

SCIENCE CENTRE NEWS LETTER

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SCIENCE CENTRE

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WHAT'S NEW IN SCIENCE?

Asia's extreme disasters have one thing in common: A rare atmospheric flip

A hidden stratospheric wind system broke its rhythm, unleashing synchronised extreme weather across Southeast Asia.

A major shift high in the atmosphere may be driving the cluster of extreme weather events unfolding in several parts of the World including across Southeast Asia, according to emerging analyses of global wind patterns.

At the centre of the concern is the Quasi-Biennial Oscillation (QBO), a normal steady, predictable system of winds that blow high above the equator. The QBO, a band of stratospheric winds 16-50 km above Earth, typically alternates direction every 26-28 months. This regular switch acts like a "metronome" for global weather, influencing monsoons, storm paths, the polar vortex and the distribution of moisture. But in December month, Scientists tracking NOAA [(National Oceanic and Atmospheric Administration) it collects real time data from satellites, weather stations and citizen Scientists] datasets observed something unusual: the QBO at 10 hectopascal (a unit of pressure equal to 100 pascals) appears to have collapsed and reversed far earlier than expected. Instead of its

usual gradual wobble, the stratospheric wind structure over the Northern Hemisphere is showing signs of a sudden break. Such a disruption is rare and can have wide-ranging consequences.

When the QBO fails to behave normally, pressure systems lose their usual coordination, storm tracks shift, blocking patterns form and rainfall starts appearing in unexpected places.

At ground level, this atmospheric shift coincides with severe flooding and wide spread damage in Vietnam.

Meteorologists note that this devastation is linked to the region's position beneath a volatile zone where collapsing stratospheric winds meet an unusually warm ocean surface. The Philippines, lying directly in this zone of atmospheric tension, may be at even greater risk. This region is now described by some Researchers as one of the most dangerous civilian environments on the planet. Sri Lanka also hit by the extreme weather condition.



Main Source:

<https://www.indiatoday.in/science/story/asia-disaster-qbo-disruption-extreme-weather-vietnam-floods-philippines-storms-2025-2829496-2025-12-02>, <http://www.noaa.gov/education>

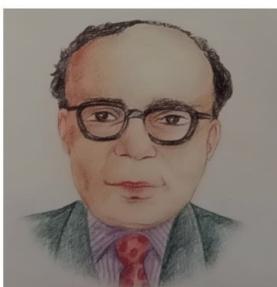
Published by: Radifah Kabir on 2nd December, 2025

SCIENTIST OF THE MONTH

Dr. Dara Kalkushroo Karanjawala

Dr. Dara Kalkushroo Karanjwala was born on the 27 January, 1922 at Mumbai in Maharashtra. He did M.B.B.S and M.S from the Bombay University.

Dr. Karanjwala is a famous urologist and kidney transplant surgeon who has worked as surgical-in-charge of kidney transplant in various hospitals in India and abroad. He was the Honorary Advisor in Urology in the Sher-e-Kashmir Institute of Medicine and Gujarmal Modi Hospital. He has to his credit papers on salmonella infection, filarial chyluria, urolithiasis and renal cell carcinoma. His works have been published in various



Indian and international journals. He was also a member, Editorial Board of British Journal of Urology.

He is remember as one of the 'Father's of Indian Urology'.

Dr. Karanjwala received Urological Society of India Gold Medal in 1981, the Shirwalkar Gold Medal in 1982, Padma Shri Award in 1983, the Dhanwantari Award in 1986 and Dr. Paul's Gold Medal in 1993 by British

Association of Urological Surgeons. He passed away in 2004 at the age of 84.

Main Source: 101, Great Indian Scientists Book, By Shyam Dhum

SCIENCE FACTS JANUARY 2026



Timings

Tuesday to Sunday
& Public Holidays
9.30 am to 4.30 pm

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1 January 1941	: British Biologist Sir Martin J. Evans (Co-winner of the 2007 Nobel Prize in Physiology/Medicine for their discoveries of principles for introducing specific gene modifications in mice by the use of embryonic stem cells) was born.
4 January 1643	: English mathematician and natural philosopher Sir Isaac Newton (established classical mechanics) was born.
4 January 1940	: Welsh Physicist Brian Josephson (Co-winner of the 1973 Nobel Prize in Physics for his theoretical predictions of the Josephson effect) was born.
4 January 1963	: Norwegian Neuroscientist May-Britt Moser (Co-winner of the 2014 Nobel Prize in Physiology/Medicine for their discoveries of cells that constitute a positioning system in the brain) was born.
6 January 1795	: French Chemist Anselme Payen (Discoverer of the enzyme diastase and the carbohydrate cellulose) was born.
7 January 1941	: English Chemist John E. Walker (Co-winner of the 1997 Nobel Prize in Chemistry for their elucidation of the enzymatic mechanism underlying the synthesis of adenosine triphosphate) was born.
8 January 1891	: German Physicist Walther Bothe (Co-winner of the 1954 Nobel Prize in Physics in recognition of his development of the coincidence counting method in the study of cosmic radiation and the discoveries he made with it) was born.
10 January 1936	: American Physicist and radio astronomer Robert Woodrow Wilson (Co-winner of the 1978 Nobel Prize in Physics for their discovery of cosmic microwave background radiation) was born.
11 January 1924	: French neuroendocrinologist Roger Guillemin (Co-winner of the 1977 Nobel Prize in Physiology/Medicine for their discoveries concerning the peptide hormone production of the brain) was born.
12 January 1942	: Swiss born Physicist Mical Major (Co-winner of the 2019 Nobel Prize in Physics for the discovery of an exoplanet orbiting a solar-type star) was born.
13 January 1864	: German Physicist Wilhelm Wien (Winner of the 1911 Nobel Prize in Physics for his discoveries regarding the laws governing the radiation of heat) was born.
13 January 1960	: American Chemist Eric Betzig (Co-winner of the 2014 Nobel Prize in Chemistry for the development of super-resolved fluorescence microscopy) was born.
18 January 1896	: The X-ray machine is exhibited for the first time.
20 January 1931	: American Physicist David Lee (Co-winner of the 1996 Nobel Prize in Physics for their discovery of superfluidity in helium-3) was born.
21 January 1912	: German born Biochemist Konrad Emil Bloch (Co-winner of the 1964 Nobel Prize in Physiology/Medicine for discoveries concerning the mechanism and regulation of the cholesterol and fatty acid metabolism) was born.
22 January 1908	: Soviet Physicist Lev Landau (Winner of the 1962 Nobel Prize in Physics for his pioneering theories for condensed matter, especially liquid helium) was born.
22 January 1936	: American Chemist Alan J. Heeger (Co-winner of the 2000 Nobel Prize in Chemistry for their discovery and development of conductive polymers) was born.
23 January 1876	: German Chemist Otto Diels (Co-winner of the 1950 Nobel Prize in Chemistry for their discovery and development of the diene synthesis) was born.
23 January 1929	: Canadian Chemist John Charles Polanyi (Co-winner of the 1986 Nobel Prize in Chemistry for his research in Chemical Kinetics) was born.
25 January 1627	: Irish Chemist Robert Boyle (Known for Boyle's law) was born.
26 January 1911	: German-born Physicist Polykarp Kusch (Co-winner of the 1955 Nobel Prize in Physics for his precision determination of the magnetic moment of the electron) was born.
28 January 1922	: American Biochemist Robert W. Holley (Co-winner of the 1968 Nobel Prize in Physiology/Medicine for describing the structure of an alanine transfer RNA, linking DNA and protein synthesis) was born.

Ans: 1. a 2. c 3. b 4. a 5. d

SCIENTIFIC QUESTION

What is Big Bang?(part-3)

Radiation

Ear and

Epochs

By the end of the grand unification epoch several key events took place. The strong force freezing out provided the immense energy density of the Inflationary Epoch.

3 . The Inflationary Epoch:

Time Period: from 10^{-36} to 10^{-32} seconds

Triggered by the separation of the strong nuclear force, the universe undergoes an extremely rapid exponential expansion known as cosmic inflation.

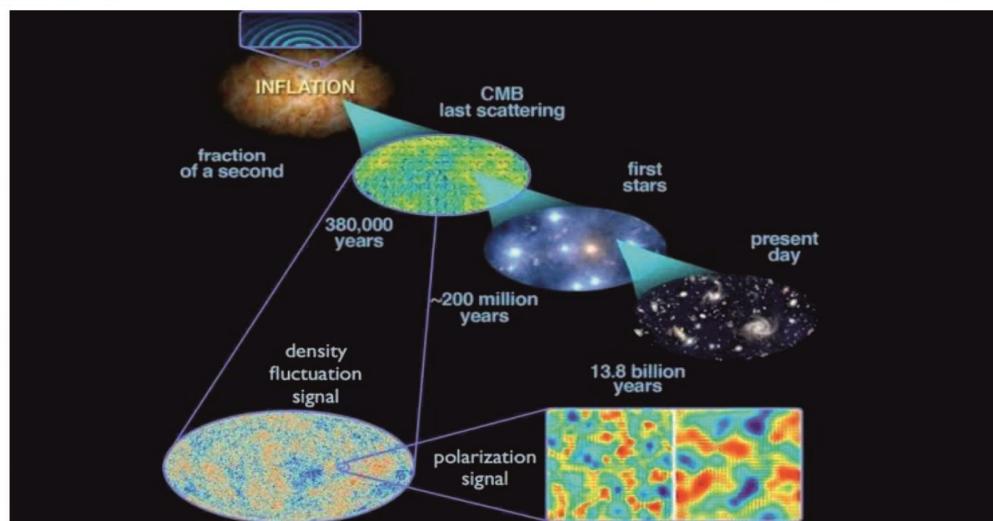
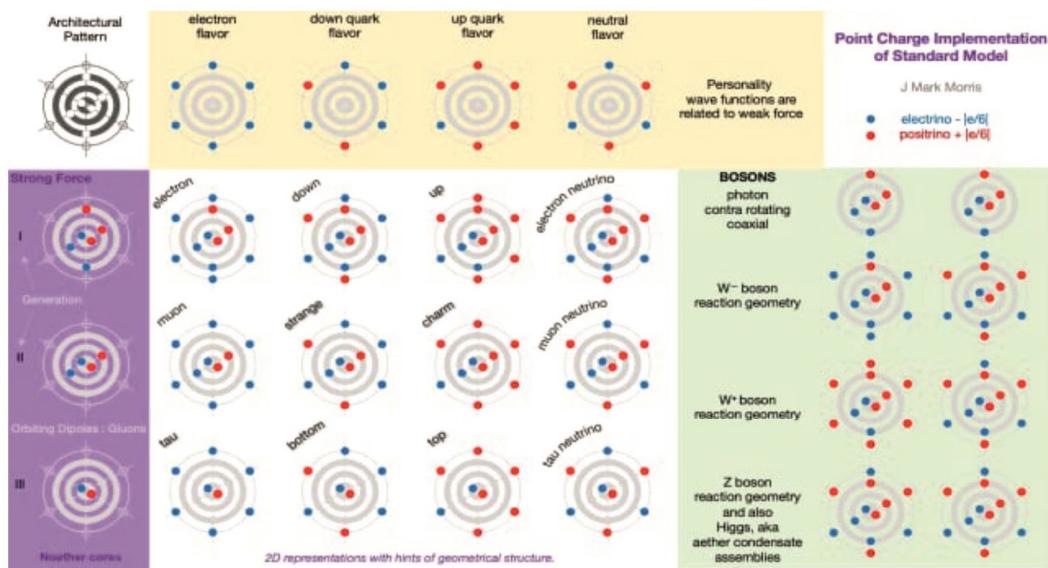
This Epoch was a brief period of rapid, exponential expansion of the universe.

During this period the universe's size increased dramatically, growing from subatomic to roughly the size of a grapefruit. The linear dimensions of the early universe during this period of a tiny fraction of a second by a factor of at least 10^{26} to around 10 centimeters.

The high potential energy of the inflation field was released at the end of inflation as it decayed into other particles. This process known as reheating, the universe with a dense, hot mixture of fundamental particles remaining from the Grand unification Epoch (a hot, dense quark-gluon plasma called "quark soup") become distributed very thinly across the universe.

4. Electroweak Epoch:

Time Period:
from 10^{-36} to 10^{-12} seconds



The universe was extremely hot but had cooled enough for gravity to have separated from the other fundamental forces.

The strong nuclear force separated from the Electroweak force but Electromagnetism and the weak nuclear force remained unified until a Electroweak phase transition when the electromagnetic and weak forces split into their separate forms and particles acquired mass.

The Electroweak

Epoch ended when the universe cooled to a critical temperature (around 10^{15} K) due to expansion. This cooling triggered a process called electroweak symmetry breaking which had two major consequences.

- The electroweak force split into particles interaction with the distinct electromagnetic and weak nuclear forces.
- Through the Higgs mechanism, particles interacting with the pervasive Higgs field acquired mass. Before it the Higgs field had a zero vacuum expectation value, so all fundamental particles were massless.

Higgs field after acquired mass caused the W and Z bosons (carriers of the weak force) to become massive and short-ranged, while the photon (carrier of the electromagnetic force) remained mass less and long-range.

Main Source and Image:

https://www.physicsoftheuniverse.com/topics_bigbang_timeline.html,
<http://en.wikipedia.org>

SCIENCE FAIR-2025



Surat Municipal Corporation had organized “Science Fair-2025” at Art Gallery, Science Centre Surat on 22nd and 23rd August, 2025 for students of Std. 8 to 12. Suman High School No.10 had participated in Science fair with their project on “Smart Load Barrier” under the subtheme of “Building Sustainable Future of Digital India for the Global Leadership”.

The aim of the project was to apply mathematical principles in designing a Smart Load Barrier system that can calculate, predict and regulate the maximum load on a road/bridge using weight distribution formulas, threshold values and logical algorithms, ensuring safety and efficiency.

In this project, the data is collected for the average weights of different types of vehicles (car, trucks, buses) and find safe load capacity of a sample bridge/road (e.g.20 tons). Then apply mathematical formula:

Load = mass / gram

$$\text{Stress} = \text{Load}/\text{area}$$

Calculate maximum permissible load for given structure and define threshold value

If vehicle weight < threshold, Barrier open

If vehicle weight > threshold, Barrier remains closed



KNOW THE ENTERING INTO SPACE GALLERY EXHIBIT

International Space Laws (Selected)

A launching country shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the Earth or to aircraft in flight. Whenever two or more states jointly launch a space object, they shall be jointly and severally liable for any damage caused.

This Exhibit is situated at “Entering Space Gallery” between Fun Science Gallery and Power of Play Gallery at First Floor of Science Centre.



QUIZ

1. Which non-metal element is found in Gaseous form?
a. Chlorine b. Sulfur c. Phosphorus d. Bromine
2. Which non-metal element is in Solid form?
a. Bromine b. Chlorine c. Sulfur d. Hydrogen
3. Which non-metal element is a conductor of electricity?
a. Sulfur b. Graphite c. Iodine d. Chlorine
4. Which element is present at the base of components like vitamins, proteins and carbohydrates?
a. Carbon b. Sodium c. Sulfur d. Chlorine
5. Which non-metal element has a luster?
a. Carbon b. Sulfur c. Phosphorus d. Iodine

Main Source: Nayneet MCQs Science and Technologies, Std 10