Genetics and Heredity – 8th grade

1. Introduction to Genetics

- Definition and importance of genetics.
- Role of DNA in heredity.
- Overview of genetic traits and inheritance.

2. DNA and Chromosomes

- What is DNA?: Structure and function.
- Nucleotides: The building blocks of DNA.

- **Chromosomes: Where genetic material is stored.**
- **Genes and Alleles: What determines traits.**

3. Inheritance and Traits

- **Dominant vs. Recessive Alleles: How traits are passed down.**
- **Homozygous and Heterozygous Traits.**
- **Genotype vs. Phenotype: Genetic makeup vs. physical traits.**
- **Sex Chromosomes: Differences between male (XY) and female (XX).**

4. Punnett Squares and Probability

- **How to use a Punnett Square: Predicting offspring traits.**

- **Probability of inheritance: Examples with dominant and recessive traits.**
- **Incomplete Dominance and Codominance: Blending of traits vs. both traits showing equally.**

5. Meiosis and Genetic Variation

- **Meiosis vs. Mitosis: How gametes are formed.**
- **How genetic variation occurs: Crossing over and mutations.**
- **Mutations and Their Effects: Neutral, beneficial, and harmful mutations.**

6. Genetic Disorders and Ethical Considerations

- **Examples of Genetic Disorders: Sickle cell anemia, Huntington's disease, Down syndrome.**
- **What causes genetic disorders?: Mutations and chromosome abnormalities.**
- **Genetic Testing and Ethics: Pros and cons of genetic screening.**

7. Summary and Review

- **Recap of key concepts.**
- **Q&A session.**
- **Homework assignment: Practice problems on Punnett squares, inheritance patterns, and mutations.**

Assessment & Homework

In-Class Quiz: Covering basic, medium, and advanced questions related to genetics. Homework: Solve practice problems on inheritance, DNA structure, and Punnett squares.