

1. A student crosses a brown llama and a black llama and discovers that the offspring exhibit a 2.8:1.2 phenotypic ratio. Does this cross exhibit Mendelian inheritance?
 - a. A sampling error has occurred but the cross still follows Mendelian patterns of inheritance.
 - b. A sampling error has occurred and the cross is not considered to follow Mendelian patterns of inheritance.
 - c. Fur color on llamas exhibits incomplete dominance, which is not considered to follow Mendelian patterns of inheritance.
 - d. Fur color on llamas exhibits codominance, which is not considered to follow Mendelian patterns of inheritance.
2. What separates during Anaphase of Meiosis II?
 - a. Homologous chromosomes
 - b. Sister chromatids
 - c. Chromosomes
 - d. euchromatin
3. A woman who has cystic fibrosis and a man who is heterozygous for the allele decide to have children. What percentage of the progeny would have cystic fibrosis?
 - a. 25%
 - b. 50%
 - c. 75%
 - d. 100%
4. Two pea plants are crossed, one with the genotype AaBb and the other with the genotype aaBb. What is the probability that a plant with the genotype AaBB will be produced?
 - a. 1/3
 - b. 1/2
 - c. 1/4
 - d. 1/8
5. In a cross between a man who has red-green color blindness and a woman who carries the allele, how many of their daughters will have red-green color blindness?
 - a. 25%
 - b. 50%
 - c. 75%
 - d. 100%
6. In which phase of the cell cycle does DNA replication take place?
 - a. G₀ phase
 - b. Interphase
 - c. S phase
 - d. G₁ phase
 - e. Prophase
7. When a black guinea pig and a white guinea pig are crossed, all of the offspring are brown. What is the most likely cause of this result?
 - a. The allele for brown fur is X-linked.
 - b. The black guinea pig and the white guinea pig are both heterozygotes.

- c. The alleles for fur color exhibit codominance.
 - d. The alleles for fur color exhibit incomplete dominance.
8. When does crossing over occur?
- a. Early prophase I
 - b. Prometaphase I
 - c. Metaphase I
 - d. Late Prophase I
9. A couple decides to have children. To which children will the father transmit his X chromosome?
- a. All of his daughters but none of his sons
 - b. All of his sons but none of his daughters
 - c. To all of his sons and daughters
 - d. He will not transmit an X chromosome to any of his children
10. The X and Y chromosomes are so different in size and shape that they are unable to line up at Metaphase I.
- a. True
 - b. False
11. A man with Achondroplasia and a woman expressing the normal phenotype decide to have children. What is the probability that their first and second children both have Achondroplasia?
- a. $1/2$
 - b. 1
 - c. $1/4$
 - d. $1/8$
12. Two frogs, one with the genotype GgHh, and the other with the genotype gghh, are crossed. The numbers and genotypes of the progeny are recorded as shown below.

GH: 250

Gh: 16

gh: 217

gH: 17

What is the approximate distance between genes "G" and "H"?

- a. 0.066 cM
 - b. 0.066 cm
 - c. 6.6 cM
 - d. 66 cM
13. In question #12, were the "G" and "H" alleles in coupling or repulsion linkage?
- a. Coupling
 - b. Repulsion
 - c. Both "a" and "b" are correct
 - d. Not enough information to determine this

14. Which of the following is NOT considered to be a model organism?
- E. coli*
 - Arabidopsis thaliana*
 - Field mouse
 - House mouse
15. During which of the following checkpoints leads into the G_0 cell cycle arrest phase?
- G_1/G_0
 - G_1/S
 - S/G_2
 - G_2/M
 - Both "b" and "d" are correct
16. The final product(s) of meiosis is/are:
- Four $2n$ cells
 - Two $2n$ cells
 - Two $1n$ cells
 - Four $1n$ cells
17. In a cell where $2n = 10$, how many chromosomes are present in metaphase of mitosis?
- 5
 - 10
 - 15
 - 20
18. The allele that is NOT expressed in the heterozygote is considered to be:
- Dominant
 - Recessive
 - Incomplete dominant
 - Codominant
19. The number of chromosomes per cell is halved at the end of _____.
- MI
 - MII
 - Mitosis
 - None of the above
20. If a primary oocyte has 8 chromosomes, how many chromosomes are present in a secondary oocyte?
- 4
 - 8
 - 16
 - None of the above
21. An individual with the genotype XXXY would have ____ Barr bodies in each somatic cell.
- 1
 - 2
 - 3
 - All of the above are possible

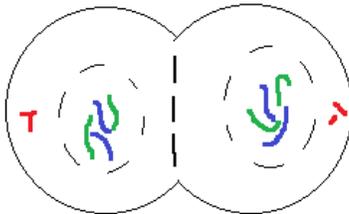
22. An individual with type AB blood makes _____ antigens and _____ antibodies.

- a. A; B
- b. No; A and B
- c. A and B; No
- d. B; A

23. In the ABO system, the I^A and I^B alleles exhibit _____.

- a. Complete dominance
- b. Incomplete dominant
- c. Codominance
- d. X-linked inheritance

24. Name the correct phase of Mitosis depicted below.



- a. Anaphase
- b. Telophase
- c. Telophase I
- d. Cytokinesis

25. Two pea plants, one with the genotype AB/ab , and the other with the genotype ab/ab are crossed. Which of the following phenotypes would be considered recombinant?

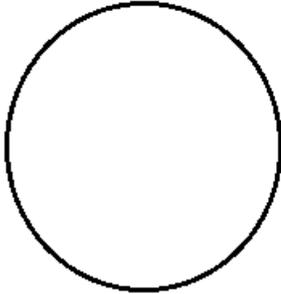
- a. AB
- b. ab
- c. Ab
- d. Both choices "a" and "b"

26. Two blind men go to a department store at the same time each to order 5 pairs of socks. The sales clerk accidentally places all ten pairs into the same shopping bag and gives all pairs to one blind man and an empty bag to the other.

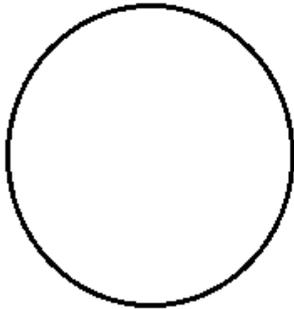
- a. What do the two socks of a pair represent in the cell cycle?
- b. There are two pairs of socks of each color in the bag. What do the two pairs (four total socks) of each color represent?
- c. What in the story performs the same function as spindle fibers?
- d. What would happen if one man failed to grasp his sock of a particular pair and how does this relate to events in the cell cycle?

27. A cell has eight chromosomes in G_1 of interphase. Draw a picture of this cell with its chromosomes at the following stages. Indicate how many DNA molecules are present at each stage.

a. Metaphase of mitosis



b. Anaphase of mitosis



28. In humans, alkaptonuria is a metabolic disorder in which affected persons produce black urine. Alkaptonuria results from an allele (a). Normal metabolism results from allele (A). Sally has normal metabolism, but her brother has alkaptonuria. Sally's father has alkaptonuria, and her mother has normal metabolism.

- a. Give the phenotypes of Sally, her mother, her father, and her brother.
- b. If Sally's parents have another child, what is the probability that this child will have alkaptonuria?
- c. If Sally marries a man with alkaptonuria, what is the probability that their first child will have alkaptonuria?
- d. Draw a pedigree chart with the information you have learned in the previous questions.