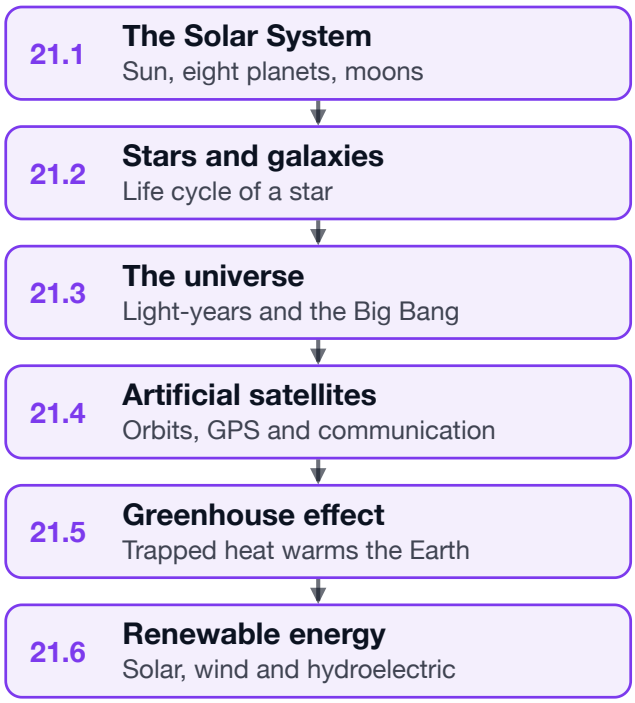
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Chapter 21: Space and Environment

Class 10 Physics · Quick revision notes · New syllabus 2026-27 · Punjab Boards

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Chapter 21 takes you from our own planet out to the edge of the universe and back again. You will learn how the **Solar System** is arranged, how **stars** are born and die, and how billions of stars make up a **galaxy** like the Milky Way, the faint band you can see on a clear night in the northern areas. You will see how **satellites** such as PAKSAT stay in orbit and carry TV and internet signals. Back on Earth, the chapter explains the **greenhouse effect**, how global warming links to heatwaves and floods like those of 2022, and how **renewable energy** from the sun, wind and water can help.



Topics at a glance

- **21.1 The Solar System** Sun, eight planets, moons
  The Sun, planets, moons, asteroids and comets.
- **21.2 Stars and galaxies** Life cycle of a star
  The life cycle of stars and the Milky Way galaxy.
- **21.3 The universe** Light-years and the Big Bang
  Distances in light-years, the expanding universe and the Big Bang.
- **21.4 Artificial satellites** Orbits, GPS and communication
  Orbits, geostationary satellites and their uses.
- **21.5 Greenhouse effect** Trapped heat warms the Earth
  Greenhouse gases, global warming and its effects.

- **21.6 Renewable energy** Solar, wind and hydroelectric
  Solar, wind and hydroelectric power vs fossil fuels.

Key definitions

- **Solar System** is the Sun together with the eight planets, their moons, and the asteroids and comets that orbit it.
- **Galaxy** is a huge group of billions of stars, gas and dust held together by gravity. Our galaxy is the Milky Way.
- **Light-year** is the distance light travels in one year, about 9.46×10^{15} m. It is a unit of distance, not time.
- **Geostationary satellite** is a satellite that orbits above the equator once every 24 hours, so it stays over the same place on Earth.
- **Greenhouse effect** is the warming of the Earth because gases such as carbon dioxide and methane trap infrared radiation given off by the ground.
- **Renewable energy** is energy from sources that are naturally replaced, such as sunlight, wind and flowing water.

Important formulas

Distance travelled by light

$$d = ct$$

Efficiency of an energy source

$$\eta = \frac{\text{useful energy output}}{\text{total energy input}} \times 100\%$$

Questions students ask

Q. Is a light-year a unit of time?

No. A light-year is a distance: how far light travels in one year, about 9.46×10^{15} m. It is used because distances to stars are far too large for kilometres.

Q. Why does a geostationary satellite seem to stay still?

It orbits above the equator in the same direction as the Earth spins and takes 24 hours for one orbit, so it stays above the same point. That is why a dish antenna can point at it all the time.

Q. Is the greenhouse effect always harmful?

No. A natural greenhouse effect keeps the Earth warm enough for life. The problem is the extra carbon dioxide from burning fossil fuels, which traps more heat and causes global warming.

Q. What will happen to the Sun in the future?

The Sun is a medium-sized star about halfway through its life. In billions of years it will swell into a red giant and then shrink into a white dwarf.

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