Prelim Bits 14-12-2022 | UPSC Daily Current Affairs

Geminids Meteor Shower

Geminids Meteor Shower, the annual celestial show peaks around December 13-14 in 2022.

- The meteor shower is named after the constellation Gemini.
- The constellation is not the source of the meteors but the meteor shower appears to originate from the constellation in the sky.

The Geminids meteor shower and the Quadrantids meteor shower are the only major showers not caused by a comet.

- Most meteor showers originate from comets but the Geminids meteor shower originate from an asteroid, the 3200 Phaethon.
- The 3200 Phaethon is 3.6-mile (5.8-kilometer) wide space rock which comes closer to the sun than any other named asteroid.
- The 3200 Phaethon takes 1.4 years to complete one round of the Sun.
- As it moves close to the Sun while orbiting it, the rocks on its surface heat up and break off.
- When the Earth passes through the trail of this debris, the Geminids are caused.
- The Geminids is one of the best and most reliable annual meteor showers.
- If their peak coincides with the new moon and clear sky, the Geminids can produce approximately 100-150 meteors per hour for viewing.

The 3200 Phaethon, discovered on October 11, 1983, is named after the Greek mythology character Phaethon, son of the Sun God Helios.

References

1. Indian Express - What is the Geminids meteor shower?
2. Live Mint - Bengaluru to witness dazzling Geminids showers
3. Economic Times - Bengaluru to witness Geminids meteor shower

Base Editing

For the first time, Base editing technology used in CAR-T therapy defeated a seemingly incurable cancer.

- Base editing is a newer genome editing approach that allows scientists to zoom to a precise part of the genetic code and then alter the molecular structure of just one

base.
- There are 4 types of bases in the DNA - adenine (A), cytosine (C), guanine (G) and thymine (T).
- These bases in our DNA spell out the genetic code and instructions for our body.
- Base editing uses components from CRISPR systems together with other enzymes to directly install point mutations into cellular DNA or RNA.
- Base editing makes point mutations in the DNA possible without generating double strand breaks (DSBs).
- Base editors directly convert one base or base pair into another and changes the genetic instructions.

Base editing in CAR-T therapy

- CAR-T therapy is an immunotherapy that uses T-cells for the treatment of cancer.
- The base editing tool is used to engineer a new type of T-cell from a healthy T-cell (own or from donor).
- This engineered T-cell is used in CAR-T therapy for treating cancerous cells.
- Through this gene editing technique, the patient (Alyssa) received genetically modified cells that were programmed to specifically attack her cancer while leaving the rest of her body alone.

References

1. Indian Express - What is base editing?
2. CNN - Gene editing technology for treatment-resistant cancer
3. BBC - Base editing: Revolutionary therapy

Threatened Species

A list of threatened species was released at the 15th Conference of Parties (COP15) to the UN Convention on Biological Diversity in Montreal.

- Several marine species like Abalone, dugong and pillar coral are threatened with extinction.

Abalone Shellfish

- Abalone is a shellfish species threatened with extinction.
- Abalone species are among the world's most expensive seafood.
- 20 of the world's 54 (44%) abalone shellfish species at risk of extinction, according to IUCN.

Species of Abalone	IUCN status
Black abalone (*H. cracherodii*) Found in California and Mexico	Critically Endangered
Green ormer (*H. tuberculata*) Found from the English Channel to Northwest Africa and the Mediterranean	Vulnerable

Omani abalone (*H. mariae*), a commercial species Found in the Arabian Peninsula	Endangered

- **Threats** - Marine heatwaves have exacerbated abalone diseases worldwide.
- Unsustainable extraction and poaching along with climate change, disease, algal blooms and pollution.

Dugong

- The Dugong is an herbivorous marine mammal species.
- **IUCN Status** - Remains Vulnerable globally but
  - In East Africa - Critically Endangered
  - In New Caledonia - Endangered
- **Threats** - Unintentional capture in fishing gear.
- Destruction of their food (sea grass) due to chemical pollution, bottom trawling and oil and gas exploration and production.

Pillar Coral

- The pillar coral is a hard coral found throughout the Caribbean from the Yucatan Peninsula and Florida to Trinidad and Tobago.
- They are affected by the contagious Stony Coral Tissue Loss Disease.
- Its population shrunk by over 80% across most of its range since 1990.
- **IUCN status** - Critically Endangered (moved from Vulnerable)

References

1. Down To Earth - Marine species threatened with extinction

Meitei Script of Manipuri

Newspapers in Manipur are working to replace the Bengali script that's currently in use with Meitei Mayek or the Manipuri script.

- The script, once patronised by Meitei rulers but which fell into disuse with the advent of Hinduism and eventually disappeared is revived now.
- The Meiteilon (Manipuri language) script is fairly old and proofs dates back till the 6th century.
- **Different Meitei scripts** -The inscriptions on the coins of the 7th and 8th Century had 18-letter Meitei script.
- It expanded to the 36-letter script in the 17th century during the reign of Meidingu Pamheiba (1709-1748).
- **Usage of Bengali Script** - With the advent of Hinduism, the popular Bengali script was used in the 18th and 19th century inscriptions.
- Bengali script became more popular when formal education was started by Sir James Johnstone in 1885.
- During the reign of Maharaja Sir Churachand (1891-1941), the Bengali script of

Manipuri was adopted.
- **Revival of Meitei Script** - A movement to revive the Meitei Mayek started in the 1930s and gathered strength in the 1950s.
- In 1977, the 27-letter script for Meiteilon was approved by the State Government.

Definition of Manipuri language

- The Manipur Official Language Act, 1979, was enacted with the definition of Manipuri language as 'Meiteilon written in Bengali script and spoken by the majority of Manipuri population'.
- The Manipur Official Language (Amendment) Act of 2021, modified the definition of 'Manipuri language' as 'Meiteilon in Meetei Mayek and spoken by the majority of Manipur population' with a proviso that for 10 years, both the Bengali and Meitei Mayek scripts shall be allowed.

References

1. Indian Express The story of Meitei script
2. IUCN - Human activity devastating marine species

Pandoravirus

Scientists have revived several large viruses that had been buried in the frozen Siberian ground (permafrost) for tens of thousands of years.

- A group of scientists from France, Germany and Russia managed to reanimate 13 viruses from samples of Siberian permafrost.
- These revived viruses are called zombie virus.
- All the viruses cultured so far are giant DNA viruses that only affect amoebae.
- Viable viruses have been detected in permafrost samples earlier as well like Pithovirus and Mollivirus.
- Out of the 13 ancient viruses, the youngest virus to be revived was 27,000 years old.
- The oldest of them is a 48,500-year-old amoeba virus called Pandoravirus Yedoma.
- Pandoravirus Yedoma is the oldest virus ever to have been revived.
- The Pandoravirus Yedoma was found in the bodies of permafrost-preserved mammoths, woolly rhinoceros, and prehistoric horses.
- The virus was named after Pandora's Box - an artefact in Greek mythology connected with the myth of Pandora in Hesiod's poem.

References

1. Business Line - Buried danger: Pandoravirus
2. Latestly - What Is Zombie Virus and Pandoravirus Yedoma?

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