

Genealogy: Scientific Foundations

Genealogy · Answer Key · 15 Questions

1. What type of genetic marker is most commonly used in autosomal DNA tests for genealogical purposes, spanning across all chromosomes?

- A) Single Nucleotide Polymorphisms (SNPs)**
- B) Short Tandem Repeats (STRs)
- C) Mitochondrial DNA (mtDNA) haplogroups
- D) Y-chromosome haplogroups

2. Mitochondrial DNA (mtDNA) is inherited exclusively from which parent?

- A) The father
- B) The mother**
- C) Both parents equally
- D) Only if the child is male

3. The Y-chromosome, passed down from father to son, is primarily used to trace which lineage?

- A) Maternal ancestral line
- B) Paternal ancestral line**
- C) All direct ancestral lines
- D) Maternal and paternal ancestral lines

4. In population genetics, the concept of the 'Most Recent Common Ancestor' (MRCA) refers to:

- A) The most recently deceased ancestor in a family tree
- B) The shared ancestor of two individuals or groups at a specific point in the past**
- C) The oldest known ancestor of a specific population
- D) The first common ancestor identified through DNA analysis

5. What is the primary principle behind using DNA databases for genealogical matching?

- A) Comparing unique genetic mutations between individuals
- B) Identifying shared segments of DNA inherited from common ancestors**
- C) Analyzing the frequency of specific genes within a population
- D) Mapping the geographical origins of ancestral populations

6. The 'founder effect' in population genetics, relevant to genealogical studies, describes:

- A) The genetic drift that occurs when a new population is established by a small number of individuals**
- B) The accumulation of genetic mutations over many generations
- C) The uniform distribution of genetic traits within a large population
- D) The process by which individuals migrate to new regions

7. When interpreting ethnicity estimates from DNA tests, it's important to remember that these estimates are based on:

- A) Exact historical migration patterns
- B) Reference populations with known genetic ancestries**
- C) The oldest known surviving family records
- D) The frequency of specific surnames in historical documents

8. The study of paleogenetics allows genealogists to:

- A) Predict future genetic traits
- B) Analyze DNA from ancient human remains to understand ancestral populations**
- C) Identify living relatives through modern DNA sequencing
- D) Determine the health status of current individuals

9. What is the term for the exchange of genetic material between non-sister chromatids during meiosis, which shuffles genetic information and is a source of variation?

- A) Replication
- B) Segregation
- C) Independent Assortment
- D) Crossing Over**

10. The HapMap Project (now superseded by the 1000 Genomes Project and others) was a significant initiative that:

- A) Cataloged all known human diseases
- B) Mapped genetic variation across human populations**
- C) Sequenced the entire human genome for the first time
- D) Identified specific genes responsible for physical appearance

11. In genealogy, the concept of 'endogamy' refers to:

- A) Marriage outside of a defined social group
- B) Marriage within a specific social group, clan, or ethnic group**
- C) The process of adopting children from outside the family
- D) The inheritance of property through generations

12. Which type of DNA testing is most useful for tracing distant maternal ancestry over tens of thousands of years?

- A) Autosomal DNA
- B) Y-chromosome DNA
- C) Mitochondrial DNA (mtDNA)**
- D) Somatic DNA

13. The genetic phenomenon where a person receives a DNA segment from an ancestor but then passes on only a portion of that segment to their offspring is due to:

- A) Gene flow
- B) Genetic drift
- C) Recombination**
- D) Mutation

14. What is the approximate mutation rate for Single Nucleotide Polymorphisms (SNPs) in the human genome?

- A) One mutation per generation per billion base pairs**
- B) One mutation per million generations per base pair
- C) One mutation per hundred generations per base pair
- D) One mutation per thousand generations per base pair

15. When comparing DNA results from different testing companies, a significant overlap in shared centimorgans (cM) between two individuals suggests:

- A) They are unrelated
- B) They are closely related**
- C) They have adopted each other
- D) They share only ancient ancestors