



CBSE Class 12 Biology Formula Sheet

16 formulas across 5 chapters — 2025-26 CBSE board exams

Ch 4. Principles of Inheritance and Variation

Monohybrid cross — F₂ phenotypic ratio

Dominant : Recessive = 3 : 1

Tip: Genotypic ratio: TT : Tt : tt = 1 : 2 : 1

Dihybrid cross — F₂ phenotypic ratio

9 : 3 : 3 : 1 (two dominant : one dom + one rec : other dom + rec : both recessive)

Tip: Requires genes on different chromosomes (Independent Assortment)

Incomplete dominance — F₂ ratio

Phenotypic ratio = 1 : 2 : 1 (same as genotypic; blending apparent)

Tip: Example: red × white → pink in snapdragon; no complete dominance

Test cross ratio

1 : 1 (F₁ heterozygous × homozygous recessive parent)

Tip: Used to determine whether an organism showing dominant phenotype is TT or Tt

Codominance (ABO blood groups)

I^AI^B genotype → AB blood group (both A and B antigens expressed)

Tip: Both alleles expressed simultaneously with no blending; distinct from incomplete dominance

Ch 5. Molecular Basis of Inheritance

Chargaff's Rule

A = T | G = C | A + G = T + C (Purines = Pyrimidines)

Tip: Most important equation in genetics — appears every year

DNA base percentage

If A% is given: T = A%, G = C = (100 - 2A)/2 %

Number of H-bonds in DNA

H-bonds = 2 × (A = T pairs) + 3 × (G = C pairs)

Ch 6. Evolution

Hardy-Weinberg Principle

$p^2 + 2pq + q^2 = 1$ and $p + q = 1$

p = frequency of dominant allele, q = frequency of recessive allele

Ch 11. Organisms and Populations

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Exponential (J-shaped) growth

$$dN/dt = rN \text{ or } N_t = N_0 \times e^{(rt)}$$

r = intrinsic rate of natural increase, N = population size, t = time

Tip: Occurs when resources are unlimited; produces J-shaped curve

Logistic (S-shaped) growth

$$dN/dt = rN \times (K - N)/K$$

K = carrying capacity; $(K - N)/K$ = environmental resistance factor

Tip: S-shaped (sigmoid) curve; population growth slows and stabilises at K

Population growth rate (r)

$$r = b - d$$

b = birth rate, d = death rate

Tip: $r > 0$: growing; $r = 0$: stable; $r < 0$: declining population

Ch 12. Ecosystem

Lindemann's 10% law

Energy available at next trophic level = 10% of energy at current trophic level

Tip: 90% lost as heat, respiration, decomposition — limits food chains to 3–4 trophic levels

Gross Primary Productivity (GPP)

$$GPP = NPP + R_{\text{plants}}$$

R_{plants} = energy used by producers in respiration

Tip: Total rate of energy fixed by producers via photosynthesis

Net Primary Productivity (NPP)

$$NPP = GPP - R_{\text{plants}}$$

Tip: Energy available to consumers; measured in $\text{g/m}^2/\text{yr}$ or $\text{kcal/m}^2/\text{yr}$

Secondary Productivity

$$\text{Secondary P} = \text{Ingested energy} - \text{Respiration} - \text{Fecal losses}$$

Tip: Rate of energy storage by consumers (herbivores, carnivores)