

Student: _____

1. Natural selection determines how a species
 - A. breeds.
 - B. feeds.
 - C. evolves.
 - D. All of these answers are true.
2. The idea that organisms with genetically determined characteristics that make them better suited for the environment will have more surviving offspring is
 - A. the inheritance of acquired characteristics.
 - B. the Hardy-Weinberg concept.
 - C. the theory of natural selection.
 - D. convergent evolution.
3. Which of the following is a common selective agent for natural selection?
 - A. mutations
 - B. competition for food and other resources
 - C. sex ratio
 - D. population size
4. Which of these factors would be involved in maintaining a constant gene frequency in a population?
 - A. dominant alleles
 - B. lack of migration
 - C. high rate of mutation
 - D. a caste system that determines whom one can marry
5. Spontaneous mutations, which will be passed to offspring, can occur in the cell's
 - A. DNA.
 - B. mRNA.
 - C. tRNA.
 - D. All of these answers are true.
6. In order for the frequency of a particular allele in a population to increase,
 - A. the allele must be selected for.
 - B. those having the allele must be better reproducers.
 - C. the individuals without the allele do not compete as well.
 - D. All of these answers are true.
7. In order to maintain somewhat constant genetic frequencies, there must be
 - A. a relatively large population to prevent genetic drift.
 - B. very low migration and mutation rates.
 - C. random mating.
 - D. All of these answers are true.
8. Which of the following would be an example of sexual selection?
 - A. a sex ratio of 5 females to 1 male
 - B. females avoid aggressive males
 - C. male deer with poor eyesight are more often killed by accidents
 - D. well-nourished females produce more offspring

9. When new alleles enter a gene pool, the frequency of the new allele
- will always remain low.
 - will increase then decrease.
 - could have been caused by migration of individuals into the population.
 - is not influenced by in-migration, only by out-migration.
10. The gene frequencies of a population can be expected to change if
- the population is small.
 - no mutation occurs.
 - no migration occurs into or out of the population.
 - random mating occurs.
11. Natural selection may result in
- retention of favorable genes.
 - mutations.
 - the introduction of new genes into a population.
 - All of these answers are true.
12. Gene frequencies will NOT change in a population if certain conditions are met, such as if
- all organisms mate randomly.
 - there is no migration.
 - there is no mutation.
 - All of these answers are true.
13. ____ is NOT a condition of the Hardy-Weinberg concept.
- Random mating
 - Lack of mutations
 - Small population size
 - Lack of migration
14. An organism's fitness is measured by
- the number of offspring it has.
 - the size of the population of which it is a member.
 - how long it lives compared to others in its species.
 - All of these answers are true.
15. A complete set of genes of an individual in a population is referred to as a
- genome.
 - gamete.
 - gene pool.
 - homolog.
16. Which is **true** with regard to the Hardy-Weinberg concept?
- Gene frequencies change on a random basis.
 - Mutation prevents the Hardy-Weinberg equilibrium from being achieved.
 - Gene frequencies are unaffected by population size.
 - The Hardy-Weinberg concept only applies to animal populations.
17. There is a population of giraffes. Some have short necks, some have medium-length necks, and some have long necks. If the short-necked individuals are regularly eliminated from the population, this would be an example of
- disruptive selection.
 - sexual selection.
 - disfunctional selection.
 - directional selection.

18. Which of the following traits would NOT affect the genetic diversity of a specific population?
- A. removing the tails of sheep for several generations
 - B. breeding only cats that displayed green eyes
 - C. removing most of the dandelions from your lawn
 - D. None of these answers is true.
19. Which of the following would be a selecting agent?
- A. A mutation in a bacterium that allows the bacterium to resist an antibiotic.
 - B. A gene found in some mosquitoes that allows those mosquitoes to survive exposure to DDT.
 - C. A fungus (Dutch elm disease) that causes the death of 95% of elms in the eastern United States.
 - D. All of the choices are correct.
20. If a bacterium with the ability to survive the effects of an antibiotic "pops up" in a population, it most likely
- A. resulted from spontaneous mutation.
 - B. increased in number before the antibiotic began to be used.
 - C. was introduced from another species.
 - D. was created by the antibiotic.
21. There is a range of color in mice from black to brown to gray to white. In a region of white sand there is a black volcanic deposit. The white mice survive better on the white sand and the black mice survive better on the black volcanic deposit. This could be an example of
- A. sexual selection.
 - B. disruptive selection.
 - C. directional selection.
 - D. stabilizing selection.
22. Stabilizing selection would be present if
- A. gene frequencies do not change from one generation to the next.
 - B. mutations constantly replace the genes lost from one generation to the next.
 - C. there are no selecting agents.
 - D. All of these are possible.
23. One reason that each individual has unique genetic information is
- A. asexual reproduction.
 - B. the environment.
 - C. genetic recombination.
 - D. mitosis.
24. The unique genetic information for each individual is the result of
- A. genetic recombination.
 - B. selection.
 - C. mRNA.
 - D. recombinant DNA.
25. The genome is all the individual's
- A. DNA.
 - B. mRNA.
 - C. tRNA.
 - D. All of these answers are true.
26. Genetic recombination is the result of
- A. fertilization.
 - B. meiosis.
 - C. sexual reproduction.
 - D. All of these answers are true.

27. Most populations tend to
- A. produce only the number of offspring needed for replacement.
 - B. produce many more offspring than needed for replacement.
 - C. have more females than males.
 - D. have more males than females.
28. Characteristics gained during an individual's lifetime are
- A. inherited.
 - B. dominant.
 - C. acquired.
 - D. mutations.
29. If a chemical kills 85% of a population of fish, and 15% have genes to resist the chemical, the chemical is
- A. an acquired characteristic.
 - B. responsible for causing the genes to change.
 - C. responsible for a gene frequency change.
 - D. None of the answers is correct.
30. If there is no natural selection, the
- A. gene frequencies in a population remain constant.
 - B. the frequency of dominant genes increases.
 - C. the frequency of dominant genes decreases.
 - D. the population will become extinct.
31. It has become clear that there are many examples of genetic information being transferred from one species to another. This would
- A. increase the number of mutations in the species receiving the genetic information.
 - B. increase the genetic diversity of the species receiving the genetic information.
 - C. cause new species to form.
 - D. make selecting agents less important.
32. Differential reproduction results in
- A. increased mutation rates.
 - B. more dominant genes.
 - C. extinction.
 - D. changing gene frequency.
33. A selecting agent
- A. causes mutations.
 - B. selects the conditions an organism lives under.
 - C. lowers the percentage of unfavorable genes in a population.
 - D. None of the answers is correct.
34. In order for a spontaneous mutation to enter the general population, it must occur
- A. in a female.
 - B. after reproduction.
 - C. in the gonads.
 - D. before the individual becomes sexually mature.
35. An individual's genome includes
- A. only favorable genes.
 - B. only genes passed on to the offspring.
 - C. all its genes.
 - D. all the genes except those resulting from mutations.

36. In an individual, an allele may be present and not express itself when
- one allele is recessive and one allele is dominant.
 - two recessive alleles are present.
 - two dominant alleles are present.
 - the individual is haploid.
37. Acquired characteristics
- are passed on to the offspring.
 - are caused by mutations.
 - result in natural selection.
 - are obtained after fertilization.
38. Sexual selection can
- change the gene frequency.
 - lower the reproductive rate.
 - prevent natural selection.
 - not be a selecting agent.
39. If the Hardy-Weinberg conditions are **met**,
- gene frequencies will change steadily.
 - evolution will occur.
 - speciation will occur.
 - gene frequencies will remain constant.
40. Most species produce large numbers of offspring by sexual reproduction. This is important to the theory of natural selection because
- each individual is unique and this diversity allows selecting agents to operate.
 - selecting agents often lead to the death of large numbers of offspring.
 - the diversity shown in the offspring makes it highly likely that some of them will be able to reproduce successfully.
 - All of the choices are correct.
41. If changes occur in the genetic diversity of a species and they are not the result of natural selection, which of the following could have occurred?
- This could be a case of genetic drift.
 - The population may be extremely small.
 - Random events may have eliminated certain genes from the population.
 - All of the answers are correct.
42. The invalid idea that traits gained during an organism's lifetime can be passed on to future generations is
- the theory of natural selection.
 - the Hardy-Weinberg concept.
 - Mendel's law of inheritance.
 - the theory of acquired characteristics.
43. If allele 'a' is favored, or selected for, over allele 'A,'
- 'A' will increase in frequency and 'a' will decrease in frequency.
 - both alleles will increase in frequency.
 - 'a' will increase in frequency and 'A' will decrease in frequency.
 - the frequencies of both alleles will remain the same.
44. If two alleles exist for a characteristic (A and a) and allele 'a' is lethal in homozygous individuals,
- the frequency of the 'a' allele will remain constant.
 - the 'a' allele will be eliminated from the population.
 - the 'a' allele is not likely to be eliminated from the population.
 - the frequency of the 'a' allele will increase.

45. In accordance with the Hardy-Weinberg concept, a population with 80% dominant (A) alleles and 20% recessive (a) alleles would have ____ heterozygous individuals.
- A. 4%
 - B. 16%
 - C. 32%
 - D. 64%
46. Forty-nine percent of a population is homozygous dominant for a particular trait. According to the Hardy-Weinberg law, the gene frequency of this dominant allele will be
- A. 0.24.
 - B. 0.49.
 - C. 0.70.
 - D. 0.9.
47. Evolution is the result of
- A. the inheritance of acquired characteristics.
 - B. natural selection.
 - C. Hardy-Weinberg equilibrium.
 - D. random mating.
48. The fittest organism in a population is the
- A. organism that successfully produces the most offspring.
 - B. strongest and fastest organism.
 - C. organism that lives longest.
 - D. most intelligent organism.
49. The theory of natural selection was proposed
- A. independently by Darwin.
 - B. jointly by Darwin and Wallace.
 - C. independently by Mendel.
 - D. jointly by Wallace and Lamarck.
50. New genes are introduced into a gene pool by
- A. evolution.
 - B. spontaneous mutations.
 - C. natural selection.
 - D. inheritance of acquired characteristics.
51. Under natural conditions without modern medicine, which of the following conditions has the LEAST impact on fitness?
- A. Alzheimer disease, a neurological disorder that generally afflicts individuals over the age of 65
 - B. valvular stenosis, a birth defect resulting in a narrow valve that restricts blood flow from the heart
 - C. amenorrhea, the inability to menstruate
 - D. Tay-Sachs, a congenital (from the time of birth) disorder in which neurons degenerate
52. ____ make up a genetically distinct population.
- A. All the moose on an island
 - B. All insects in a city park
 - C. A pair of robins nesting in a tree
 - D. All of the animals in a zoo
53. All of the ____ are a species.
- A. St. Bernard dogs in the world
 - B. white-tailed deer in Michigan
 - C. red-winged blackbirds in the world
 - D. mules in the world

54. A ____ indicates that evolution is occurring.
- stable population size
 - high rate of migration
 - constant environment
 - change in gene frequency
55. Which of the following would be an example of natural selection?
- Mutations change the gene frequency of a population.
 - All of the plants on an island are killed by a volcanic eruption.
 - In a forest, the taller oak trees produce twice as many acorns as shorter ones.
 - Mice that were painted with a white stripe by biologists were eaten by predators more often than those that were not painted.
56. Which of the following would be necessary for evolution to take place?
- a large population
 - genetic diversity within populations
 - asexual reproduction
 - separate male and female sexes
57. Which of the following could be an agent of natural selection?
- accidental death of cows by lightning strikes
 - insects that are eaten after they have reproduced
 - characteristics of female animals that cause males to avoid them
 - increases in the population size
58. Which of the following is not important for the process of natural selection?
- meiosis
 - mutation
 - asexual reproduction
 - sexual reproduction
59. Which of the following is a major influence on the direction of evolution (which organisms go extinct and which new ones evolve)?
- the environmental conditions a species encounters
 - the size of the Earth
 - mutations in the cells that do not form gametes
 - floods, tornados, earthquakes, and hurricanes
60. If a gene expresses itself, but not equally in all individuals that have it, there is a difference in
- expressivity.
 - penetrance.
 - dominance.
 - acquired traits.
61. Which of the following activities could lead to a decrease in the genetic diversity in the gene pool of a species?
- an increase in the reproductive rate, which results in increased population size
 - a decrease in the size of the population from millions to hundreds
 - the absence of mutations
 - the species switches from asexual reproduction to sexual reproduction
62. There are many kinds of animals in which males have characteristics that are clearly disadvantageous to them. Which of the following statements offers the best explanation for the retention of these disadvantageous characteristics?
- Natural selection has not gotten around to eliminating them yet.
 - Females may select males with the disadvantageous characteristics as mates over those males that lack the characteristics.
 - Males may be strong enough to overcome these characteristics.
 - The characteristic is probably an acquired characteristic.

63. Which of the following would be an indication that evolutionary change is occurring within a species?
- A. The number of organisms in the species is increasing.
 - B. New learned behavior patterns are appearing.
 - C. No mutations have occurred within individuals of the species.
 - D. Some alleles have been lost from the species.
64. Many kinds of disease-causing bacteria are resistant to the standard antibiotics that we use to control them. This is because
- A. when bacteria are exposed to antibiotics they mutate.
 - B. there is genetic variety within the species and those that already have genes for resistance are the ones that reproduce.
 - C. new species of bacteria have evolved that are resistant to antibiotics.
 - D. when the size of the population of a species of bacterium is reduced, genetic variety decreases.
65. All of the following could result in an increase in the genetic variety within a gene pool except
- A. mutation within the gene pool.
 - B. migration of individuals into the gene pool from other subspecies.
 - C. sexual reproduction with individuals of other gene pools.
 - D. selective breeding that creates individuals with specific sets of characteristics.
66. Which of the following would be an example of directional selection?
- A. Mutations change the gene frequency of a population.
 - B. All of the plants on an island are killed by a volcanic eruption.
 - C. In a forest, the taller oak trees produce twice as many acorns as shorter ones.
 - D. Mice that were painted with a white stripe by biologists were eaten by predators more often than those that were not painted
67. A dominant allele does not express itself in every person that contains it; occasionally parents without the characteristic have children that show the characteristic. This statement represents a feature known as
- A. fitness.
 - B. expressivity.
 - C. recessiveness.
 - D. penetrance.
68. In a population, some individuals are chosen as mates more frequently than others. This statement represents
- A. sexual selection.
 - B. artificial selection.
 - C. penetrance.
 - D. morphological preference.
69. Which of the following was a biological fact important to the development of Darwin's ideas about evolution?
- A. Organisms typically produce huge numbers of offspring.
 - B. There are differences among members of the same species.
 - C. There is a high death rate among organisms.
 - D. All of these are true.
70. Lamarck's theory of evolution was based upon
- A. polyploidy.
 - B. geographic isolation.
 - C. macroevolution.
 - D. acquired characteristics.

71. Populations of hospital microbes contain mutations that protect them from specific antibiotics, that is, they are antibiotic resistant. The selecting agent in this situation is
- A. antibiotics.
 - B. the patients.
 - C. the physicians.
 - D. nurses.

13 Key

1. Natural selection determines how a species
- A. breeds.
 - B. feeds.
 - C. evolves.
 - D.** All of these answers are true.

Blooms Level: 1. Remember

Enger - Chapter 13 #1

Learning Outcome: Describe how the concepts of evolution and natural selection are related.

Section: 13.01

Section: 13.03

Topic: Evolution-Darwin

2. The idea that organisms with genetically determined characteristics that make them better suited for the environment will have more surviving offspring is
- A. the inheritance of acquired characteristics.
 - B. the Hardy-Weinberg concept.
 - C.** the theory of natural selection.
 - D. convergent evolution.

Blooms Level: 1. Remember

Enger - Chapter 13 #2

Learning Outcome: Describe how the concepts of evolution and natural selection are related.

Section: 13.01

Section: 13.03

Topic: Evolution-Darwin

3. Which of the following is a common selective agent for natural selection?
- A. mutations
 - B.** competition for food and other resources
 - C. sex ratio
 - D. population size

Blooms Level: 1. Remember

Enger - Chapter 13 #3

Learning Outcome: Describe how the concepts of evolution and natural selection are related.

Section: 13.02

Section: 13.03

Topic: Evolution-Darwin

4. Which of these factors would be involved in maintaining a constant gene frequency in a population?
- A. dominant alleles
 - B.** lack of migration
 - C. high rate of mutation
 - D. a caste system that determines whom one can marry

Blooms Level: 2. Understand

Enger - Chapter 13 #4

Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.

Section: 13.09

Topic: Evolution-Darwin

5. Spontaneous mutations, which will be passed to offspring, can occur in the cell's
- A.** DNA.
 - B. mRNA.
 - C. tRNA.
 - D. All of these answers are true.

Blooms Level: 1. Remember

Enger - Chapter 13 #5

Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.

Section: 13.09

Topic: Evolution-Darwin

6. In order for the frequency of a particular allele in a population to increase,
A. the allele must be selected for.
B. those having the allele must be better reproducers.
C. the individuals without the allele do not compete as well.
D. All of these answers are true.

*Blooms Level: 2. Understand
Enger - Chapter 13 #6
Section: 13.09
Topic: Evolution-Darwin*

Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.

7. In order to maintain somewhat constant genetic frequencies, there must be
A. a relatively large population to prevent genetic drift.
B. very low migration and mutation rates.
C. random mating.
D. All of these answers are true.

*Blooms Level: 2. Understand
Enger - Chapter 13 #7
Section: 13.09
Topic: Evolution-Darwin*

Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.

8. Which of the following would be an example of sexual selection?
A. a sex ratio of 5 females to 1 male
B. females avoid aggressive males
C. male deer with poor eyesight are more often killed by accidents
D. well-nourished females produce more offspring

*Blooms Level: 2. Understand
Enger - Chapter 13 #8
Section: 13.06
Topic: Evolution-Darwin*

Learning Outcome: Describe how individuals produced by sexual reproduction can have fitness different from that of their parents.

9. When new alleles enter a gene pool, the frequency of the new allele
A. will always remain low.
B. will increase then decrease.
C. could have been caused by migration of individuals into the population.
D. is not influenced by in-migration, only by out-migration.

*Blooms Level: 2. Understand
Enger - Chapter 13 #9
Section: 13.09
Topic: Evolution-Darwin*

Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.

10. The gene frequencies of a population can be expected to change if
A. the population is small.
B. no mutation occurs.
C. no migration occurs into or out of the population.
D. random mating occurs.

*Blooms Level: 2. Understand
Enger - Chapter 13 #10
Section: 13.09
Topic: Evolution-Darwin*

Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.

11. Natural selection may result in
A. retention of favorable genes.
B. mutations.
C. the introduction of new genes into a population.
D. All of these answers are true.

*Blooms Level: 2. Understand
Enger - Chapter 13 #11
Section: 13.03
Topic: Evolution-Darwin*

Learning Outcome: Describe how the concepts of evolution and natural selection are related.

Learning Outcome: Explain how natural selection can change the nature of a species.

12. Gene frequencies will NOT change in a population if certain conditions are met, such as if
- A. all organisms mate randomly.
 - B. there is no migration.
 - C. there is no mutation.
 - D.** All of these answers are true.

*Blooms Level: 1. Remember
Enger - Chapter 13 #12
Section: 13.09
Topic: Evolution-Darwin*

13. _____ is NOT a condition of the Hardy-Weinberg concept.
- A. Random mating
 - B. Lack of mutations
 - C.** Small population size
 - D. Lack of migration

*Blooms Level: 2. Understand
Enger - Chapter 13 #13
Section: 13.09
Topic: Evolution-Darwin*

14. An organism's fitness is measured by
- A.** the number of offspring it has.
 - B. the size of the population of which it is a member.
 - C. how long it lives compared to others in its species.
 - D. All of these answers are true.

*Blooms Level: 2. Understand
Enger - Chapter 13 #14
Section: 13.03
Topic: Evolution-Darwin*

15. A complete set of genes of an individual in a population is referred to as a
- A.** genome.
 - B. gamete.
 - C. gene pool.
 - D. homolog.

*Blooms Level: 1. Remember
Enger - Chapter 13 #15
Section: 13.01
Topic: Evolution-Darwin*

16. Which is **true** with regard to the Hardy-Weinberg concept?
- A. Gene frequencies change on a random basis.
 - B.** Mutation prevents the Hardy-Weinberg equilibrium from being achieved.
 - C. Gene frequencies are unaffected by population size.
 - D. The Hardy-Weinberg concept only applies to animal populations.

*Blooms Level: 2. Understand
Enger - Chapter 13 #16
Section: 13.09
Topic: Evolution-Darwin*

17. There is a population of giraffes. Some have short necks, some have medium-length necks, and some have long necks. If the short-necked individuals are regularly eliminated from the population, this would be an example of
- A. disruptive selection.
 - B. sexual selection.
 - C. disfunctional selection.
 - D.** directional selection.

*Blooms Level: 3. Apply
Enger - Chapter 13 #17
Section: 13.07
Topic: Evolution-Darwin*

18. Which of the following traits would NOT affect the genetic diversity of a specific population?
A. removing the tails of sheep for several generations
B. breeding only cats that displayed green eyes
C. removing most of the dandelions from your lawn
D. None of these answers is true.

*Blooms Level: 2. Understand
Enger - Chapter 13 #18*

*Learning Outcome: Explain how mutation and migration affect the genetic diversity of a population.
Section: 13.09*

Topic: Evolution-Darwin

19. Which of the following would be a selecting agent?
A. A mutation in a bacterium that allows the bacterium to resist an antibiotic.
B. A gene found in some mosquitoes that allows those mosquitoes to survive exposure to DDT.
C. A fungus (Dutch elm disease) that causes the death of 95% of elms in the eastern United States.
D. All of the choices are correct.

*Blooms Level: 2. Understand
Enger - Chapter 13 #19*

*Learning Outcome: Describe how the concepts of evolution and natural selection are related.
Section: 13.03*

Section: 13.06

Topic: Evolution-Darwin

20. If a bacterium with the ability to survive the effects of an antibiotic "pops up" in a population, it most likely
A. resulted from spontaneous mutation.
B. increased in number before the antibiotic began to be used.
C. was introduced from another species.
D. was created by the antibiotic.

*Blooms Level: 4. Analyze
Enger - Chapter 13 #20*

*Learning Outcome: Describe how the concepts of evolution and natural selection are related.
Learning Outcome: Explain how mutation and migration affect the genetic diversity of a population.*

Section: 13.01

Topic: Evolution-Darwin

21. There is a range of color in mice from black to brown to gray to white. In a region of white sand there is a black volcanic deposit. The white mice survive better on the white sand and the black mice survive better on the black volcanic deposit. This could be an example of
A. sexual selection.
B. disruptive selection.
C. directional selection.
D. stabilizing selection.

*Blooms Level: 3. Apply
Enger - Chapter 13 #21*

*Learning Outcome: Describe how the concepts of evolution and natural selection are related.
Learning Outcome: List and describe three circumstances that can prevent a specific allele from being expressed in the phenotype of an organism.*

Section: 13.07

Topic: Evolution-Darwin

22. Stabilizing selection would be present if
A. gene frequencies do not change from one generation to the next.
B. mutations constantly replace the genes lost from one generation to the next.
C. there are no selecting agents.
D. All of these are possible.

*Blooms Level: 2. Understand
Enger - Chapter 13 #22*

*Learning Outcome: List and describe three circumstances that can prevent a specific allele from being expressed in the phenotype of an organism.
Section: 13.07*

Topic: Evolution-Darwin

23. One reason that each individual has unique genetic information is
- A. asexual reproduction.
 - B. the environment.
 - C.** genetic recombination.
 - D. mitosis.

*Blooms Level: 1. Remember
Enger - Chapter 13 #23*

*Learning Outcome: Explain why genetic diversity is essential for natural selection to occur.
Section: 13.05*

Topic: Evolution-Darwin

24. The unique genetic information for each individual is the result of
- A.** genetic recombination.
 - B. selection.
 - C. mRNA.
 - D. recombinant DNA.

*Blooms Level: 1. Remember
Enger - Chapter 13 #24*

*Learning Outcome: Explain why genetic diversity is essential for natural selection to occur.
Section: 13.05*

Topic: Evolution-Darwin

25. The genome is all the individual's
- A.** DNA.
 - B. mRNA.
 - C. tRNA.
 - D. All of these answers are true.

*Blooms Level: 1. Remember
Enger - Chapter 13 #25*

*Learning Outcome: Explain why genetic diversity is essential for natural selection to occur.
Section: 13.01*

Topic: Evolution-Darwin

26. Genetic recombination is the result of
- A. fertilization.
 - B. meiosis.
 - C. sexual reproduction.
 - D.** All of these answers are true.

*Blooms Level: 1. Remember
Enger - Chapter 13 #26*

*Learning Outcome: Explain why genetic diversity is essential for natural selection to occur.
Section: 13.05*

Topic: Evolution-Darwin

27. Most populations tend to
- A. produce only the number of offspring needed for replacement.
 - B.** produce many more offspring than needed for replacement.
 - C. have more females than males.
 - D. have more males than females.

*Blooms Level: 1. Remember
Enger - Chapter 13 #27*

*Learning Outcome: List five assumptions by Darwin that were important to his developing the theory of natural selection.
Section: 13.01*

Section: 13.02

Section: 13.03

Topic: Evolution-Darwin

28. Characteristics gained during an individual's lifetime are
- A. inherited.
 - B. dominant.
 - C.** acquired.
 - D. mutations.

*Blooms Level: 1. Remember
Enger - Chapter 13 #28*

*Learning Outcome: Describe the contributions of the following individuals to evolutionary thought: Lamarck, Buffon, Wallace, and Darwin.
Section: 13.01*

Section: 13.02

Topic: Evolution-Darwin

29. If a chemical kills 85% of a population of fish, and 15% have genes to resist the chemical, the chemical is
- A. an acquired characteristic.
 - B. responsible for causing the genes to change.
 - C.** responsible for a gene frequency change.
 - D. None of the answers is correct.

*Blooms Level: 4. Analyze
Enger - Chapter 13 #29*

*Learning Outcome: Describe how the concepts of evolution and natural selection are related.
Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.
Section: 13.03
Section: 13.06
Topic: Evolution-Darwin*

30. If there is no natural selection, the
- A.** gene frequencies in a population remain constant.
 - B. the frequency of dominant genes increases.
 - C. the frequency of dominant genes decreases.
 - D. the population will become extinct.

*Blooms Level: 2. Understand
Enger - Chapter 13 #30*

*Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.
Section: 13.09
Topic: Evolution-Darwin*

31. It has become clear that there are many examples of genetic information being transferred from one species to another. This would
- A. increase the number of mutations in the species receiving the genetic information.
 - B.** increase the genetic diversity of the species receiving the genetic information.
 - C. cause new species to form.
 - D. make selecting agents less important.

*Blooms Level: 2. Understand
Enger - Chapter 13 #31*

*Learning Outcome: Explain why genetic diversity is essential for natural selection to occur.
Section: 13.05
Topic: Evolution-Darwin*

32. Differential reproduction results in
- A. increased mutation rates.
 - B. more dominant genes.
 - C. extinction.
 - D.** changing gene frequency.

*Blooms Level: 1. Remember
Enger - Chapter 13 #32*

*Learning Outcome: Explain how survival, reproductive success, and mate selection can alter gene frequency from one generation to the next.
Learning Outcome: Explain why excess reproduction is important to the concept of natural selection.
Section: 13.06
Topic: Evolution-Darwin*

33. A selecting agent
- A. causes mutations.
 - B. selects the conditions an organism lives under.
 - C.** lowers the percentage of unfavorable genes in a population.
 - D. None of the answers is correct.

*Blooms Level: 2. Understand
Enger - Chapter 13 #33*

*Learning Outcome: Describe how the concepts of evolution and natural selection are related.
Learning Outcome: Explain how survival, reproductive success, and mate selection can alter gene frequency from one generation to the next.
Section: 13.06
Topic: Evolution-Darwin*

34. In order for a spontaneous mutation to enter the general population, it must occur
- A. in a female.
 - B. after reproduction.
 - C.** in the gonads.
 - D. before the individual becomes sexually mature.

Blooms Level: 2. Understand

Enger - Chapter 13 #34

Learning Outcome: Explain how mutation and migration affect the genetic diversity of a population.

Section: 13.01

Section: 13.03

Section: 13.04

Topic: Evolution-Darwin

35. An individual's genome includes
- A. only favorable genes.
 - B. only genes passed on to the offspring.
 - C.** all its genes.
 - D. all the genes except those resulting from mutations.

Blooms Level: 1. Remember

Enger - Chapter 13 #35

Learning Outcome: Explain why genetic diversity is essential for natural selection to occur.

Section: 13.01

Topic: Evolution-Darwin

36. In an individual, an allele may be present and not express itself when
- A.** one allele is recessive and one allele is dominant.
 - B. two recessive alleles are present.
 - C. two dominant alleles are present.
 - D. the individual is haploid.

Blooms Level: 2. Understand

Enger - Chapter 13 #36

Learning Outcome: List and describe three circumstances that can prevent a specific allele from being expressed in the phenotype of an organism.

Section: 13.01

Section: 13.03

Topic: Evolution-Darwin

37. Acquired characteristics
- A. are passed on to the offspring.
 - B. are caused by mutations.
 - C. result in natural selection.
 - D.** are obtained after fertilization.

Blooms Level: 1. Remember

Enger - Chapter 13 #37

Learning Outcome: Describe the contributions of the following individuals to evolutionary thought: Lamarck, Buffon, Wallace, and Darwin.

Section: 13.02

Topic: Evolution-Darwin

38. Sexual selection can
- A.** change the gene frequency.
 - B. lower the reproductive rate.
 - C. prevent natural selection.
 - D. not be a selecting agent.

Blooms Level: 2. Understand

Enger - Chapter 13 #38

Learning Outcome: Describe how individuals produced by sexual reproduction can have fitness different from that of their parents.

Section: 13.06

Topic: Evolution-Darwin

39. If the Hardy-Weinberg conditions are **met**,
- A. gene frequencies will change steadily.
 - B. evolution will occur.
 - C. speciation will occur.
 - D.** gene frequencies will remain constant.

Blooms Level: 2. Understand

Enger - Chapter 13 #39

Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.

Section: 13.09

Topic: Evolution-Darwin

40. Most species produce large numbers of offspring by sexual reproduction. This is important to the theory of natural selection because
- A. each individual is unique and this diversity allows selecting agents to operate.
 - B. selecting agents often lead to the death of large numbers of offspring.
 - C. the diversity shown in the offspring makes it highly likely that some of them will be able to reproduce successfully.
 - D.** All of the choices are correct.

*Blooms Level: 2. Understand
Enger - Chapter 13 #40*

*Learning Outcome: Explain why excess reproduction is important to the concept of natural selection.
Section: 13.06
Topic: Evolution-Darwin*

41. If changes occur in the genetic diversity of a species and they are not the result of natural selection, which of the following could have occurred?
- A. This could be a case of genetic drift.
 - B. The population may be extremely small.
 - C. Random events may have eliminated certain genes from the population.
 - D.** All of the answers are correct.

*Blooms Level: 1. Remember
Enger - Chapter 13 #41*

*Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.
Section: 13.08
Section: 13.09
Topic: Evolution-Darwin*

42. The invalid idea that traits gained during an organism's lifetime can be passed on to future generations is
- A. the theory of natural selection.
 - B. the Hardy-Weinberg concept.
 - C. Mendel's law of inheritance.
 - D.** the theory of acquired characteristics.

*Blooms Level: 2. Understand
Enger - Chapter 13 #42*

*Learning Outcome: Describe the contributions of the following individuals to evolutionary thought: Lamarck, Buffon, Wallace, and Darwin.
Section: 13.02
Topic: Evolution-Darwin*

43. If allele 'a' is favored, or selected for, over allele 'A,'
- A. 'A' will increase in frequency and 'a' will decrease in frequency.
 - B. both alleles will increase in frequency.
 - C.** 'a' will increase in frequency and 'A' will decrease in frequency.
 - D. the frequencies of both alleles will remain the same.

*Blooms Level: 4. Analyze
Enger - Chapter 13 #43*

*Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.
Section: 13.09
Topic: Evolution-Darwin*

44. If two alleles exist for a characteristic (A and a) and allele 'a' is lethal in homozygous individuals,
- A. the frequency of the 'a' allele will remain constant.
 - B. the 'a' allele will be eliminated from the population.
 - C.** the 'a' allele is not likely to be eliminated from the population.
 - D. the frequency of the 'a' allele will increase.

*Blooms Level: 4. Analyze
Enger - Chapter 13 #44*

*Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.
Section: 13.09
Topic: Evolution-Darwin*

45. In accordance with the Hardy-Weinberg concept, a population with 80% dominant (A) alleles and 20% recessive (a) alleles would have ____ heterozygous individuals.
- A. 4%
 - B. 16%
 - C. 32%**
 - D. 64%

Blooms Level: 4. Analyze

Enger - Chapter 13 #45

Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.

Section: 13.09

Topic: Evolution-Darwin

46. Forty-nine percent of a population is homozygous dominant for a particular trait. According to the Hardy-Weinberg law, the gene frequency of this dominant allele will be
- A. 0.24.
 - B. 0.49.
 - C. 0.70.**
 - D. 0.9.

Blooms Level: 4. Analyze

Enger - Chapter 13 #46

Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.

Section: 13.09

Topic: Evolution-Darwin

47. Evolution is the result of
- A. the inheritance of acquired characteristics.
 - B. natural selection.**
 - C. Hardy-Weinberg equilibrium.
 - D. random mating.

Blooms Level: 1. Remember

Enger - Chapter 13 #47

Learning Outcome: Describe how the concepts of evolution and natural selection are related.

Section: 13.01

Section: 13.03

Topic: Evolution-Darwin

48. The fittest organism in a population is the
- A. organism that successfully produces the most offspring.**
 - B. strongest and fastest organism.
 - C. organism that lives longest.
 - D. most intelligent organism.

Blooms Level: 1. Remember

Enger - Chapter 13 #48

Learning Outcome: Describe how individuals produced by sexual reproduction can have fitness different from that of their parents.

Section: 13.03

Topic: Evolution-Darwin

49. The theory of natural selection was proposed
- A. independently by Darwin.
 - B. jointly by Darwin and Wallace.**
 - C. independently by Mendel.
 - D. jointly by Wallace and Lamarck.

Blooms Level: 1. Remember

Enger - Chapter 13 #49

Learning Outcome: Describe the contributions of the following individuals to evolutionary thought: Lamarck, Buffon, Wallace, and Darwin.

Section: 13.02

Topic: Evolution-Darwin

50. New genes are introduced into a gene pool by
A. evolution.
B. spontaneous mutations.
C. natural selection.
D. inheritance of acquired characteristics.

*Blooms Level: 2. Understand
Enger - Chapter 13 #50*

*Learning Outcome: Explain how mutation and migration affect the genetic diversity of a population.
Section: 13.01
Section: 13.09
Section: 13.10*

Topic: Evolution-Darwin

51. Under natural conditions without modern medicine, which of the following conditions has the LEAST impact on fitness?
A. Alzheimer disease, a neurological disorder that generally afflicts individuals over the age of 65
B. valvular stenosis, a birth defect resulting in a narrow valve that restricts blood flow from the heart
C. amenorrhea, the inability to menstruate
D. Tay-Sachs, a congenital (from the time of birth) disorder in which neurons degenerate

*Blooms Level: 4. Analyze
Enger - Chapter 13 #51*

*Learning Outcome: Describe how individuals produced by sexual reproduction can have fitness different from that of their parents.
Section: 13.03*

Topic: Evolution-Darwin

52. _____ make up a genetically distinct population.
A. All the moose on an island
B. All insects in a city park
C. A pair of robins nesting in a tree
D. All of the animals in a zoo

*Blooms Level: 2. Understand
Enger - Chapter 13 #52*

*Learning Outcome: Describe how the concepts of evolution and natural selection are related.
Section: 13.03
Section: 13.05*

Topic: Evolution-Darwin

53. All of the _____ are a species.
A. St. Bernard dogs in the world
B. white-tailed deer in Michigan
C. red-winged blackbirds in the world
D. mules in the world

*Blooms Level: 2. Understand
Enger - Chapter 13 #53*

*Learning Outcome: Describe how the concepts of evolution and natural selection are related.
Section: 13.03
Section: 13.05*

Topic: Evolution-Darwin

54. A _____ indicates that evolution is occurring.
A. stable population size
B. high rate of migration
C. constant environment
D. change in gene frequency

*Blooms Level: 1. Remember
Enger - Chapter 13 #54*

*Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.
Section: 13.09*

Topic: Evolution-Darwin

55. Which of the following would be an example of natural selection?
A. Mutations change the gene frequency of a population.
B. All of the plants on an island are killed by a volcanic eruption.
C. In a forest, the taller oak trees produce twice as many acorns as shorter ones.
D. Mice that were painted with a white stripe by biologists were eaten by predators more often than those that were not painted.

Blooms Level: 4. Analyze

Enger - Chapter 13 #55

Learning Outcome: Describe how the concepts of evolution and natural selection are related.

Section: 13.03

Topic: Evolution-Darwin

56. Which of the following would be necessary for evolution to take place?
A. a large population
B. genetic diversity within populations
C. asexual reproduction
D. separate male and female sexes

Blooms Level: 1. Remember

Enger - Chapter 13 #56

Learning Outcome: List five assumptions by Darwin that were important to his developing the theory of natural selection.

Section: 13.02

Section: 13.03

Topic: Evolution-Darwin

57. Which of the following could be an agent of natural selection?
A. accidental death of cows by lightning strikes
B. insects that are eaten after they have reproduced
C. characteristics of female animals that cause males to avoid them
D. increases in the population size

Blooms Level: 1. Remember

Enger - Chapter 13 #57

Learning Outcome: List five assumptions by Darwin that were important to his developing the theory of natural selection.

Section: 13.02

Section: 13.03

Section: 13.06

Topic: Evolution-Darwin

58. Which of the following is not important for the process of natural selection?
A. meiosis
B. mutation
C. asexual reproduction
D. sexual reproduction

Blooms Level: 2. Understand

Enger - Chapter 13 #58

Learning Outcome: List five assumptions by Darwin that were important to his developing the theory of natural selection.

Section: 13.02

Section: 13.03

Section: 13.06

Topic: Evolution-Darwin

59. Which of the following is a major influence on the direction of evolution (which organisms go extinct and which new ones evolve)?
A. the environmental conditions a species encounters
B. the size of the Earth
C. mutations in the cells that do not form gametes
D. floods, tornados, earthquakes, and hurricanes

Blooms Level: 2. Understand

Enger - Chapter 13 #59

Learning Outcome: Explain how natural selection can change the nature of a species.

Section: 13.06

Section: 13.07

Topic: Evolution-Darwin

60. If a gene expresses itself, but not equally in all individuals that have it, there is a difference in
A. expressivity.
B. penetrance.
C. dominance.
D. acquired traits.

Blooms Level: 1. Remember

Enger - Chapter 13 #60

Learning Outcome: List and describe three circumstances that can prevent a specific allele from being expressed in the phenotype of an organism.

Section: 13.05

Topic: Evolution-Darwin

61. Which of the following activities could lead to a decrease in the genetic diversity in the gene pool of a species?
A. an increase in the reproductive rate, which results in increased population size
B. a decrease in the size of the population from millions to hundreds
C. the absence of mutations
D. the species switches from asexual reproduction to sexual reproduction

Blooms Level: 2. Understand

Enger - Chapter 13 #61

Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.

Section: 13.03

Section: 13.05

Section: 13.09

Topic: Evolution-Darwin

62. There are many kinds of animals in which males have characteristics that are clearly disadvantageous to them. Which of the following statements offers the best explanation for the retention of these disadvantageous characteristics?
A. Natural selection has not gotten around to eliminating them yet.
B. Females may select males with the disadvantageous characteristics as mates over those males that lack the characteristics.
C. Males may be strong enough to overcome these characteristics.
D. The characteristic is probably an acquired characteristic.

Blooms Level: 2. Understand

Enger - Chapter 13 #62

Learning Outcome: Explain how survival, reproductive success, and mate selection can alter gene frequency from one generation to the next.

Section: 13.06

Topic: Evolution-Darwin

63. Which of the following would be an indication that evolutionary change is occurring within a species?
A. The number of organisms in the species is increasing.
B. New learned behavior patterns are appearing.
C. No mutations have occurred within individuals of the species.
D. Some alleles have been lost from the species.

Blooms Level: 2. Understand

Enger - Chapter 13 #63

Learning Outcome: Explain how survival, reproductive success, and mate selection can alter gene frequency from one generation to the next.

Section: 13.05

Section: 13.06

Topic: Evolution-Darwin

64. Many kinds of disease-causing bacteria are resistant to the standard antibiotics that we use to control them. This is because
A. when bacteria are exposed to antibiotics they mutate.
B. there is genetic variety within the species and those that already have genes for resistance are the ones that reproduce.
C. new species of bacteria have evolved that are resistant to antibiotics.
D. when the size of the population of a species of bacterium is reduced, genetic variety decreases.

Blooms Level: 1. Remember

Enger - Chapter 13 #64

Learning Outcome: Provide examples that indicate that evolution is occurring.

Section: 13.01

Section: 13.03

Section: 13.04

Topic: Evolution-Darwin

65. All of the following could result in an increase in the genetic variety within a gene pool except
- A. mutation within the gene pool.
 - B. migration of individuals into the gene pool from other subspecies.
 - C. sexual reproduction with individuals of other gene pools.
 - D.** selective breeding that creates individuals with specific sets of characteristics.

*Blooms Level: 2. Understand
Enger - Chapter 13 #65
Section: 13.09
Topic: Evolution-Darwin*

Learning Outcome: List the five conditions necessary to prevent gene frequency changes according to the Hardy-Weinberg concept.

66. Which of the following would be an example of directional selection?
- A. Mutations change the gene frequency of a population.
 - B. All of the plants on an island are killed by a volcanic eruption.
 - C.** In a forest, the taller oak trees produce twice as many acorns as shorter ones.
 - D. Mice that were painted with a white stripe by biologists were eaten by predators more often than those that were not painted

*Blooms Level: 1. Remember
Enger - Chapter 13 #66
Section: 13.07
Topic: Evolution-Darwin*

Learning Outcome: Describe how the concepts of evolution and natural selection are related.

Learning Outcome: Explain how survival, reproductive success, and mate selection can alter gene frequency from one generation to the next.

67. A dominant allele does not express itself in every person that contains it; occasionally parents without the characteristic have children that show the characteristic. This statement represents a feature known as
- A. fitness.
 - B. expressivity.
 - C. recessiveness.
 - D.** penetrance.

*Blooms Level: 1. Remember
Enger - Chapter 13 #67
Section: 13.05
Section: 13.09
Topic: Evolution-Darwin*

Learning Outcome: Explain why genetic diversity is essential for natural selection to occur.

68. In a population, some individuals are chosen as mates more frequently than others. This statement represents
- A.** sexual selection.
 - B. artificial selection.
 - C. penetrance.
 - D. morphological preference.

*Blooms Level: 1. Remember
Enger - Chapter 13 #68
Section: 13.06
Topic: Evolution-Darwin*

Learning Outcome: Explain how survival, reproductive success, and mate selection can alter gene frequency from one generation to the next.

69. Which of the following was a biological fact important to the development of Darwin's ideas about evolution?
- A. Organisms typically produce huge numbers of offspring.
 - B. There are differences among members of the same species.
 - C. There is a high death rate among organisms.
 - D.** All of these are true.

*Blooms Level: 1. Remember
Enger - Chapter 13 #69
Section: 13.02
Topic: Evolution-Darwin*

Learning Outcome: List five assumptions by Darwin that were important to his developing the theory of natural selection.

70. Lamarck's theory of evolution was based upon
- A. polyploidy.
 - B. geographic isolation.
 - C. macroevolution.
 - D. acquired characteristics.**

Blooms Level: 1. Remember

Enger - Chapter 13 #70

Learning Outcome: Describe the contributions of the following individuals to evolutionary thought: Lamarck, Buffon, Wallace, and Darwin.

Section: 13.02

Topic: Evolution-Darwin

71. Populations of hospital microbes contain mutations that protect them from specific antibiotics, that is, they are antibiotic resistant. The selecting agent in this situation is
- A. antibiotics.**
 - B. the patients.
 - C. the physicians.
 - D. nurses.

Blooms Level: 3. Apply

Enger - Chapter 13 #71

Learning Outcome: Describe how the concepts of evolution and natural selection are related.

Learning Outcome: Provide examples that indicate that evolution is occurring.

Section: 13.03

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Section: 13.07

Topic: Evolution-Darwin

13 Summary

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