Applied Sciences

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Frontiers of Science

- Science studies nature at **three levels (or sizes)**:
- **1. The Big (Cosmos / Astronomy)**
- Deals with the **vast universe**.
- Studies stars, planets, galaxies, and the origin of the universe.
- Example: Space exploration, telescopes, study of black holes.

The Small (Microscopic / Particle Physics)

- Deals with **tiny particles** of matter.
- Studies atoms, electrons, protons, neutrons, and subatomic particles (like quarks).
- Example: Nuclear physics,
- Quantum physics
- Electron microscope.

The Moderate (Human Scale / Everyday Physics)

- Deals with objects of **ordinary size** that we see in daily life.
- Studies motion, force, energy, machines, electricity, etc.
- Example: Cars, bridges, household appliances.

Scientific Method with Examples

- **Observation 👀**
- Notice something.
- *Example:* An apple falls from a tree to the ground.
- **Question / Problem ❓**
- Ask why it happened.
- *Example:* Why does the apple always fall downward, not upward?
- **Hypothesis ❗**
- Make a guess.
- *Example:* Maybe a force pulls the apple toward the Earth.

Scientific Method

- **Experimentation** 🔬
- Test the guess by experiments.
- *Example:* Drop different objects (stone, paper, ball) from a height and see if they fall.
- **Results / Data** 📊
- Collect observations.
- *Example:* All objects fall downward (though speed may differ due to air).

Scientific Method

- **Conclusion** ✓
- Decide if hypothesis is correct.
- *Example:* Yes, objects fall because of Earth's pull.
- **Theory / Law** 📄
- If confirmed many times, it becomes a theory or law.
- *Example:* Newton's Law of Gravitation.

Role of Physics in Daily Life

- Electricity, mobile phones, internet, and computers.
- Medical technologies (X-rays, ultrasound, MRI).
- Transportation (cars, airplanes, rockets).
- Communication (satellites, radio, TV).
- Understanding nature (earthquakes, climate, space).

Methods of Study in Physics

- **Observation** – noticing natural phenomena.
- **Hypothesis** – proposing an explanation.
- **Experimentation** – testing under controlled conditions.
- **Laws & Theories** – universal principles (e.g., Newton's laws, laws of motion).