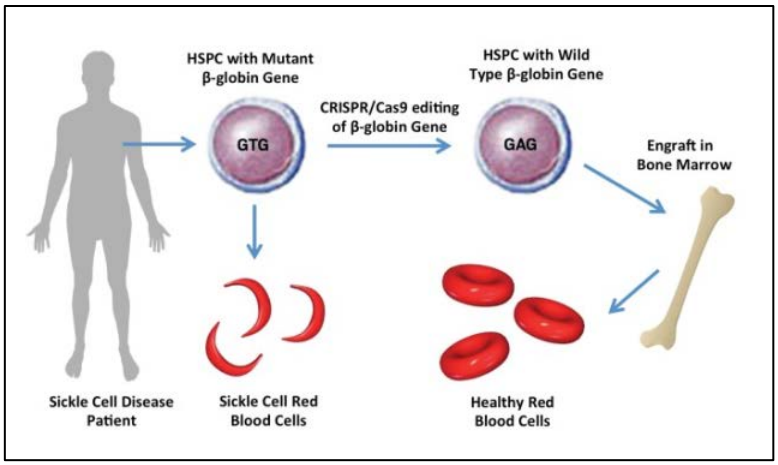
Casgevy

Context: The first therapy based on gene editing technology Crispr-Cas9 for sickle cell disease and thalassaemia has been approved in UK.

- Casgevy stands as the world's first licensed therapy grounded in Crispr-Cas9 gene editing technology.
- **Apheresis Process - One-Time Treatment**: Apheresis, a singular treatment, involves the collection of blood stem cells from the bone marrow through a filtering process. This step precedes the gene editing procedure.
- **Cell Processing Timeline**:
  - Collected cells are transported to a manufacturing site.
  - The editing and testing of these cells take approximately 6 months.
- **Gene Editing with Crispr-Cas9:**
  - The therapy utilizes the patient's own blood stem cells, precisely edited using Crispr-Cas9 gene editing technology.
  - A departure from the need for closely matched donors in traditional bone marrow transplants.
- **Targeted Gene - BCL11A:**
  - The therapy specifically targets the BCL11A gene, pivotal in the transition from fetal to adult haemoglobin.
  - Fetal Haemoglobin, naturally present at birth, lacks the abnormalities associated with adult haemoglobin.
- **Mechanism for Treatment**:
  - Casgevy prompts the body's innate mechanisms to enhance the production of fetal Haemoglobin.
  - This approach alleviates symptoms associated with certain conditions.
- **Comparison with Bone Marrow Transplants**: Unlike bone marrow transplants requiring closely matched donors, Casgevy uses the patient's own cells for treatment.



- **Foetal Haemoglobin Advantage**:Leveraging the body's ability to produce more fetal haemoglobin offers a promising avenue for addressing specific medical conditions.
- **Side Effects Similar to Stem Cell Transplants**:
  - Side effects mirror those associated with autologous stem cell transplants.
  - Common effects include nausea, fatigue, fever, and an increased susceptibility to infections.
- **Sickle Cell Anaemia:**
  - Inherited blood disorder causing severe anaemia.
  - Caused by a mutation in the haemoglobin-β gene on Chromosome 11.
  - Mutation leads to crescent-shaped haemoglobin under low oxygen.
  - Symptoms include pain, fever, infections, strokes, and organ damage.
  - 30,000-40,000 children born with it annually in India.
  - Managed with blood transfusions, iron supplements, and stem cell transplants.
- **Thalassemia:**
  - Inherited blood disorder causing reduced haemoglobin chain production.
  - Mutation causing reduced production of alpha or beta chains.
  - Reduced production of haemoglobin chains.
  - Symptoms include fatigue, shortness of breath, irregular heartbeats, requiring lifelong blood transfusions.
  - India has the largest thalassemia population (1-1.5 lakh children).
  - Managed with blood transfusions, iron supplements, and stem cell transplants.

Climate Change Glossary

Context: With the COP28 coming in there is a need for us to understand the terms related to Climate Change. Given below is a list of them.

- **COP (Conference of the Parties):** An annual international climate meeting organized by the United Nations, involving 198 countries that are parties to the UN Framework Convention on Climate Change (UNFCCC). These parties pledge voluntary actions to prevent "dangerous anthropogenic [human-caused] interference with the climate system."
- **Kyoto Protocol**: The Kyoto Protocol, established in 1997, was an international treaty that imposed obligations on wealthy and industrialized nations to reduce their greenhouse gas emissions by assigned amounts. It was adopted in Kyoto, Japan, and became effective in 2005. The protocol formally expired in 2020, succeeded by the Paris Agreement as the primary international treaty for coordinating global action against climate change.

- **Paris Agreement (COP21, 2015):** Adopted in 2015 at COP21 in Paris, the Paris Agreement legally binds 195 nations to collaborative efforts to combat climate change and adapt to its effects. It aims to limit the global average temperature rise and is considered a landmark deal.
- **1.5 Degree Limit**: Under the Paris Agreement, governments worldwide have committed to keeping the average global temperature "well below" 2 degrees Celsius this century compared to pre-industrial levels. Additionally, efforts are pledged to limit the rise to 1.5 degrees Celsius, a crucial threshold to avoid severe climate change impacts.
- **Glasgow Pact (COP26):** Achieved at the COP26 summit in Glasgow, the pact calls for the phasedown of coal and the phaseout of fossil fuels. Notably, it marked the first explicit mention of coal in a UN climate agreement and resolved a deadlock over carbon markets.
- **Carbon Markets:** Carbon markets are essentially trading systems where countries or industries can buy and sell carbon credits. These credits are earned for exceeding greenhouse gas emission reduction targets and can be traded to other entities for financial compensation.
- **Greenhouse Gases:** Greenhouse gases (GHGs) are substances that trap heat in the Earth's atmosphere. Mainly resulting from the burning of fossil fuels like coal, diesel, gasoline, kerosene, and natural gas, prominent GHGs include carbon dioxide, methane, and nitrous oxide.
- **Net Zero:** Net zero, also known as carbon-neutrality, doesn't imply reducing emissions to zero but achieving a state where a country's emissions entering the environment are balanced by the removal of greenhouse gases. This removal can involve creating more carbon sinks like forests or implementing technologies for carbon dioxide removal (CDR).
- **Carbon Capture and Storage (CCS):** Carbon capture and storage involve capturing carbon dioxide at fossil fuel plants and factories and storing it beneath the Earth's surface, preventing its release into the atmosphere.
- **Carbon Capture, Utilisation, and Storage (CCUS):** Going beyond CCS, CCUS not only captures carbon but also utilizes it in the production of various goods like alcohols, biofuels, plastics, or concrete.
- **Geo-engineering:** Geo-engineering refers to deliberate large-scale interventions in the Earth's natural systems to address climate change. It includes various proposed techniques, such as carbon dioxide removal (CDR), with ongoing debates about their effectiveness and potential side effects.
- **IPCC (Intergovernmental Panel on Climate Change):** Established in 1988 by the World Meteorological Organization (WMO) and the UN Environment Programme (UNEP), the IPCC is the United Nations body responsible for assessing the science related to climate change. It produces Assessment Reports, special reports, and methodology reports evaluating the state of knowledge on climate change.
- **Nationally Determined Contributions (NDCs):** Under the Paris Agreement, each country is required to outline its efforts to reduce national emissions and adapt to climate change, known as NDCs. These commitments are submitted every five years, with successive NDCs expected to be more ambitious than the previous ones.
- **National Adaptation Plans (NAPs):** National Adaptation Plans help countries develop strategies to respond to present and future impacts of climate change. They aim to reduce vulnerability, strengthen adaptive capacity, and enhance resilience to severe climate change effects.
- **Global Stocktake**: **The** global stocktake involves a five-year review where countries assess their progress in the fight against climate change. COP28 will present the findings of the first stocktake exercise, outlining what needs to be done in the next five years to enhance the effectiveness of climate change mitigation efforts.
- **Triple Renewable Energy:** The International Energy Agency's (IEA) 'Roadmap to Net Zero by 2050' report, published in 2021, emphasizes the need to triple global renewable capacity by 2030 to meet the net-zero goal. Achieving this step could potentially avoid seven billion tonnes of carbon dioxide emissions between now and 2030, equivalent to eliminating all current emissions from China's power sector.
- **Just Transition**: The term 'just transition' describes the shift to a low-carbon or net-zero economy while safeguarding the rights of workers and addressing the needs of affected communities, particularly in industries undergoing significant changes like fossil fuels.
- **Common but Differentiated Responsibilities (CBDR):** CBDR is a principle of international law stating that different countries have distinct capabilities and responsibilities in addressing cross-border environmental problems, including climate change. An example is the 1989 Montreal Protocol, allowing a grace period for 'developing countries' to implement control measures.
- **Loss and Damage:** Although there's no universally agreed de finition, 'loss and damage' broadly refers to the unavoidable social and financial impacts caused by extreme weather events in the context of international climate negotiations.

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28 November, 2023

NEWS IN BETWEEN THE LINES

Unlawful Activities Prevention Act (UAPA)

Recently, the Jammu and Kashmir Police filed a case under the UAPA against seven Kashmiri students for allegedly chanting pro-Pakistan slogans during the recent Cricket World Cup final.

About UAPA:

- The Unlawful Activities Prevention Act (UAPA) was established in **1967.**
- It is an Indian law that aims to **prevent unlawful activities** in India.
- Amendments in **2004** and **2019** expanded its scope to include **'terrorist activities'** and empowered the **Home Ministry** to designate individuals as terrorists.
- Its main objective is to provide powers to deal with activities that threaten India's **sovereignty** and **integrity**.
- The Unlawful Activities (Prevention) Amendment Act of **2008** added new **sections 43A** to **43F** to the Act.
- The Unlawful Activities (Prevention) Amendment Bill of **2019** allows officers of the rank of Deputy Superintendent or Assistant Commissioner of Police or above to investigate cases
- Punishments include up to **7 years' imprisonment** and fines for unlawful activities, life imprisonment for terrorist acts resulting in death and **5 years** to life imprisonment for other terrorist activities.

Rat-Hole Mining

Recently, a seasoned miner joined Silkyara's rescue efforts with rat hole mining technique to save 41 construction workers trapped in under-construction Silkyara Barkot tunnel.

About Rat-Hole Mining:

- Rat-hole mining is a **primitive and hazardous** method of coal mining.
- It involves digging very small tunnels, usually **3-4 feet high**, which workers enter to extract coal.
- **Box-Cutting method** creates rectangular openings leading to vertical pits and smaller horizontal tunnels for coal extraction.
- There are two types of rat-holes: **Vertical shafts** and **Horizontal holes**.
- Rat-hole mining is practiced mostly in Northeastern states, especially in **Meghalaya**.
- The National Green Tribunal (NGT) had imposed ban rat-hole mining in **2014** due to hazards and environmental concerns, upheld in **2015**.
- Supreme Court overturned the ban on private and community mining in **2019**, penalizing the Meghalaya government with a **Rs 300 crore fine**.

Kambala

Recently, despite previous Supreme Court bans, the Karnataka government amended legislation to permit the popular traditional buffalo race, Kambala, leading to its successful event in Bengaluru on November 25 and 26.

About Kambala:

- Kambala is a **traditional buffalo race** that takes place in the coastal districts of **Karnataka**.
- The race is held during the winter months, from **November** to **March**.
- The race is held on **two parallel tracks** filled with mud and water.
- The race is **sponsored by local Tuluva** landlords.
- Some types of Kambala include: **Pookere Kambala**, Baare Kambla, **Kori Kambala**, Arasu Kambla, **Devere Kambla** and Baale Kambala.
- It violates the Prevention of Cruelty to Animals (PCA) Act, **1960**.
- The Supreme Court had banned **jallikattu**, bullock-cart races and **kambala** events in its judgement on **May 7, 2014.**

Shettihalli Wildlife Sanctuary

The National Green Tribunal has recently instructed the state government to resolve delays in declaring the Shettihalli Wildlife Sanctuary as an eco-sensitive zone within six months.

About Shettihalli Wildlife Sanctuary:

- Shettihalli Wildlife Sanctuary is located in the Shimoga district of **Karnataka**.
- It was declared a wildlife sanctuary on **November 23, 1974**.
- The sanctuary also includes the Mandagadde Natural Bird Sanctuary, which is located on a small island in the river Tunga.

Fauna: Some notable trees species encompass **silver oak**, **teak**, **Indian Thorny Bamboo**, Calcutta bamboo, **Asan**, Tectona Grandis, Sweet Indrajao, Amla and more.

Flora: It is a home to a diverse mammalian population including **Tigers**, **Leopards**, Wild Dogs, Jackals, Gaurs, Elephants, **Sloth Bears**, Sambars, Spotted Deer, **Wild Pigs**, Common Langurs and Bonnet Macaques.

Axolotl

Recently, the ecologists from Mexico's National Autonomous University relaunched a fundraising campaign aimed at strengthening conservation endeavors for axolotl.

About Axolotl:

- Axolotl is a neotenic salamander, remaining in its aquatic larval form throughout its life.
- It's unique for its external gills and feathery appearance.
- Native to the ancient Aztec canals of Xochimilco in Mexico City, axolotls are also found in other parts of Mexico, primarily in freshwater bodies and streams.
- Almost all 18 species of axolotls found in Mexico are critically endangered due to factors such as water pollution, fungal infections, and the invasion of non-native species like rainbow trout.
- Initiatives like the "Adoptaxolotl" campaign aim to raise funds for captive breeding programs and habitat restoration.
- It holds cultural importance in Mexico due to its regenerative abilities and unique appearance.
- It symbolizes resilience and regeneration in Mexican folklore.

Teenage Galaxies

About Teenage Galaxies:

- Teenage galaxies observed by the James Webb Space Telescope were formed roughly 23 billion years after the Big Bang, revealing insights into their developmental stage.
- The galaxies formed 2–3 billion years after the Big Bang.
- They possess a distinctive chemical composition, indicating substantial star formation while still undergoing rapid growth.
- They exhibit behaviors distinct from contemporary ones, undergoing crucial yet not fully understood processes that significantly shape their future as they evolve.
- They were found to glow with eight elements, including oxygen, nickel and others.
- Oxygen, a fundamental component in a galaxy's 'DNA' for tracing its historical growth, was notably present.
- Nickel's surprising brightness suggests unique properties in massive stars, influencing the glow of gas within these galaxies.

Place in News

Peru

Recently, Peru has faced a dire environmental crisis as it grapples with the rapid loss of over half its glacier surface within just six decades.

Peru (Capital: Lima)

Location: Peru is situated in the western part of South America.

Political Boundaries: Peru shares its border with Colombia, Brazil, Bolivia, Chile and Ecuador.

Physical Features:

- Peru is dominated by the **Andes mountain range**.
- **Mount Huascarán** stands as the country's highest point.
- Some notable rivers include the **Amazon**, **Purus**, **Jurua**, among others.
- The **sierra** (highlands) is the region of the Andes; it includes the Altiplano plateau as well as the highest peak of the country.
- **Lake Titicaca**, the largest in South America and shared with Bolivia, lies amidst the Andes.

POINTS TO PONDER

- Which Union Ministry is associated with 'National Gopal Ratna Awards'? **- Ministry of Fisheries, Animal Husbandry & Dairying**
- SURYA KIRAN is a joint military exercise between India and which country? **- Nepal**
- Which country has been declared as the Chair of the International Sugar Organisation (ISO) for the year 2024? **- India**
- India formalized Memorandum of Understanding (MoU) on semiconductors with which bloc? **- European Union**
- India's first sloth bear rescue centre is located in which state? **- Karnataka**