POLIO

- Since 1988, when the World Health Assembly established the Global Polio Eradication Initiative (GPEI), wild poliovirus subtype-2 and subtype-3 have been successfully eradicated.
- The number of wild poliovirus cases across the world has sharply dropped by more than 99.9%.
- Today, Afghanistan and Pakistan are the only countries where indigenous wild poliovirus subtype-1 transmission continues uninterrupted.

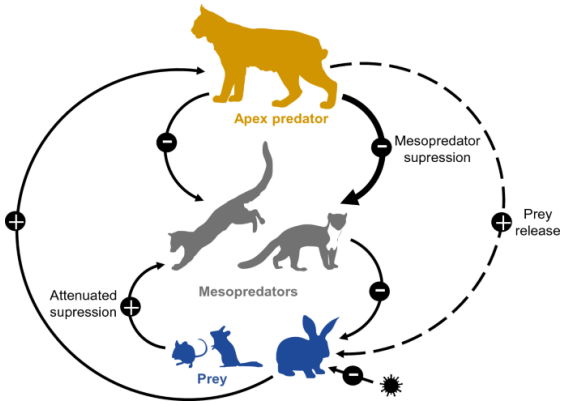
About POLIO

- Polio, or poliomyelitis, is a disabling and life-threatening disease caused by the poliovirus.
- The virus spreads from person to person and can infect a person's spinal cord, causing paralysis (can't move parts of the body).
- There are three variations of poliovirus, called wild poliovirus type 1, 2, and 3 (WPV1, WPV2, and WPV3).
- Wild polio types 2 and 3 have been eradicated (no longer exist), and wild polio type 1 only exists in a few parts of the world. Polio type 1 is most likely to cause paralysis.
- There are two types of vaccines that can prevent polio:
- Inactivated poliovirus vaccine (IPV) is given as an injection in the leg or arm, depending on the patient's age. Only IPV has been used in the United States since 2000.
- The oral poliovirus vaccine (OPV) is still used throughout much of the world.
- The Polio vaccine protects children by preparing their bodies to fight the poliovirus.

THE HINDU

MESOPREDATORS

- Medium-sized carnivorous species mesopredators like coyotes or bobcats tend to move into human-dominated areas to avoid predation by larger carnivores, a phenomenon also known as the "human shield" effect.
- But this places the safety seeking species at considerably greater risk for mortality due to human activities.



MESOPREDATOR

- A mesopredator is a predator which occupies a mid-ranking trophic level in a food web.
- There is no standard definition of a mesopredator, but they are usually referred to as being medium-sized, compared to the apex predator and the prey in the food web.
- Mesopredators typically prey on smaller animals

THE HINDU

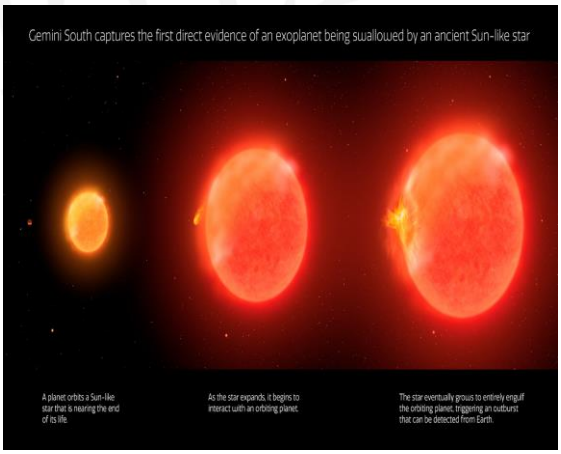
LAKE SHRINKAGE

- The amount of water stored in more than half of the largest lakes and reservoirs worldwide is declining (Science) due to a warming climate and increased human impacts.
- This underscores the importance of accounting for these impacts in future surface water resources management strategies.
- Combining satellite measurements with climate and hydrologic models, researchers have built a global dataset of decadal-scale trends in lake water storage from 1992 to 2020 for 2,000 of the world's largest lakes and reservoirs.

THE HINDU

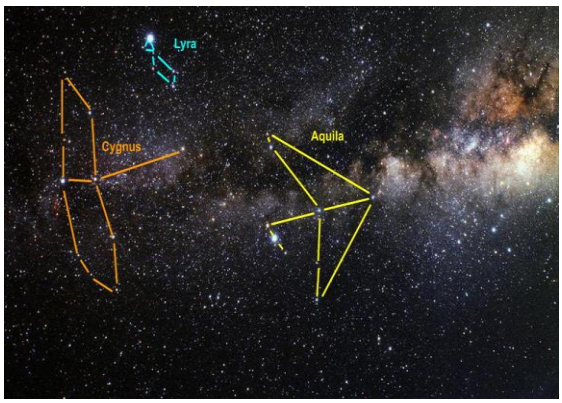
Fate of Earth

- As a star runs out of fuel, it will billow out to a million times its original size, engulfing any matter, including planets, in its wake



- The Aquila constellation is located in the northern sky, on the celestial equator.
- The constellation's name means "the eagle" in Latin.
- The constellation represents the eagle of the god Jupiter in Roman mythology. It was first catalogued by

the Greek astronomer Ptolemy in the 2nd century.



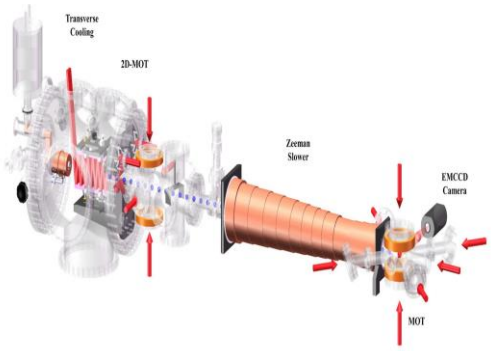
THE HINDU

Calcium 41

- Since its invention in 1947, carbon dating has revolutionized many fields of science by allowing scientists to estimate the age of an organic material based on how much carbon-14 it contains.
- However, carbon-14 has a half-life of 5,700 years, so the technique cannot determine the age of objects older than around 50,000 year.
- In 1979, scientists suggested using calcium-41, with a half-life of 99,400 years.
- It is produced when cosmic rays from space smash into calcium atoms in the soil and is found in the earth's crust, opening the door to dating fossilized bones and rock. But several problems need to be overcome before it can be used to reliably date objects.
- When an organic entity is alive, its body keeps absorbing and losing carbon-14 atoms. When it dies, this process stops and the extant carbon-14 starts to decay away.
- Using the difference between the relative abundance of these atoms in the body and the number that should have been there, researchers can estimate when the entity died.

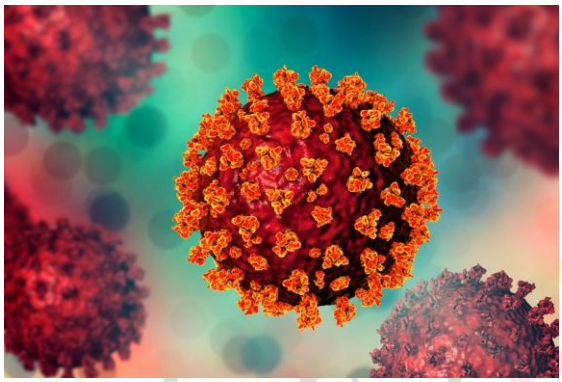
Atom trap trace analysis (ATTA)

- A technique called atom trap trace analysis (ATTA) as a solution. ATTA is sensitive enough to spot these atoms; specific enough to not confuse them for other similar atoms and fits on a table top. A sample is vaporized in an oven. The atoms in the vapor are laser-cooled and loaded into a cage made of light and magnetic fields.
- In ATTA, a laser's frequency is tuned such that it imparts the same energy as required for an electron transition in calcium-41.
- The electrons absorb and release this energy, revealing the presence of their atoms.



THE HINDU

(DPUD)



- Indian researchers have, for the first time, been able to synthesize small molecules that can effectively halt the infection of cells by SARS-CoV-2 and influenza viruses by targeting the hosts.
- In place of antivirals that directly target the virus in question, the team, co-led by researchers at IISER Mohali and IIT Ropar, attempted the host-directed therapy.
- Of the 28 molecules screened, one molecule 1, 3diphenylurea derivative (DPUD) was able to block both SARS-CoV-2 and influenza virus infection by almost 100% in cells without being toxic to the cells.
- "These molecules carry chloride ions into the cell, thereby leading to a large accumulation of chloride inside the cell, disturbing the chloride equilibrium.
- When the chloride equilibrium is disturbed, some endocytic pathways become non-functional. As a result, the viruses fail to enter the cells and establish infection
  - **THE HINDU**

