

Factly Weekly

Compilation

2024

**For UPSC CSE Prelims
Exam**

**1st Week
June 2024**

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UPSC Syllabus: Environment

Canopy Bridges for Gibbons in Assam

Why in News?

The Northeast Frontier Railway (NFR) has allocated funds to build canopy bridges, allowing India's only ape to safely traverse a railway track that divides its primary habitat in eastern Assam.

About Canopy Bridges for Gibbons in Assam

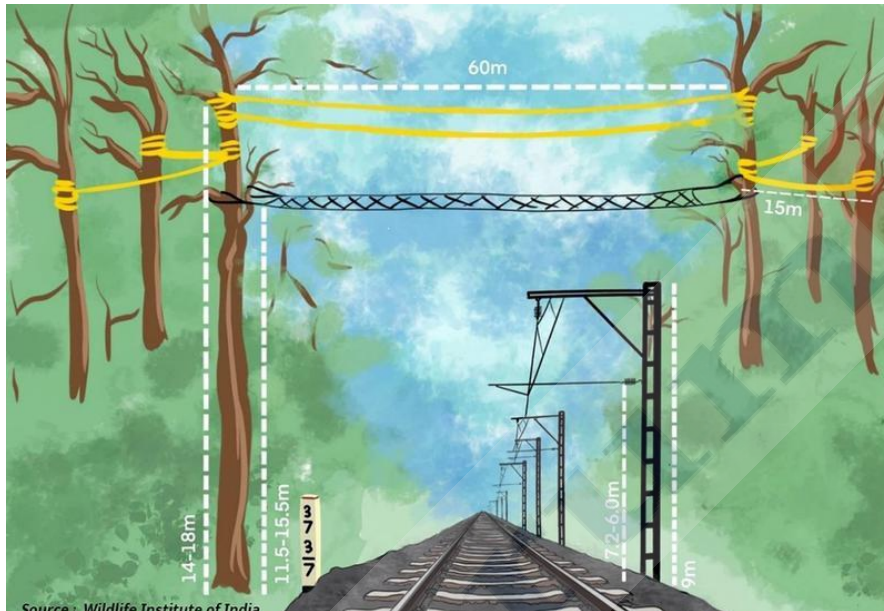


Figure 1. Source: The Hindu

1. About: Northeast Frontier Railway (NFR) will construct canopy bridges in Assam's gibbon habitat.

2. Purpose: To facilitate the movement of Hoolock gibbons across a railway track that divides their prime habitat in [Hollongapar Gibbon Sanctuary](#).

3. Designed by: Canopy bridges are designed by the [Wildlife Institute of India \(WII\)](#) in collaboration with [NFR](#). The project involves [NFR](#), [Assam State Forest Department](#), [WII](#), and other stakeholders.

4. These bridges will be **installed at strategic points** to ensure the safe movement of gibbons between the divided sections of the sanctuary.

5. **High-grade fastening materials and techniques** will be used to secure the bridges. **Safety nets** will be installed below the bridges as a fail-safe mechanism.

6. **Lianas and creepers** will be **guided along the bridges** to make them look natural.

7. **Previous Efforts:** Past efforts included an artificial canopy bridge by NFR and a natural canopy bridge by the Assam State Forest Department and Aaranyak. Gibbons preferred the natural bridge over the artificial one.

About Hoolock Gibbons

Aspects	Description
About	Gibbons are the smallest and fastest of all apes.
Characteristics	Hoolock gibbons are known for their intelligence, distinct personalities, and strong family bonds .

Habitat	1. They inhabit tropical and subtropical forests in Southeast Asia . 2. They are found in forested areas of Northeast India, Bangladesh, Myanmar, and Southern China .
Population	The estimated current population of hoolock gibbons is approximately 12,000 individuals .
Threats	1. All 20 gibbon species, including hoolock gibbons, face a high risk of extinction due to various conservation challenges. 2. Habitat Decline: Gibbon populations and their habitats have significantly declined over the past century, now restricted to small areas in tropical rainforests. 3. Primary Threat in India: The main threat to hoolock gibbons is habitat loss due to deforestation for infrastructure projects.
Conservation Status	1. International Union for Conservation of Nature’s Red List: a) Western Hoolock Gibbon: Endangered b) Eastern Hoolock Gibbon: Vulnerable 2. Indian Wildlife Protection Act 1972: Both species are listed on Schedule 1.

Air of the Anthropocene Initiative

Why in News?

The “**Air of the Anthropocene**” project uses **light painting** to visualize air pollution in India, Ethiopia, and the UK. This emphasizes severe health risks and ignites global discussions on air quality.

About the ‘Air of the Anthropocene’ Initiative

1. The “Air of the Anthropocene” project is an **international effort** that combines art and science to show air pollution in a visual way using light painting.
2. Artists and researchers worked together to create **photographic evidence of air pollution by using digital light painting techniques** and low-cost air pollution sensors.
3. The “painting with light” team used low-cost air pollution sensors to measure PM mass concentrations. They used the sensors’ real-time data to control a moving LED array, which flashed more rapidly as PM concentrations increased.

About Particulate Matter

1. Particulate matter (PM) is a mixture of tiny solid particles and liquid droplets floating in the air. It includes things like **dust, pollen, soot, smoke, and liquid drops**.

PM10- inhalable particles, with diameters that are generally 10 micrometers and smaller; and

PM2.5- fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.

2. These particles can be both **organic** (from living things) and **inorganic** (from non-living things) and come in various sizes and from different sources.

UPSC Syllabus: Reports

UNESCO's State of Ocean Report 2024

Why in News?

Recently, UNESCO State of Ocean Report 2024 has been published by United Nations.

About the UNESCO State of Ocean Report 2024

1. The UNESCO 'State of the Ocean Report' was started by the Intergovernmental Oceanographic Commission (IOC-UNESCO) during the 2022 United Nations Ocean Conference.
2. This report provides an easy-to-understand overview of the ocean's current condition. It helps track the progress of the UN Decade of Ocean Science for Sustainable Development (2021–2030) and encourages efforts towards creating a sustainable future for our oceans.
3. The first report in 2022 included insights from over 100 marine science experts on topics like ocean acidification, pollution, and tsunami warnings.
4. New editions of the report are released every year on World Oceans Day (June 8). These reports align with the seven goals of the UN Ocean Decade.

Key Highlights of the report

1. **Ocean Warming:** The upper 2,000 meters of the oceans have been warming significantly. The rate of warming has increased from 0.32 ± 0.03 watts per square meter (W/m^2) to 0.66 ± 0.10 W/m^2 in the past 20 years.
2. **Energy Absorption:** Oceans are absorbing about 90% of the Earth's excess energy. This causes deoxygenation (loss of oxygen), which threatens marine ecosystems and human economies that rely on them.
3. **Ocean Acidification:** The acidity of the ocean is increasing globally, especially in the open ocean, with a notable drop in pH since the late 1980s.
4. **Sea Level Rise:** Sea levels have been rising steadily since 1993. Better monitoring systems are needed to track this at all levels.
5. **Marine Carbon Dioxide Removal:** There is growing interest in technologies to remove carbon dioxide from the ocean, but their effectiveness and environmental impact are still uncertain.

UPSC Syllabus: Geography

Impact of the Hunga Tonga-Hunga Ha'apai Eruption

Why in News?

Recently, a study was conducted in the Journal of Climate to investigate the climatic effects caused by the eruption of Hunga Tonga-Hunga Ha'apai volcano. It erupted on January 15, 2022, in Tonga, generating a tsunami and triggering warnings across the Pacific basin.

Findings of the study

1. Ozone Layer Effect: From August to December 2023, there was a large hole in the ozone layer partly because of the Hunga Tonga eruption. This effect on the ozone was short-term and not expected to last past 2023.

2. Weather Changes: The eruption caused some unusual weather changes:

- i) Australia had a wetter summer in 2024, which is not usual for an El Niño year when it's typically drier.
- ii) The global average temperature only went up by a tiny bit, around 0.015 degrees Celsius.

3. Regional Climate Effects:

- i) Northern Australia might experience colder and wetter winters than usual up to 2029.
- ii) North America could see warmer winters during the same period.
- iii) Scandinavia might have colder winters.

4. Atmospheric Changes: The eruption changed the way air moves in the atmosphere, which could affect weather patterns.

How is Hunga Tonga Different from Typical Volcanic Eruptions?

1. Unique Eruption: Hunga Tonga-Hunga Ha'apai is an underwater volcano that erupted on January 15, 2022. This eruption was extraordinary because it shot a huge amount of water vapor high into the sky, into the stratosphere (about 15-40 kilometers above the Earth).

2. Usual Volcanic Effects: Typically, volcanoes release smoke and sulfur dioxide which leads to a cooling effect on Earth. This happens because sulfur dioxide turns into tiny particles that float in the air and reflect sunlight away from Earth.

3. Hunga Tonga's Impact: Being underwater, Hunga Tonga didn't produce much smoke but sent 100-150 million tonnes of water vapor into the stratosphere instead.

4. Effects of Water Vapor: In the stratosphere, water vapor can harm the ozone layer and act like a greenhouse gas, which might warm the Earth.

About Hunga Tonga-Hunga Ha'apai volcano

1) Location: The Hunga Tonga-Hunga Ha'apai volcano is situated in the western South Pacific Ocean, west of Tonga's main inhabited islands.

2) Type of Volcano: It is a submarine volcano, one of twelve along the Tofua Arc, part of the larger Tonga-Kermadec volcanic arc.

3) Geological Formation: This arc is formed by the subduction of the Pacific Plate beneath the Indo-Australian Plate.

4) Composition: The volcano includes two small, uninhabited islands named Hunga-Ha'apai and Hunga-Tonga.

UPSC Syllabus: World geography, Environment

Sunkoshi River

Why in News?

Under the **PLEASE (Plastic Free Rivers and Seas of South Asia)** program, a river cleanup campaign has **successfully removed 24,575 kg of waste from the Sunkoshi River banks** and waste hotspots.

About Sunkoshi River

News

Aspects	Description
About	<ol style="list-style-type: none"> 1. It is also known as the "river of gold," the Sunkoshi is located in Nepal and is part of the Koshi or Saptkoshi River system. 2. This river is among the longest and most rafted in Nepal.
Course	<ol style="list-style-type: none"> 1. The Sunkoshi originates from the Zhangzangbo Glacier in Tibet. 2. It merges with the Saptkoshi River and eventually joins the Ganga (known as the Ganges) in the Katihar district of Bihar, India. 3. It drains into the Bay of Bengal in Bangladesh.

About Koshi River

Aspects	Description
About	<ol style="list-style-type: none"> 1. The Koshi River is a transboundary river that flows through China, Nepal, and India. 2. It serves as a prominent tributary of the Ganges. 3. The Kosi River has earned the nickname "the sorrow of Bihar" due to its history of flooding and frequent alterations in its course as it flows from Nepal to Bihar
Course	<ol style="list-style-type: none"> 1. It originates from the Tibetan Plateau and crosses the Himalayas and flows through the Mahabharat range and Siwalik hills. 2. It reaches the plains of eastern Nepal and finally meets the Ganges in Bihar, India. 3. The Kosi drains an area of 74,500 sq.km, with only 11,070 sq.km lying within Indian Territory. The Koshi River system drains about 45% of Nepal. 4. The Kosi River valley is bounded by steep margins, disconnecting it from other rivers such as the Yarlung Zangbo River, Mahananda River, Gandaki, and Ganga. 5. The Koshi River is known for its tendency to change course, often flowing westward. Over the last 200 years, it has shifted westwards by approximately 112 km, causing significant changes to agricultural land.
Tributaries	The Koshi River has seven major tributaries: Sun Koshi, Tama Koshi (or Tamba Koshi), Dudh Koshi, Indravati, Likhu, Arun, and Tamore (or Tamar).

UPSC Syllabus: Geography

Mount Kanlaon

Why in News?

Recently, Mount Kanlaon on Negros island exploded sending a plume of ash, rocks and gases five kilometres.

Mount Kanlaon

About	Description
About	<ol style="list-style-type: none">1. Mount Kanlaon is a stratovolcano located in the north-central part of Negros Island in the Philippines.2. It is the highest mountain on Negros Island and the 42nd tallest peak on an island worldwide.3. Kanlaon is one of the active volcanoes in the Philippines and is part of the Pacific Ring of Fire.4. The volcano has several pyroclastic cones and craters.
Geological Features	<ol style="list-style-type: none">1. The summit of Kanlaon features a broad, elongated caldera with a crater lake, and a smaller, more active crater to the south.2. It is made up of tropical volcanic materials, including sheeted lava flows, lahar deposits, airfall tephra, and apron pyroclastic materials.3. Mount Kanlaon is home to a wide variety of flora and fauna.4. The slopes of Kanlaon serve as headwater catchments for major river systems on Negros Island.
Eruptions	<ol style="list-style-type: none">1. Kanlaon has erupted several times since 1886.2. These eruptions typically involve phreatic explosions of small to moderate size, producing minor ashfalls near the volcano.

About Phreatic Eruption

1. A phreatic eruption is a steam-driven explosion that occurs when water beneath the ground or on the surface is heated by volcanic activity.
2. **Process:** The heated water begins to boil or can even flash into steam, causing an explosion. Phreatic eruptions can occur before, during, or after a more traditional volcanic eruption.
3. **Causes:** Groundwater near volcanic vents gets heated as magma rises to the surface, leading to these phreatic eruptions.

UPSC Syllabus: World Geography

Manual of Tobacco Free Educational Institutions (ToFEI)

Why in News?

Recently, the Ministry of Education launches the implementation Manual of ToFEI on World No Tobacco Day, 2024.

About Manual of Tobacco Free Educational Institutions (ToFEI)

1. It was launched on the occasion of **World No Tobacco Day (WNTD) 2024**.
2. It was launched with the collaboration of the **Department of School Education & Literacy (DoSEL), the Ministry of Education, and the Socio-Economic and Educational Development Society (SEEDS)**
3. This year's WNTD theme is **"Protecting children from tobacco industry interference"**. The newly launched manual has been designed in line with the theme.

4. Manual Objectives

- a) Guidelines Adherence:** It assists schools in following the Manual of Tobacco Free Educational Institutions(ToFEI) guidelines issued by the Ministry of Health and Family Welfare
- b) Healthy Environment:** It aims to create a tobacco-free environment for students.
- c) Stakeholder Empowerment:** It encourages all stakeholders in adoption and enforcement of guidelines to protect students from tobacco dangers

5. Event Highlights

- a) All dignitaries took an oath against tobacco use, committing to creating a healthier, tobacco-free future for the nation's youth.
- b) Senior officials from the Ministry of Education, autonomous bodies, and States/UTs attended the event.

UPSC Syllabus: Polity and nation

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Doctrine of Merger

Why in News?

The Supreme Court of India has noted that the unique powers granted under Article 142 of the Indian Constitution are exceptions to two established legal principles: the Doctrine of Merger and the Doctrine of Stare Decisis. This is done to ensure justice is comprehensively served in specific cases.

About Doctrine of Merger

1. **Purpose:** The Doctrine of Merger aims to maintain decorum and orderliness in the judicial system.

2. **Nature:** It is a judicially created doctrine aimed at instilling discipline across different levels of courts and authorities.

3. **Principle:** When a higher court (appellate court) makes a ruling, the original ruling by the lower court is absorbed or "merged" into the higher court's decision.

4. **Rationale:** This ensures that only one final ruling exists on any given issue, avoiding confusion over which order should be followed.

5. **Application:** This doctrine applies to decisions made by all levels of courts, ensuring that the ruling of a higher court supersedes and absorbs that of a lower court.

About Doctrine of Stare Decisis

1. Stare Decisis" is Latin for "to stand by things decided." This doctrine mandates that courts follow the rulings made in earlier similar cases.

2. **Importance of Precedents:** Past decisions serve as precedents, which are principles or rules that guide judicial decisions in future similar cases.

3. **Role of Precedents:** These are used by judges as references for making decisions in current cases with similar legal questions.

4. **Obligation:** Courts are obligated to consider these precedents in their rulings to maintain consistency and predictability in the law.

5. These doctrines collectively ensure that the legal system operates efficiently, maintaining consistency and hierarchy in judicial decisions.

Phenome India Project

Why in News?

Recently, CSIR completed the first phase of its **longitudinal health monitoring project**, Phenome India, and **hosted a special event called Phenome India Unboxing 1.0**.

About Phenome India Project

Aspects	Description
About Phenome India-CSIR Health Cohort Knowledgebase	<p>1) Phenome India-CSIR Health Cohort Knowledgebase (PI-CheCK) is a project launched by the Council of Scientific and Industrial Research (CSIR) on December 7, 2023.</p> <p>2) This is the first pan-India longitudinal health monitoring study that focuses on cardio-metabolic diseases.</p> <p>3) Participants: Nearly 10,000 individuals including CSIR employees, pensioners, and their spouses from 17 states and 24 cities are involved.</p> <p>4) Data Collection: The study collects a wide range of data, including clinical questionnaires, lifestyle and dietary habits, anthropometric measurements, imaging/scanning data, and extensive biochemical and molecular data.</p>
Purpose	The initiative aims to create India-specific risk prediction models for cardio-metabolic diseases , including diabetes, liver diseases, and cardiac diseases.
Significance	<p>1) The study is critical for understanding the risk and prevalence of cardio-metabolic disorders in the Indian population, which may vary from Western populations due to ethnic diversity and different lifestyle patterns.</p> <p>2) CSIR is leveraging this project to promote Predictive, Personalized, Participatory, and Preventive (P4) healthcare, which is customized for the unique phenotypic and genetic profiles of the Indian population.</p>

About Council of Scientific and Industrial Research (CSIR)

Aspects	Description
About	<p>1. The Council of Scientific and Industrial Research (CSIR) is India's largest research and development (R&D) organization.</p> <p>2. It was established in September 1942.</p> <p>3. It operates as an autonomous body under the Societies Registration Act of 1860.</p>

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	4. CSIR receives its funding from the Ministry of Science and Technology.
Headquarters	The headquarters is situated in New Delhi .
Focus Areas	CSIR is dedicated to scientific research and development across diverse fields including aerospace, biology, chemistry, earth sciences, engineering, and medical sciences.
Organizational Structure	President: The Prime Minister of India serves as the President (Ex-officio) . Vice President: The Union Minister of Science and Technology holds the position of Vice President (Ex-officio) .
Governing Body	Leadership: The Director-General heads the governing body . Members: It includes other ex-officio members like the finance secretary responsible for expenditures. Term Length: Members typically serve terms of three years .
CSIR Board	Advisory Composition: It consists of a 15-member panel including distinguished experts from various scientific and technological fields. Role: The board advises the governing body on matters related to science and technology. Member Tenure: Each member's term also lasts for three years .

Women Representation in Lok Sabha

Why in News?

Over the years, the gender composition of the Lok Sabha has generally trended towards increasing women's representation.

About Women Representation in Lok Sabha

1. In 2024, India elected 74 women MPs to the Lok Sabha, which is four fewer than in 2019. These 74 women constitute 13.63% of the total strength of the Lower House, significantly below the proposed 33% quota for women.

2. The women MPs come from 14 different parties, with the BJP leading this list with 31 women MPs, followed by Congress with 13, and the TMC with 11.

3. Historical Progression:

i) In 1952, only 4.41% of the members in the Lok Sabha were women. By 1962, this number went up to a little over 6%. However, in 1971, it dropped to less than 4%.

ii) Since then, there has been a slow but steady rise in women's representation, crossing the 10% mark in 2009 and peaking at 14.36% in 2019. However, in 2024, this representation saw a slight decrease to 13.63%.

4. Comparative Analysis: India's 13.63% representation of women in the Lok Sabha lags behind several other countries. For instance, 46% of MPs in South Africa are women, 35% in the UK, and 29% in the US.

5. Party-wise Representation:

i) In 2024, women Lok Sabha MPs come from 14 parties. The BJP has the highest number of women MPs at 31, which is 12.92% of its total MPs.

ii) Congress follows with 13 women MPs, making up 13.13% of its MPs, and the TMC has 11 women MPs, representing 37.93% of its total.

iii) The SP has five women MPs, the DMK has three, and both the LJPRV and JD(U) have two each. Seven parties have one woman MP each.

6. New Faces and Experience:

i) Of the 74 women MPs elected in 2024, 43 are first-time MPs, and Misa Bharti of the RJD is a first-time Lok Sabha MP. Women MPs, on average, have 0.76 Lok Sabha terms of experience.

ii) The average age of women MPs is 50 years, compared to 56 years for the overall House. Additionally, 78% of the women MPs have completed their undergraduate education, which is comparable to their male counterparts.

7. Candidates' Composition:

i) Out of the total 8,360 candidates who stood in the 2024 Lok Sabha elections, around 10% were women.

ii) This number has increased over time, from 3% in 1957 to 10% in 2024. Among the major parties, 16% of BJP's candidates were women, while 13% of Congress's candidates were women, both higher than the overall average.

UPSC Syllabus: Science and technology

Cryonics Practice for Freezing Human Body

Why in News?

Recently, a cryonics company in Australia has frozen its first client, with the hope of reviving him in the future.

About Cryonics

1. The **practice of freezing an individual who has died**, to revive them in the future, is known as cryonics.
2. The word cryonics is derived from the **Greek word "krýos," meaning "icy cold."**

3. Objective: Cryonics aims **to save lives by preserving individuals** at extremely low temperatures until future medical technologies can restore them to full health.

4. Individuals in this state are referred to as **"cryopreserved patients,"** as Cryonicists do not consider them truly dead.

5. Process: The process of Cryonic preservation involves the following process:

- a) Cryonic preservation can only be performed after an individual has been legally declared dead. The process begins shortly after death, with the body being packed in ice and transported to a cryonics facility.
 - b) At the facility, blood is drained and replaced with antifreeze and organ-preserving compounds known as cryoprotective agents.
 - c) In this vitrified state, the body is placed in a chamber filled with liquid nitrogen and preserved at -196 °C.
6. Currently, a few hundred bodies have been frozen through cryonics.

Recombinant Proteins

Why in News?

Researchers at the Department of Biochemistry, Indian Institute of Science have devised an innovative method for producing recombinant proteins.

About Recombinant Proteins

Source: [evitria](#)

1. Recombinant Proteins: They are proteins that are artificially produced by introducing specific genes (Recombinant DNA) into host organisms, such as bacteria or yeast. These genes instruct the host organisms to manufacture the desired protein.

2. Types of Recombinant Proteins: There are various types based on their applications and production methods. Some of the well known recombinant protein types are **interferons, recombinant hormones, tumor necrosis factors, tumor necrosis factors, etc.**

3. Examples: Examples of recombinant proteins include **human insulin for diabetes, human growth factors for growth hormone deficiency, Factor VIII for hemophilia, and therapeutic monoclonal antibodies for treating cancer and viral infections like SARS-CoV-2.**

4. Process of Production: Recombinant protein production involves inserting a modified gene into a suitable vector (like a plasmid) and transferring it into host cells (like bacteria or yeast). It involves:

a) Insert Gene: A gene is modified and inserted into a vector.

b) Transfer to Cells: The vector is introduced into host cells.

c) Cell Growth: These cells are grown in a culture until they reach high concentration.

d) Harvesting: After growing, the cells are harvested to obtain the recombinant protein.

5. Applications of Recombinant Proteins:

a) Biomedical Research: It is used to understand health and disease mechanisms.

b) Biotherapeutics: It is employed in the development of biotherapeutic products.

c) Protein-Based Polymers: They are also utilized in drug delivery systems.

d) Disease Treatment: It is used to produce antibodies and enzymes.

e) Tissue Engineering: It provides protein scaffolds for tissue engineering applications.

About Protein

1. A protein is a **large, complex molecule** that is a key **building block of life**.

2. Role in Biological Systems:

a) Facilitator: Proteins **facilitate most biological processes** in a cell, including gene expression, cell growth, proliferation, nutrient uptake, intercellular communication, and apoptosis.

b) Synthesis Blueprint: The blueprint for **protein synthesis is stored in DNA**, which serves as a template for regulated transcriptional processes to produce messenger RNA (mRNA).

J&K Classifies Rabies as a Notifiable Disease

Why in News?

The government of Jammu and Kashmir has classified human rabies as a notifiable disease under the Epidemic Diseases Act of 1897.

About Rabies

1. Nature of Disease: Rabies is a **zoonotic**, viral disease preventable **by vaccine, caused by the RABV virus**.

2. Affected System: It primarily targets the **central nervous system**, causing severe brain disease and, ultimately, death if treatment is not administered before symptoms appear.

3. Transmission:

a) Main Carriers: **Domestic dogs are the primary transmitters** of the rabies virus to humans in up to 99% of cases. It can **affect both domestic and wild animals**.

b) Mode of Spread: The virus **spreads to humans and animals** through saliva, typically via bites, scratches, or direct contact with mucous membranes (e.g., eyes, mouth, or open wounds).

5. Symptoms:

i) Early Signs: Initial symptoms include **lethargy, fever, vomiting, and anorexia**.

ii) Advanced Symptoms: Rapid progression to **cerebral dysfunction, ataxia, paralysis, difficulties in breathing and swallowing, excessive salivation, unusual behavior, aggressiveness, and self-mutilation**.

iii) Outcome: Once clinical symptoms manifest, **rabies is almost always fatal**.

6. Prevention:

i) Rabies can be **prevented through vaccination**.

ii) The most **cost-effective method to prevent rabies** in humans is by vaccinating dogs, including puppies, to cut off the transmission at its source.

7. Treatment:

i) Post-Exposure Prophylaxis (PEP): Treatment after exposure to rabies includes wound care, administration of **human rabies immune globulin (HRIG)**, and a series of four or five rabies vaccines.

ii) This treatment is nearly 100% effective in preventing the disease if given promptly after exposure.

About notifiable disease

1. About: A notifiable disease is one that law mandates must be reported to government authorities. This reporting helps in monitoring the disease and providing early warnings of potential outbreaks. Here's who notifies these diseases and how the notification process works:

2. Who Notifies:

i) Healthcare Providers: Doctors, nurses, and other healthcare professionals are typically required to report cases of notifiable diseases.

ii) Laboratories: Medical laboratories must report findings that indicate the presence of notifiable diseases.

iii) Hospitals and Clinics: Both government and private hospitals and clinics are responsible for reporting cases of notifiable diseases.

3. How They Notify:

i) Written Notification: For most diseases, healthcare providers must fill out a specific form detailing the case and submit it to local or state health authorities within three days.

ii) Verbal Notification: In urgent situations, healthcare providers are required to report cases verbally via phone within 24 hours.

iii) Electronic Reporting Systems: Some regions may use electronic health records and reporting systems to streamline the notification process

Diadromous fish

Why in News?

Recently, a study was published in the British Ecological Society's Journal of Applied Ecology. The researchers discovered that **marine protected areas (MPAs) designated to safeguard diadromous fish species did not align with their core habitats.**

This finding highlights the need for better coordination and planning to ensure effective conservation efforts for these migratory fish.

About Diadromous fish

Aspects	Description
About	1. Diadromous fish are those species that migrate between saltwater and freshwater environments. 2. They move back and forth between the ocean and rivers or streams during different stages of their lives.
Types of Diadromous Fish	1) Anadromous Fish: These fish are born in freshwater. As juveniles, they migrate to the ocean, where they grow into adults. Later, they return to freshwater to spawn (lay eggs). 2) Catadromous Fish: These fish are born in saltwater. As juveniles, they move into freshwater, where they mature into adults. Eventually, they migrate back to the ocean to

	<p>spawn.</p> <p>3) Amphidromous Fish: These fish are born in freshwater or estuaries (where freshwater meets the sea). Initially, they drift into the ocean as larvae. Later, they return to freshwater to grow into adults and spawn.</p> <p>4) Potamodromous Fish: These fish are born in upstream freshwater habitats (upstream areas of rivers). As juveniles, they migrate downstream within freshwater to grow into adults. Finally, they migrate back upstream to spawn.</p>
Threats to Diadromous Fish	<p>Diadromous fish face various human-induced pressures:</p> <p>i) Agricultural and pollutant runoffs: Contaminants from agriculture and other sources can harm their habitats.</p> <p>ii) Habitat destruction: Dam construction and land development impact their migration routes.</p> <p>iii) Barriers to migration: Dams, weirs, and other structures hinder their movement.</p> <p>iv) Fishing and bycatch: Overfishing and accidental capture affect their populations.</p> <p>v) Climate change: Altered water temperatures and habitats impact their survival.</p>

Stromatolites- Geological Structures

Why in News?

Recently, scientists discovered **living stromatolites** which are ancient geological structures formed by algae on Sheybarah Island, located on the northeastern shelf of the Red Sea in Saudi Arabia.

About Stromatolites

1. About Stromatolites: These are **layered structures** formed by the activity of microorganisms, primarily **cyanobacteria (blue-green algae)**. They are also **known as stromatoliths**.

2. Formation Process: These **organisms trap and bind sedimentary grains in shallow waters**, creating layers upon layers until they form mound-like structures.

3. Appearance: Stromatolites typically display thin, **alternating light and dark layers**. Their shapes can vary, being flat, rounded (hummocky), or dome-shaped.

4. Historical Significance

i) They are **ancient structures**, most common during the Precambrian era, over 542 million years ago.

ii) While **primarily marine**, some ancient stromatolites from **more than 2.5 billion years ago are found in environments** ranging from intertidal zones to freshwater lakes.

iii) **Current Locations:** Today, **living stromatolites are rare** which are found in a few salty lagoons or bays, notably in Western Australia. **Shark Bay is a key location for these living marine stromatolites**.

5. Importance of Stromatolites

i) **Fossil Records:** It provide **critical evidence of early life on Earth**, with fossils dating back over 3.5 billion years.

ii) **Oxygen Production:** The cyanobacteria in stromatolites are photosynthetic. They produce **oxygen as a byproduct** of their metabolism.

iii) **Role in Understanding the Great Oxygenation Event and evolution of complex life forms:** About 2.5 billion years ago, as stromatolites became more prevalent, they **significantly increased the oxygen levels in the atmosphere**. This transformation was crucial as it changed the atmosphere from being rich in carbon dioxide to one rich in oxygen. The rise in atmospheric oxygen set the **stage for the evolution of more complex life forms**, including the development of eukaryotic cells, which are cells with a nucleus.

PraVaHa software

Why in News?

The Indian Space Research Organisation (ISRO) recently developed PraVaHa, a Computational Fluid Dynamics (CFD) software.

About PraVaHa software

Aspects	Description
About	<ol style="list-style-type: none">1. PraVaHa is a software developed by ISRO's Vikram Sarabhai Space Centre (VSSC) for analyzing the aerodynamics and thermodynamics of aerospace vehicles.2. This software, known as a Computational Fluid Dynamics (CFD) tool helps simulate the flow of air around various vehicles like rockets and re-entry vehicles (both with and without wings).
Aim	<ol style="list-style-type: none">1. PraVaHa aims to take over most of the CFD simulations for aerospace vehicle design, currently done using commercial software.2. This means it could become a primary tool for designing missiles, aircraft, and rockets, providing solutions to complex aerodynamic problems.
Applications of PraVaHa	<ol style="list-style-type: none">1. Gaganyaan Program: PraVaHa is crucial in analyzing the aerodynamics of human-rated launch vehicles, including HLVM3, Crew Escape System (CES), and Crew Module (CM).2. Collaborative Development: It's designed to be secure and flexible, allowing academic institutions and government labs to work together on developments.3. Simulation Capabilities: Currently, PraVaHa can simulate airflow in both perfect gas and real gas conditions. Work is ongoing to extend its capabilities to simulate chemical reactions, such as those occurring during re-entry into Earth's atmosphere and in scramjet engines.

Importance of Computational Fluid Dynamics (CFD):

i) **Design Studies:** Initial design studies for launch vehicles **require evaluating many different configurations** to find the best one.

ii) **Aerodynamic Loads:** Aerospace vehicles face **extreme aerodynamic and thermal loads** (pressure and heat) during launch and re-entry into Earth's atmosphere.

iii) **Flow Understanding:** Understanding how air flows around vehicles like rockets or crew modules during re-entry is **crucial for designing their shape, structure, and thermal protection systems** (TPS).

iv) **Unsteady Aerodynamics:** The unsteady (changing) **part of aerodynamics can cause serious flow issues and significant noise** during a mission.

UPSC Syllabus: Economy

Preston Curve

Why in News?

It has been observed that with the increasing per capita income in India, there has been a shift in attention towards Preston curve which was first proposed by “**Samuel H. Preston**” in the year “**1975**”.

About the Preston Curve

1. About: The Preston Curve is a graph that shows **the relationship between the average income per person in a country (usually measured as GDP per capita) and the average life expectancy of its people.**

2. Origin: The concept was introduced by American sociologist **Samuel H. Preston** in his **1975** paper titled “**The changing relation between mortality and level of economic development**”.

3. Key Observations of the Preston Curve:

i) Generally, **people in wealthier countries live longer compared to those in poorer countries.**

ii) This trend is likely because individuals in richer nations typically have better access to healthcare, education, clean environments, and nutritious food.

iii) **Economic Growth and Life Expectancy:** When a country’s economy grows and incomes rise, life expectancy also tends to increase significantly. This improvement is initially due to better access to basic necessities like food and healthcare.

Example: In India, the average income rose from approximately **₹9,000 per year in 1947 to about ₹55,000 in 2011**. Correspondingly, the average life expectancy increased from 32 years to over 66 years during the same period.

5. Limitations of Income Growth on Life Expectancy: The relationship between per capita income and life expectancy starts to plateau beyond a certain point. Further increases in income do not lead to significant gains in life expectancy, possibly because there is a natural limit to human lifespan.

UPSC Syllabus: International Relations

UN Global Supply Chain Forum

Why in News?

The **Government of Barbados and the UN Trade and Development (UNCTAD)** recently concluded the inaugural United Nations Global Supply Chain Forum successfully.

About the UN Global Supply Chain Forum

Source: The Print

1. Organised by: The first-ever UN Global Supply Chain Forum, **organized by the UN Trade and Development (UNCTAD) and the Government of Barbados**, was successfully held from **May 21 to 24, 2024**, in Barbados.

Factly Compilation June (First Week) 2024

2. Purpose: The event brought together over 1,000 participants from around the globe to address global disruptions, geopolitical tensions, climate change, and the impacts of the COVID-19 pandemic on international trade.

3. Participants and Key Focus Areas: The forum included trade and transport Ministers from various small island developing states (SIDS), representatives from UN agencies, major global ports such as the Port of Seattle, and leaders in the shipping and logistics sectors.

4. Initiatives and Outcomes:

a. A “Manifesto for Intermodal, Low-Carbon, Efficient and Resilient Freight Transport and Logistics,” was introduced which aims to transform freight transport to meet global climate goals and bolster socio-economic resilience.

b. The launch of the UN Trade and Development Trade-and-Transport Dataset, developed with the World Bank. This dataset provides extensive global data on over 100 commodities and various transport modes, helping to analyze trade and transport costs comprehensively.