



# BIOLOGY

## BOOKS - NAVNEET PUBLICATION

### HEREDITY AND VARIATION

#### Examples

1. Irrespective of all of us being humans, what difference do you notice in our skin colour?



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2. All of you are in std. IX. Why then are some students tall and some short?



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3. How do specific traits or characteristics appear in organisms?



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## Exercise

1. Complete the following sentences by choosing the appropriate words from the brackets:

(Inheritance , sexual reproduction, asexual reproduction, chromosome, DNA, gene)

Hereditary characters are transferred from parents to off spring by .....here they are said to be structural and functional units of heredity.



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2. Complete the following sentences by choosing the appropriate words from the brackets:

(Inheritance , sexual reproduction, asexual reproduction, chromosome, DNA, gene)

Organisms produced by .....show minor variations.



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**3.** Complete the following sentences by choosing the appropriate words from the brackets:

(Inheritance , sexual reproduction, asexual reproduction, chromosome, DNA, gene)

The component which is in the nuclei of cells and carries the hereditary characteristics is called....



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4. Complete the following sentences by choosing the appropriate words from the brackets:

(Inheritance , sexual reproduction, asexual reproduction, chromosome, DNA, gene)

Chromosomes are mainly made up of .....



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5. Complete the following sentences by choosing the appropriate words from the

brackets:

(Inheritance , sexual reproduction, asexual reproduction, chromosome, DNA, gene)

Organisms produced through.....show major variations.



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6. Choose the correct alternative and write it along with its allotted alphabet:

Information necessary for.....synthesis in the cell is stored in DNA.

A. Protein

B. Glucose

C. Fat

D. Minerals

**Answer: A**



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7. Choose the correct alternative and write it along with its allotted alphabet:

The structure in the nucleus of cells that



carries the hereditary characteristics is called the.....

A. genome

B. chromosome

C. mitochondria

D. nucleolus

**Answer: B**



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8. Choose the correct alternative and write it along with its allotted alphabet:

Crab's chromosome number is ....while in humans it is.....

A. 200, 46

B. 254 , 46

C. 20, 200

D. 20, 46

**Answer: A**



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9. Choose the correct alternative and write it along with its allotted alphabet:

.....discovered DNA while studying the white blood cells.

- A. watson, crick
- B. Frederick Miescher
- C. Alexander Fleming
- D. Gregor Johann Mendal

**Answer: B**



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**10.** Choose the correct alternative and write it along with its allotted alphabet:

The RNA molecule which, according to the message of the mRNA carries the amino acid upto the ribosomes is called.....

A. messenger RNA

B. ribosomal RNA

C. transfer RNA

D. all the above

**Answer: C**



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**11.** Choose the correct alternative and write it along with its allotted alphabet:

The experiments performed on pea plants are presented by the .....method.

A. Mendel square

B. Punnet square

C. Mendal columns

D. Punnet columns

**Answer: B**



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**12.** Choose the correct alternative and write it along with its allotted alphabet:

Down syndrome is a disorder arising due to  
.....abnormality.

A. chromosomal

B. mental

C. physical

D. physiological

**Answer: A**



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**13.** Choose the correct alternative and write it along with its allotted alphabet:

.....retardation is the most prominent characteristic of all the genetic syndromes.

A. Mental

B. Physical

C. Emotional

D. Financial

**Answer: A**



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**14.** Choose the correct alternative and write it along with its allotted alphabet:

Normal haemoglobin has.....as the 6th amino acid in its molecular structure.

- A. Valine
- B. aspartic acid
- C. glutamic acid
- D. proline

**Answer: C**



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**15.** Choose the correct alternative and write it along with its allotted alphabet:

.....disorders are inherited from the mother only.

A. Chromosomal

B. Genetic

C. Mitochondrial

D. Physical

**Answer: C**



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**16.** State whether the following statements are

True or False:

Wrinkled seed in the dominant character.



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**17.** State whether the following statements are

True or False:

Some of the Mendelian principles now form the basis of modern genetics.



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**18.** State whether the following statements are

True or False:

In a monohybrid ratio, the phenotypic ratio is

9:3:3:1.





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**19.** State whether the following statements are True or False:

The centromeres is exactly at the mid-point in sub metacentric chromosome.



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**20.** State whether the following statements are True or False:

Segments of the RNA molecule are called genes.



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21. Complete the analogy:

44 + X: Turner syndrome :: 44 + XXY :.....



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22. Complete the analogy:

3:1 : Monohybrid :: 9:3:3:1 :.....



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**23.** Complete the analogy:

Women : Turner syndrome : : Men :.....



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**24.** Note the relationship between the first two words and suggests suitable words in the fourth place:

Male: 44+XY::Female:.....



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**25.** Note the relationship between the first two words and suggests suitable words in the fourth place:

Homozygous : rr :: Heterozygous :.....



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**26.** Note the relationship between the first two words and suggests suitable words in the fourth place:



Centromere exactly at the mid-point :  
Metacentric :: Centromere at the end of  
chromosome:.....



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27. Note the relationship between the first two  
words and suggests suitable words in the  
fourth place:

J-shaped chromosome: Acrocentric :: V -shaped  
chromosome : .....



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**28.** Note the relationship between the first two words and suggests suitable words in the fourth place:

Down's syndrome: 47 chromosomes : Turner's syndrome:.....



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**29.** Find the odd one out and give reason:

Adenine, thymine Uracil, Guanine.



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**30.** Find the odd one out and give reason:

Absence of hair on arms, Brown and straight hair, Attached ear lobes, Rolling tongue.



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**31.** Find the odd one out and give reason:

Green pod, Tall plant, white flower, Axillary flower.



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**32.** Find the odd one out and give reason:

Cystic fibrosis, klinefelter's syndrome,  
Hutchinson's disease, Albinism.



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**33.** Match the columns/ How are the items in groups A,, B and C inter-related?

A	B	C
Leber hereditary optic neuropathy	44 + XXY	Pale skin, white hair
Diabetes	44 + X	Men are sterile
Albinism	Mitochondrial disorder	Women are sterile
Turner syndrome	Polygenic disorder	This disorder arises during development of zygote.
Klinefelter syndrome	Monogenic disorder	Effect on blood-glucose level.



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**34.** Complete the table:

Chromosome number:

Sr. No.	Organism	No. of chromosomes
(1)	.....	46
(2)	.....	48
(3)	Crab	.....
(4)	.....	04
(5)	.....	48
(6)	Maize	.....



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**35.** Complete the table:

Sr. No.	Disorder	Type	Cause
(1)	Albinism	.....	.....
(2)	.....	.....	Amino acid valine instead of glutamic acid
(3)	.....	Mitochondrial disorder	.....
(4)	Cleft lip and palate	.....	Mutations in multiples genes



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**36.** Define the following terms :

Gene



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**37. Define the following terms :**

Genetics



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**38. Define the following :**

Heredity



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### 39. Define: Phenotype



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### 40. Define: Genotype



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### 41. Give definition

Monohybrid



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**42.** Give definition

Dihybrid



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**43.** Give definition

Dominant



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**44.** Define the term 'recessive'



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**45.** Give definition

Homozygous



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**46.** Give definition

Heterozygous



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**47.** Explain DNA fingerprinting.



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**48.** Distinguish between:

DNA and RNA



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**49.** Distinguish between: Phenotype and Genotype



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**50.** Distinguish between: Monohybrid Cross and Dihybrid Cross



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**51. Distinguish between: Dominant Character and Recessive Character**



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**52. Differentiate between Turner's syndrome and Klinefelter's syndrome.**



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**53.** Name the following

Dominant characters in human beings.



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**54.** Name some dominant and recessive characteristics seen in human beings.



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**55.** Disorders due to numerical changes in the chromosomes:



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**56.** Name the following

Symbols to denote the sickle cell disorder.



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**57.** Name the following

Tests of the sickle cell anaemia.



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**58.** Name the following

Harmful chemicals are present in the tobacco smoke.



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**59.** Complete the paragraph by choosing the words given in the bracket:

(consumption, smoking, tremors, cancer, uncontrolled, harmful)

Tabacco smoke contains many .....chemicals.

They cause.....cell division. Tabacco smoke is

full of minute carbon particles which causes

normal tissue of the lung to transform into

thickened black tissue. This causes.....while

chewing tabacco or tabacco products much of

the extract is absorbed into the body.

Excessive tabacco.....many cause cancer of lips

or tongue, visual disorders or.....To protect one's body from cancer one must avoid .....and consumption of tobacco and tobacco products in any form.



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**60. What is a gene?**



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**61.** Answer the following questions:

What is DNA fingerprinting? Explain it in brief.

Where is this technique used? Give any two examples.



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**62.** Enlist seven traits of pea plant selected/studied by Mendel.



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**63.** Answer the following question

What are  $F_1$  and  $F_2$  generations? Why are genotypic and phenotypic ratios different in these generations?



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**64.** Answer the following question

What are the reasons for hereditary disorders?



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**65.** What are the main objectives of National Health Mission?



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**66.** Answer the following question

What harm is caused to body by tobacco consumption?



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**67.** Answer the following question

Why is it necessary for people to have their blood examined before marriage ?



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**68.** Answer the following question

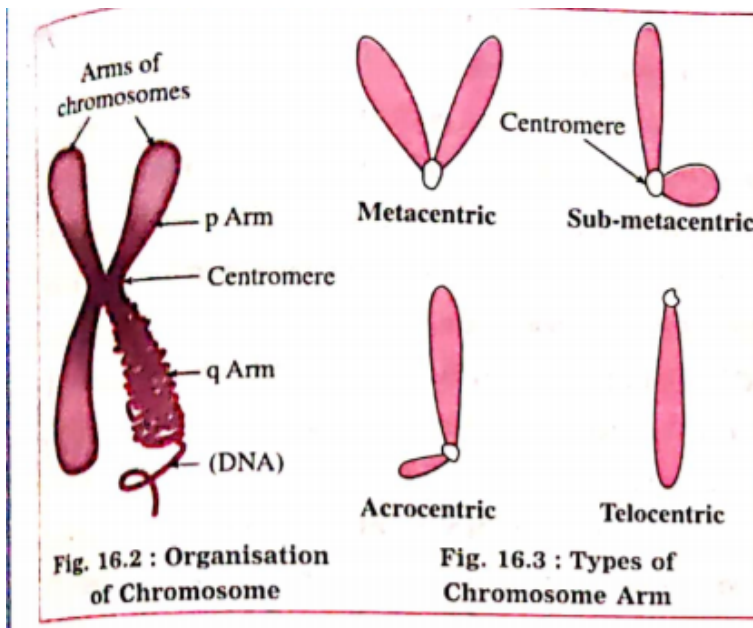
Is it right to avoid living with a person suffering from a genetic disorder?



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69. With neat and well labelled diagrams, answer the following question:

What is meant by 'chromosome'. Explain its types.



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**70.** Enlist the functions of DNA.



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**71.** With neat and well labelled diagrams, answer the following question:

Describe the structure of the DNA molecule.

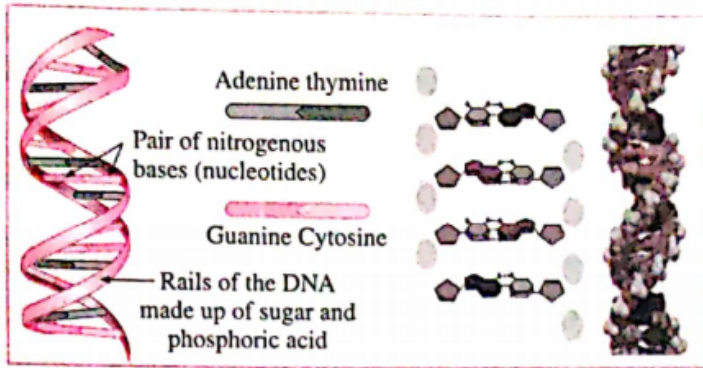


Fig. 16.4 : Structure of DNA

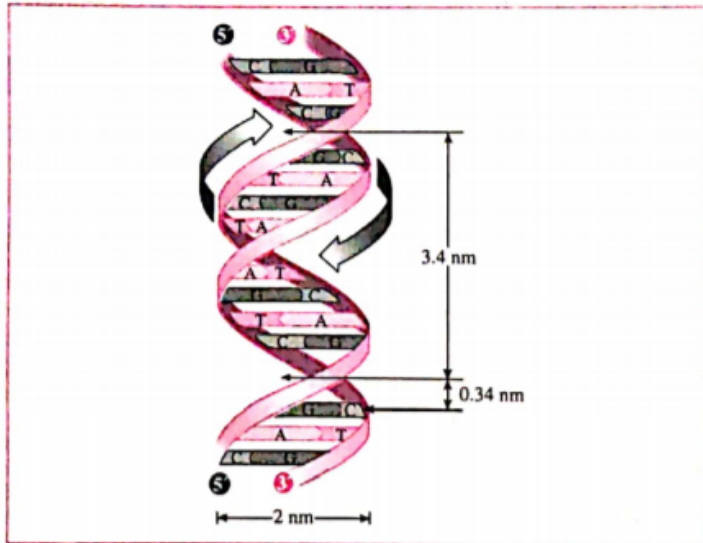


Fig. 16.5 : DNA (Watson and Crick's Model)



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**72.** Explain the structure, function and types of RNA.



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**73.** Give the scientific reason:

The albino person has pale skin and white hair.



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**74.** Give the scientific reason:

The person suffering from sickle-cell anaemia

has reduced oxygen carrying capacity of the haemoglobin.



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**75.** Give the scientific reason:

Mitochondrial disorders are transmitted only from mother to her progeny.



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**76.** Give the scientific reason:

Polygenic disorders do not strictly follow Mendel's principles of heredity.



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**77.** Give the scientific reason:

There is hypertension due to smoking.



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**78.** Explain Mendel's monohybrid progeny with the help of any one cross.



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**79.** Explain Mendel's dihybrid ratio with the help of any one cross.



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**80.** What is a dihybrid cross? Explain with the help of a suitable example and checker board method.



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**81.** Explain the following :

Distinguish between monohybrid and dihybrid cross.



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**82.** Explain the following :

Explain the inheritance of sickle-cell anaemia disease.



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**83.** Write a note on Human Genome Project (HGP).



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**84.** Write a brief note on Down syndrome:



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**85.** Write a brief note on Turner syndrome:



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**86.** Write short notes on:

Monogenic disorders



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**87.** Write short notes on: Sickle-cell anaemia:  
Symptoms and treatment.



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