Genetics and Genomics

1. **The Genetic Code of Genes and Genomes**
   - DNA is the molecule of heredity
   - The structure of DNA is a double helix composed of two intertwined strands
   - Genes affect organisms through the action of proteins
   - Genes specify proteins by means of a genetic code
   - Genes change by mutation
   - Most traits are complex traits affected by multiple genetic and environmental factors
   - Evolution means continuity of life with change
2. **Transmission Genetics: Heritage from Mendel**
   - Mendel took a distinctly modern view of transmission genetics
   - Genes come in pairs, separate in gametes, and join randomly in fertilization
   - The alleles of different genes segregate independently
   - Chance plays a central role in Mendelian genetics
   - The results of segregation can be observed in human pedigrees
   - Simple dominance is not always observed
   - Epistasis can affect the observed ratios of phenotypes
3. **The Chromosomal Basis of Heredity**
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4. **Gene Linkage and Genetic Mapping**
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5. **Human Chromosomes and Chromosome Behavior**
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6. **DNA Structure, Replication, and Manipulation**
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7. **The Genetics of Bacteria and Their Viruses**
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8. **The Molecular Genetics of Gene Expression**
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9. **Genomics, Proteomics, and Genetic Engineering**

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10. Molecular Genetics of the Cell Cycle and Cancer

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11. Molecular Evolution and Population Genetics

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12. The Genetic Basis of Complex Traits

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