

IB Physics Topic D1 Gravitational Fields; SL & HL

By timthedev07, M25 Cohort

Table of Contents

1	Gravitational Field Strength	1
2	Newton's Law of Gravitation	2
3	Extended Bodies and Point Masses	3
4	Kepler's Laws of Planetary Motion	4
4.1	Quantifying Kepler's Third Law	4
5	Gravitational Potential Energy	5
6	Gravitational Potential	6
6.1	Change in Gravitational Potential Energy	6
6.2	Equipotential Surfaces	6
7	Linking to Gravitational Field Strength	7
8	Orbital Motion Equations	8
9	Types of Orbits	9
10	Escape Velocity	10
11	Total Energy of a Satellite	11

1 Gravitational Field Strength

2 Newton's Law of Gravitation

3 Extended Bodies and Point Masses

4 Kepler's Laws of Planetary Motion

- **Kepler's First Law:** The orbit of a planet is an ellipse with the Sun at one of the two foci.
- **Kepler's Second Law:** A line segment joining a planet and the Sun sweeps out equal areas during equal intervals of time.
- **Kepler's Third Law:** The square of the orbital period of a planet is directly proportional to the cube of the semi-major axis of its orbit.

$$T^2 \propto r^3$$

4.1 Quantifying Kepler's Third Law

5 Gravitational Potential Energy

6 Gravitational Potential

6.1 Change in Gravitational Potential Energy

6.2 Equipotential Surfaces

7 Linking to Gravitational Field Strength

8 Orbital Motion Equations

9 Types of Orbits

10 Escape Velocity

11 Total Energy of a Satellite