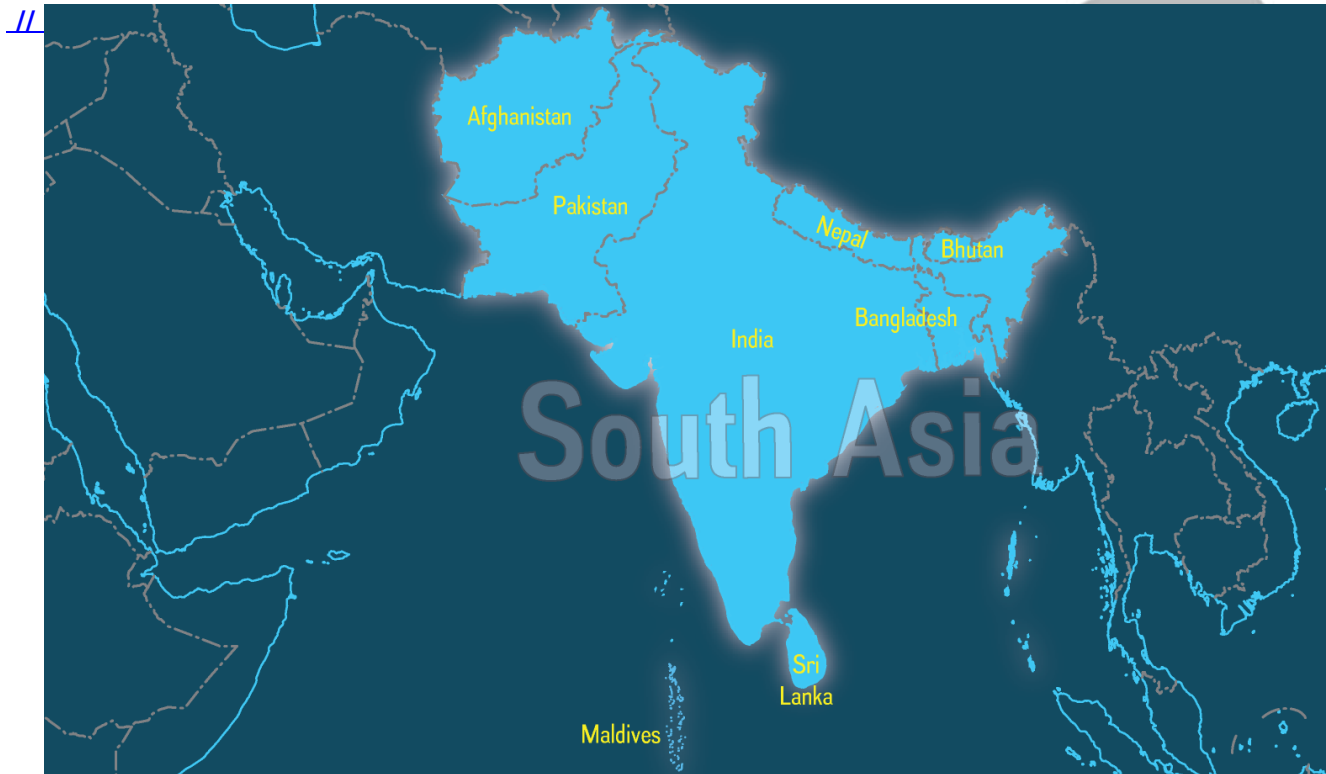




China's Rising Influence in South Asia

Why in News

China has held its **third multilateral dialogue** virtually with countries from **South Asia** to take forward **closer cooperation on fighting Covid-19** and coordinating their **economic agendas**, reflecting a new approach in Beijing's outreach to the region.



Key Points

▪ Participating countries:

- It brought together every country in the region **barring India, Bhutan and the Maldives**, and was aimed at **“anti-epidemic cooperation and poverty reduction cooperation”**.
- The recent meeting was attended by **all five countries** that have taken part in these dialogues: **Pakistan, Nepal, Afghanistan, Sri Lanka and Bangladesh**.
- All three dialogues have been attended by **Pakistan and Nepal**.

▪ Engagements through other Platforms:

- Previously at the July **quadrilateral dialogue** with Afghanistan, Nepal and Pakistan, China's proposed extending the **China-Pakistan Economic Corridor** (CPEC) to Afghanistan, as well as taking forward an **economic corridor plan** with Nepal, called the **Trans-Himalayan Multi-dimensional Connectivity Network**.

▪ Other Initiatives by China to Enhance Engagement in South Asia:

- According to the **American Enterprise Institute's China Global Investment Tracker**, China has committed around **100 billion USD** in the economies of Afghanistan, Bangladesh, the Maldives, Pakistan, Nepal and Sri Lanka.
 - China is now the **largest overseas investor** in the Maldives, Pakistan, and Sri Lanka.
- **Afghanistan:**
 - Beijing was a part of the **trilateral China-Pakistan-Afghanistan foreign ministers dialogue** which focuses on facilitating Afghan domestic political reconciliation, enhancing regional connectivity, and improving regional common development.
 - The trilateral discussions also agreed to push **“forward under the [Belt and Road Initiative \(BRI\)](#)” and “to enhance connectivity by extending the CPEC to Afghanistan”**.
- **Bangladesh:**
 - China and Bangladesh pledged to deepen defense cooperation, especially in the areas of **“defense industry and trade, training, equipment and technology**.
 - China is also the **largest arms supplier of the Bangladeshi military, providing 71.8%** of weapons from 2008 to 2018.
- **Bhutan**
 - It **does not have diplomatic relations** with China.
- **Maldives:**
 - China's relationship with the Maldives is near-exclusively focused on leveraging BRI to develop Maldives as well as to raise Chinese influence there to counter India.
- **Nepal:**
 - Chinese President went to Nepal in 2019.
 - This was the **first visit by a Chinese head of state in 23 years**.
 - The countries have signed agreements to **accelerate Infrastructure building in Nepal and improve connectivity between them**.
 - Both the countries have also announced the launch of a **feasibility study of the China-Nepal cross-border railway**.
- **Sri Lanka:**
 - Sri Lanka handed over **Hambantota port** on a 99-year lease to China to repay its loan back to china. **Hambantota is geostrategically located on the Indian Ocean, potentially bolstering Beijing's String of Pearls**.

▪ Concerns for India:

- **Security Concerns:**
 - Growing cooperation between Pakistan and China.
 - Increasing nexus between Nepal and China.
 - Acceptance to China-Pakistan Economic Corridor by south asian countries.
- **Leadership Roles in South Asia:**
 - It shows increasing chinese presence in south asia and its acceptance by the countries as a torch bearer for the region which India wants for itself.
- **Economic Concerns:**
 - Over the past decade, China has replaced India as the **major trading partner of several South Asian countries**. For instance, the share of India's trade with

Maldives was **3.4 times that of China's in 2008**. But by 2018, **China's total trade with Maldives slightly exceeded that of India**.

- China's trade with **Bangladesh is now about twice that of India**. China's trade with Nepal and Sri Lanka **still lags India's trade with those countries but the gap has shrunk**.

Way forward

- India does not have the **economic capacity as China**. Thus it should cooperate with China for the development of these countries such that fruits of development collectively reach South Asia.
- It should also **strongly condemn the plans for extension of the China-Pakistan Economic Corridor**.
- Further India should invest in these countries where **China falls short** and maintain its good will in South Asia and prevent these nations from slipping off from **India's Influence**.

[Source:TH](#)

Quantum Technology

Why in News

The detailed project report for a [National Mission on Quantum Technology and Applications \(NMQTA\)](#) has been drawn out and finalised.

- **Union Budget 2020-21 proposed** to spend **Rs 8,000 crore** on the newly launched **NMQTA**.
- In 2018, the **Department of Science & Technology** unveiled a programme called [Quantum-Enabled Science & Technology \(QuEST\)](#) and committed to investing Rs. 80 crore over the next three years to accelerate research.
 - The mission **seeks to develop quantum computing linked technologies amidst the second quantum revolution** and make **India the world's third-biggest nation in the sector** after the US and China.



- The areas of focus for the NM-QTA Mission will be in fundamental science, translation, technology development and towards addressing issues concerning national priorities
- The mission can help prepare next generation skilled manpower, boost translational research and also encourage entrepreneurship and start-up ecosystem development.
- Quantum principles will be used for engineering solutions to extremely complex problems in computing, communications, sensing, chemistry, cryptography, imaging and mechanics



- Their applications which will be boosted include those in aero-space engineering, numerical weather predictions, simulations, securing the communications & financial transactions, cyber security, advanced manufacturing, health, agriculture, education
- It can bring India in the list of few countries with an edge in this emerging field will have a greater advantage in garnering multifold economic growth and dominant leadership role



Key Points

▪ About Quantum Technology/Computing:

- Quantum Technology is **based on the principles of Quantum mechanics that was developed in the early 20th century** to describe nature at the scale of **atoms and elementary particles**.
- The first phase of this revolutionary technology has **provided the foundations of our understanding of the physical world, including the interaction of light and matter**, and led to ubiquitous inventions such as **lasers and semiconductor transistors**.
- A second revolution is currently underway with the **goal of putting properties of quantum mechanics in the realms of computing**.

▪ Difference Between Conventional and Quantum Computing:

- **Conventional computers** process information in **'bits' or 1s and 0s**, following classical physics under which our computers can process a '1' or a '0' at a time.
- **Quantum computers** compute in **'qubits' (or quantum bits)**. They exploit the properties of quantum mechanics, the science that governs how matter behaves on the atomic scale.

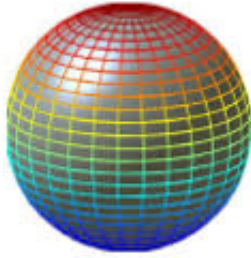
- In this scheme of things, processors can be a 1 and a 0 simultaneously, a state called quantum superposition.
- Because of quantum superposition, a quantum computer — if it works to plan — can **mimic several classical computers working in parallel**.

Bit
0



1

Qubit
0



1

▪ Properties of Quantum Computing:

- The basic properties of quantum computing are **superposition, entanglement, and interference.**

• Superposition:

- It is the ability of a quantum system to be in **multiple states simultaneously.**
- The example of superposition is the flip of a coin, which consistently lands as heads or tails—a very binary concept. However, when that coin is in mid-air, it is both heads and tails and until it lands, heads and tails simultaneously. Before measurement, the electron exists in quantum superposition.

BITS

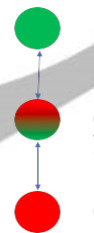
vs

QBITS

Classical Computer – Operations on BITS



Quantum Computer – Operations on Quantum BITS



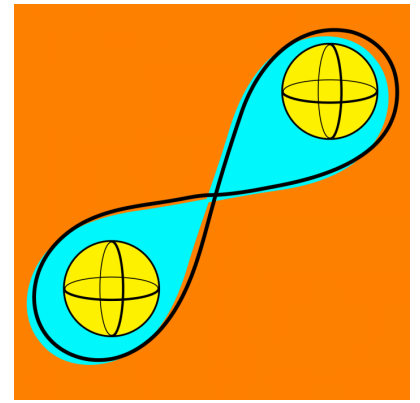
0 and 1 at the same time
"SUPERPOSITION"



Qubits can take same value simultaneously. This characteristic expands the possibility of parallel calculations

• Entanglement:

- It means the two members of a pair (Qubits) exist in a single quantum state. Changing the state of one of the qubits will instantaneously change the state of the other one in a predictable way. This happens even if they are separated by very long distances.
- Einstein called spooky '**action at a distance**'.



- **Interference:**

- Quantum interference states that elementary particles (Qubits) can not only be in more than one place at any given time (through superposition), but that an individual particle, such as a photon (light particles) can cross its own trajectory and interfere with the direction of its path.

- **Applications of Quantum Technology:**

- **Secure Communication:**

- [China recently demonstrated](#) secure quantum communication links between terrestrial stations and satellites.
- This area is **significant to satellites, military and cyber security** among others as it promises unimaginably fast computing and safe, unhackable satellite communication to its users.

- **Research:**

- It can **help in solving some of the fundamental questions in physics related to gravity, black hole etc.**
- Similarly, the quantum initiative could give a big boost to the [Genome India project](#), a collaborative effort of 20 institutions to enable new efficiencies in life sciences, agriculture and medicine.

- **Disaster Management:**

- [Tsunamis](#), [drought](#), [earthquakes](#) and [floods](#) may become more predictable with quantum applications.
- The collection of data regarding [climate change](#) can be streamlined in a better way through quantum technology.

- **Pharmaceutical:**

- Quantum computing **could reduce the time frame of the discovery of new molecules and related processes** to a few days from the present 10-year slog that scientists put in.

- **Augmenting Industrial revolution 4.0:**

- Quantum computing is an integral part of [Industrial revolution 4.0](#).
- Success in it will help in **Strategic initiatives aimed at leveraging other Industrial revolution 4.0 technologies** like the [Internet-of-Things](#), machine learning, [robotics](#), and [artificial intelligence](#) across sectors will further help in laying the foundation of the Knowledge economy.

- **Challenges Associated with Quantum Computing:**

- The dark side of quantum computing is the **disruptive effect that it can have on cryptographic encryption, which secures communications and computers.**
- It might pose a challenge for the government also because if this technology goes into wrong hands, all the **government's official and confidential data will be at a risk of**

being hacked and misused.

Way Forward

- Long after the birth of social media and artificial intelligence, there are now demands to regulate them. **It would be prudent to develop a regulatory framework for quantum computing before it becomes widely available.**
- It will be better to **regulate it or define the limits of its legitimate use, nationally and internationally** before the problem gets out of hand like nuclear technology.

[Source:TH](#)

CAFE-2 Regulations and BS-VI Stage II Norms

Why in News

The **auto industry** has requested the government to **defer the implementation** of **Corporate Average Fuel Efficiency (CAFE-2)** regulations and **BS-VI stage II norms** to **April 2024**, given the impact of the [lockdown](#) measures.

- **As of now**, the **CAFE-2 norms** and **BS-VI stage II norms** are set to come into effect in **2022** and **April 2023** respectively.

Key Points

- **Corporate Average Fuel Efficiency (CAFE-2) Regulations:**
 - **About:**
 - **CAFE or Corporate Average Fuel Efficiency/Economy** regulations are in force in many advanced as well as developing nations, including India.
 - They **aim at lowering fuel consumption** (or improving fuel efficiency) of vehicles by **lowering Carbon dioxide (CO₂) emissions**, thus serving the **twin purposes** of **reducing dependence on oil** for fuel and **controlling pollution**.
 - **Corporate Average** refers to **sales-volume** weighted average for every auto manufacturer. The idea of CAFÉ is to push manufacturers to achieve fuel efficiency targets by **producing and selling more fuel-efficient models**, including [electric vehicles](#)
 - **Launch in India:**
 - The CAFÉ standards **were first notified in 2017** by the Union **Ministry of Power (MoP)** under **Energy Conservation Act, 2001**.
 - The regulation is **in accordance with the fuel consumption standards of 2015** that aim to **increase fuel efficiency of vehicles road by 35% by 2030**.
 - The **Ministry of Road Transport and Highways (MoRTH)** is the **nodal agency** responsible for monitoring and reporting a summary of annual fuel consumption by automobile manufacturers at the end of each fiscal year.
 - The regulation was **introduced in two target phases: Carbon dioxide emission target of 130 gram/kilometre by 2022-23** and **113 g/km 2022-23 onwards**.
 - **Applicability:**

- The norms are applicable for **petrol, diesel, Liquefied Petroleum Gas (LPG) and Compressed Natural Gas (CNG) passenger vehicles.**

- **BS-VI Stage II Norms:**

- Bharat Stage (BS) emission standards are laid down by the government to **regulate the output of air pollutants from internal combustion engine and spark-ignition engine equipment**, including motor vehicles.
- These standards are targeted at making **improvements in three areas** - emission control, fuel efficiency and engine design.
- The central government has **mandated** that vehicle makers must manufacture, sell and register **only BS-VI (BS6) vehicles from 1st April, 2020.**
- BS-VI is **equivalent to Euro-VI norms** currently in place across countries in Europe.
- As per BS-VI emission norms, **petrol vehicles** will have to effect **a 25% reduction in their NOx**, or nitrogen oxide emissions. **Diesel engines** will have to **reduce their HC+NOx** (hydro carbon + nitrogen oxides) **by 43%**, their **NOx levels by 68%** and **particulate matter levels by 82%.**
- **Sulphur content** in fuel is a **major cause for concern.** BS-VI fuel's sulphur content is much lower than BS-IV fuel. It is reduced to 10 mg/kg max in BS-VI from 50 mg/kg under BS-IV.
- Some of the **measures to be introduced from 2023 onwards** include deciding the **confirmatory factor for in-service compliance, market surveillance and independent verification testing** of in-use vehicles by regulatory authorities, adoption of **more stringent driving cycle for emissions testing, public disclosure of emissions data** by the manufacturers on publicly accessible websites, and **on-board fuel consumption meters** among others.

[Source: IE](#)

Pravasi Bharatiya Divas

Why in News

Pravasi Bharatiya Divas (PBD) is **celebrated on 9th January every year** to mark the contribution of **Overseas Indian community** in the development of India.

- On the occasion, several events such as **PBD Convention, Pravasi Bharatiya Samman Award** and **Bharat ko Janiye Quiz** are organised.

Key Points

- **Background:**

- **9th January** was chosen as the day to celebrate PBD since it was **on this day in 1915 that Mahatma Gandhi, the greatest Pravasi, returned to India from South Africa**, led India's freedom struggle and changed the lives of Indians forever.

- **PBD Conventions:** These are **held once every two years.**

- **PBD 2021:** The **16th PBD Convention** was held virtually in New Delhi. The **theme** was **"Contributing to Aatmanirbhar Bharat"**.
- **Chief Guest:** President of Suriname Chandrikapersad Santokhi.

- **Highlights:**

- **Response to the Pandemic:**

- Despite dependence on critical things like PPE kits, masks, ventilators or testing kits, India developed its capabilities not only to become self-reliant but started exporting many things.
 - India's drugs regulator has **approved** the Oxford Covid-19 vaccine **Covishield**, manufactured by the Serum Institute, and **indigenously developed Covaxin** of Bharat Biotech for restricted emergency use in the country.

- **Use of Technology:**

- India is using technology to **end corruption** ([Direct Benefit Transfer](#)).
 - Further, **India's space programme** and **tech start-up ecosystem** is a leader in the global sphere.

- **Recent Initiatives:**

- Including [New Education Policy 2020](#) and [Production Linked Subsidies Scheme](#).

- **Initiatives for Indian Diaspora:**

- [Vande Bharat Mission](#), in which more than 45 lakh Indians were rescued during Corona times.
 - [Skilled Workers Arrival Database for Employment Support \(SWADES\)](#), an initiative for returning immigrants from the Gulf and other areas.
 - **Global Pravasi Rishta Portal** for better connectivity and communication with the Pravasi Bharatiyas.

- **75th Anniversary of India's Freedom (2021):**

- The Prime Minister **asked the members of the diaspora** and people in Indian Missions world over to prepare a portal, a digital platform where contribution of the Pravasi Bharatiyas in the freedom struggle of India can be documented.

- **Pravasi Bharatiya Samman Award:**

- It is the **highest honour conferred on a Non-Resident Indian, Person of Indian Origin;** or an organisation or **institution established and run by Non-Resident Indians** or Persons of Indian Origin, who have made significant contribution in better understanding of India abroad, support India's causes and concerns in a tangible way, community work abroad, welfare of local Indian community, philanthropic and charitable work, etc.
 - During the PBD convention, select eminent Indian diaspora members are awarded the Pravasi Bharatiya Samman Awards in the presence of the President of India.
 - **30 Winners of the 2021 Award:** Including **Suriname President Chandrikapersad Santokhi**, **Curacao Prime Minister Eugene Rhuggenaath** and **New Zealand minister Priyanca Radhakrishnan**.

- **Third Edition Bharat ko Janiye Quiz (2021):**

- It was **launched in 2015-16** in order to **strengthen the engagement with young overseas Indians (18-35)** and encourage them to know more about their country of origin.
 - The first edition was held in 2015-16 and the second one in 2018-19.
 - **Fifteen winners** of the Quiz were announced during the PBD convention and **will be invited for an India Tour** (Bharat ko Janiye Darshan) after Covid.

[Source:PIB](#)

MukundPura Meteorite

Why in News

A recent study has shed light on the mineralogy of the meteorite named Mukundpura CM2 which fell in Mukundpura village near Jaipur in **2017**.

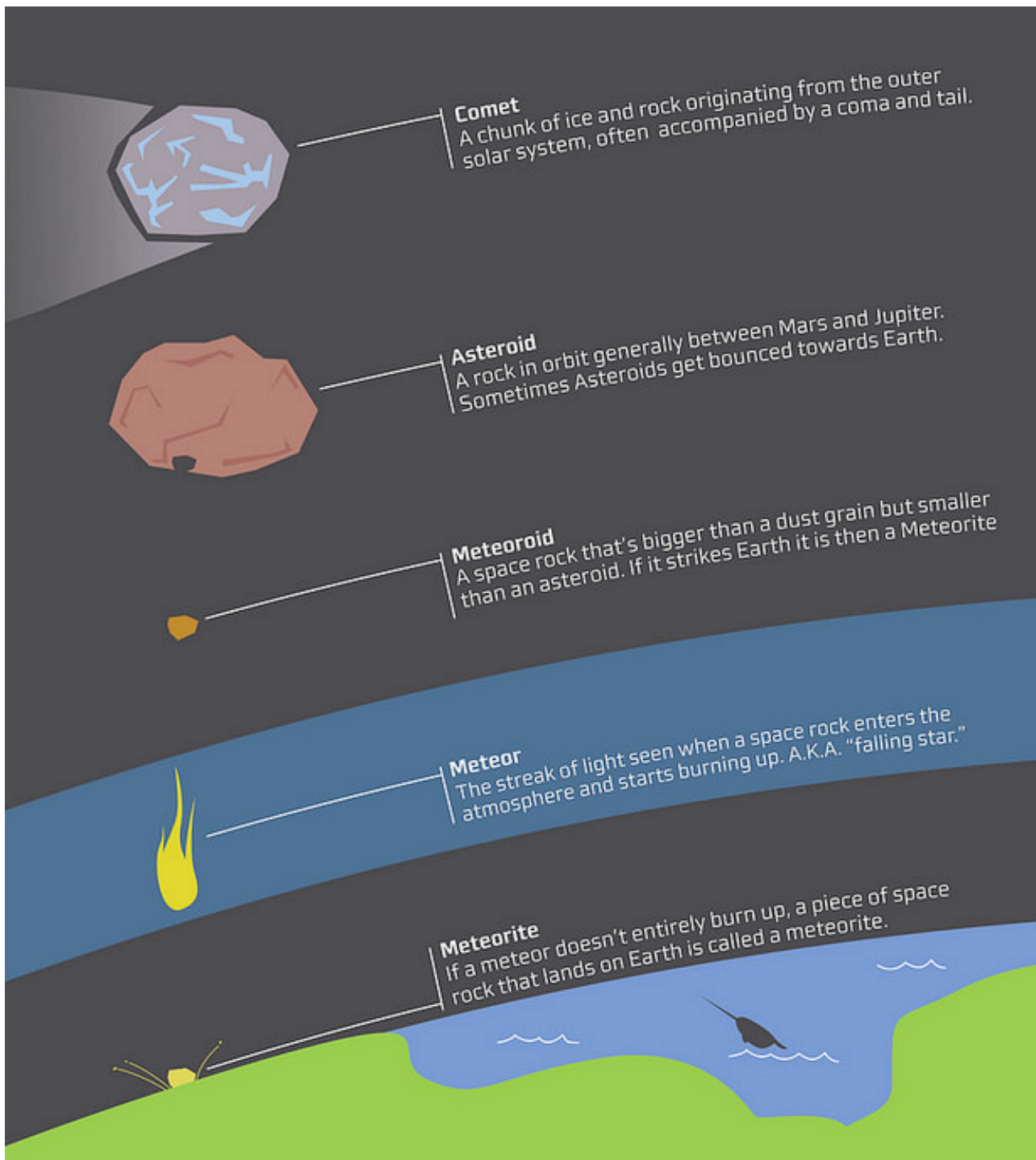
- A meteorite is a **solid piece of debris** from an object, such as a [comet](#), [asteroid](#), or **meteoroid**, that **originates in outer space** and survives its passage through the atmosphere to reach the **surface of a planet or moon**.

Key Points

- **About:**
 - The meteorite named **Mukundpura CM2** was classified to be a **carbonaceous chondrite**. The composition of carbonaceous chondrites are also similar to the Sun.
 - Chondrites are silicate droplet bearing meteorites, and this Mukundpura chondrite is the **5th carbonaceous meteorite known to fall in India**.
- **Classification Of Meteorite:**
 - Meteorites are classified into **three groups: Stony** (silicaterich), **Iron** (Fe-Ni alloy), and **Stony Iron** (mixed silicate iron alloy).
 - **Mukundpura CM2** is a type of **stony meteorite**, considered the **most primitive meteorite** and a remnant of the first solid bodies to accrete in the solar system.
- **Components of Meteorite:**
 - Detailed spectroscopic studies revealed that the **meteorite had very high (about 90%) phyllosilicate minerals** comprising both **magnesium and iron**.
 - **Forsterite and FeO olivine, calcium aluminium rich inclusion (CAI) minerals**.
 - Few **magnetites, sulphides, aluminium complexes and calcites** were also found.
- **Importance of studying Asteroid:**
 - **Understanding of Solar system's history.**
 - How the solar system evolved into the Sun and planets of today.
 - The effects of impact of meteorites.
 - They are often rich in volatiles and other minerals and can be **exploited for future planetary exploration**.

Difference between Meteor, Meteorite and Meteoroid

- When **meteoroids** enter Earth's atmosphere (or that of another planet, like Mars) at **high speed and burn up**, the fireballs or "**shooting stars**" are called **meteors**.
- When a meteoroid **survives a trip through the atmosphere and hits the ground**, it's called a **meteorite**.



[Source:TH](#)

Domestic Exploration of Lithium

Why in News

Recent surveys by the **Atomic Minerals Directorate for Exploration and Research (AMD)** have

shown the presence of **lithium resources in Mandya district**, Karnataka.

- AMD is the oldest unit of the **Department of Atomic Energy**.

Key Points

▪ About Lithium:

◦ Properties:

- It is a chemical element with the symbol **Li**.
- It is a soft, silvery-white metal.
- Under standard conditions, it is the **lightest metal** and the **lightest solid element**.
- It is highly **reactive and flammable, and must be stored in mineral oil**.
- It is **an alkali metal and a rare metal**.

- The **alkali metals** consist of the chemical elements **lithium, sodium, potassium, rubidium, caesium, and francium**. Together with hydrogen **they constitute group 1**, which lies in the **s-block** of the periodic table.
- **Rare Metals** (RM) include Niobium (Nb), Tantalum (Ta), Lithium (Li), Beryllium (Be), Cesium (Cs) etc. and **Rare Earths** (RE) include Lanthanum (La) to Lutetium (Lu) besides Scandium (Sc) and Yttrium (Y).

- These **metals are strategic in nature** with wide application in the nuclear and other high tech industries such as electronics, telecommunication, information technology, space, defense etc.

◦ Uses:

- Lithium metal is used to make **useful alloys**.
 - For example, with lead to make **'white metal'** bearings for motor engines, with **aluminium to make aircraft parts**, and with **magnesium to make armour plates**.
- In Thermonuclear reactions.
- To make **electrochemical cells**. Lithium is an important component in **Electric Vehicles**, Laptops etc.

▪ Lithium Resources in Karnataka:

- The survey shows presence of **1,600 tonnes of lithium resources** in the **igneous rocks** of the **Marlagalla-Allapatna** region of **Karnataka's Mandya district**.

▪ Benefits of Domestic Exploration:

◦ Reducing Import Bill:

- **India currently imports all its lithium needs**. Over 165 crore lithium batteries are estimated to have been imported into India between 2016-17 and 2019-20, at an estimated import bill of upwards of **USD 3.3 billion**.

◦ Reducing Overdependence on China:

- China is a major source of **lithium-ion energy storage products** being imported into the country.

▪ Issues Associated with Domestic Exploration:

- The new find is categorised as **"inferred"**.

- The **'inferred'** mineral resource is the part of a resource for which **quantity, grade and mineral content** are estimated only with a **low level of confidence**

based on information gathered from locations such as **outcrops, trenches, pits, workings, and drill holes** that may be of limited or uncertain quality, and also of lower reliability.

- The lithium find is **comparatively small**, considering the size of the proven reserves in **Bolivia, Argentina, Australia, and China respectively**.
- India is seen as a **late mover in attempts to enter the lithium value chain**, coming at a time when **Electric Vehicles** are predicted to be a **sector ripe for disruption**.
- 2021 is likely to be a turning point for battery technology with several **potential improvements to the li-ion technology**, and alternatives to this tried-and-tested formulation in [advanced stages of commercialisation](#).

▪ **Extraction Method:**

- Lithium can be extracted in different ways, depending on the type of the deposit .

- **Solar evaporation** of large **brine pools**.

- A **brine pool** is a volume of brine collected in a seafloor depression.
- For example: Brines of **Sambhar and Pachpadra** in Rajasthan.

- **Hard-rock extraction of the ore** (a metal-bearing mineral).

- For example: **rock mining at Mandya**.

▪ **Other Potential Sites:**

- The major **mica belts** in **Rajasthan, Bihar, and Andhra Pradesh**.
- **Pegmatite** (igneous rocks) belts in **Odisha and Chhattisgarh**.
- Brines of **Sambhar and Pachpadra** in Rajasthan, and **Rann of Kachchh** in Gujarat.

▪ **Other Government Initiative:**

- India, through a newly state-owned company **Khanij Bidesh India Ltd**, had **signed an agreement with an Argentinian firm** to jointly prospect lithium in Argentina that has the **third largest reserves of the metal in the world**.
- The company has a specific mandate **to acquire strategic mineral assets such as lithium and cobalt abroad**.

[Source:IE](#)

Jagannath Temple

Why in News

Recently, the **Shree Jagannath Temple Administration (SJTA)** announced that devotees don't need to produce their [Covid-19 negative report](#) for getting entry into the shrine in Puri from January 21.

- **At present** devotees entering the temple **have to show Covid-19 negative reports**.
- The temple **opened to the public from 3rd January** after remaining closed for nine months in the wake of the [pandemic](#).

Key Points

- The temple is believed to be constructed in the **12th century by King Anatavarman Chodaganga Deva of the Eastern Ganga Dynasty**.

- Jagannath Puri temple is **called 'Yamanika Tirtha'** where, according to the Hindu beliefs, the power of 'Yama', the god of death has been nullified in Puri due to the presence of Lord Jagannath.
- This temple was called the **"White Pagoda"** and is a **part of Char Dham pilgrimages (Badrinath, Dwaraka, Puri, Rameswaram)**.
- There are **four gates** to the temple- **Eastern 'Singhdwara'** which is the main gate with two crouching lions, **Southern 'Ashwadwara'**, **Western 'Vyaghra Dwara'** and **Northern 'Hastidwara'**. There is a carving of each form at each gate.
- In front of the entrance stands the Aruna stambha or sun pillar, which was originally at the [Sun Temple in Konark](#).



[Source:TH](#)

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