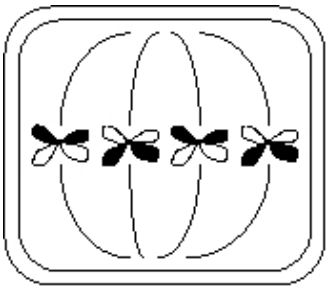
Name: _____ ***Date:*** _____

GHSGT Ecology/Genetics Review (EcoGenReview)



1. The plant cell shown above is in which phase of mitosis?

   A. anaphase B. interphase C. prophase D. metaphase

2. What is the genetic makeup of offspring resulting from mitosis?

   A. They are genetically identical to the parent cell.
   B. They have half as many chromosomes as the parent cell.
   C. They have twice as many chromosomes as the parent cell.
   D. They share half their genes in common with both parent cells.

3. Genetics is the study of

   A. bacteria.
   B. evolution.
   C. heredity.
   D. reproduction.

4. What kind of bonds are found between nitrogen bases in a DNA molecule?

   A. hydrogen
   B. nitrogen
   C. oxygen
   D. phosphate

5. Sexual reproduction results from the joining of two specialized sex cells called gametes. When a sperm and ovum combine to form a cell, what is this cell called?

   A. embryo
   B. fetus
   C. zygote
   D. baby

6. Read the passage and answer the question. The French biologist Cuenot crossed wild, gray-colored mice with white (albino) mice. In the first generation, all were gray. From the many litters of the second generation, 223 were gray and 72 were white. What principle of genetics is demonstrated by the data?

   A. codominance
   B. crossing over
   C. dominance
   D. epistasis

7. If the sequence of nucleotides were AGC on a strand of DNA, what would be the nucleotide sequence on a strand of mRNA formed during transcription?

   A. ACG
   B. UCG
   C. TGC
   D. TCG

8. To maintain the number of chromosomes from parents to offspring during sexual reproduction, two steps are required. The first, meiosis, results in

   A. twice as many chromosomes as in the original cell.
   B. rearranged chromosomes of the same size and number.
   C. larger chromosomes than those in the original cell.
   D. half the number of chromosomes as in the original cell.

9. During sexual reproduction, traits pass from parents to offspring. The meiosis phase allows chromosomes to

   A. remain constant in number after fertilization.
   B. fluctuate in number with environmental changes.
   C. increase in number from the previous generation.
   D. remain constant in number from parent to offspring.

10. The process of meiosis, which is a special kind of cell division, forms gametes for

    A. growth.
    B. repair.
    C. replacement.
    D. reproduction.

11. Most animals reproduce sexually. The egg and sperm cells involved in sexual reproduction are formed by

    A. budding.
    B. cloning.
    C. meiosis.
    D. regeneration.

12. What happens during meiosis?

    A. The number of chromosomes increases from haploid to diploid.
    B. The number of chromosomes decreases from diploid to haploid.

C. There is a segregation of dominant and recessive genes.
D. There is an integration of dominant and recessive genes.

13. How does the production of sperm and egg cells differ?

A. Each meiotic division produces four sperm cells and one egg cell. Sperm are motile while the egg can not move on its own.
B. The egg cell is much larger than a sperm cell.
C. The number of chromosomes found in a human sperm is different from the number found in a human egg cell.
D. A and B

14. Half of Wendy's chromosomes came from her mother and half from her father. Few of her chromosomes are identical to those of either parent because most of the genes on them have been exchanged with genes on other chromosomes. What process accounts for this?

A. independent assortment
B. crossing over
C. nondisjunction
D. segregation

15. Which is NOT true of meiosis?

A. Both eggs and sperm cells have the same number of chromosomes.
B. Both eggs and sperm cells have one-half the parent cells' chromosome number.
C. It is a process producing gametes only.
D. It is the same process that occurs in body cell division.

16. In mitosis, interphase is the period when the cell begins preparations to divide. Which of the sequences below follows interphase?

A. prophase metaphase anaphase telophase
B. metaphase prophase telophase anaphase
C. anaphase telophase interphase anaphase
D. telophase anaphase metaphase prophase

17. An animal cell containing 32 chromosomes divides by mitosis. Each of the resulting daughter cells goes through mitosis. The cells that result each have

A. 4 chromosomes.
B. 8 chromosomes.
C. 16 chromosomes.
D. 32 chromosomes.

18. All chromosomes are composed of

A. DNA and lipids.
B. DNA and protein.

C. RNA and lipids.
D. RNA and protein.

19. During meiosis how many times is the DNA replicated?

A. zero times
B. one time
C. two times
D. four times

20. What is the final outcome of mitosis?

A. Reproductive cells called gametes are produced.
B. Two gametes unite to form a zygote.
C. Chromosomes are paired.
D. Nuclear material in the cell divides equally.

21. Hemophilia is more common in males than females because it is caused by a

A. dominant gene found on the X chromosome.
B. dominant gene found on the Y chromosome.
C. recessive gene found on the X chromosome.
D. recessive gene found on the Y chromosome.

22. Which condition is caused by a chromosome going the wrong way during genetic formation producing a zygote with an extra chromosome?

A. color blindness
B. Cooley's anemia
C. Down's syndrome
D. hemophilia

23. Which is in the shape of a double helix?

A. amino acid
B. deoxyribonucleic acid
C. enzyme
D. protein

24. Messenger RNA carries genetic information in groups of three bases known as

A. amino acids. B. codons. C. enzymes. D. helixes.

25. The uniting of egg and sperm is

A. fertilization.
B. germination.

C. mutation.
D. pollination.

26. As each section of the genetic code on DNA is transcribed to mRNA, the two strands of DNA rejoin. Then the mRNA moves into the cytoplasm through a pore in the nuclear membrane. Ribosomes attach to the mRNA, in the cytoplasm, to carry out the formation of a protein. What is this process called?

A. mutation
B. synthesis
C. translation
D. transference

27. Which **best** shows the proper code-structure sequence in protein synthesis?

A. DNA, mRNA, mRNA, polypeptide, enzyme
B. DNA, mRNA, tRNA, polypeptide, enzyme
C. enzyme, polypeptide, mRNA, mRNA, DNA
D. mRNA, DNA, mRNA, enzyme, polypeptide

28. An individual's sex is determined by his or her sex chromosomes. Which is NOT correct?

A. Sperm carry only the Y chromosome.
B. A zygote with chromosomes XY is male.
C. A zygote with chromosomes XX is female.
D. The sex of the zygote is determined by the sperm.

29. Which of the following DNA base pairs are correct?

A. A-A
   C-C
B. A-T
   T-A
C. A-T
   G-A
D. A-T
   T-G

30. In which way is meiosis different from mitosis?

A. Meiosis produces cells without nuclei.
B. Meiosis produces egg and sperm cells.
C. Chromosomes divide during mitosis but not during meiosis.
D. Mitosis results in cells with one half the number of chromosomes.

31. If skin and muscle cells in humans have 46 chromosomes, how many chromosomes will be present in a typical egg cell?

A. 23
B. 46

C. 92
D. 115

32. Which of the following events takes place before mitosis and before meiosis in reproductive organs?

A. nuclear division
B. DNA replication
C. RNA redistribution
D. cell membrane pinching

33. In living things, whether plant or animal, the carrier of hereditary instructions is

A. DNA.
B. genetic vacuole.
C. messenger RNA.
D. mitochondria in animals, chloroplasts in plants.

34. During interphase, chromosomes are NOT very distinct when viewed under a microscope. During this phase they are long and intertwined. What is occurring during interphase?

A. chromosomes replicate
B. ribosomes are linking with the DNA
C. the cell is in an “active phase” prior to mitosis
D. centiomeres of chromosomes attach to spindle fibers

35. An organism that is capable of passing on a trait for a specific disease to its offspring, but which does NOT express the disease itself, is described as which of the following?

A. a carrier
B. a homozygote
C. a mutant
D. a purebred

36. A normal cell formed by fertilization, containing two copies of each chromosome, one from the mother and one from the father, is

A. diploid.
B. haploid.
C. a gamete.
D. an allele.

37. An example of nondisjunction would be

A. unsuccessful DNA cloning of a single-celled organism.
B. a spontaneous mutation occurring naturally in an organism.
C. an abnormality in the number of chromosomes within an organism.
D. the manipulation of DNA segments and chromosomes within microorganisms.

38. The gene for red/green colorblindness in humans is recessive and primarily affects males. It must be located on

A. the X chromosome
B. the Y chromosome
C. both the X and Y chromosomes
D. either the X or Y chromosome

39. Which of the following correctly shows the shape of a DNA molecule?

A.

B.

C.

D.

40. The observed trait that appears in an organism as a result of its genetic makeup is called the organism's

A. allele
B. genotype
C. phenotype
C. phenotype

D. karyotype

41. Genetic information usually flows in one specific direction. Which of the following **best** represents this flow?

    A. DNA → Protein → RNA
    B. Protein → RNA → DNA
    C. RNA→ Protein → DNA
    D. DNA → RNA → Protein

42. Genetic information for a breed of chicken is shown above.

    Which of the following crosses of chickens will produce **only** Frizzle fowl offspring?

    A. Normal X Frizzle fowl
    B. Frizzle fowl X Frizzle fowl
    C. Normal X Feather shedder
    D. Feather shedder X Feather shedder

43. DNA and RNA are similar because they both contain

    A. deoxyribose.
    B. nucleotides.
    C. thymine.
    D. double helices.

44. The picture below shows two dogs and their puppies.

The parent dogs are each heterozygous for two traits: fur color and white spotting. Both parent dogs are solid black. Their puppies, however, have four different phenotypes as listed below.

· solid black
· black with white spots
· solid red
· solid red
· red with white spots

Which of the following explains how these parent dogs can produce puppies with these four phenotypes?

A. The genes for these traits are sex-linked.
B. The genes for these traits mutate frequently.
C. The genes for these traits assort independently.
D. The genes for these traits are on the same chromosome.

45. The diagram below represents a cell. The letters in the diagram represent alleles for two different genetic traits.

According to Mendel's law of independent assortment, which of the following shows all of the allele combinations expected in gametes produced by this cell?

A.

B.

C.

D.

46. Two spotted leopards produce a litter of four cubs. Three of the cubs are spotted and one is solid black. The black coat is **probably** what type of trait?

A. dominant
B. recessive
C. polygenic
D. sex-linked

47. Which of these will complete the mRNA strand matched to DNA?

A. CAG
B. AUG
C. GUC
D. UAC

48. The parts of DNA that provide the code for proteins are the —

A. sugars.
B. phosphates.
C. hydrogen bonds.
D. nitrogenous bases.

49. Which of these is most responsible for carrying coded information from the nucleus?

A. The cell membrane
B. The ribosomes
C. mRNA
D. ATP

50. In squash plants, yellow fruit (Y) is dominant to white fruit (y). If two plants heterozygous for yellow fruit are crossed,what are the possible genotypes of the offspring?

A. Yy only
B. YY, yy only
C. Yy, yy only
D. YY, Yy, yy only

51. The field of science that studies the interactions among living and nonliving factors in the environment is

A. anthropology.
B. ecology.
C. embryology.
C. embryology.
D. zoology.

52. Replacing inorganic nutrients in soil is accomplished primarily by the

A. second-order consumers.
B. first-order consumers.
C. decomposers.
D. herbivores.

53. The origin of all of the energy found in **most** ecosystems is

A. the sun.
B. the food pyramid.
C. primary producers.
D. the top predator.

54. Ecosystems are made up of both abiotic and biotic factors. Which of the following factors is considered biotic?

A. sand
B. water
C. bacteria
D. carbon dioxide

55. Ecosystems are made up of both abiotic and biotic factors. Which of the following is an abiotic part of an ecosystem?

A. water
B. algae
C. lichens
D. yeast

56. In the typical terrestrial ecosystem, the primary producers are usually

A. abiotic.
B. animals.
C. herbivores.
D. plants.

57. Which of the following **best** describes a biome?

A. areas of like climate and ecology
B. primary productivity per square kilometer
C. all of the living organisms in an ecosystem
D. areas that include the entire range of an organism

58. In the study of ecology, what is a population?

A. all plants and animals in a given place
B. all the living and nonliving things in an environment
C. all the organisms of one particular species in a given place
D. different plants interacting with each other in a given place

59. Which of the following is an example of ecological succession?

A. a moth species evolving gray wings for camouflage
B. a dog chasing a bird to use it for nutritional value
C. a pine forest slowly replacing a grassy meadow
D. leaves decomposing in a forest

60. Which of these species would be *most* in danger of becoming extinct if one of their food sources became unavailable?

A. Brown bear
B. Panda
C. Polar bear
D. Black bear

Answer Key

1. D) metaphase

2. A) They are genetically identical to the parent cell.

3. C) heredity.

4. A) hydrogen

5. C) zygote

6. C) dominance

7. B) UCG

8. D) half the number of chromosomes as in the original cell.

9. A) remain constant in number after fertilization.

10. D) reproduction.

11. C) meiosis.

12. B) The number of chromosomes decreases from diploid to haploid.

13. D) A and B

14. B) crossing over

15. D) It is the same process that occurs in body cell division.

16. A) prophase $\rightarrow$metaphase $\rightarrow$anaphase $\rightarrow$telophase

17. D) 32 chromosomes.

18. B) DNA and protein.

19. B) one time

20. D) Nuclear material in the cell divides equally.

21. C) recessive gene found on the X chromosome.

22. C) Down's syndrome

23. B) deoxyribonucleic acid

24. B) codons.

25. A) fertilization.

26. C) translation

27. B) DNA, mRNA, tRNA, polypeptide, enzyme

28. A) Sperm carry only the Y chromosome.

29. B)

A-T

T-A

30. B) Meiosis produces egg and sperm cells.

31. A) 23

32. B) DNA replication

33. A) DNA.

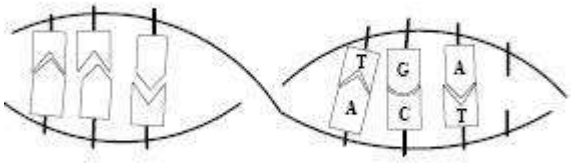
34. A) chromosomes replicate

35. A) a carrier

36. A) diploid.

37. C) an abnormality in the number of chromosomes within an organism.

38. A) the X chromosome



39. D)

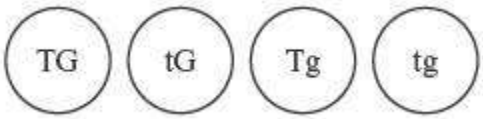
40. C) phenotype

41. D) DNA → RNA → Protein

42. C) Normal X Feather shedder

43. B) nucleotides.

44. C) The genes for these traits assort independently.

45. C) 

46. B) recessive

47. C) GUC

48. D) nitrogenous bases.

49. C) mRNA

50. D) YY, Yy, yy only

51. B) ecology.

52. C) decomposers.

53. A) the sun.

54. C) bacteria

55. A) water

56. D) plants.

57. A) areas of like climate and ecology

58. C) all the organisms of one particular species in a given place

59. C) a pine forest slowly replacing a grassy meadow

60. B) Panda