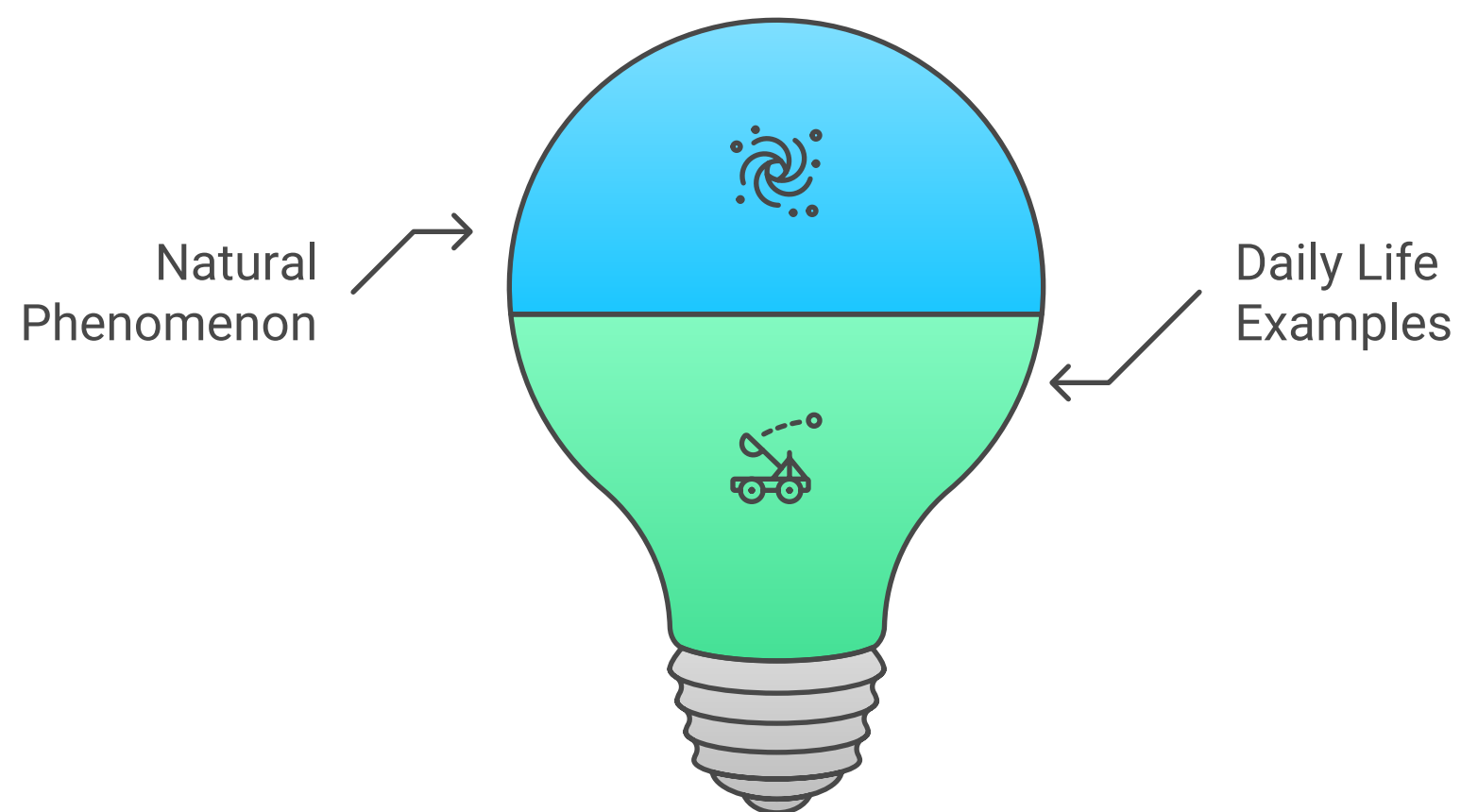


The topic of **Gravitation** in the Class 9 CBSE syllabus covers the fundamental principles of gravitational force, the universal law of gravitation, and its applications. Here's an overview of the subtopics included:

1. Introduction to Gravitation

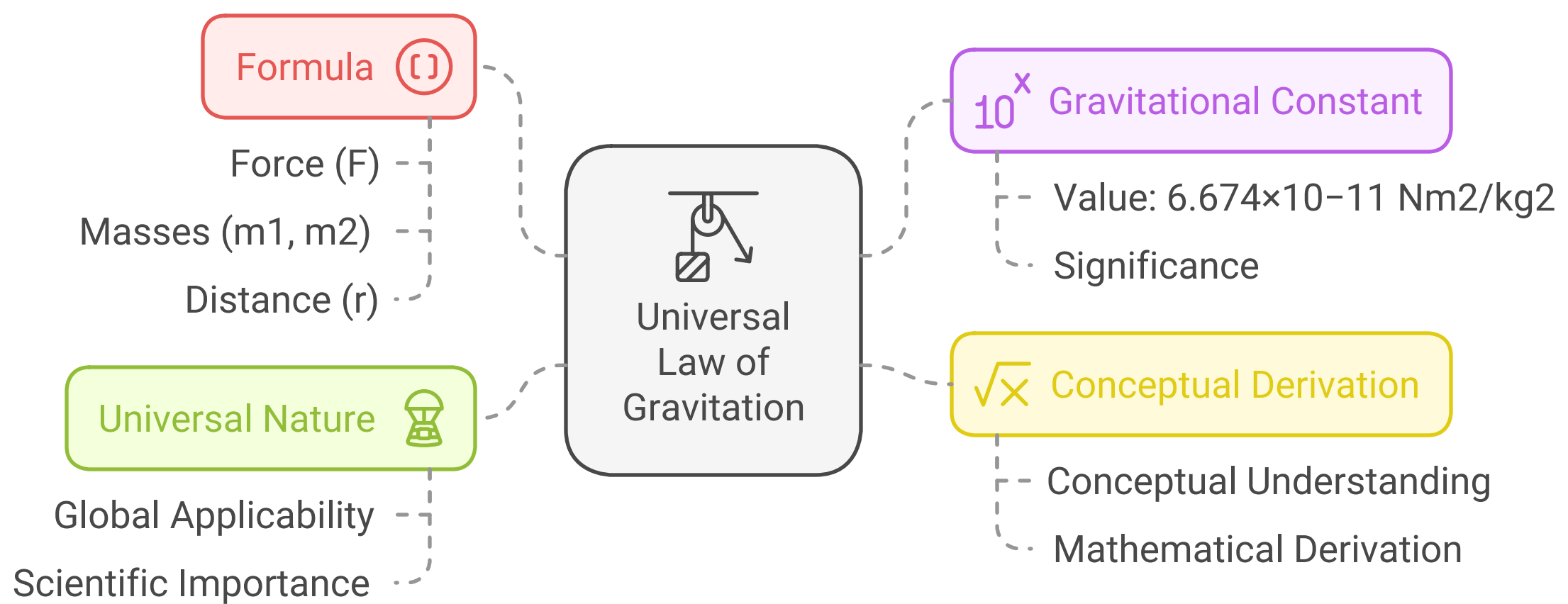
- Gravitational force as a natural phenomenon.
- Examples of gravitational force in daily life.

Understanding Gravitational Force



2. Universal Law of Gravitation

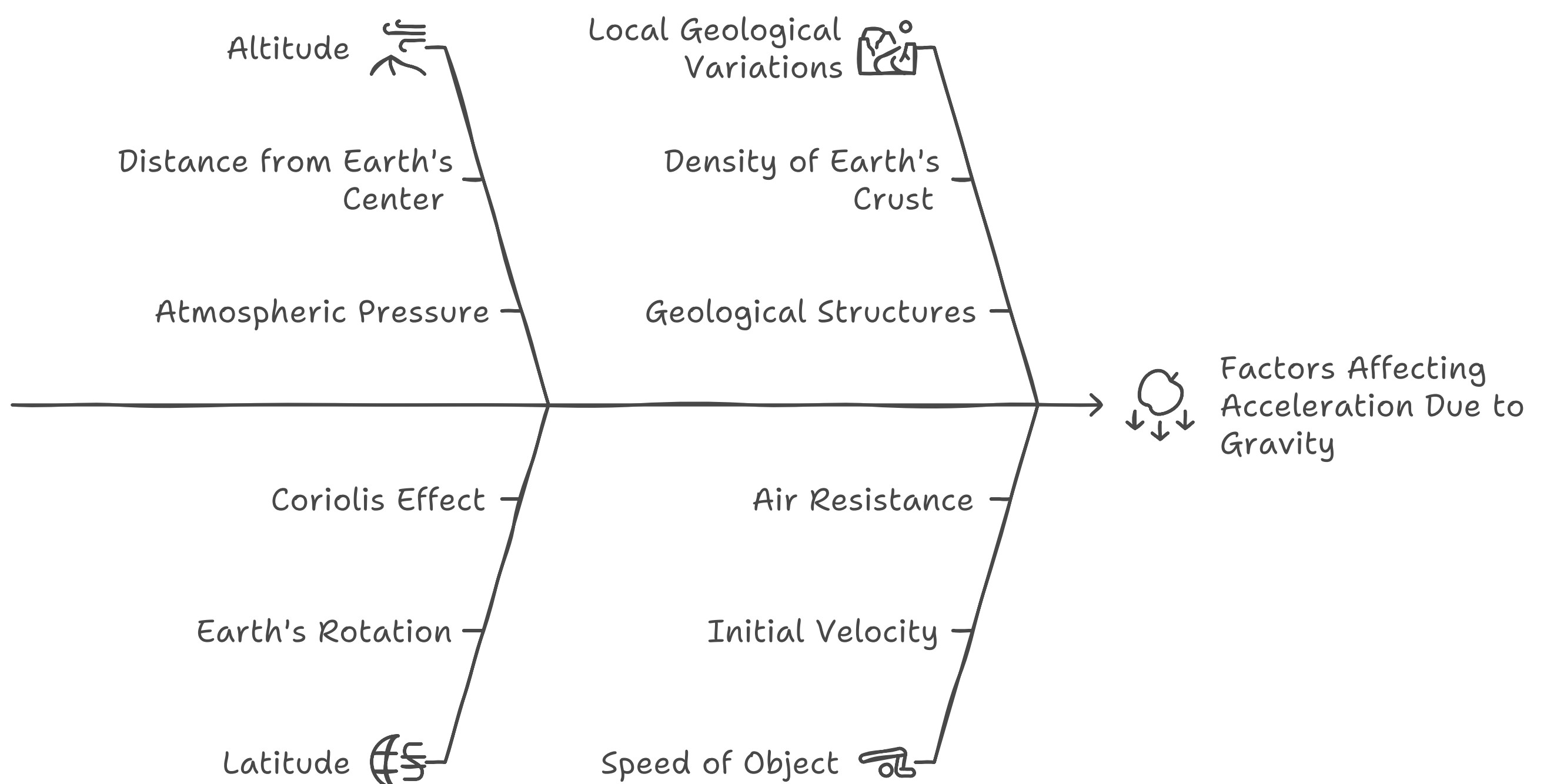
- Statement of the law:
- $F = G \frac{m_1 m_2}{r^2}$
- where:
 - F : Force of attraction between two objects.
 - G : Gravitational constant $[6.674 \times 10^{-11} \text{ Nm}^2/\text{kg}^2]$.
 - m_1, m_2 : Masses of the two objects.
 - r : Distance between the centers of the two objects.
- Derivation of the formula (conceptual understanding).
- Importance of G and its universal nature.



3. Free Fall

- Concept of objects falling under gravity.
- Acceleration due to gravity [g]: $g = 9.8 \text{ m/s}^2$
 - Factors affecting g.

Understanding Acceleration Due to Gravity



4. Motion of Objects Under Gravity

- Equations of motion applied to free-falling objects:
 - $v = u + gt$
 - $h = ut + \frac{1}{2}gt^2$
 - $v^2 = u^2 + 2gh$ [where u is the initial velocity, h is height, v is the final velocity].

5. Mass and Weight

- Definition of mass and weight.
- Relationship: $W = mg$
 - Variation of weight on different planets.

6. Thrust and Pressure

- Concept of thrust: Force acting perpendicular to a surface.
- Pressure: $P = \frac{\text{Force}}{\text{Area}}$
- Applications of pressure in daily life.

7. Archimedes' Principle

- Buoyant force and displacement of fluid.
- Statement of the principle: "A body immersed in a fluid experiences a buoyant force equal to the weight of the fluid displaced by it."
- Applications: Designing ships, submarines, etc.

8. Relative Density

- Definition and formula: $\text{Relative Density} = \frac{\text{Density of the substance}}{\text{Density of water}}$

Important Tips for Study:

- Focus on understanding the formulas and their derivations.
- Solve numerical problems based on $F = G \frac{m_1 m_2}{r^2}$, $v = u + gt$, and buoyant force.
- Perform experiments like verifying Archimedes' principle to build practical knowledge.

Would you like detailed notes, solved examples, or PowerPoint slides for any of these topics?