

AP BIOLOGY CHEAT SHEET

Unit 5: Heredity

Quick Overview

- **Focus:** how traits are inherited through Mendelian and non-Mendelian patterns.
- **Exam lens:** use Punnett squares, probability, and chi-square to predict inheritance outcomes.

Mendelian Genetics

- **Law of Segregation:** alleles separate during gamete formation.
- **Law of Independent Assortment:** alleles of different genes assort independently.
- **Monohybrid cross ratio:** 3:1 phenotype.
- **Dihybrid cross ratio:** 9:3:3:1 phenotype.

Mnemonic: "Segregation separates, assortment assigns."

Cell Cycle Basics

- **Product Rule:** chance of A AND B = $P(A) \times P(B)$.
- **Sum Rule:** chance of A OR B = $P(A) + P(B)$.
- **Punnett squares = quick visual predictor of genotype/phenotype ratios.**

Mitosis

- **Incomplete dominance:** blended traits (red \times white \rightarrow pink).
- **Codominance:** both alleles show (AB blood).
- **Polygenic traits:** multiple genes (skin color, height).
- **Epistasis:** one gene masks another.
- **Sex-linked traits:** often X-linked (hemophilia, color blindness).

Mnemonic: "Incomplete = in-between, Codominant = co-appear."

Integrated Tutor Tip

- **Always write the ratio first** (expected outcome) before calculating.
- **This avoids rushing into Punnett squares and missing the big picture — especially on FRQs.**

Mini formula box

- **Independent assortment combinations:** 2^n (n = haploid number).
- **Monohybrid cross ratio:** 1:2:1 genotype, 3:1 phenotype.
- **Chi-square:** use to test expected Mendelian ratios.

Pedigrees

- **Circles = female, squares = male.**
- **Shaded = affected.**
- **Patterns help distinguish autosomal vs. sex-linked inheritance.**

Checkpoints & Regulations

Formula: $\chi^2 = \Sigma((\text{observed} - \text{expected})^2 / \text{expected})$.

- $df = \text{categories} - 1$.
- If $p > 0.05 \rightarrow$ accept null (fits expected).

Common exam pitfalls

- **Mixing up incomplete dominance with codominance.**
- **Forgetting to apply product rule for "AND" problems.**
- **Mislabeling pedigrees (autosomal vs sex-linked).**
- **Not checking chi-square significance level before concluding.**

Visual Mnemonics

PUNNETT SQUARE SHORTCUT

AA	Aa
Aa	aa

Observed



Expected



Compare

Chi-square

INCOMPLETE DOMINANCE



Blend

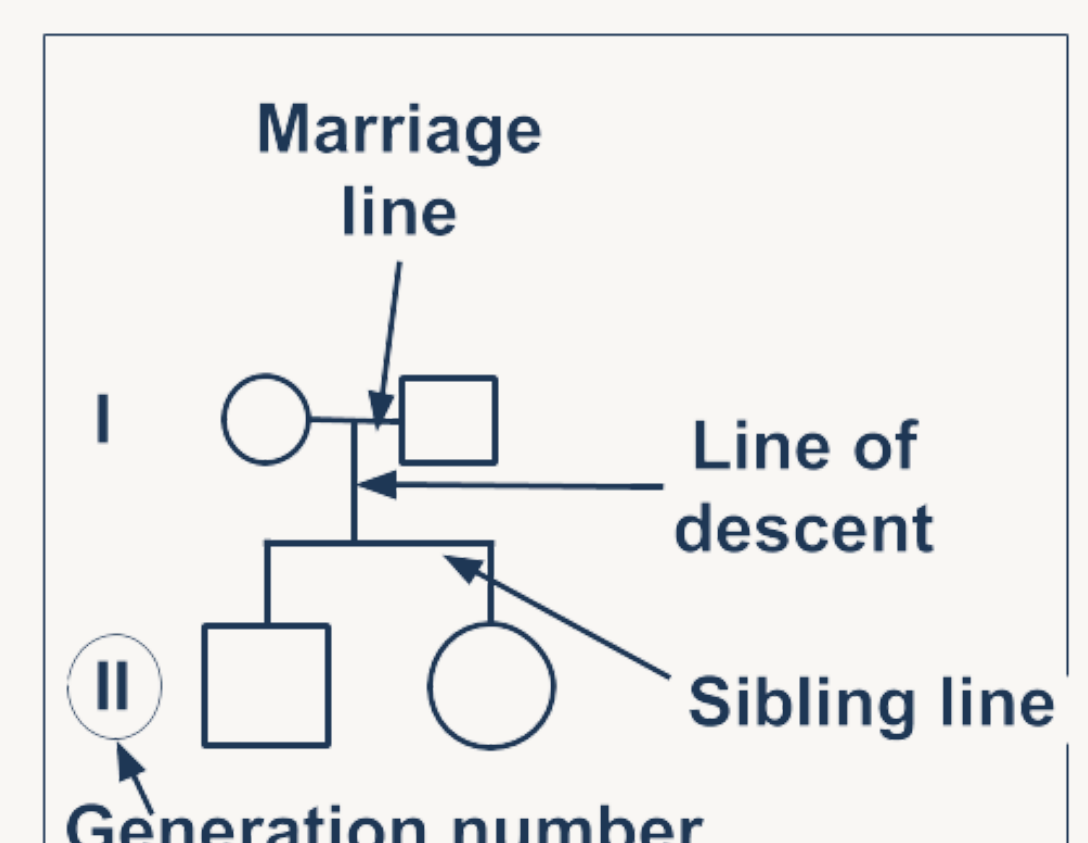
Rr

CODOMINANCE



Both traits show

BW



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