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Science Reporter

विज्ञान एवं प्रौद्योगिकी मन्त्रालय
MINISTRY OF SCIENCE AND TECHNOLOGY



MK Yadav Sir

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AUKUS ALLIANCE

(Syllabus: GS Paper 2 – IR)

Australia, Britain to build AUKUS subs

Agence France-Presse
ADELAIDE

Australia and Britain said on Friday that a landmark deal to develop AUKUS nuclear-powered submarines would go ahead, despite mounting fears about costs, capabilities and the possible return of Donald Trump.

Under the fledgling AUKUS deal, the two countries along with the United States have pledged to beef up their military muscle in a bid to counter China's rise.

Defence chiefs this week unveiled ambitious plans to supply Australia with a fleet of nuclear-powered submarines, a key pillar of the agreement.

"The three governments involved here are working at pace to make this happen," Australian Defence Minister Richard Marles said on Friday.

However, some fear Mr. Trump could jettison the pact if he wins this year's presidential election, returning to his "America first" style of foreign policy.

Context: Recently, Australia and Britain affirmed that despite mounting concerns regarding costs, capabilities, and the potential return of the former USA president, the landmark AUKUS deal to develop nuclear-powered submarines would proceed as planned.

AUKUS Alliance

- **About:** It is a strategic security alliance involving Australia, the UK, and the US, focusing on the Indo-Pacific region.
- **Established in:** 2021.
- **Submarine Acquisition Assistance**: The pact involves the US and UK aiding Australia in acquiring nuclear-powered submarines armed with conventional weapons.
- **Comprehensive Cooperation**: AUKUS encompasses collaboration on various fronts such as cyber security, artificial intelligence, quantum technologies, undersea capabilities, and more.

Significance of AUKUS

- **Promotion of Regional Freedom**: AUKUS is geared towards upholding freedom and openness in the Indo-Pacific, particularly in areas like the South China Sea.
- **Countering China's Ambitions**: The partnership serves to bolster Australia's naval strength, presenting a challenge to China's hegemonic aspirations in the region.
- **Enhanced Military Coordination**: Operationalizing AUKUS will foster closer military coordination among participating nations, enhancing regional security.
- **Mitigating China's Encirclement of India**: AUKUS could alleviate some of China's encirclement tactics against India by strengthening strategic alliances in the Indo-Pacific.

INDIAN EXPRESS

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GULAAL GOTA

(Syllabus GS Paper 1 – Art and Culture)

GULAAL GOTA: A BEAUTIFUL, UNIQUE HOLI TRADITION OF JAIPUR



Artisan Amjad Khan gives final touches to his stock of *gulaal gotas* ahead of Holi in Jaipur this week. *Rohit Jain Paras*

PARUL KULSHRESTHA
JAIPUR, MARCH 22

AS PEOPLE celebrate Holi on Monday, revellers in many parts of the country will hurl balloons filled with coloured water on each other. However, in some parts of Rajasthan's Jaipur, an old tradition will play out, where colours will be thrown through a unique medium called the 'gulaal gota', dating back around 400 years.

What is a *gulaal gota*?

A *gulaal gota* is a small ball made of lac, filled with gulaal (dry colour). Weighing around 20 grams when filled with gulaal, these balls are thrown at people on Holi — they break up into bits on impact, and cover the person in *gulaal*.

Local artisans say that making *gulaal gotas* involves first boiling the lac in water to make it flexible. Lac is a resinous substance secreted by certain insects. It is also used to make bangles.

After shaping the lac, colour is added to it. Red, yellow, and green are added first, as other colours can be obtained through their combinations. After the processing is done, artisans heat the lac. It is then blown into a spherical shape with the help of a blower called *phunkni*.

Then, *gulaal* is filled in the balls before they are sealed with lac.

Where does the raw material for *gulaal gota* come from?

Lac is brought from Chhattisgarh and Jharkhand. As per the Chhattisgarh State Skill Development Authority's website, the female scale insect is one of the sources of lac. To produce 1 kg of lac resin, around 300,000 insects are killed. The lac insects also yield resin, lac dye and lac wax. Gulaal is usually bought from the market.

How did *gulaal gotas* become a tradition in Jaipur?

Gulaal gotas are made by Muslim lac makers, called *manihaars*, only in Jaipur.

According to Awaz Mohammad, a *gulaal gota* maker who has received an award from the President of India, *manihaars*' ancestors were shepherds and horse traders who arrived from Afghanistan. They settled in Bagru, a town located close to Jaipur, and learnt lac-making from Hindu lac makers (*lakhere*).

The city of Jaipur was established in 1727. Its founder Sawai Jai Singh II, an admirer of art, dedicated a lane at the Tripoliya Bazaar to the *manihaar* community, naming it *Manihaaron ka Raasta*. This is where lac bangles, jewellery, and *gulaal gota* are mostly sold, even today.

Artisans say that in older times, kings would ride through the city on elephant back on Holi, and toss *gulaal gotas* to the public. The erstwhile royal family is also known to order *gulaal gota* at the palace for the festival.

How much does *gulaal gota* cost? How do artisans sustain themselves?

A box of six *gulaal gota* balls is typically sold for Rs 150, which is much costlier than water balloons. Usually, the whole family of artisans is engaged in this work, including women. These are sent to be sold in different parts of the country, such as Vrindavan. Preparations begin three months before Holi.

For *manihaars*, lac bangles are the main source of sustenance, as making *gulaal gota* is a seasonal work. Artisans say that the bangles are eco-friendly as they are made without any chemicals.

However, Jaipur has of late become a hub of many factories where cheap, chemical-based bangles are being made with minimum lac, even causing skin allergies in some cases. Original lac bangles are costlier. Hence, the demand for lac-only bangles has fallen.

What is the future like for this work?

The Government of India has given "artisan cards" to the lac bangle and *gulaal gota* makers, allowing them to avail some benefits.

Many artisans have gone to different parts of the world to showcase their art. Awaz Mohammad, for instance, was invited to put up a shop at the G20 summit in New Delhi last year, where Prime Minister Narendra Modi and other dignitaries appreciated him.

In a bid to save the tradition, some *gulaal gota* makers have demanded a Geographical Indication (GI) tag for this work. A GI tag can help boost awareness about a product and highlight its location-specific exclusivity.

Context: In certain areas of Jaipur in Rajasthan, an ancient tradition will unfold where colors will be dispersed using a distinctive method known as "Gulaal Gota," which traces its origins back approximately 400 years.

Gulaal Gota

- **About:** It is a traditional item used in Holi celebrations, consisting of a small ball made of lac filled with dry gulaal.
- **Crafting Process**: Local artisans begin by boiling lac in water to make it flexible, as lac is a resinous substance secreted by certain insects, commonly used in crafting various items like bangles.
- **Color Addition**: Once shaped, color is added to the lac, typically starting with primary colors like red, yellow, and green, which can be combined to create additional hues.
- **Shaping and Sealing**: After coloring, the lac is heated and blown into spherical shapes using a blower called "phunkni", and then filled with dry gulaal before being sealed with more lac.
- **Raw Material Sourcing:** Lac, sourced from Chhattisgarh and Jharkhand, is the primary raw material for Gulaal Gotas.
    - Around 300,000 lac insects are killed to produce 1 kg of lac resin, which also yields lac dye and wax.
- **Historical Roots**: Gulaal Gotas are exclusively crafted by Muslim lac makers known as Manihaars in Jaipur.
    - Manihaars, whose ancestors were shepherds and horse traders from Afghanistan, have established this tradition in Jaipur.

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REVERSE OSMOSIS
(Syllabus: GS Paper 3 – Sci and Tech)

Fact or fallacy: Is your water purifier safe?

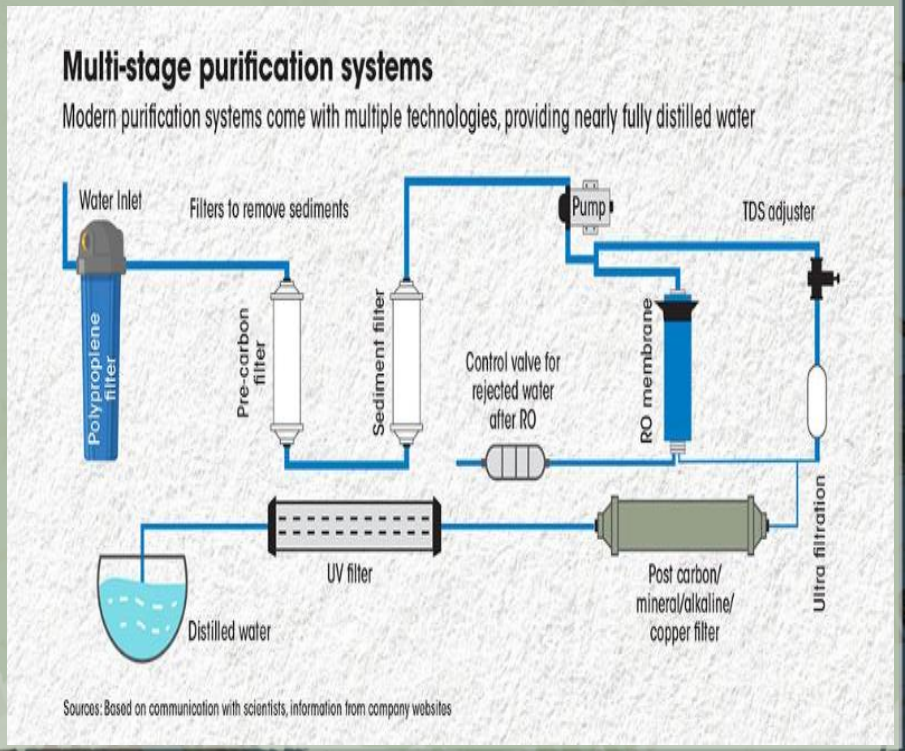
Context: Reverse osmosis (RO) water purifiers are gaining popularity in India as a preferred option for ensuring safe and clean drinking water. Nevertheless, experts caution that RO water, which may contain dangerously low mineral levels, can adversely affect health.

Reverse Osmosis

- **About:** It is a water purification process employing a partially permeable membrane to eliminate ions, undesirable molecules, and larger particles from drinking water.
- **Principle of Reverse Osmosis**: Reverse osmosis operates by reversing the mechanism of osmosis, employing pressure against a salt solution and a semi-permeable membrane.
- **Mechanism:** High-pressure pumps force water across the RO membrane, leaving behind 95% to 99% of dissolved salts in the reject stream.
- **Application of Pressure**:In reverse osmosis, the salt solution is pressurized against the semi-permeable membrane, surpassing the osmotic pressure.
- **Pressure Dependency**: The pressure needed correlates with the salt concentration; higher concentrations demand higher pressures.
- **Selective Rejection**: Contaminants are rejected based on size and charge, enhancing purification effectiveness.
- **Industrial Applications**: RO is crucial for producing demineralized water, vital for various industrial processes.

Diffusion

- **About:** Diffusion entails the transfer of particles or energy from areas of high concentration to regions of lower concentration.
- **Scope**: It applies to various entities such as atoms, ions, molecules, and even energy itself.
- **Gradient Dependency**: The driving force behind diffusion is the gradient in Gibbs free energy or chemical potential.



ORDER OF THE DRUK GYALPO
(Syllabus: GS Paper 2 – IR)

PM Modi Becomes 1st Foreign Head To Be Bestowed With Bhutan's Highest Civilian Award Order Of The Druk Gyalpo

Context: King of Bhutan Jigme Khesar Namgyel Wangchuck conferred Bhutan's highest civilian award, the Order of the Druk Gyalpo, on Prime Minister of India in Thimpu.

Order Of The Druk Gyalpo

- **About:** It is Bhutan's most esteemed civilian honor, recognizing individuals for their exceptional contributions to society.
- **Lifetime Achievement Recognition**: Instituted to honor lifetime achievements, this award symbolizes paramount importance in Bhutanese society.
- **Selection Criteria**: Recipients are meticulously chosen based on their outstanding accomplishments and positive impact, reflecting Bhutanese values of service, integrity, and leadership.
- **Alignment with Bhutanese Values**: Contributions are evaluated in accordance with Bhutanese values, emphasizing holistic development, cultural preservation, and regional harmony.

Why was Indian PM Awarded?

- **Recognition of Bilateral Ties**: Prime minister of india's award highlights the strong relationship between India and Bhutan, emphasizing the depth of their bilateral ties.
- **Leadership and Commitment:** The citation accompanying the award underscores Modi's unwavering commitment to progress, reflecting his leadership qualities.
- **Economic Achievements**: India's PM leadership has contributed to India's remarkable economic growth, positioning it as the world's fastest-growing economy and a future global economic powerhouse.
- **Global Influence and Moral Authority**: India's Prime Minister leadership has bolstered India's moral authority and increased its global influence, making significant strides on the international stage.

PIB Mar 22

BLUE ECONOMY
(Syllabus: GS Paper 3 – Economy)

Ministry of Earth Sciences hosts Inter-Ministerial Joint Workshop on Blue Economy

Context: Recently, the Ministry of Earth Sciences (MoES) organized a consultative workshop in New Delhi focused on the Blue Economy.

Blue Economy

- **About**: The Blue Economy revolves around the sustainable utilization of ocean resources to foster economic growth, enhance livelihoods, and generate employment opportunities.
- **Origin**: The idea was first introduced by Gunter Pauli in his 2010 book, "The Blue Economy: 10 years, 100 innovations, 100 million jobs."
- **Objectives and Focus:** The concept advocates for the implementation of eco-friendly strategies in ocean development, aiming for increased productivity while simultaneously ensuring the preservation of the ocean's overall health.
- **Factors Affecting Blue Economy**: Sea-based Terror Activities, Disasters, Man-made Issues, Climate Change, and Marine Pollution
- **India's Maritime Landscape**: India boasts a coastline stretching 7,500 km, with 9 out of 29 states having coastal boundaries.
    - The country is home to 1,382 islands.
    - India's Exclusive Economic Zone extends over 2 million square kilometers.
- **India's Allocations in the Indian Ocean**: In the Indian Ocean, India has been allocated areas abundant in rare metals by the International Seabed Authority. These include hydrothermal sulphide vents in the mid-ocean ridge area and poly-metallic nodules in the central Indian Ocean.

Blue Economy 2.0

- **About:** The blue economy presents immense opportunities for sustainable growth.
- **Aim**: To promote climate resilience in the blue economy, a scheme for restoration and adaptation measures, as well as coastal aquaculture and mariculture, will be launched.

Significance of the Blue Economy for India

- **Socio-Economic Opportunities**: The expansive scope of India's blue economy presents a significant socio-economic opportunity, allowing the responsible utilization of ocean resources for the benefit of society.
- **Synergy With SDG**: The concept aligns seamlessly with all of the United Nations' Sustainable Development Goals (SDGs), with a particular emphasis on contributing to SDG14, which focuses on 'life below water.'

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MADARSA EDUCATION ACT, 2004

(Syllabus: GS Paper 2 – Governance)

Allahabad HC terms U.P. Madarsa Act a violation of secularism

Ishita Mishra
NEW DELHI

Terming the Uttar Pradesh Board of Madarsa Education Act, 2004 unconstitutional, the Allahabad High Court on Friday said it was found to be a violation of secularism.

The court said it was not possible to segregate and save any portion of the Act that would be of any relevance and maintained that the State has no power to create a board for religious education or establish a board for school education only for a particular religion and philosophy associated with it.

A Bench of Justices Vivek Chaudhary and Subhash Vidyarthi – while dealing with a writ petition filed by Anshuman Singh Rathore that challenged the legality of the Board – said it was the duty of the State to provide education, which is secular in nature, more particularly for minors, i.e., children up to the age of 18.

'Highly divisive'

"It cannot discriminate and provide different types of education to children belonging to different religions. Any such action on the part of the State would be violative of secularism, which is part of the basic structure of the Constitution. Such an action... is not only unconstitutional but also highly divisive of the society on religious lines," the court noted.

It added that education under the Act is certainly not equivalent to the education being imparted to the students of other regular educational institutions recognised by the State primary, high school, and intermediate boards.

The court observed that while the students of all other religions are getting educated in modern subjects, denial of the same quality by the Madarsa Board amounts to violation of both Articles 21-A and 21 of the Constitution.

It added that the State cannot hide behind the lame excuse that it is fulfilling its duty by providing traditional education on nominal fee.

Context: The Allahabad High Court recently declared the Uttar Pradesh Board of Madarsa Education Act, 2004, as 'unconstitutional' and directed the state government to accommodate students studying in Madarsas in other schools.

Uttar Pradesh Board of Madarsa Education Act, 2004

- **About**: Madrasas operate under the state minority welfare ministry, raising concerns about the potential arbitrariness of this arrangement compared to other minority education institutions.
- **Forced**: On September 3, 2004
- **Contrast with Education Ministry**: This setup contrasts with other minority education institutions, such as those for Jains, Sikhs, Christians, etc., which fall under the education ministry, prompting questions about fairness and consistency.
- **Board Structure**: The Board overseeing madrasas is designated as a body corporate with specific membership criteria, outlining representation from various educational and legislative bodies.:
- **Tenure**: 3 Years
- **Removal:** The State Government holds the authority to remove board members for misconduct, ensuring accountability within the governing structure.
- **UGC Act**: The Madrasa Act is deemed to violate Section 22 of the University Grants Commission Act, 1956, adding legal complexity to its implementation and legitimacy.

Power of the Board

- **General Authority**: The Board is endowed with all necessary powers, as stipulated by the Act and its accompanying regulations, to fulfill its obligations and duties.
- **Cancellation and Withholding:** The authority to annul an examination or withhold a candidate's result for various infractions such as using unfair means, providing incorrect information, committing fraud, or displaying gross indiscipline.
- **Result Adjustment**: The ability to nullify exam results due to specific transgressions or genuine errors made by the Board in result declaration.
- **Recognition Determination:** The discretion to deny recognition to institutions that fail to meet the prescribed standards for staff, instruction, equipment, or infrastructure.

REUSABLE LAUNCH VEHICLE-PUSHPAK

(Syllabus: GS Paper 3 – Sci and Tech)

ISRO Successfully Carried Out Landing Of Its Reusable Launch Vehicle Pushpak

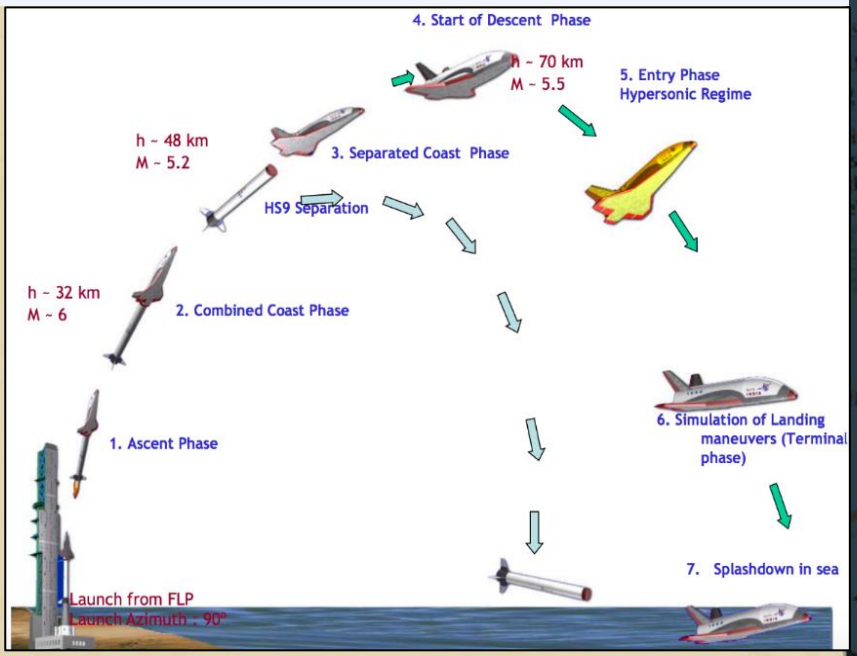
Context: The Indian Space Research Organisation, ISRO, recently achieved the successful landing of its **Reusable Launch Vehicle Pushpak** at the Aeronautical Test Range in Challakere, Chitradurga, Karnataka.

About Reusable Launch Vehicle(RLV)

- **About:** It is a space plane/shuttle, which can travel to low earth orbits to deliver payloads and return to earth for use again (fully reusable launch vehicle).
  - It is designed as an all-rocket, fully reusable single-stage-toorbit (SSTO) vehicle.
- **Aim:** To enable low-cost access to space i.e. capable of launching satellites into orbit around earth and then re-enter the atmosphere.
- **Features**: The configuration of RLV-TD is like that of an aircraft and combines the complexity of both launch vehicles and aircraft.
  - **Winged RLV-TD**: configured to act as a flying test bed to evaluate various technologies, namely, hypersonic flight (HEX), autonomous landing (LEX), return flight experiment (REX), powered cruise flight, and Scramjet Propulsion Experiment (SPEX).

Launch Vehicle Pushpak

- **About**: Indian Air Force Chinook Helicopter hoisted Pushpak to 4.5 km altitude before release.
- **Autonomous Approach and Landing**: Pushpak autonomously navigated towards the runway from 4 km away, adjusting for cross-range factors.
- **Precision Landing and Braking**: Pushpak executed a pinpoint landing on the runway and halted using its brake parachute and nose wheel steering system.



AVATAR (Aerobic Vehicle for Trans atmospheric Hypersonic Aerospace TrAnspoRtation)

- **About:** It is ISRO's planned **reusable launch vehicle platform** which will carry out satellite launches like normal aircraft, takes off vertically and lands back on a runway. It is designed to use **ramjets and scramjets** for thrust.
- **Note:** It is to develop this fully functional AVATAR RLV, that ISRO is conducting a series of RLV – TD technology demonstration missions.

INTELLECTUAL PROPERTY
(Syllabus: GS Paper 3 – Sci and Tech)

Plan to reward patent, IPR creation in technical textiles in the works

Context: India is preparing a framework to reward the industry and academia for developing copyrights, trademarks and patents in technical textiles, which are meant for non-aesthetic purposes.

- The textiles ministry has proposed 10 years of exclusive rights for the industry to commercialise the intellectual property (IP) if their funding contribution is at least 50% in projects funded under the National Technical Textiles Mission (NTTM).

Intellectual Property

- **About**: It refers to creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce.
- **IP is protected by:** Law, for example, patents, copyright and trademarks, GI tag etc., which enable people to earn recognition or financial benefit from what they invent or create.
- **Aim**: To foster an environment in which creativity and innovation can flourish.
- World intellectual property organization (WIPO): It is the global forum for intellectual property (IP) services, policy, information and cooperation.
- **In India**: Department of Industrial Policy & Promotion (DIPP), Ministry of Commerce and Industry is the apex body regulating IPR.
- **Intellectual Property Rights**: It refer to the entitlements granted to individuals for the products of their intellect.
  - Typically, these rights afford the creator exclusive control over the utilization of their creation for a specified duration.

National IPR Policy

- **About**: It is initiated the National Intellectual Property Rights (IPR) Policy in 2016, aligning with the vision of "Creative India; Innovative India".
- **Coverage and Synergies:** The policy encompasses all forms of intellectual property (IP) and aims to establish synergies with other agencies, fostering a conducive environment for innovation.
- **Implementation**: DPIIT, serving as the nodal department for IPR development in India, oversees the policy's implementation through the Cell for IPR Promotion & Management (CIPAM), providing a centralized reference point.
- **International Standards**: India's IPR regime adheres to the Trade Related Aspects of Intellectual Property (TRIPS) agreement of the World Trade Organization (WTO), ensuring alignment with global standards.

PHY.ORG Mar 22

WHITE DWARF

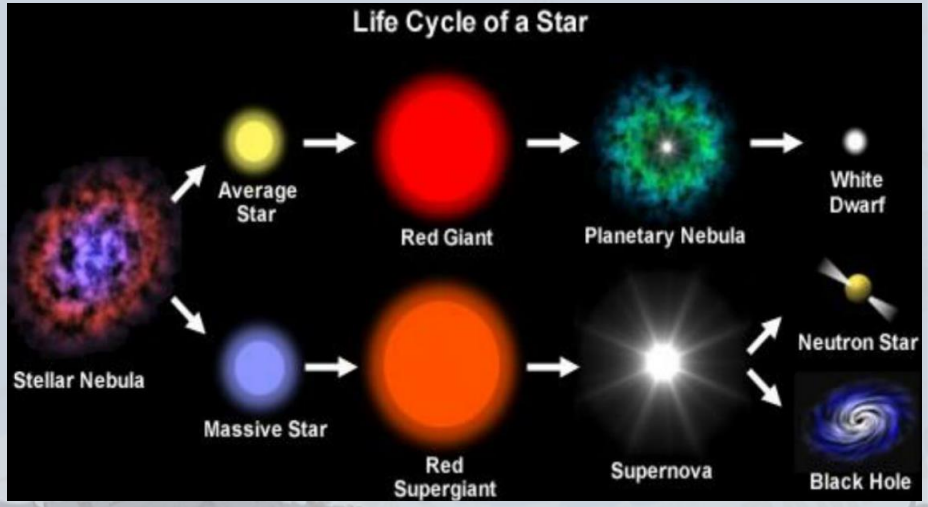
(Syllabus: GS Paper 1 – Geography)

Four new DAQ white dwarfs discovered

Context: Astronomers from the University of Oklahoma and their colleagues report the detection of four white dwarf stars of a recently discovered rare DAQ spectral subclass.

White Dwarf

- **About:** A white dwarf forms from the core **of a dying star**, becoming the endpoint of stars like the Sun after nuclear fuel depletion.
  - Pluto is a dwarf planet located in a distant region of our solar system beyond Neptune known as the Kuiper Belt.
- **Energy Generation**: White dwarfs cease nuclear fusion reactions but maintain high temperatures.
- **Size and Density**: Despite being half as massive as the Sun, white dwarfs are only slightly larger than Earth, making them extraordinarily dense.
- **Composition and Pressure**: Comprising helium, carbon, oxygen nuclei, and energetic electrons, white dwarfs are supported by electron degeneracy pressure.
- **Cooling Process**: Without accreting matter, white dwarfs cool over billions of years, potentially leading to the formation of black dwarfs.
- **Cosmological Significance:** White dwarfs offer insights into past star formation, with their luminosity aiding astronomers in dating stellar origins.
- **X-ray Emission:** Young white dwarfs emit soft X-rays, serving as crucial cosmological records of their progenitor stars.
- **Observational Milestones**: In 2006, Hubble observed white dwarfs in globular star clusters, revealing them as the dimmest stars ever seen in such clusters.



PIB Mar 22

IMT TRILATERAL EXERCISE
(Syllabus: GS Paper 2 – IR)

INDIA - MOZAMBIQUE - TANZANIA TRILATERAL EXERCISE IMT TRILAT- 2024

Context: INS Tir and INS Sujata will participate in the forthcoming edition of India Mozambique Tanzania (IMT) Tri Lateral (TRILAT) Exercise.

IMT Trilateral Exercise

- **About**: This is a collaborative maritime exercise involving India, Mozambique, and Tanzania.
- **Harbour Phase**: Naval ships Tir and Sujata will interact with respective Navies at Zanzibar (Tanzania) and Maputo (Mozambique) ports from 21-24 March 2024.
- **Activities in Harbour Phase**: It will commence with a Planning Conference followed by various joint training activities like Damage Control, Fire Fighting, Visit Board Search and Seizure procedures, Medical Lectures, Casualty Evacuation, and Diving operations.
- **Sea Phase**: Practical aspects of countering asymmetric threats, Visit Board Search and Seizure procedures, boat handling, manoeuvres, and firing exercises will be covered during the sea phase.
    - A joint Exclusive Economic Zone (EEZ) surveillance is planned.
- **Joint Debrief:** The exercise will wrap up with a joint debrief session scheduled at Nacala (Mozambique), fostering collaborative evaluation and learning.

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