

**HOWARD UNIVERSITY  
COLLEGE of ARTS and SCIENCES  
COMPREHENSIVE SCIENCES**

**LIFE SCIENCES – UNIT IV: GENETICS STUDY QUESTIONS**

1. Define genetics.
2. Arrange the following in the correct descending order of magnitude:  
DNA – nucleus – cell – gene – chromosome
3. Define trait.  
How does a trait differ from a gene?  
How does a trait differ from a chromosome?
4. List three plant physical traits.
5. List three animal physical traits.
6. List one bacterial physical trait.
7. List one protozoan physical trait.
8. List one fungal physical trait.
9. Cite one type of physiological trait that may be found in any form of life.
10. Cite one type of immunological trait.
11. Cite one specific trait that is sex-linked.
12. Define chromosome. Describe the parts of a chromosome.
13. What is meant by the diploid (2N) chromosome number?
14. What specific types of cells carry the 2N number?
15. What is meant by the monoploid/haploid (N) chromosome number?
16. Name the four specific cell types that carry the N number.
17. What is the N chromosome number for all human gametes?
18. What is the 2N chromosome number for all human somatic cells?

19. What are two dominant human traits?

What are two recessive human traits?

20. Define Mitosis.

Why is Mitosis a significant biological process?

What are the stages/phases of Mitosis?

21. Briefly describe the activities of the chromosomes in each of these Mitotic phases:

Interphase, Prophase, Metaphase, Telophase

22. How many 2N cells result when a 2N cell undergoes Mitosis?

23. Define Meiosis.

Why is Meiosis a significant biological process?

24. Briefly summarize what happens to the chromosomes after phase 1 of Meiosis has been completed.

25. Does Meiosis begin with an N or a 2N cell?

Cite the specific organs where Meiosis may occur.

26. After Meiosis has been completed, how many N cells are the result?

Name the four specific N cells that may result from Meiosis.

27. Cite one way in which Meiosis differs from Mitosis.

28. Cite:

- one specific plant cell that results from Meiosis
- one specific animal cell that results from Meiosis
- one specific animal cell that results from Mitosis

29. How does "crossing-over" occur during Meiosis?

30. Cite one difference between crossing-over, segregation, and independent assortment.

31. State Mendel's Principles of Inheritance.

32. What is a gene?

What is an allele?

33. What does a Punnett Square predict? Why is it reliable? Is the premise of the square mostly biological or mathematical?

34. What is phenotype? Genotype? Give your phenotype.

35. What is a hybrid?

36. What are heterozygous and homozygous genes?

37. What is the  $F_2$  phenotypic ratio? The  $F_2$  genotype ratio?

38. If 100 plant seeds are germinated with the genetic make-up of R-red flowers (50%) and r-white flowers (50%), how many plants in  $F_2$  will be rr?

39. Define genome.

40. DNA is an important nucleic acid. How is DNA responsible for both the Genetic and Triplet Codes?

41. What molecules make-up a nucleotide?

42. List two (each) purines and pyrimidines that are nitrogen bases found in nucleotides of RNA and DNA.

43. How can a mutation be caused?

44. Is it possible to have life without DNA? Why/Why not?

45. What is recombinant DNA?

46. What is the future implication of genetic engineering advances entailing recombinant DNA?

47. What is eugenics?