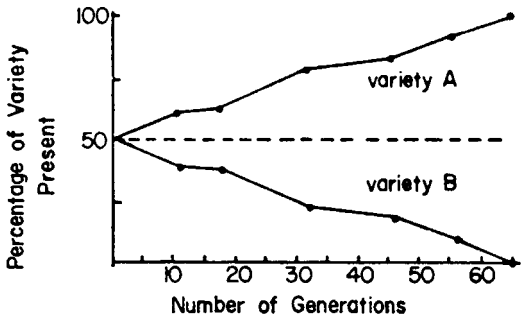
Genetic Drift

Name: _____ **Date:** _____

1. The graph shown illustrates changes in the percentages of two varieties of a certain species.



Which variety will contribute significantly to the future of the species gene pool?

A. variety *A*, only

B. variety *B*, only

C. both variety *A* and *B*

D. neither variety *A* nor variety *B*

2. What is the most probable reason that the percentage of variety *A* is increasing in the population of this species?

A. There is no chance for variety *A* to mate with variety *B*.

B. There is no genetic difference between variety *A* and variety *B*.

C. Variety *A* has some adaptive advantage that variety *B* does not.

D. Variety *A* is somehow less fit to survive than variety *B*.

3. Over a long period of time the organisms on an island changed so that they could no longer interbreed with the organisms on a neighboring island. This inability to interbreed is known as

A. hybridization

B. reproductive isolation

C. artificial selection

D. survival of the fittest

4. In areas of the American Southwest certain insect species are quickly becoming resistant to continuous application of chemical insecticides. The increase in the number of insecticide-resistant species is due to

A. inheritance of acquired traits

B. variability through asexual reproduction

C. geographic isolation

D. natural selection

5. Which level of biological organization is studied in the Hardy-Weinberg principle?

A. population B. community

C. ecosystem D. organism

6. Humans have modified some animal species by breeding only those that possess certain desirable traits. As a result, we have racehorses and greyhounds that are faster than their predecessors.

In a similar way many animals have been modified naturally. The giraffe has long forelegs and a long neck, head, and tongue which make it well adapted for browsing in the higher branches of trees. Therefore the giraffe can obtain food that is beyond the reach of other animals, especially during droughts. Ancient populations of giraffes varied in the relative length of their body parts. Those giraffes that were able to browse the highest were more likely to survive. They mated and their offspring often inherited the structural characteristics suitable for high browsing. The giraffes that could not reach the food supply most likely died of starvation and therefore did not produce as many offspring as those that could reach higher.

The variations to which the author refers are the direct result of

A. asexual reproduction

B. regenerative ability

C. inherent need

D. gene recombination

7. The modification of some animal species by humans, as described in the passage, results from the process known as

A. natural selection

B. artificial selection

C. vegetative propagation

D. chromosomal mutation

8. Which idea included in Darwin's theory of evolution is *not* found in the passage?

A. variation

B. struggle for existence

C. overproduction

D. survival of the fittest

9. Which are two factors that change gene frequencies in a population?

A. no mutations and large populations

B. no migration and no mutations

C. large populations and random mating

D. mutations and nonrandom mating

10. Geographic isolation of organisms increases the likelihood of genetic differentiation. This genetic differentiation occurs because geographic isolation

A. prevents interbreeding between populations

B. prevents interbreeding within populations

C. stimulates the production of different kinds of enzymes

D. accelerates the production of new mutations

11. According to the theory of natural selection, genes responsible for new traits that are beneficial to the survival of a species in a particular environment will usually

A. decrease suddenly in frequency

B. decrease gradually in frequency

C. not change in frequency

D. increase in frequency

12. A trait appears in six out of seven boys in a particular family, but in one of the girls. Which pattern of heredity is suggested by this information?

A. incomplete dominance

B. multiple alleles

C. independent assortment

D. sex linkage

13. Which factor would have the *least* effect on changing the gene frequencies in a population?

A. asexual reproduction in the population

B. migration of half the population

C. separating the population into two groups by a geographic barrier

D. a change in the population's environment

14. Favorable adaptations are genetic characteristics that

A. cannot be passed on to the next generation

B. are acquired by increased use of an organ

C. reduce the organism's chances of survival

D. improve the organism's chances of survival

15. A genetically stable population of pupfish has occupied the deserts of Nevada for several years. The gene pool of this pupfish population will most likely continue to remain stable if

A. the population size is reduced

B. frequent migrations occur

C. random mating occurs

D. the number of mutations is increased

16. A species of frog has inhabited the tropical rain forests of South America for the past one million years. Which two factors would tend to disrupt the gene pool stability of this frog population?

A. low mutation rate and random mating

B. high mutation rate and numerous migrations

C. low mutation rate and no migrations

D. large population random mating

17. The change in gene pool frequencies in a population would most likely be caused by

A. geographic isolation

B. no migration

C. no mutation

D. large population size

18. According to the Hardy-Weinberg principle, which factors tend to keep a population's gene frequencies constant?

A. high mutation rate and geographic isolation

B. large population size and random mating

C. nonrandom mating and frequent migrations

D. small population size and changing environmental conditions

19. A gene pool tends to remain stable if

A. the organisms mate randomly

B. the population size is small

C. mutation occurs regularly

D. abundant migration occurs

20. The stinging cells of the hydra are an inherited trait that

A. prevents the hydra from moving to a new ecosystem

B. assists the hydra in carrying no aerobic respiration

C. is a structural adaptation, making the hydra better able to survive in its watery environment

D. is a reproductive adaptation, allowing the hydra to spread its species more efficiently

21. According to the Hardy-Weinberg principle, gene frequencies would tend to remain constant within a population of deer mice, *Peromyscus maniculatus*, when

A. the population size decreases

B. mutation rates within the population are high

C. the population mates randomly

D. frequent migrations both into and out of the population occur

22. Which factor would most likely disrupt the stability of the gene pool of a large population?

A. the production of large numbers of offspring within the population

B. the occurrence of nonrandom mating within the population

C. the absence of migration into and out of the population

D. the absence of mutations within the population

23. Which characteristics of a population would most likely indicate the *least* potential for evolutionary change?

A. asexual reproduction and few mutations

B. asexual reproduction and many mutations

C. sexual reproduction and few mutations

D. sexual reproduction and many mutations

24. Select the term, *chosen from the list below*, that is best described by the statement shown.

The total of all the heritable genes that exist in a given population

A. Gene pool
B. Gene mutation
C. Gene frequency
D. Genotype

25. Select the term, *chosen from the list below*, that is best described by the statement shown.

The percentage of each allele for a particular trait in a population

A. Genetic Code
B. Gene mutation
C. Gene frequency
D. Genotype

26. A gene mutation has adaptive value if it

A. enables an organism to survive an environmental change

B. results in the production of an unhealthy organism

C. leads to the extinction of a species

D. produces sterility in male members of a species

27. If the gene pool of a sunfish population remains stable over a long period of time, the sunfish population would probably be

A. small with many mutations

B. small with random mating

C. large with few mutations

D. large with nonrandom mating

28. Which factor would contribute to instability in the gene pool of population A?

A. no migration

B. random mating

C. high frequency of mutations

D. heterotrophic nutrition

A COMPARISON OF FOUR ANIMAL POPULATIONS

Pop.	Relative Size of Pop.	Type of Mating	Frequency of Mutations
A	very small	random	high
B	large	nonrandom	moderate
C	small	random	low
D	large	random	low

29. The sum of all the heritable alleles for all the traits present in a given population is known as its

A. gene pool

B. codon

C. nucleotide

D. chromosome number

30. A tiny population of orchids is isolated on a small island that contains a high concentration of radioactive elements in its rocks. A study of this population would most likely show that the gene frequencies of the population would

A. remain the same

B. reach stability

C. change often

D. become dominant

31. Answer the following question(s) based on the information given and on your knowledge of biology.

For many generations, a particular species of snail has lived in an isolated pond. Some members of the species have light-colored shells and some have dark-colored shells. During this time, the species has been producing large numbers of offspring through random mating, and no migration has occurred.

Which additional condition must be present if the gene frequencies of these snails are to remain constant?

A. asexual reproduction

B. lack of mutations

C. genetic variation

D. common ancestry

32. A change in the environment of the pond caused the light-colored shells to become an important survival trait, and the number of light-colored snails increased. This situation will most likely cause

A. the addition of a fifth nitrogenous base to the DNA of the snails

B. a change in the frequency of the genes for shell color

C. an increase in the number of ribosomes in the cells of the snail

D. the extinction of this species of snail

33. The total of all the inheritable genes found in these snails is referred to as a

A. pedigree B. karyotype

C. phenotypic ratio D. gene pool

34. All of the snails of this species living in the pond may be classified as

A. a population B. an ecosystem

C. a community D. a biome

35. Which factor would most likely change the gene frequencies in a population?

A. maintenance of a large population

B. selective mating throughout the population

C. no mutations in the population

D. no migrations into or out of the population

36. What will most likely happen if a population is large and no migration, mutation, or environmental change occurs?

A. Natural selection will increase.

B. Nonrandom mating will start to occur.

C. The rate of evolution will increase.

D. Gene frequencies will remain constant.

37. The Hardy-Weinberg principle would most likely be used in a study of

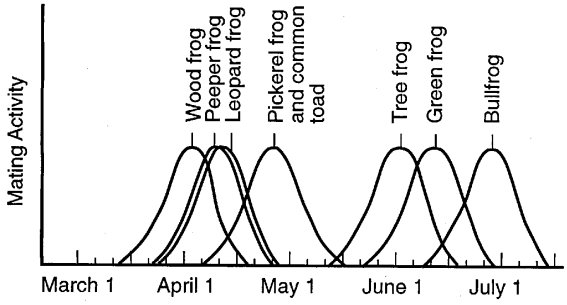
A. ecological succession

B. population genetics

C. endocrine regulation

D. embryological development

38. A field biologist was researching the possibility of interbreeding among various amphibians living in a particular habitat in New York State. The mating timetable for these amphibians is shown. Which generalization could the field biologist correctly make?



A. The peeper frog and green frog do not interbreed.

B. All of the amphibians interbreed randomly throughout the mating season.

C. The wood frog and tree frog interbreed.

D. The frogs can interbreed with any of the other frogs but not with toads.

39. Many squirrels in the city of Syracuse are black, rather than the typical gray. This coloration is due to the presence of a gene that codes for the production of more melanin than is produced in gray squirrels.

The relative frequencies of black and gray color in the squirrel population in Syracuse would tend to remain constant if

A. the squirrel population is small and some squirrels migrate out of the city

B. no mutations in genes for color occur and the squirrels do not mate randomly

C. a large number of squirrels migrate into the city and random mating occurs

D. the squirrel population is large and no mutations in genes for color occur

40. Calculating the relative percentages of black and gray squirrels and predicting how these percentages may change in future generations would be an investigation in the field of

A. genetic engineering B. population genetics

C. biotechnology D. cytology

41. In Yellowstone National Park, some species of algae and bacteria can survive and reproduce in hot springs at temperatures near the boiling point of water. The ability to survive and reproduce at these temperatures is an example of

A. aggregate formation

B. adaptation

C. artificial selection

D. reproductive isolation

42. Select the concept, chosen from the list below, that is most closely associated with the sum of all heritable genes for a trains in a group of interbreeding organisms.

A. Population

B. Gene pool

C. Gene frequency

D. Hardy-Weinberg principle

43. Select the concept, chosen from the list below, that is most closely associated with the percentage of an allele for a trait in a group of interbreeding organisms.

A. Population

B. Gene pool

C. Gene frequency

D. Hardy-Weinberg principle

44. The gene frequency for a particular trait in a population was determined to be 80% *A* (dominant allele) and 20% *a* (recessive allele). Fifty years later, the gene frequency was determined to be 60% *A* and 40% *a*. What does this change indicate about the gene pool?

A. It has remained stable.

B. It is evolving.

C. It has become predominantly recessive.

D. It lacks mutation.

45. The gene frequencies in a population would most likely change due to

A. random mating

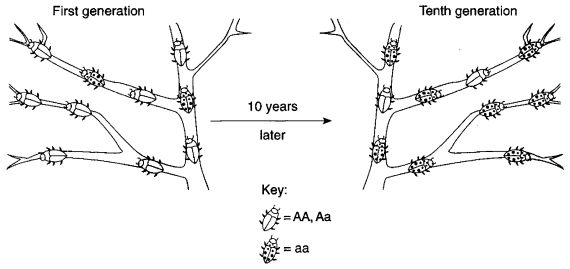
B. stable environment

C. a large population

D. mutations

46. The diagram shown illustrates the change that occured in the frequency of phenotypes in an insect population over 10 generations.

A probable explanation for this change would be that over time there was



A. a decrease in the adaptive value of gene *a*

B. an increase in the adaptive value of gene *a*

C. an increase in the population of this insect

D. a decrease in the mutation rate of gene *A*

47. The study of natural events that affect gene frequencies in sexually reproducing groups of organisms is known as

A. comparative biochemistry

B. population genetics

C. recombinant DNA technology

D. genetic counseling

48. Which condition would most likely produce a change in the gene pool of a population

A. a large population

B. random mating in the population

C. migrations out of the population

D. no mutations in the population

49. Characteristics of a species that make its members better able to live and reproduce in their environment are known as

A. favorable adaptations

B. homologous structures

C. abiotic factors

D. biotic factors

50. A large population of houseflies was sprayed with a newly developed, fast-acting insecticide. The appearance of some houseflies that are resistant to this insecticide supports the concept that

A. species traits tend to remain constant

B. biocides cause mutations

C. variation exists within a species

D. the environment does not change

51. Base your answer(s) to the following question(s) on the information given and on your knowledge of biology.

A large population of green aphids lives in a field and feeds on wild rose plants.

According to the Hardy-Weinberg principle, the stability of the aphid gene pool is maintained partly by the

A. type of food the aphids eat

B. type of habitat in which the aphids live

C. color of the aphids

D. large size of the aphid population

52. What will most likely result if exposure to insecticides causes mutations in the aphids over several generations?

A. Gene frequencies in the aphids will remain constant.

B. Gene frequencies in the aphids will change.

C. The number of gene alterations in the wild roses will increase.

D. The wild roses will become extinct.

53. The total of the heritable factors for the traits in the deer population of New York State is an example of a

A. gene pool

B. phenotypic ratio

C. diploid number

D. chromosome number

54. The study of factors that affect gene frequencies in the members of a species of sexually reproducing organisms living in a given area is known as

A. Mendelian genetics B. genetic screening

C. population genetics D. genetic engineering

55. According to the Hardy-Weinberg principle, the gene pool of a population will remain stable if

A. no mutations occur

B. the population is small

C. individuals migrate into and out of the population

D. nonrandom mating occurs by artificial selection

56. A culture of euglena, an autotrophic unicellular organism, was prepared in a laboratory. During the first 80 hours, the population increased. After this period of time, the population decreased until the organisms died out completely. Which statement is the most probable explanation for the decrease in this population?

A. The euglenas destroyed their hosts.

B. The euglenas began to carry out photosynthesis.

C. Toxic waste products accumulated in the euglena culture.

D. Euglena cannot successfully reproduce in a laboratory culture.

57. The Hardy-Weinberg principle of population genetics can be applied to a population that can reproduce only

A. by budding

B. by binary fission

C. asexually

D. sexually

58. Differences between the members of a population will most likely be passed to future generations if they are

A. due to genetic changes and result in unfavorable variations

B. due to genetic changes and result in favorable variations

C. not due to genetic changes and result in unfavorable variations

D. not due to genetic changes and result in favorable variations

59. The American toad breeds earlier in the spring than the Fowler's toad does. Therefore, they do not interbreed, even though they often live in the same habitat. Which conclusion can best be drawn from this information?

A. The two species do not interbreed because of geographic isolation.

B. The two species do not interbreed because of a form of reproductive isolation.

C. Adaptive mutations occurred more often during the evolution of the American toad.

D. Fowler's toad has a higher rate of survival than the American toad does.

Genetic Drift 10/14/2022

1.
Answer: A
Points: 1

2.
Answer: C
Objective: B.07E
Points: 1

3.
Answer: B
Points: 1

4.
Answer: D
Points: 1

5.
Answer: A
Points: 1

6.
Answer: D
Points: 1

7.
Answer: B
Points: 1

8.
Answer: C
Points: 1

9.
Answer: D
Points: 1

10.
Answer: A
Points: 1

11.
Answer: D
Points: 1

12.
Answer: D
Points: 1

13.
Answer: A
Points: 1

14.
Answer: D
Points: 1

15.
Answer: C
Points: 1

16.
Answer: B
Objective: B.07F
Points: 1

17.
Answer: A
Points: 1

18.
Answer: B
Points: 1

19.
Answer: A
Points: 1

20.
Answer: C
Objective: B.07E
Points: 1

21.
Answer: C
Points: 1

22.
Answer: B
Points: 1

23.
Answer: A
Points: 1

24.
Answer: A
Points: 1

25.
Answer: C
Points: 1

26.
Answer: A
Points: 1

27.
Answer: C
Points: 1

28.
Answer: C
Points: 1

29.
Answer: A
Points: 1

30.
Answer: C
Points: 1

31.
Answer: B
Points: 1

32.
Answer: B
Points: 1

33.
Answer: D
Points: 1

34.
Answer: A
Points: 1

35.
Answer: B
Points: 1

36.
Answer: D
Points: 1

37.
Answer: B
Points: 1

38.
Answer: A
Points: 1

39.
Answer: D
Points: 1

40.
Answer: B
Points: 1

41.
Answer: B
Points: 1

42.
Answer: B
Points: 1

43.
Answer: C
Points: 1

44.
Answer: B
Points: 1

45.
Answer: D
Points: 1

46.
Answer: B
Points: 1

47.
Answer: B
Points: 1

48.
Answer: C
Points: 1

49.
Answer: A
Points: 1

50.
Answer: C
Points: 1

51.
Answer: D
Points: 1

52.
Answer: B
Points: 1

53.
Answer: A
Points: 1

54.
Answer: C
Points: 1

55.
Answer: A
Points: 1

56.
Answer: C
Points: 1

57.
Answer: D
Points: 1

58.
Answer: B
Points: 1

59.
Answer: B
Points: 1