National Science Day 2025

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Why in News?

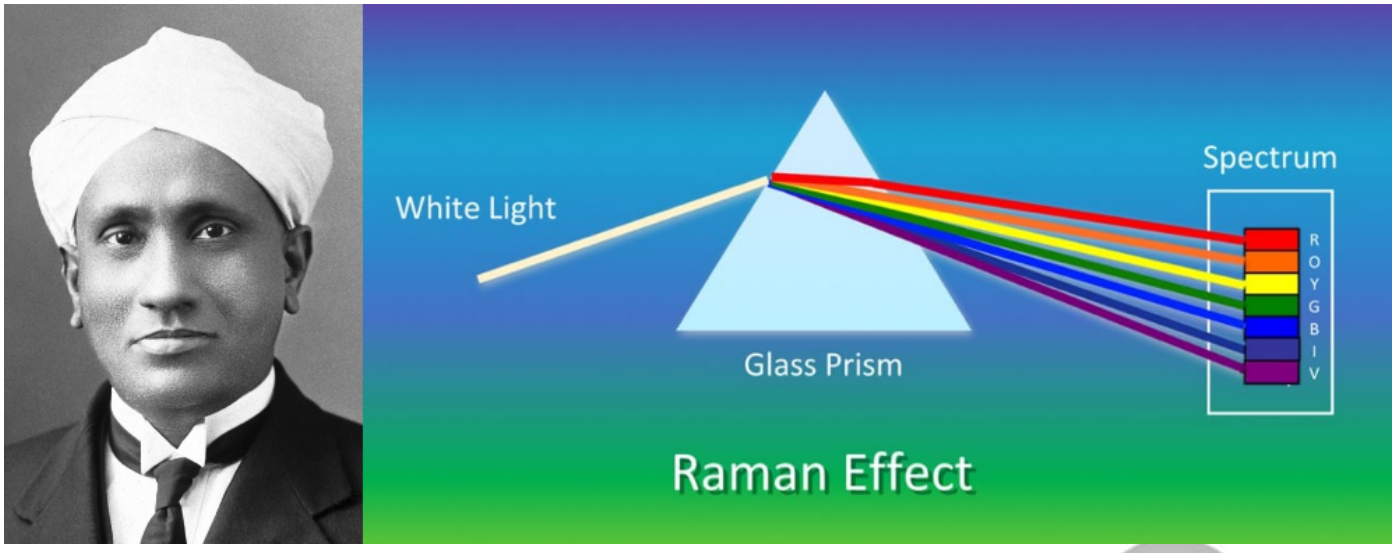
India celebrates **National Science Day (NSD)** on **28th February annually** to honor **Sir Chandrasekhara Venkata (CV) Raman's** discovery of the **Raman Effect** **in 1928**.

- The **2025 theme**, *"Empowering Indian Youth for Global Leadership in Science and Innovation for Viksit Bharat"*, highlights the role of **scientific innovation and youth leadership** and aligns with the **Viksit Bharat 2047 vision**.

Note: In 1986, the Government of India designated **28th February** as **National Science Day**, which was first celebrated in 1987.

What are the Key Facts About CV Raman?

- **Early Life:** CV Raman was born on 7th November 1888, in Tiruchirappalli, Tamil Nadu. He earned his M.A. in Physics from Presidency College, Madras and contributed significantly to atomic physics and optics.
  - He founded the **Raman Research Institute (1948), Indian Journal of Physics (1926), and Indian Academy of Sciences (1934).**
  - His research spanned **optics, light scattering, X-rays, acoustics, and sea colors**, leading to the discovery of the **Raman Effect**.
- **Honors & Recognition:** Knighted in 1929 by the British government, CV Raman won the **1930 Nobel Prize in Physics** for Raman Effect, making him the **first Asian to receive a Nobel Prize in science.**
  - He was also honored with the **Bharat Ratna in 1954,** India's highest civilian award.
- **Raman Effect:** It refers to the phenomenon where **incoming excitation light** interacts with a sample, undergoes a **change in wavelength**, and generates **scattered light** due to interactions with molecular vibrations. This phenomenon is known as **Raman scattering.**
  - **Applications of Raman Effect:** It forms the basis of **Raman Spectroscopy** (analyzing molecular vibrations), widely used to study material properties.
    - Its applications expanded after the advent of **lasers** in the 1960s, aiding **chemical analysis** by identifying substances without breaking them.
    - It also helps **forensic science** detect drugs in sealed evidence bags and enables safe **nuclear waste analysis** using **fiber-optic** probes.



India's Advancements in Science and Technology in 2024

- **Innovation and IP:** India ranked **39th** in the **Global Innovation Index 2024** and **6th** in global **Intellectual Property (IP) filings** (**World Intellectual Property Organisation 2024 Report**).
    - The **Network Readiness Index 2024** saw India rise to **49th** from **79th (2019)**, highlighting progress in **ICT and digital transformation**.
- **Anusandhan National Research Foundation (ANRF):** Launched under the **ANRF Act 2023**, boosts India's **R&D ecosystem** with key programs like **promoting electric vehicles (EVs) in India.**
- **National Quantum Mission (NQM):** Aims to position India as a leader in **quantum computing, communication, sensing, and materials**.
- **National Supercomputing Mission (NSM):** A total of **33 supercomputers** with a combined computing capacity of 32 **petaflops** have been deployed in the country under NSM.
    - Future plans aim to **increase capacity to 77 PetaFlops** using indigenous technology.
- **Artificial Intelligence:** The **BharatGen initiative** is developing India's first **multimodal, multilingual Large Language Model (LLM)** for **Generative AI (GenAI).**
- **Geospatial Science: Geospatial technology** adoption has increased through Spatial Thinking Programs in Schools, covering 116 schools across seven states.
- **Climate Research:** India has strengthened climate resilience by launching **four Centres of Excellence** for **flood and drought risk mapping**, enhancing disaster preparedness and adaptation strategies.