. A person whose ancestors adapted to a hot, humid environment is likely to have a long, narrow nose. 154. M and N are codominant genes coding for blood proteins. If population A has the genotype frequencies: 35% NN, 50% MN, and 15% MM, does its allele frequency differ from population B which has genotype frequency of 35% NN, 40% MN and 25% MM?a. yes b. no c. you can't tell from this data 155. Humans evolved on which continent?a. Africa b. North America c. Asia d. Europe 156. Which lived on Earth before Homo habilis?a. Homo erectus b. Homo sapiens c. Australopithicus d. all of the above 157. The following shows actual data comparing a mitochondrial DNA sequence from humans and several other species Human ACACCATA Chimp ACACCATABonobo ACACCATA Gorilla CCACCACA Orangutan CCACCACA Gibbon CCACCATA From this data, what can we conclude? a. humans are more closely related to chimps than to bonobosb. there seems to be no relationship between these speciesc. the least closely related to humans seem to be gorillas and orangutansd. bonobos, gorillas, and gibbons form the most closely related grouping 158. The first humans to expand their range well outside Africa werea. Homo habilis b. Homo erectus c. Australopithecus afarensis d. Neanderthals 159. A group of organisms of the same species which interbreed under natural conditions are called a a. population b. species c. kingdom d. family 160. Humans \_\_\_\_\_\_ primates.a. are b. are related to (but are not themselves) c. are not related to 161. Forward-facing eyes are adaptive for primates becausea. it helps them see farther b. their sense of smell is not very goodc. it allows depth perception d. it helps develop social skills 162. In the human line, which evolved first?a. a large brain b. bipedalism (walking on two legs) 163. Gene frequencies in a gene pool may shift randomly and by chance. This is calleda. artificial selection b. adaptive radiation c. genetic drift d. natural selection 164. People with pale skin tend to suffer froma. not enough folate in sunny tropical areas b. not enough vitamin D in sunny tropical areas165. People with dark skin tend to suffer froma. not enough folate in regions with little sunlight b. not enough vitamin D in region with little sunlight166. Which of the following would indicate that one subpopulation of a species is evolving independently of another?a. Mutations arising in one subpopulation are not transferred to the other subpopulation.b. There are no similar genes in the gene pools of the two groups.c. The frequency of an allele in one subpopulation is different than the frequency of the same allele in the other subpopulation.d. Both a and c are correct.

181. Tall, thin people evolve in what type of area?a. arctic b. high mountains c. tropics d. any of these182. A living fossil isa. a computer-animated extinct creature, such as the dinosaurs in Jurassic Parkb. a fossil that still contains recoverable DNA and traces of metabolic activityc. a missing linkd. a modern organism that has changed little from its ancient fossil ancestors 183. Which is the earliest member of the genus Homo?a. Homo erectus b. Homo habilis c. Homo neanderthalensis d. Homo sapiens184. During human evolution, people who lived in \_\_\_\_\_\_ parts of the Earth found light colored skin to be most adaptive. a. hot, sunny b. wet c. cool, cloudy185. During human evolution, people who lived in \_\_\_\_\_\_ parts of the Earth found dark colored skin to be most adaptive. a. hot, sunny b. wet c. cool, cloudy186. Which vitamin is destroyed by UV light?a. folate b. vitamin D187. Which vitamin is made by UV light?a. folate b. vitamin D188. During the time when hominins were evolving, the climate they inhabited was becominga. cooler and drier b. warmer and drier c. hotter and more humid d. much colder 189. The ape line is derived from thea. Old World monkeys b. New World monkeys190. Which is an example of the founder effect? a. all of the deer on an island were killed off, but the population was restored by immigration of a small number of deer from the mainlandb. when the climate of a desert changed, the main species of mouse evolved into two different species specializing for slightly different environments.c. most of the native birds were lost when cats were introduced to a tropical island, but the populations have recently grown again. d. an introduced fungus killed off all of the American elm trees in the Midwest. 191. Humans have genes in common with all of these, but with which do they have the most genes in common? a. bacteria b. mice c. fish d. jellyfish192. Apes evolved a unique \_\_\_\_\_\_\_\_\_ which helps them climb and swing through trees. a. head b. tail c. shoulder d. pelvis193. To which group do humans belong? a. hominids b. hominins c. both d. neither194. Which is the most recent direct ancestor of Homo sapiens?a. Homo neanderthalensis b. Homo erectus c. Homo heidelbergensis d. Homo habilisAnswers to even-numbered questions

2d, 4a, 6b, 8a, 10c, 12b, 14a, 16c, 18b, 20b, 22d, 24b, 26b, 28d, 30a, 32a, 34c, 36a, 38c, 40b, 42c, 44a, 46a, 48d, 50d, 52a, 54a, 56b, 58c,60c, 62a, 64a, 66b, 68a, 70a, 72d, 74b, 76a, 78b, 80a, 82c, 84d, 86d, 88a, 90a, 92b, 94d, 96a, 98d, 100b, 102b, 104d, 106c, 108a, 110b, 112a, 114b, 116d, 118c, 120b, 122b, 124b, 126a, 128c, 130a, 132a, 134a, 136d, 138a, 140c, 142d, 144c, 146c, 148c, 150b, 152b, 154a, 156c, 158b, 160a, 162b, 164a, 166d, 168c, 170b, 172c, 174a, 176a, 178d, 180a, 182d, 184c, 186a, 188a, 190a, 192c, 194c