

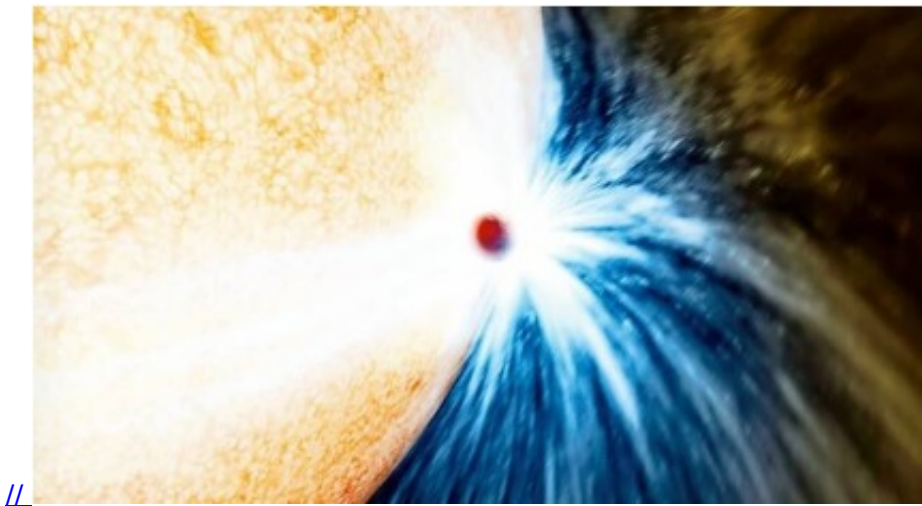


Star Engulfing Jupiter-Sized Planet

Why in News?

According to a recent study, scientists have observed a bloated **Sun-like star, identified as ZTF SLRN-2020**, swallowing a Jupiter-sized planet, causing the star to expel some material into space in an energetic belch.

- The researchers used the **Zwicky Transient Facility (ZTF)** at Caltech's Palomar Observatory to spot the star rapidly become 100 times brighter, then figured out why this happened.



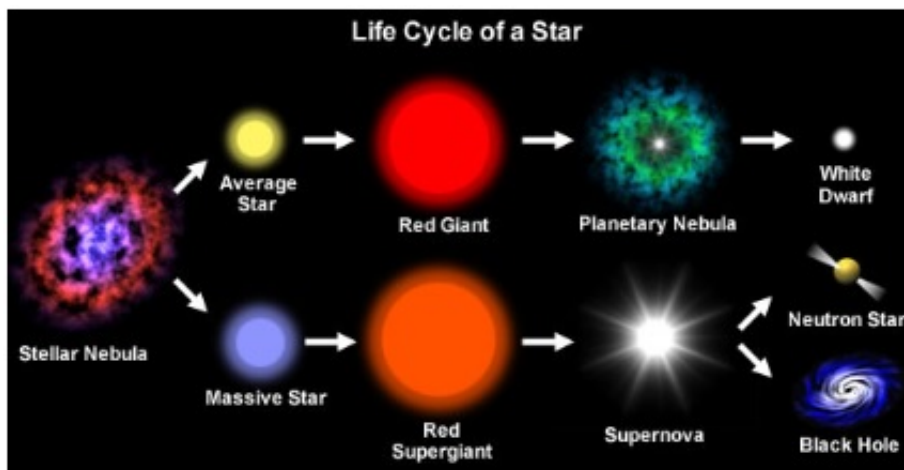
What are the Findings of the Study?

- **Star:**
 - The star is similar to our sun in size and composition and is located in our [Milky Way galaxy](#) about **12,000 light-years** from Earth in the **direction of the constellation Aquila**.
 - A light year is the distance light travels in a year, 5.9 trillion miles (9.5 trillion km).
 - The star is around 10 billion years old, twice as old as the sun.
 - The constellation Aquila, the eagle, is visible in the northern hemisphere from July through October. It is a mid-sized constellation, spanning 652 square degrees of the sky.
 - The star is in the **early stages of the red giant phase**, which means that it was bloated in its old age and **had depleted hydrogen fuel in its core**, causing its dimensions to expand.
 - Red giant stars can swell to a hundred times their original diameter, engulfing **any planets in their way**.
 - Mercury, Venus and finally Earth, our solar system's three innermost planets, will meet this destiny as the sun evolves through its **red giant phase in about 5 billion years**.
- **Star Engulfing the Planet:**
 - As the star grew, the planet's orbit brought it too close, and it started getting pulled into

the **star's atmosphere**. The closer it got, the faster it was pulled in, **causing it to plunge into the star suddenly**, creating the emission of intense radiation.

What is the Life Cycle of a Star?

- **Birth:** A star's life cycle begins with a [Nebula](#), where gravity pulls gas and dust together to form a protostar.
 - **Nebulae** are huge clouds of gas and dust.
- **Main Sequence Stage:** When the core **gets hot enough**, [Nuclear Fusion](#) starts, and the star enters the main sequence stage.
 - During the main sequence stage, the **star burns hydrogen in its core, producing energy that keeps the star stable** and shining brightly.
 - Smaller stars burn fuel slowly and can shine for billions of years, while massive stars **burn it fast and may only last for hundreds of thousands** of years.
- **Old Age and Death:** As a star's hydrogen runs out, it expands and cools, becoming a red giant. Smaller stars turn into a planetary nebula, **then a [white dwarf](#), and eventually a black dwarf**.
 - More massive stars **explode as a supernova, scattering materials into space**, and leaving behind a neutron star or a [black hole](#).



UPSC Civil Services Examination Previous Year Question (PYQ)

Q. Recently, scientists observed the merger of giant 'blackholes' billions of light-years away from the Earth. What is the significance of this observation? (2019)

- (a) 'Higgs boson particles' were detected.
- (b) 'Gravitational waves' were detected.
- (c) Possibility of inter-galactic space travel through 'wormhole' was confirmed.
- (d) It enabled the scientists to understand 'singularity'.

Ans: (b)

- Every few minutes a pair of black holes smash into each other. These cataclysms release ripples in the fabric of space time known as gravitational waves.
- Gravitational waves are 'ripples' in space-time caused by some of the most violent and energetic processes in the Universe. Albert Einstein predicted the existence of gravitational waves in 1916 in his General Theory of Relativity.
- The strongest gravitational waves are produced by catastrophic events such as colliding black holes, the collapse of supernovae, coalescing neutron stars or white dwarf stars, etc.
- Scientists have yet again detected gravitational waves produced by the merger of two light black

holes about a billion light-years away from the Earth.

- It was recorded by Laser Interferometer Gravitational-Wave Observatory (LIGO).
- **Therefore, option (b) is the correct answer.**

[Source: IE](#)

Multimodal Logistics Park in Assam

For Prelims: [Multi Modal Logistics Park](#), [Bharatmala Pariyojna](#)

For Mains: Infrastructure, Significance of Logistic Sector in Economy, [Multi Modal Logistics Park](#), [Bharatmala Pariyojna](#)

Why in News?

Recently, the **Union Minister of Ports, Shipping & Waterways and Ayush**, visited the construction site of [India's first International Multi-Modal Logistics park\(MMLP\) in Jogighopa, Assam](#), to review the progress made so far.

- Multi Modal Logistics Park is likely to **Boost Connectivity** in the [Northeast](#).

What is the Scope of this Project?

- The park is being developed under the ambitious [Bharatmala Pariyojana](#) of the Government.
- This park is **being made by National Highways & Infrastructure Development Corporation Limited (NHIDCL)**.
- The park will be **connected to road, rail, air, and waterways**.
- It is being developed in 317-acre land along the [Brahmaputra](#).
- Project is likely to unlock huge potential for the region along with neighboring countries like **Bhutan and Bangladesh**.

What is MMLP?

- **About:**
 - A **MMLP is a transportation hub that combines different modes of transport** in one location to enable efficient movement of goods.
 - These logistics parks are typically located **near major transportation nodes, such as ports, airports, and highways**.
 - They are designed to handle a large volume of goods, with facilities for **warehousing, distribution**, and value-added services such as **packaging and labeling**.
- **Benefits:**
 - **Improved Supply Chain Efficiency:**
 - By bringing together multiple modes of transportation, MMLPs can reduce the **time moving goods between different locations**. This helps to streamline the supply chain and improve overall efficiency.
 - **Reduced Logistics Costs:**
 - MMLPs can **reduce logistics costs by providing shared facilities and**

infrastructure, such as warehousing and transportation, which can be used by multiple companies. This helps to **lower operational costs and improve profitability.**

- **Enhanced Safety and Security:**
 - MMLPs often have advanced security systems and protocols in place to ensure the **safety of goods and people.** This helps to **prevent theft, damage, and other security issues that can impact the supply chain.**
- **Environmental Benefits:**
 - By **reducing the number of trips required to transport goods, MMLPs can help to reduce carbon emissions** and other environmental impacts associated with transportation.
- **Status of MMLP in India:**
 - The Cabinet Committee on Economic Affairs (CCEA) authorized the Ministry of Road Transport and Highways (MoRTH) to develop 35 MMLP under the Bharatmala Pariyojana.
 - Bangalore, Chennai, Guwahati, and Nagpur MMLPs under implementation.
 - The MMLPs are to be developed under **Public Private Partnership (PPP)** on **Design, Build, Finance, Operate and Transfer (DBFOT) mode.**
 - The **National Highways and Logistics Management (NHLML), a special purpose vehicle (SPV)** fully owned by the National Highways Authority of India (NHAI), plans to construct the majority of the proposed MMLPs in PPP mode.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Q. What is the significance of Industrial Corridors in India? Identifying industrial corridors, explain their main characteristics. **(2018)**

[Source: PIB](#)

Petersberg Climate Dialogue 2023

- **For Prelims:** [Climate Finance](#), [United Nations Framework Convention on Climate Change \(UNFCCC\)](#), Global Stocktake, Petersberg Dialogue.
- **For Mains:** Climate Finance and its Significance, The politics of climate change, impact of climate change on vulnerable communities and countries

Why in News?

The **Petersberg Dialogue on Climate Change** was hosted in **Berlin, Germany** from May 2-3, 2023, by **Germany and the United Arab Emirates**, which is hosting the **28th Conference of Parties (COP28)** to the [United Nations Framework Convention on Climate Change \(UNFCCC\)](#).

What is Petersberg Dialogue?

- The Petersberg Climate Dialogue is an **annual high-level political and international forum held before the [United Nations Climate Change Conferences \(COP\)](#).**
- It was initiated in 2010 by former German Chancellor Angela Merkel.
- The forum aims to prepare for **successful negotiations at COP climate change conferences.**

- The central goal is to **strengthen trust in multilateral climate negotiations and between states.**
- The dialogue focuses on **climate adaptation, climate finance, and dealing with loss and damage.**

What are the Key Takeaways from the Petersberg Climate Dialogue?

- **Need for Clean Energy Transition:**
 - **UN Secretary-General** emphasized the need to **“break our fossil fuel addiction and drive decarbonization in every sector”** to achieve a **1.5°C global warming pathway.**
- **Global Renewables Target:**
 - German Foreign Minister initiated discussions around a potential global target for renewables at the next climate conference. And stressed the need to make **sharp cuts in greenhouse gas emissions to limit global warming to 1.5°C.**
- **Fossil Fuel Phaseout:**
 - **COP28** President called for a **tripling of renewable energy capacity by 2030** followed by a **doubling in 2040.** And urged participants to **ramp up renewable energy capacity building** and **focus on phasing out fossil fuel emissions** while phasing up viable, affordable **zero-carbon alternatives.**
- **Status of Climate Finance:**
 - The developed countries are **“on a good track”** to deliver the **USD 100 billion per year** they had promised to mobilize by **2020 during COP15 in 2009.**
 - However, a recent estimate pegs climate finance needs at **1 trillion USD annually by 2030** for emerging markets alone, highlighting the urgent need for financial reparations.
- **Urgent Global Financial Systems Transformation:**
 - The need for an urgent global financial systems transformation was underlined so that **crucial climate finance** can be unlocked for the most **climate vulnerable countries in the world.**
 - The burden of keeping global temperatures from rising beyond 1.5°C **cannot fall on the poorest countries, who are least responsible for the stock of greenhouse gases** in the atmosphere.
- **Global Stocktake:**
 - 2023 is the year for the Global Stocktake, which aims to assess whether current efforts will enable us to reach the objectives set out in the **Paris Agreement.**
 - The report has been underway for the past two years and is set to be released in September of 2023.
 - **Union Minister for the Indian Ministry of Environment, Forest and Climate Change**, stated that the outcome of the first Global Stocktake should focus on **how climate change impacts, actions, and responses** have a bearing on the **developmental priorities of developing countries, including eradication of poverty.** It should also seek to convey a message on **sustainable lifestyles and sustainable consumption** to inform the next round of **Nationally Determined Contributions** and enhanced international cooperation.

What are the India's Initiatives for Climate Change and Green Energy?

- **National Adaptation Fund for Climate Change (NAFCC):**
 - It was established in 2015 to meet the cost of adaptation to climate change for the State and Union Territories of India that are particularly vulnerable to the adverse effects of climate change.
- **National Clean Energy Fund:**
 - The Fund was created to promote clean energy, and funded through an initial **carbon tax** on the use of coal by industries.
 - It is governed by an Inter-Ministerial Group with the Finance Secretary as the Chairman.
 - Its mandate is to fund research and development of innovative **clean energy technology** in the fossil and non-fossil fuel-based sectors.
- **National Adaptation Fund:**

- The fund was established in 2014 with a corpus of Rs. 100 crores with the aim of bridging the gap between the need and the available funds.
- The fund is operated under the Ministry of Environment, Forests, and Climate Change (MoEF&CC).

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. With reference to the Agreement at the UNFCCC Meeting in Paris in 2015, which of the following statements is/are correct? (2016)

1. The Agreement was signed by all the member countries of the UN, and it will go into effect in 2017.
2. The Agreement aims to limit the greenhouse gas emissions so that the rise in average global temperature by the end of this century does not exceed 2°C or even 1.5°C above pre-industrial levels.
3. Developed countries acknowledged their historical responsibility in global warming and committed to donate \$ 1000 billion a year from 2020 to help developing countries to cope with climate change.

Select the correct answer using the code given below:

- (a) 1 and 3 only
- (b) 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

Ans: (b)

Mains

Q. Describe the major outcomes of the 26th session of the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC). What are the commitments made by India in this conference? (2021)

Source: DTE

Drug Recall

- **For Prelims: Drug Recall, Not of Standard Quality, [The Drugs and Cosmetics Act, 1940](#), [Drugs Controller General of India, CDSCO](#).**
- **For Mains: Need for Drug Recall Law in India.**

Why in News?

Recently, a pharmaceutical company inadvertently **shipped a Mislabeled batch of Drugs to the market**, which highlights the **issue of circulating substandard drugs** in the market and need for **Drug Recall Law in India**.

- While such recalls take place regularly in the U.S., including by Indian companies, but not seen in India.

What is a Drug Recall?

- A drug recall occurs when a prescription or over-the-counter drug is removed from the market **because of its harmful or side effects**.
- Drug recall is the process of **removing or correcting a marketed drug product** that violates the laws and regulations governing the safety, efficacy, or quality of a drug.
- Drug recalls are typically issued **when a product is found to be defective, contaminated, mislabeled, or poses a risk** to the health and safety of patients.
- The goal of a drug recall is to **protect the public from harm** by removing the affected product from the market, and to provide a remedy or refund for consumers who have already purchased the product.

What is the Need for Drug Recall Law in India?

- It is crucial for India to have a national Drug Recall Law to guarantee that once a drug is known to be **Not of Standard Quality (NSQ)**, the entire batch is withdrawn from the market.
 - Currently, **there is no such Law in India to withdraw the entire batch of substandard drugs** from the market.
- At most state **drug regulators can order a withdrawal of a particular batch** from their state but given that India is a common market, it is possible that the **same batch is dispersed across multiple states**.
- In such a case, there needs to be a central drug regulator who can execute and coordinate national recall.
- Despite flagging this as a major issue in 1976, India still lacks a **national law on recalling drugs**.
 - As a result, even after government analysts declare drugs to be NSQ, there is no system to **actually withdraw batches of drugs from across India**.

Why does India not have Regulatory Infrastructure for Substandard Drugs?

- **Apathy and Lack of Expertise:**
 - The Drug Regulation Section of government is not up to the task of **tackling complex drug regulatory issues** due to a combination of different factors including **apathy, lack of expertise in the area**, and a greater interest in enabling the growth of the pharmaceutical industry than **protecting public health**.
- **Fragmented Regulatory Structure:**
 - India has a highly fragmented regulatory structure, with **each state having its own drug regulator**.
 - But despite the fragmentation, **drugs manufactured in one state can seamlessly cross borders** to be sold in all states around the country.
- **Opposition to Centralised Regulatory:**
 - Both the pharmaceutical industry and state drug regulators **have resisted greater centralisation** of regulatory powers.
 - The incompetence of a regulator in just one state can **lead to adverse effects for patients in other states**, whose citizens have no influence or electoral power to demand accountability of that regulator.
- **No Interest within Government:**
 - There appears to be no interest within the government and **no sustained demand from civil society** for reform.

- The government is more invested in the **growth of the pharmaceutical industry rather than public health.**
- There is possibly a perception that **tighter regulation could slow the growth of the pharmaceutical industry.**

What are the Implications of Delay in Framing any such Law?

- When substandard drugs are not promptly recalled from the market, it can have **serious consequences for consumers**, including illness and even death. However, in India, the process of drug recall is often slow and ineffective, leading to a **dangerous situation for the public.**
- If the government does not take swift action to recall substandard drugs, it could **indicate a lack of accountability and responsibility towards the health and safety of the people.**
- Furthermore, delaying the recall of these drugs could lead to a **loss of public trust in the healthcare system and the government.**

How Drugs Are Regulated in India?

- **The Drugs and Cosmetics Act:**
 - **The Drugs and Cosmetics Act, 1940 and Rules 1945** have entrusted various responsibilities to central and state regulators for regulation of drugs and cosmetics.
 - It provides the regulatory **guidelines for issuing licenses to manufacture Ayurvedic, Siddha, Unani medicines.**
- **Central Drugs Standard Control Organisation(CDSCO):**
 - Prescribes standards and **measures for ensuring the safety, efficacy and quality of drugs**, cosmetics, diagnostics and devices in the country.
 - Regulates the **market authorization of new drugs and clinical trials standards.**
- **Drugs Controller General of India:**
 - DCGI is the head of department of the CDSCO of the Government of India responsible for **approval of licences of specified categories of drugs** such as blood and blood products, IV fluids, vaccines and sera in India.
 - DCGI also sets **standards for manufacturing, sales, import**, and distribution of drugs in India.

Way Forward

- If health activists accept there is a problem with drug regulation and ask for systemic reform, they will **add to the medley of voices asking for reform.** Right now, there appears to be a reluctance to even accept there is a problem with drug quality in India.
- To create an effective recall mechanism, the **responsibility of recalling drugs has to be centralised**, with one authority that has the legal power to hold companies liable for failures to recall drugs from across the country, and further, to also search and seize batches of failed medicine.

Source: TH