Mitosis and Genetics Study Guide Answer Key

1. Which of the following is true of Interphase?
   a. It is part of Meiosis
   b. It occurs before Meiosis
   c. The cell does normal cell activities during interphase
   d. Both B and C

2. What is uncoiled, stringy DNA called?
   a. Chromatin
   b. Chromosomes
   c. Chlorophyll
   d. Sister Chromatids

3. Which of the following are true statements?
   a. DNA replicates during Interphase
   b. Chromatin is made of DNA
   c. Genes are found on DNA
   d. All of the above

4. Why do organisms do Meiosis?
   a. To make more skin and muscle cells in their bodies
   b. To make gametes (sperm or eggs)
   c. Just for fun
   d. All of the above

5. Meiosis I and Meiosis II both have the same order for their phases. Which of the following is the correct order?
   a. Metaphase, Anaphase, Telophase, Prophase
   b. Prophase, Anaphase, Telophase, Metaphase
   c. Prophase, Metaphase, Anaphase, Telophase
   d. Interphase, Metaphase, Telophase, Prophase, Anaphase

6. What important events take place during PROPHASE I?
   i. Chromatin condenses to form visible chromosomes
   ii. The nucleus and nucleolus disintegrate
   iii. Homologous chromosomes pair up to form Tetrads
   iv. Chromosomes line up down the middle of the cell
   a. i only
   b. i, ii, and iii
   c. i and iv
   d. i, ii, iii, and iv
7. What happens during Metaphase I?
   a. **Tetrads line up down the middle of the cell**
   b. Chromatin condenses to form visible chromosomes
   c. Homologous chromosomes separate and move toward opposite ends of the cell
   d. All of the above

8. What happens during Anaphase I?
   a. Tetrads line up down the middle of the cell
   b. Chromatin condenses to form visible chromosomes
   c. **Homologous chromosomes separate and move toward opposite ends of the cell**
   d. All of the above

9. What is one event that may occur during Telophase I?
   a. Tetrads may line up down the middle of the cell
   b. Chromatin may condense to form visible chromosomes
   c. **The nucleus of each cell may reappear as two independent cells are being formed**
   d. None of the above

10. Which of the following are true?
    a. Cytokinesis is the division of the cytoplasm to form two separate cells
    b. Cytokinesis may occur at the same time as Telophase I
    c. The two new cells produced at the end of Telophase I and Cytokinesis are haploid
    d. A and B

11. How is Prophase II different than Prophase I?
    a. **Tetrads do NOT form in Prophase II**
    b. The nucleus does NOT go away during Prophase II
    c. There are NO chromosomes during Prophase II
    d. All of the above

12. What happens in Metaphase II?
    a. Chromosomes separate from one another
    b. **Chromosomes line up single file down the middle of the cell**
    c. Tetrads (pairs of homologous chromosomes) line up down the middle of the cell
    d. All of the above

13. What happens in Anaphase II?
    a. **Sister Chromatids separate and move toward opposite poles**
    b. Chromosomes line up single file down the middle of the cell
    c. Nuclei re-form
    d. Tetrads split up and move toward opposite poles

14. What happens during Telophase II?
    a. Each newly forming cell gets a nucleus
    b. Chromosomes uncoil to form chromatin
    c. 4 haploid gametes are being formed
    d. **All of the above**
15. What are the final results after Telophase II and Cytokineses are finished?
   a. 4 diploid gametes
   b. 2 diploid gametes
   c. **4 haploid gametes**
   d. 2 haploid gametes

16. Which allele is dominant?
   a. **G**
   b. g

17. Which allele is recessive?
   a. G
   b. **g**

18. Which phase occurs BEFORE meiosis?
   a. **Interphase**
   b. Prophase
   c. Anaphase
   d. Metaphase

19. Which of the following take place during INTERPHASE?
   a. Protein synthesis (proteins are made)
   b. DNA replication (DNA is copied)
   c. Normal cell metabolism and activity
   d. **All of the above**

20. What is true about the cell pictured below and how do you know?

   ![Cell](image)

   a. It is in prophase because the nucleus and nucleolus are still visible
   b. It is in metaphase because chromosomes are visible
   c. It is in prophase because the spindle fibers are visible
   d. **It is in interphase because the nucleus and nucleolus are still visible**
21. The diagram to the right summarizes Meiosis I. Which of the following statements is true?

a. Cell 1 is in interphase and Cell 2 is in prophase
b. **Cell 1 is diploid and Cell 2 is haploid**
c. Cell 1 has 4 chromosomes
d. Cell 2 has 2 chromosomes

22. Which phase of Meiosis is shown in the image?

a. Anaphase II
b. Telophase II
c. **Prophase I**
d. Metaphase I
23. What phase of Meiosis is shown in the picture?

![Image of Meiosis](image)

a. Anaphase II  
b. Telophase II  
c. Prophase I  
d. Metaphase I

24. Which phase of Meiosis is shown in the picture?

![Image of Meiosis](image)

a. Anaphase II  
b. **Anaphase I**  
c. Telophase I  
d. Telophase II
25. What phase of Meiosis is shown in the picture?

a. Anaphase II  
b. Metaphase I  
c. Prophase I  
d. Telophase I

26. The division of the cytoplasm as shown in the image is called ________.

a. Cytokinesis  
b. Metaphase I  
c. Prophase I  
d. Telophase II
27. What is shown in the image?

* a. Telophase II and Cytokinesis
* b. Telophase I and Cytokinesis
* c. Anaphase I and Prophase I
* d. Anaphase II and Cytokinesis

28. What is shown in the image?

* a. Anaphase II and Cytokinesis
* b. Telophase I
* c. Metaphase II
* d. Prophase II
29. What is shown in the picture?

- a. Prophase II
- b. **Metaphase II**
- c. Anaphase II and Cytokinesis
- d. Telophase I

30. What is shown in the image below?

- a. Metaphase II
- b. Anaphase I
- c. **Anaphase II**
- d. Metaphase I
31. What would be the genotype and phenotype of the baby produced by the following fertilization event? (Key: G = yellow and g = green)

a. The genotype would be green and the phenotype would be GG
b. The phenotype would be green and the genotype would be gg
**c. The genotype would be Gg and the phenotype would be yellow**
d. The phenotype would be gg and the genotype would be yellow

32. What percent of offspring shown in the Punnett square are heterozygous?

a. 10%
b. 75%
**c. 50%**
d. 25%
33. What percent of offspring shown in the Punnett square are homozygous recessive?

a. 10%
b. 50%
c. 75%
d. 25%
34. The end result of meiosis is ____________.

   a. 2 diploid body cells
   b. 2 haploid body cells
   c. 4 diploid gametes
   d. **4 haploid gametes**

35. Chromosomes that are the same size and have the same genes in the same order are called:

   a. alleles
   b. gametes
   c. **homologous chromosomes**
   d. antagonists
36. The following question is for a cell with a diploid (2N) number of 4. Which phase of meiosis is represented by the following diagram?

![Diagram of Meiosis]

- **a. Anaphase II**
- b. Telophase II
- c. Metaphase I
- d. Interphase

37. If a gene for hair color is found on one chromosome, then the same gene for hair color will be located in the same location on another___________.

- a. analogous chromosome
- **b. homologous chromosome**
- c. antagonist chromosome
- d. genetically engineered mouse

38. In metaphase I, ________________________________.

- a. homologous chromosome pairs (tetrads) line up the middle of the cell
- b. homologous chromosome pairs (tetrads) separate
- c. sister chromatids separate
- d. chromosomes line up single file down the middle of the cell

39. In anaphase 1, ________________________________.

- a. homologous chromosome pairs (tetrads) line up the middle of the cell
- **b. pairs of homologous chromosomes separate and chromosomes move toward opposite poles**
- c. sister chromatids separate
- d. chromosomes line up single file down the middle of the cell

40. What happens in cytokinesis?

- **a. the cytoplasm of the cell divides to produce independent cells**
- b. the cells fuse together to make a larger cell
- c. the kinetic energy of the cells increases
- d. the cyto does some kinesis or something like that

36 of 15
41. The following question is for a cell with a diploid (2N) number of 24. Which phase of meiosis is represented by the following diagram?

![Diagram](image)

a. Interphase  
b. Prophase I  
c. Anaphase I  
d. **Telophase II and Cytokinesis**

42. In prophase I, homologous chromosomes pair up to form a(n) __________.

a. oxymoron  
b. **tetrad**  
c. group  
d. tetrarch

43. The following question is for a cell with a diploid (2N) number of 4. Which phase of meiosis is represented by the following diagram?

![Diagram](image)

a. Prophase I  
b. Telophase II  
c. Metaphase I  
d. **Telophase I and Cytokinesis**

44. In telophase I, which of the following events occur?

a. the nuclear envelope re-forms  
b. the chromosomes unwind to become chromatin  
c. the spindle apparatus disintegrates  
d. **all of the above**

45. Why don't homologous chromosomes pair up to form tetrads in prophase II? (read answers carefully)

a. they aren't as friendly in prophase II as they were in prophase I  
b. homologous pairs were separated in Meiosis I  
c. homologous chromosomes are now found in separate cells because of Meiosis I  
d. **both b and c are correct**
46. In metaphase II, what happens?
   a. homologous chromosome pairs (tetrads) line up the middle of the cell
   b. homologous chromosome pairs (tetrads) separate
   c. sister chromatids separate
   d. **chromosomes line up single file down the middle of the cell**

47. Who is known as "The Father of Genetics"?
   a. Reginald Punnett
   b. Charles Darwin
   c. Alfred Wegner
   d. **Gregor Mendel**

48. Which is an example of a purebred gene?
   a. AA
   b. Aa
   c. XY

49. Genotype describes
   a. when two alleles of a particular gene are the same
   b. **the set of alleles that an organism has**
   c. different versions of a gene
   d. none of the above

50. When Gregor Mendel crossed true-breeding tall plants with true-breeding short plants, all the offspring were tall because ____________________________.
   a. the allele for tall plants is recessive
   b. the allele for short plants is dominant
   c. **the allele for tall plants is dominant**
   d. they were true-breeding like their parents

51. When Gregor Mendel crossed a tall plant with a short plant, the F1 plants inherited ________________.
   a. **1 allele from each parent**
   b. 2 alleles from each parent
   c. 3 alleles from each parent
   d. 4 alleles from each parent

52. What is a synonym for homozygous?
   a. heterozygous
   b. **purebred**
   c. hybrid

53. An organisms with two identical alleles for a trait is __________.
   a. hybrib
   b. **homozygous**
   c. heterozygous
54. The genetic makeup of an organism is called its ________.
   a. Genotype
   b. traits
   c. phenotype
   d. homozygous

55. ________ is the term used to refer to an organism that has two different alleles for the same trait.
   a. Genotype
   b. Phenotype
   c. Homozygous
   d. Heterozygous

56. Which of the following genotypes is homozygous recessive.
   a. bb
   b. BB
   c. Bb
   d. BA

57. Which of the following is a homozygous dominant genotype.
   a. TT
   b. Tt
   c. tt
   d. Tr

58. What word refers to traits that are physically expressed?
   a. Genotype
   b. Heterozygous
   c. Homozygous
   d. Phenotype

59. The process that forms reproductive cells is called?
   a. mitosis
   b. meiosis

60. The process of cell division is:
   a. mitosis
   b. meiosis
   c. nucleus
   d. nuclei

61. Sex cells can only be produced through which of the following processes?
   a. Meiosis
   b. Fission
   c. Mitosis
   d. Budding