



TOPPERS HUB
ACADEMY

FOUNDATION YEAR BOOSTER

Class 9 Foundation

Science & Maths Key Notes

A free study resource by **Toppers Hub Academy**

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Science — Physics & Chemistry

- Matter exists in three states: solid, liquid and gas; states change with temperature and pressure.
- An atom is the smallest particle of an element; atomic number = number of protons.
- Motion: distinguish distance vs displacement, speed vs velocity; acceleration = change in velocity / time.
- Equations of motion: $v = u + at$; $s = ut + \frac{1}{2}at^2$; $v^2 = u^2 + 2as$.
- Gravitation: g on Earth $\approx 9.8 \text{ m/s}^2$. Work = force $\times$ distance.
- Sound needs a material medium; its speed in air is about 343 m/s.

Science — Biology

- The cell is the basic structural and functional unit of life.
- Plant cells have a cell wall and chloroplasts; animal cells do not.
- Tissues are groups of similar cells performing a specific function.
- Diffusion and osmosis move substances across cell membranes.
- Improvement in food resources covers crops, livestock and fisheries.

Maths — Number Systems & Algebra

- Rational numbers can be written as p/q ; irrational numbers cannot (e.g., $\sqrt{2}$, π).
- A polynomial's degree is the highest power of the variable.
- Factor theorem: $(x - a)$ is a factor of $p(x)$ if $p(a) = 0$.
- A linear equation in two variables has infinitely many solutions.
- Identities: $(a+b)^2 = a^2 + 2ab + b^2$; $(a-b)^2 = a^2 - 2ab + b^2$.

Maths — Geometry & Mensuration

- Triangle congruence rules: SSS, SAS, ASA and RHS.
- The angle sum of a triangle is 180 degrees.
- Heron's formula: area = $\sqrt{s(s-a)(s-b)(s-c)}$, where s is the semi-perimeter.
- Surface area and volume formulas for cube, cuboid, cylinder, cone and sphere.
- Probability of an event = favourable outcomes / total outcomes.

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