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SCIENCE MONTHLY

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SCIENCE & TECHNOLOGY

MARCH 2020

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1. SPACE

1.1 Chandrayaan 3

What is Chandrayaan 3 mission is about?

- The new mission's goal is to land on the lunar South Pole, similar to its predecessor.
- The launch will be performed using the GSLV Mk III rocket.
- The mission configuration will include a lander and a rover.
- The existing Chandrayaan 2 orbiter will be used, reducing the overall mission cost.
- Weighing 2,379kg, the orbiter carries five instruments.
- It has a mission life of seven years.
- It is mounted with solar panels that can generate 1kW of electrical power.

What is GSLV Mk III launch vehicle?

- GSLV Mark 3 (GSLV Mk III) is a three-stage heavy-lift launch vehicle.
- It was also used for launching the Chandrayaan 2 in 2019.
- It consists of a core liquid booster (L110), two solid rocket boosters (S200) on each side and a cryogenic upper stage (C25).
- India's biggest cryogenic engine CE-20 powers the upper stage.
- Two Vikas engines that burn 110t of fuel power the core stage.

1.2 Commemorating Discovery of Brightest Asteroid

Why in News?

On March 29, 1807, Heinrich Wilhelm Matthias Olbers, a German astronomer and physician, discovered 4 Vesta - known to be the brightest asteroid.

What is an Asteroid?

- Asteroids are actually minor planets.
- They can neither be classified either as a planet or as a comet.
- These are generally in the direct orbit around the Sun.
- They are also known as the inner solar system.
- The larger forms of asteroids are also known as planetoids.

- These are different from the minor planets in the outer solar system in their volatile-based surfaces much like comets.
- These are generally known as asteroid belt.

What is the difference between an asteroid and a comet?

- The main difference between asteroids and comets is their composition, as in, what they are made of.
- Asteroids are made up of metals and rocky material, while comets are made up of ice, dust and rocky material.
- Both asteroids and comets were formed early in the history of the solar system about 4.5 billion years ago.
- Asteroids formed much closer to the Sun, where it was too warm for ices to remain solid.
- Comets formed farther from the Sun where ices would not melt.
- Comets which approach the Sun lose material with each orbit because some of their ice melts and vaporizes to form a tail.

1.3 GISAT-1

Why in News?

The Indian Space Research Organisation (ISRO) announced that its launch of a new type of earth observation satellite, GISAT-1 is postponed.

What is GISAT-1?

- GISAT-1 is short for Geo-Imaging Satellite and is the first of two earth imagers planned.
- GISAT-1 is designed to work in geosynchronous orbit, which is roughly 22,000 miles (36,000 kilometers) above the planet.
- This position will allow the satellite to continuously monitor the Indian subcontinent and nearby ocean waters.
- The satellite will provide imagery with a resolution of 137 feet (42 meters) and will last at least seven years in orbit.
- The satellite can take pictures in multiple wavelengths of light at the same time.
- A twin satellite, Gisat-2, is scheduled to join Gisat-1 in orbit in August
- Its multi-spectral and hyperspectral payloads would help to get "spectral signatures for agriculture, forestry, mineralogy, disaster warning, cloud properties, snow and glaciers and oceanography."
- GSLV rocket, F-10, will lift the satellite to space in an initial elliptical orbit.

What are the goals of Gisat-1?

- To perform real-time imaging over a large swath of territory,
- Providing rapid information about natural disasters and other short-term events.

- This data should also show long-term trends in fields ranging from agriculture to forestry to cloud properties.

1.4 Start of Solar Cycle

Why in News?

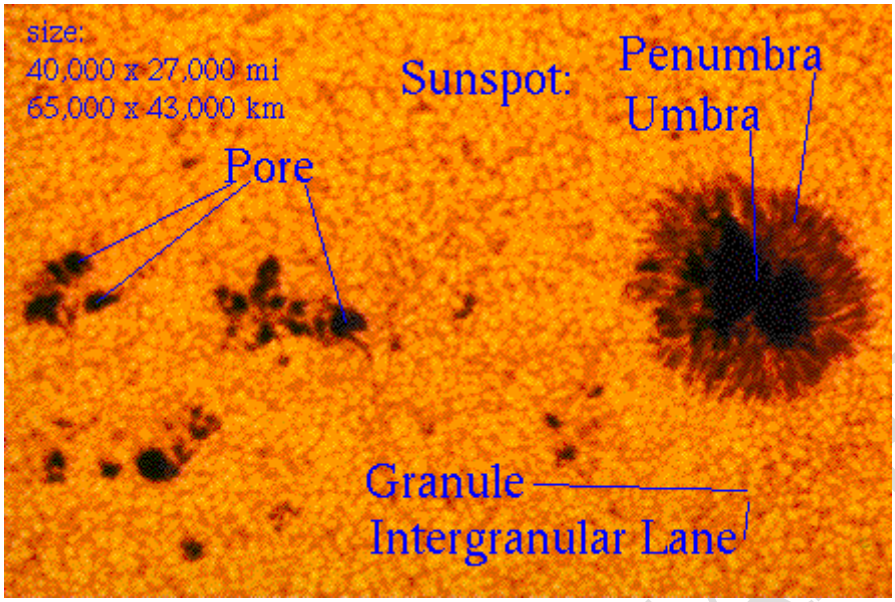
The sunspots identified by researchers had announced the start of a new solar cycle.

What is Solar Cycle?

- A cycle in which the amount of magnetic flux that rises up to the Sun's surface varies with time is called the solar cycle.
- This cycle lasts 11 years on average.
- This cycle is also referred to as the sunspot cycle.
- Near the minimum of the solar cycle (i.e. Solar minimum), it is rare to see sunspots on the Sun.
- Even the spots that do appear are very small and short-lived.
- During "solar maximum", there will be sunspots visible on the Sun almost all the time (more than 100 spots visible at a time!).
- Some of those spots will be very large (up to 50,000 km in diameter) and last several weeks.

What are sun spots?

- Sunspots are regions where the solar magnetic field is very strong.
- In visible light, sunspots appear darker than their surroundings because they are a few thousand degrees cooler than their surroundings.
- Most of the visible surface of the Sun has a temperature of about 5400 degrees C.
- But in a big sunspot the temperature can drop to about 4000 degrees C.
- Sunspots come in sizes between about 2500 km and about 50,000 km.
- So while they are quite large, they are still much smaller than the Sun itself, which has a diameter of 1,392,000 km.
- Most sunspots are roughly circular in shape.
- Sunspots have two distinct parts: the umbra and the penumbra.



- Sunspots do not appear everywhere on the Sun.
- They are usually concentrated in two bands, about 15 - 20 degrees wide in latitude, that go around the Sun on either side of the solar equator.
- The average latitude of those bands varies with the solar cycle.
- Just after the minimum of the solar cycle, sunspots appear at average latitude of about 25 - 30 degrees (both north and south of the equator).
- As the solar cycle progresses, newer sunspots appear closer and closer to the equator.
- The last sunspots of the solar cycle appear at average latitude of about 5 - 10 degrees.
- During all parts of the solar cycle, sunspots are almost never found at latitudes greater than about 70 degrees.

2. ENVIRONMENT

2.1 Air purifier developed under NIDHI

Why in News?

The Department of Science and Technology (DST) said that an air purifying technology developed could offer an effective solution to the country's fight against the coronavirus COVID-19 contagion by reducing the viral load of the infected areas.

What is NIDHI?

- National Initiative for Developing and Harnessing Innovations (NIDHI) is an umbrella programme conceived and developed by Department of Science & Technology.
- It aims at nurturing ideas and innovations (knowledge-based and technology-driven) into successful startups

- The programme would drive entrepreneurial ecosystem with an objective of socio-economic development through wealth and job creation.
- NIDHI aims to nurture start-ups through scouting, supporting and scaling of innovations.

What are the key components of NIDHI?

- NIDHI-GCC -Grand Challenges and Competitions for scouting innovations
- NIDHI-PRomotion and Acceleration of Young and Aspiring technology entrepreneurs (NIDHI-PRAYAS) -Support from Idea to Prototype
- NIDHI-Entrepreneur In Residence (NIDHI-EIR) -Support system to reduce risk
- Startup-NIDHI through Innovation and Entrepreneurship Development Centres (IEDCs) in academic institutions; encouraging Students to promote start-ups
- Start-up Centre in collaboration with MHRD; Inculcating a spirit of entrepreneurship in National Institutions of Higher Learning
- NIDHI-Technology Business Incubator (TBI) -Converting Innovations to start-ups
- NIDHI-Accelerator -Fast tracking a start-up through focused intervention
- NIDHI-Seed Support System (NIDHI-SSS)-Providing early stage investment
- NIDHI Centres of Excellence (NIDHI-CoE) -A World class facility to help startups go global

2.2 BS-VI comes into force

Why in News?

he Central government has announced that from April 1, 2020, all vehicles sold in India should comply with Bharat Stage-VI, or BS-VI emission standards.

What are 'Bharat Emission Standards'?

- These are the standards set up by the Indian government which specify the amount of air pollutants from internal combustion engines, including those that vehicles can emit.
- If these emit more pollutants than the prescribed limit, they don't get a clearance to be sold in an open market.
- Bharat Stage Emission Standards have been instituted by the Central Pollution Control Board (CPCB), instituted within the Ministry of Environment Forests and Climate Change.
- Vehicle emission norms were introduced in India in 1991 for petrol and in 1992 for diesel vehicles.
- Since 2000, Euro norms are followed in India under the name Bharat Stage Emission Standards for four wheeled vehicles.

What are the differences between two stages?

- The extent of sulphar is the major difference between Bharat Stage IV and Bharat Stage VI norms.
- BS-IV fuels contain 50 parts per million (ppm) sulphur, the BS-VI grade fuel only has 10 ppm sulphur.

- BS VI can bring PM in diesel cars down by 80 per cent .
- The new norms will bring down nitrogen oxides from diesel cars by 70 per cent and in petrol cars by 25 per cent.
- BS VI also make on-board diagnostics (OBD) mandatory for all vehicles.
- OBD device informs the vehicle owner or the repair technician how efficient the systems in the vehicle are.

2.3 E-waste Recycling

Why in News?

The government said it more than doubled the electronic waste (e-waste) it recycled in 2018-19 over 2017-18

What is E-waste Recycling?

- E-waste refers to electronic waste.
- E-waste recycling is the reuse and reprocessing of electrical and electronic equipment of any type that has been discarded or regarded as obsolete.
- Recycling of e-waste is a growing trend and was initiated to protect human and environmental health mainly due to the widespread environmental pollution impacts of e-waste.

What are the environmental hazards caused by e-waste?

Lead

It exerts toxic effects on various systems in the body such as:

- The central (organic affective syndrome) and
- Peripheral nervous systems (motor neuropathy),
- hemopoietic system (anaemia),
- genitourinary system (capable of causing damage to all parts of nephron) and
- Reproductive systems (male and female).

Mercury

- It causes damage to the genitourinary system (tubular dysfunction), the central and peripheral nervous systems as well as the foetus.
- When inorganic mercury spreads out in the water, it is transformed into methylated mercury, which bio-accumulates in living organisms and concentrates through the food chain, particularly by fish.

Cadmium

- It is a potentially long-term cumulative poison.
- Toxic cadmium compounds accumulate in the human body, especially in the kidneys.
- There is evidence of the role of cadmium and beryllium in carcinogenicity.

Polycyclic aromatic hydrocarbons (PAH)

- Affects lung, skin and bladder.

2.4 Himalayan Ibex a distinct species

Why in News?

A recent study by scientists of the Zoological Survey of India (ZSI) has proved that Himalayan Ibex, Ladakh and Himachal Pradesh, is a distinct species from the Siberian Ibex.

What is Species diversity?

- It is defined as the number of different species present in an ecosystem and relative abundance of each of those species.
- Diversity is greatest if all the species present are equally abundant in the area.
- Two constituents of species diversity:

Species richness:

- Number of different species present in an ecosystem.
- Tropical areas have greater species richness as the environment is conducive for a large number of species

Species evenness:

- Relative abundance of individuals of each of those species.
- High evenness: If the number of individuals within a species is fairly constant across communities
- Low evenness: if the number of individuals varies from species to species, it is said to have low evenness.
- High evenness leads to greater specific diversity

2.5 Monkey vs Ape

Why in News?

A study shows how long-tailed macaques in Greater Nicobar Island handle objects and use tools to simplify their efforts.

What are the differences between monkeys and apes?

- Monkeys and apes are both primates, which means they're both part of the human family tree.
- The quickest way to tell the difference between a monkey and an ape is by the presence or absence of a tail.
- Almost all monkeys have tails; apes do not.
- Monkeys are generally smaller and narrow-chested, while apes are larger and have broad chests
- Apes' shoulder joints allow them to swing through trees (while some monkeys also have this ability, most of them are built for running across branches rather than swinging).

- Apes have an appendix and monkeys do not.
- Apes are generally more intelligent than monkeys, and most species of apes exhibit some use of tools.
- List of apes: human, gibbon, chimpanzee, bonobo, orangutan, or gorilla (or a lemur, loris, or tarsier).

2.6 Olive Ridleys undisturbed mass nesting

Why in News?

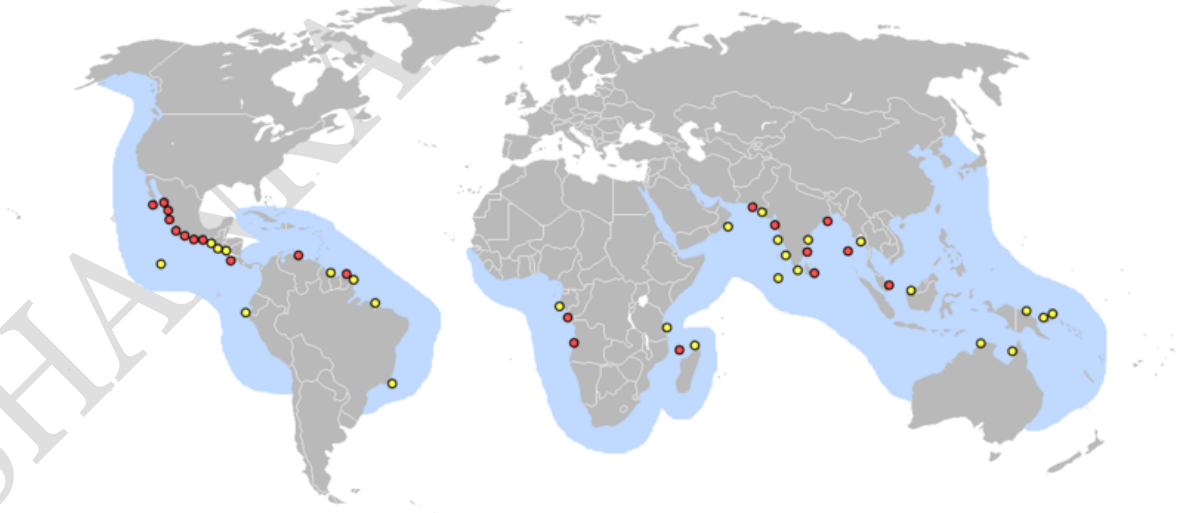
Restrictions in place for the COVID-19 threat is saving lakhs of Olive Ridley turtles from possible intrusion by humans, while they are continuing mass nesting at Odisha's Rushikulya rookery.

What are olive ridleys?

- They are also known as the **Pacific ridley sea turtle**
- They are the smallest and the most abundant of all sea turtles found in the world.
- They are found in warm and tropical waters, primarily in the Pacific and Indian Oceans.
- They can also be found in warm waters of Atlantic Ocean.
- They are best known for their unique mass nesting called Arribada, where thousands of females come together on the same beach to lay eggs.

What are the nesting sites in Orissa?

- The coast of Orissa in India is the largest mass nesting site for the Olive-ridley, followed by the coasts of Mexico and Costa Rica.
- Nesting also occurs along the Coromandel Coast and Sri Lanka, but in scattered locations.



2.7 Rabi Harvest To Be Affected

Why in News?Due to lack of farm workers Rabi harvest may be affected.

What is Kharif season?

- The Kharif season differs in every state of the country but is generally from June to September.
- These crops are usually sown at the beginning of the monsoon season around June and harvested by September or October.
- Rice, maize, bajra, ragi, soybean, groundnut, cotton are all Kharif types crops.

What is Rabi season?

- The Rabi season usually starts in November and lasts up to March or April.
- Rabi crops are mainly cultivated using irrigation since monsoons are already over by November.
- In fact, unseasonal showers in November or December can ruin the crops.
- The seeds are sown at the beginning of autumn, which results in a spring harvest.
- Wheat, barley, mustard and green peas are some of the major rabi types of crops that grow in India.

What are zaid crops?

- There is a short season between Kharif and Rabi season in the months of March to July.
- The crops that grow in this season are Zaid crops.
- These crops are grown on irrigated lands and do not have to wait for monsoons.
- Some examples of Zaid types of crops are pumpkin, cucumber, bitter groud.

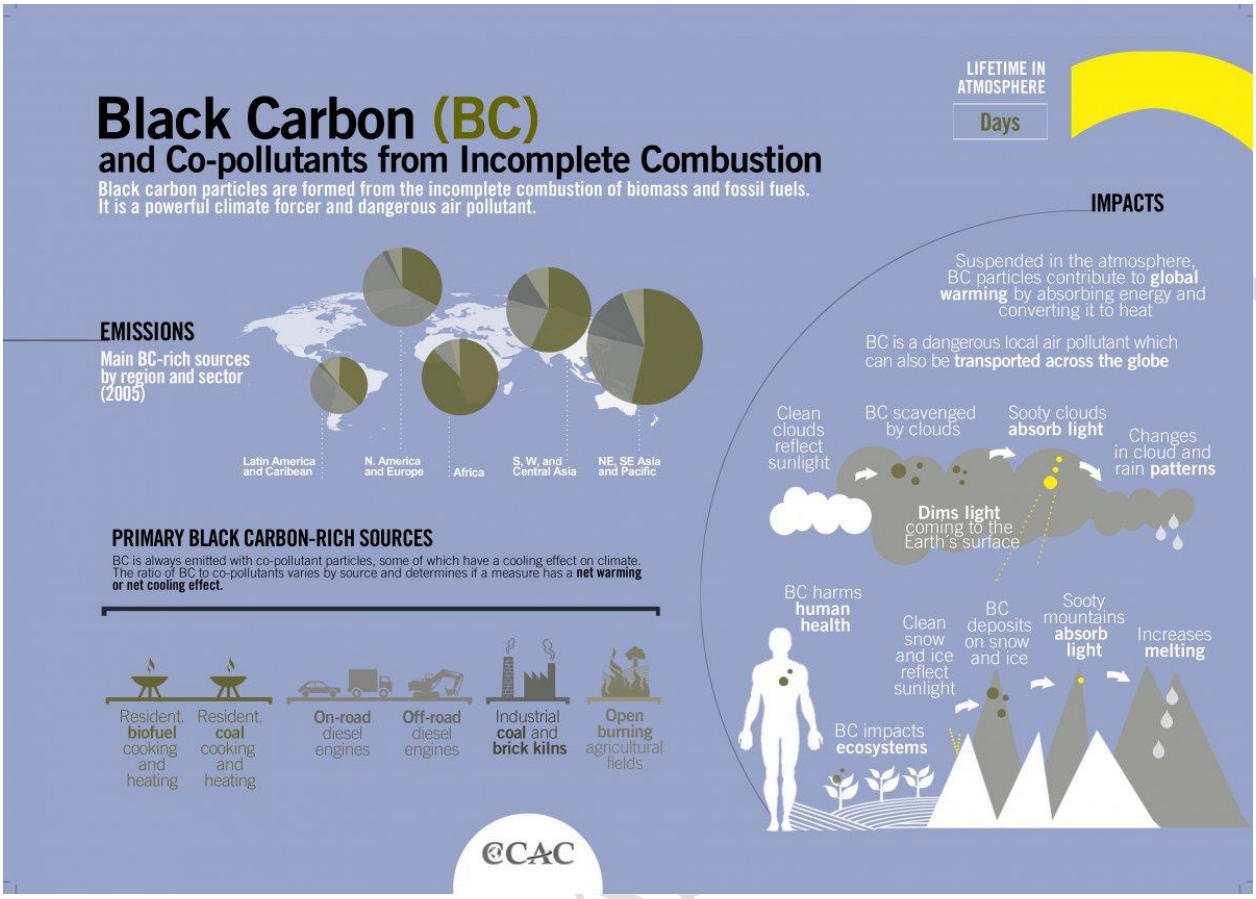
2.8 Rise in Black carbon Concentrations

Why in News?

Black carbon concentrations near the Gangotri glacier rose 400 times in summer due to forest fires and stubble burning from agricultural waste, and triggered glacial melt, says a study

What is Black Carbon?

- Black carbon is a potent climate-warming component of particulate matter.
- It is formed by the incomplete combustion of fossil fuels, wood and other fuels.
- Complete combustion would turn all carbon in the fuel into carbon dioxide (CO_2).
- Combustion is never complete and CO_2, carbon monoxide, volatile organic compounds, and organic carbon and black carbon particles are all formed in the process.
- The complex mixture of particulate matter resulting from incomplete combustion is often referred to as soot.
- Black carbon is a short-lived climate pollutant with a lifetime of only days to weeks after release in the atmosphere.



- During this short period of time, black carbon can have significant direct and indirect impacts on the climate, glacial regions, agriculture and human health.
- Several studies have demonstrated that measures to prevent black carbon emissions can reduce near-term warming of the climate, increase crop yields and prevent premature deaths.

3. INNOVATION

3.1 In-flight Wifi

Why in News?

The central government has permitted airlines operating in India to provide in-flight WiFi services to passengers.

How in-flight WiFi works?

- There are two systems of connectivity for inflight WiFi - Air-to-ground and satellite.
- Air-to-ground system is a ground based system that works similar to mobile data network on cell phones.
- There are towers that project signals upwards unlike mobile data towers that projects downwards.
- Antennae fitted beneath the airplanes receive signals from these towers and send them to an onboard server.
- The server has a modem that converts these signals, thereby providing WiFi to passengers.

- These towers are connected to operation centres run by service providers.
- In Satellite based WiFi system, antennae are fitted on the top of airplanes.
- Antennae receive signals from satellites orbiting the earth.
- The antennae need to constantly adjust their position to receive signals as both the satellite and the airplane are constantly moving.
- These satellites are linked to ground stations that are connected to operation centres run by service providers.
- The air-to-ground system works seamlessly, unless the airplane is flying over a space with no towers.
- In that case, satellite WiFi systems can be utilised.
- Even though airlines all over the world are rushing to provide inflight WiFi services, WiFi in airplanes are slower and expensive than on the ground.

3.2 Superhydrophobic

Why in News?

A team of chemical engineers has now created a superhydrophobic coating made with polyurethane and silicon dioxide nanoparticles that can be used to save steel from rusting.

What is Superhydrophobic?

- "Superhydrophobic" has become the common nomenclature to describe ANY surface which easily repels liquids.
- A superhydrophobic coating is a coating that has a water contact angle of greater than 150 degrees and a sliding angle of less than 10 degrees.

What are the methods to prevent corrosion?

1. **Barrier Coatings**
   - One of the easiest and cheapest ways to prevent corrosion is to use barrier coatings like paint, plastic, or powder.
   - Powders, including epoxy, nylon, and urethane, are heated to the metal surface to create a thin film.
2. **Hot-Dip Galvanization**
   - This corrosion prevention method involves dipping steel into molten zinc.
   - The iron in the steel reacts with the zinc to create a tightly-bonded alloy coating which serves as protection.
3. **Alloyed Steel (Stainless)**
   - Alloyed steel is one of the most effective corrosion prevention methods around, combining the properties of various metals to provide added strength and resistance to the resulting product.

3.3 Cathodic Protection

Ebola vaccine for SARS-CoV-2

Why in News?

With increasing death rate worldwide doctors and scientists are looking forward for promising drug to treat SARS-CoV-2.

What is Ebola?

- Ebola is a rare but deadly virus
- It is caused by an infection with a group of viruses within the genus *Ebolavirus*
- It causes fever, body aches, and diarrhea, and sometimes bleeding inside and outside the body.
- As the virus spreads through the body, it damages the immune system and organs.
- Ultimately, it causes levels of blood-clotting cells to drop.
- This leads to severe, uncontrollable bleeding.
- The disease was known as Ebola hemorrhagic fever but is now referred to as Ebola virus.
- It kills up to 90% of people who are infected.
- Ebola isn't a contagious diesease.
- It spreads to people by contact with the skin or bodily fluids of an infected animal, like a monkey, chimp, or fruit bat.
- Then it moves from person to person the same way.
- You can't get Ebola from air, water, or food.
- A person who has Ebola but has no symptoms can't spread the disease, either.

4. BIO-TECHNOLOGY

4.1 Cleaning, Disinfecting and Sterlizing

What is cleaning?

- The removal of foreign materials (soil and organic material) from objects and is normally accomplished using water with detergents or enzymatic products.
- This is also the first step to disinfection and sterilisation.
- This process does not kill the bacteria or virus; it instead reduces its percentage on the surface.

What is disinfecting?

- Disinfection helps us kill germs with the use of chemicals.
- This can be done with bleach, chlorine or any alcohol-based product available in the market.
- But this process can still leave still behind vegetative spores on the surface.

Methods of Disinfecting:

- Chlorination (sodium hypochlorite solution)
- Chlorine gas
- Photocatalytic disinfection
- Ultraviolet light (UV)
- Ozonation
- Chloramines

What is sterilizing?

- This process destroys all the microorganisms on the surface or in a fluid to prevent disease transmission associated with the use of that item.
- It kills everything including the spores.

Methods used in sterilizing:

- Heat Method
- Filtration
- Radiation sterilization
- Chemical method of sterilization

4.2 Dementia & Pollution

Why in News?

According to the study, patients with cardiovascular diseases (CVD) who live in polluted environments may require additional support from care providers to prevent dementia.

What is dementia?

- Dementia is a syndrome in which there is deterioration in memory, thinking, behaviour and the ability to perform everyday activities.
- Dementia mainly affects older people.
- It is not a normal part of ageing.
- Worldwide, around 50 million people have dementia, and there are nearly 10 million new cases every year.
- Alzheimer disease is the most common form of dementia and may contribute to 60–70% of cases.
- Dementia is one of the major causes of disability and dependency among older people worldwide.
- There is no treatment currently available to cure dementia or to alter its progressive course.

4.3 Diabulimia

Why in News?

people with diabetes can develop diabulimia

What is diabulimia?

- diabulimia = diabetes + bulimia.
- Diabetes is a disease that affects the way your body uses blood sugar.
- Bulimia is an eating disorder where you binge on food and then purge it by throwing up or taking a laxative in order to lose weight.
- "diabulimia" (also known as ED-DMT1) is a life-threatening combination and the unhealthy practice of withholding insulin to manipulate or lose weight.
- People suffering from ED-DMT1 may exhibit any number of eating disorder behaviors or they may only manipulate their insulin and otherwise have normal eating patterns.

What are warning signs of diabulimia?

- Rapid weight loss with normal or heavy eating
- Physical exhaustion
- Increased appetite (the body's cells are essentially starving)
- Mood changes
- Decreased concentration and motivation (this can be seen in changes in academic and professional performance)

4.4 Epidemics vs Pandemics

Why in News?

The World Health Organisation has declared the novel coronavirus outbreak a pandemic.

What is the history of pandemics?

- The history's worst known infectious disease outbreak of the Spanish flu occurred in 1918.
- The influenza virus H1N1 killed more than 50 million people and infected over 500 million people across the world.
- Some of the major pandemics since the 20th century are Spanish flu, Asian flu, Hong Kong flu, HIV, SARS, Swine flu, MERS, Ebola and COVID-19.

What is the difference between epidemic and pandemic?

- Epidemic is a term that is often broadly used to describe any problem that has grown out of control.
- An epidemic is defined as "an outbreak of a disease that occurs over a wide geographic area and affects an exceptionally high proportion of the population."
- An epidemic is an event in which a disease is actively spreading.

- In contrast, the term pandemic relates to geographic spread and is used to describe a disease that affects a whole country or the entire world.

Epidemic	Pandemic
• Event in which a disease is actively spreading • Often used to describe problem that has grown out of control	• Relates to geographic spread • Describes disease that affects a whole country or the entire world

4.5 Genome Sequence of COVID-19

Why in News?

India has finally shared two whole genome sequence data of the novel coronavirus (SARS-CoV-2) with the Global Initiative on Sharing All Influenza Data (GISAID).

Why study Genome?

- Sequencing the genome of novel coronavirus will help us to know where the virus came from and how the virus has spread.
- For instance, by sequencing the genome of the virus isolated from an Indian patient, it will become possible to know if the virus had come from China or any other country.

What is Genome sequencing?

- Genome sequencing is figuring out the order of DNA nucleotides, or bases, in a genome—the order of As, Cs, Gs, and Ts that make up an organism's DNA.
- The human genome is made up of over 3 billion of these genetic letters.
- The rules of base pairing (or nucleotide pairing) are:
    - A with T: the purine adenine (A) always pairs with the pyrimidine thymine (T)
    - C with G: the pyrimidine cytosine (C) always pairs with the purine guanine (G)

4.6 Hantavirus

Why in News?

According to China's Global Times, a man from Yunnan Province was tested positive and died due to hantavirus.

What is Hantavirus?

- Hantaviruses are a family of viruses spread mainly by rodents.
- It can cause varied disease syndromes in people worldwide.
- Infection with any hantavirus can produce hantavirus disease in people.
- Hantaviruses in the Americas are known as "New World" hantaviruses and may cause hantavirus pulmonary syndrome (HPS).

- Other hantaviruses, known as "Old World" hantaviruses, are found mostly in Europe and Asia and may cause hemorrhagic fever with renal syndrome (HFRS).
- Each hantavirus serotype has a specific rodent host species and is spread to people via aerosolized virus that is shed in urine, feces, and saliva, and less frequently by a bite from an infected host.

What is zoonotic disease?

- A zoonotic disease is a disease spread between animals and people.
- Zoonotic diseases can be caused by viruses, bacteria, parasites, and fungi. Some of these diseases are very common.
- Some examples include:
    - anthrax
    - ascariasis
    - brucellosis
    - plague
    - echinococcosis
    - Lassa fever
    - listeriosis
    - Lyme disease
    - monkeypox
    - psittacosis
    - rabies
    - salmonellosis
    - trichinosis
    - toxoplasmosis
    - typhus
    - West Nile fever
- Major modern diseases such as Ebola virus disease and salmonellosis are zoonoses.
- HIV was a zoonotic disease transmitted to humans in the early part of the 20th century, though it has now evolved to a separate human-only disease.

4.7 Hydroxychloroquine for COVID-19

Why in News?

Health Ministry allows Hydroxychloroquine with Azithromycin for COVID-19.

What is hydroxychloroquine?

- Hydroxychloroquine is a disease-modifying anti-rheumatic drug (DMARD).
- It regulates the activity of the immune system, which may be overactive in some conditions.
- Hydroxychloroquine can modify the underlying disease process, rather than simply treating the symptoms.

What it is used for?

Hydroxychloroquine is used to treat:

- Lupus erythematosus
- rheumatoid arthritis.
- It's also used to prevent and treat malaria.

What is Azithromycin used for?

- Azithromycin is used to treat a wide variety of bacterial infections.
- It is a macrolide-type antibiotic.
- It works by stopping the growth of bacteria.
- This medication will not work for viral infections (such as common cold, flu).

4.8 Incubation

Why in News?

21 days lockdown announced to contain spreading of coronavirus.

What is incubation of a virus in host?

- The time before the symptoms of a viral infection appear is called the incubation period.
- During this time, viral genomes are replicating and the host is responding, producing cytokines such as interferon that can have global effects, leading to the classical symptoms of an acute infection (e.g., fever, malaise, aches, pains, and nausea).
- These symptoms are called the prodrome.
- Whether or not an infected person is contagious (i.e. is shedding virus) during the incubation period depends on the virus.

What is the incubation period of COVID-19?

- Presentations of COVID-19 have ranged from asymptomatic/mild symptoms to severe illness and mortality.
- Common symptoms have included fever, cough, and shortness of breath.
- Other symptoms, such as malaise and respiratory distress, have also been described.
- Symptoms may develop 2 days to 2 weeks following exposure to the virus.

- A pooled analysis of 181 confirmed cases of COVID-19 outside Wuhan, China, found the mean incubation period to be 5

4.9 Neurodiverse Workplaces

Why in News?

Provided with the right workplace environment, people with cognitive conditions like dyslexia and autism can be an asset to the company, claim neurodiversity advocates.

What is dyslexia?

- Dyslexia is a learning disorder that affects your ability to read, spell, write, and speak.
- Kids who have it are often smart and hardworking, but they have trouble connecting the letters they see to the sounds those letters make.

What Causes Dyslexia?

- It's linked to genes, which is why the condition often runs in families.
- Kids with parents, siblings, or other family members having dyslexia are more likely to have it.
- The condition stems from differences in parts of the brain that process language.

What is Autism?

- Autism is a complex, lifelong developmental disability that typically appears during early childhood.
- It can impact a person's social skills, communication, relationships, and self-regulation.
- Autism is defined by a certain set of behaviors and is a "spectrum condition" that affects people differently and to varying degrees.
- While there is currently no known single cause of autism, early diagnosis helps a person receive the support and services that they need, which can lead to a quality life filled with opportunity.

4.10 Plasma Treatment for COVID-19

Why in News?

A study shows promising results with plasma treatment for COVID-19

What is Plasma?

- Plasma is the clear, straw-colored liquid portion of blood.
- It is the remaining portion of the blood after removing red blood cells, white blood cells, platelets and other cellular components.
- It is the single largest component of human blood, comprising about 55 percent, and contains water, salts, enzymes, antibodies and other proteins.
- It is composed of 90% water.
- Plasma is a transporting medium for cells and a variety of substances vital to the human body.

- Plasma carries out a variety of functions in the body, including clotting blood, fighting diseases and other critical functions.
- Source plasma is plasma that is collected from healthy, voluntary donors through a process called plasmapheresis.

4.11 Population size shapes evolution patterns in E. coli

Why in News?

Studying cultures of *E. coli* bacteria has found that the population size determines the kind of fitness trade-offs the microbes adopt.

What is fitness trade-offs?

- Organisms do not have the capacity to maximise all their functions at the same time.
- Often when they enhance one function, another function suffers, or when they adapt to survive well in one environment, they cannot survive or reproduce well in another environments.
- This is called a fitness trade-off.
- This concept has been used by evolutionary biologists to explain why species prefer one environment to another.

What are E-coli?

- E. coli (Escherichia coli), is a type of bacteria.
- It normally lives in your intestines.
- It's also found in the gut of some animals.
- Most types of E. coli are harmless and even help keep your digestive tract healthy.
- But some strains can cause diarrhea if you eat contaminated food or drink fouled water.
- E. coli in addition to causing food poisoning it may also cause pneumonia and urinary tract infections from different types of the bacteria.
- 75% to 95% of urinary tract infections are caused by E. coli.
- Some versions of E. coli make you sick by making a toxin called Shiga.
- This toxin damages the lining of your intestine.
- The strains of E. coli that make the toxin are sometimes called STEC, which is short for "Shiga toxin-producing E. coli."

4.12 SARS & MERS

What is SARS?

- SARS - Severe Acute Respiratory Syndrome (SARS).
- It is caused by a virus called the SARS-associated coronavirus (SARS-CoV).

- It is a member of the Coronaviridae family.
- It also includes many of the viruses that cause the common cold.
- Coronaviruses have been found in many different animal species including birds and mammals.
- It is transmitted by the spread of respiratory droplets produced when an infected person coughs or sneezes.
- SARS-CoV is thought to have passed from animals to humans through close contact, butchering or eating undercooked meat in parts of Southern China.

What is MERS?

- Middle East Respiratory Syndrome (MERS) is an illness caused by a virus (more specifically, a coronavirus) called Middle East Respiratory Syndrome Coronavirus (MERS-CoV).
- Most MERS patients developed severe respiratory illness with symptoms of fever, cough and shortness of breath.
- About 3 or 4 out of every 10 patients reported with MERS have died.

4.13 Zoonotic diseases

How do germs spread between animals and people?

- Direct contact: While petting or touching animals, and bites or scratches.
- Indirect contact: Coming into contact with areas where animals live and roam.
- Vector-borne: Being bitten by a tick, or an insect like a mosquito or a fleafood-borne Eating or drinking contaminated food.
- Water-borne: Drinking or coming in contact with water that has been contaminated with feces from an infected animal.

What are the types of Influenza in Animals?

Bat influenza:

- Influenza A viruses are found in bats.
- Internal genes of bat flu viruses are compatible with human flu viruses.
- H17N10, H18N11 found only in bats.

Influenza in cats: Cats can be infected with influenza viruses, including avian influenza viruses.

Canine influenza (Dog flu):

- A contagious respiratory disease in dogs caused by specific type A influenza viruses — H3N8, H3N2.
- No human infections with canine influenza have ever been reported.

Swine/Variant influenza: A respiratory disease of pigs caused by type A influenza viruses.

Avian influenza:

- These viruses occur naturally among wild aquatic birds worldwide and can infect domestic poultry and other bird and animal species.
- All subtypes of influenza A viruses apart from H17N10 and H18N11 can infect birds.

What is Monkey fever?

- Money fever or Kyasanur forest disease (KFD) is a viral fever.
- It is a tick-borne hemorrhafic fever.
- it is endemic to South Africa.
- It is a virus fever, belonging to the family Flaviviridae, which also includes yellow fever and dengue fever.
- The disease is carried by ticks, rodents, birds, etc and it affects monkeys and human beings.
- It is a vector-borne disease.
- The virus is transmitted to humans through the bite of nymphs of the tick or when humans come into contact with an infected animal.