



Proud Moment : CHANDRAYAAN 3 - A FLIGHT TO THE MOON



Our Founder and his Vision

Knowledge is the prime wealth among all wealths. In other words, knowledge is the best and important wealth among all wealths. Start your journey to find or explore the knowledge. Our founder and renowned scholar late Padmashri Dr Vellayani Arjunan's vision is to spread quality education to entire community and make it affordable.

Shri. Vellayani Arjunan was born on 10 February 1933 at Vellayani in the erstwhile Kingdom of Travancore. After receiving a Master of Arts degree in Malayalam, he went on to teach Malayalam Language and Literature at Sree Narayana College in Kollam. He later became the first Malayalam lecturer in Aligarh Muslim University, from which he gained his PhD degree in 1964. After leaving Aligarh Muslim University, he was appointed director of the State Institute of Encyclopaedic Publications in Kerala

He was honoured with the Padma Shri award by the nation in 2008. Dr Arjun, who was the first Professor of Malayalam at the Aligarh University and head of the Department of Modern Indian Languages. He supervised 20 research scholars and published more than 100 research papers and articles. He had authored 40 books in different genres including poetry, short story, essays and literary criticism, and his books were prescribed as textbooks in Kerala schools from 1959 onwards.



Degree	Topic	Awarding Institution
D.Litt.	Influence of Sree Narayana Guru on Malayalam Poetry.	Aligarh Muslim University
D.Litt.	A Comparative Study of the Mutual Relations and Uniformity of Hindi and Malayalam Languages.	Agra University
D.Litt.	The influence of Hindi Vocabularies on the South Indian Languages: A Linguistic study.	Jabalpur University
Ph.D.	A Comparative Linguistic Study of Common Vocables of Hindi and Malayalam Languages.	Aligarh Muslim University

Other degrees

Degree	Subject
B.A. Hons	Malayalam Language and Literature
M.A.	Malayalam Language and Literature
M.A.	Hindi Language and Literature
M.A.	Hindi Special
P.G. Diploma	Tamil, Telugu, Kannada





From the Editor's Desk.....

Dear Students & future leaders,

Students are the future of a country. What we teach them, how we groom them will define what will happen in our country tomorrow. 15 August is a special day for every Indian as it is the day when India got itself free from the colonial trap. Wish every student a very Happy Independence Day.

Always feel proud in being an Indian because we have a glorious past and promising future. Happy Independence Day 2023. It is a privilege to be born in a free country as we are able to breathe fresh air, speak our thoughts and live a harmonious life. Freedom doesn't see colours or shapes. There is enough hate and violence in the world, and now we need to build a better future, full of love, unity and understanding. Here's to a wonderful Independence Day!



What is special about the month of August ?



International Youth Day, observed on **August 12th** each year, is a United Nations designated day to celebrate and recognize the role of young people as agents of positive change in society. The day aims to raise awareness of the challenges and issues faced by youth worldwide, as well as to promote youth empowerment, engagement, and inclusion in decision-making processes. The theme of International Youth Day varies each year, focusing on diverse aspects of youth development, such as education, employment, mental health, climate action, and social inclusion. It provides an opportunity for young people to showcase their creativity, innovation, and dedication to making a meaningful impact in their communities. Through events, workshops, and campaigns organized on this day, governments, organizations, and individuals come together to address the specific needs and aspirations of young people, encouraging them to participate actively in shaping a better future for themselves and the world. International Youth Day is a call to action to invest in youth, recognizing their potential as catalysts for positive social change and sustainable development.



CHANDRAYAAN 3 : A FLIGHT TO THE MOON

What is Chandrayaan-3?

Chandrayaan-3 is the third Moon mission by India's space agency ISRO. The goal is to place a lander and rover on the lunar surface and operate them for roughly one lunar day, or 14 Earth days. The small rover, which weighs just 26 kilograms (57 pounds), will fly to the Moon inside the lander. Both vehicles are equipped with science instruments to study the surface. The Chandrayaan-3 lander and rover are similar in design to those from the Chandrayaan-2 mission. The mission is set to launch in late August 2023. Unlike its predecessor, Chandrayaan-3 does not include an orbiter. The propulsion module that will carry the lander to lunar orbit is equipped with a science instrument that will observe Earth as if it were an exoplanet, providing data for future exoplanet studies.

How will Chandrayaan-3 get to the lunar surface?

According to the information, it will take about 40 days to place Chandrayaan-3 on the lunar surface. The mission began on July 14, 2023 with a launch aboard India's Launch Vehicle Mark 3 (LVM3) rocket. The LVM3 will place the spacecraft and an attached propulsion module into an elongated Earth orbit with an apogee of about 36,500 kilometers (22,700 miles) above the planet. The propulsion module will raise its orbit several times before transferring into lunar orbit. At the Moon, the propulsion module will lower Chandrayaan-3 until it reaches a circular, 100-kilometer (62-mile) orbit. There, the two vehicles will separate, leaving the lander to deorbit and touch down in the Moon's south polar region. At the moment of contact, the lander should be moving less than 2 meters per second vertically, and 0.5 meters per second horizontally (6.5 and 1.6 feet per second, respectively).



What will Chandrayaan-3 do on the Moon?

A successful touchdown will mark a huge achievement for ISRO, placing them in a small group of nations that have landed spacecraft on other worlds. Beyond this milestone, Chandrayaan-3 has technologies to demonstrate and science to perform. The solar-powered lander and rover will have about two weeks to study their surroundings. They are not designed to survive the chilly lunar night. The rover can only communicate with the lander, which communicates directly with Earth. ISRO says the Chandrayaan-2 orbiter can also be used as a contingency communications relay.

The rover has two payloads:

- Laser Induced Breakdown Spectroscope (LIBS): Determines the chemical and mineralogical composition of the surface.
- Alpha Particle X-ray Spectrometer (APXS): Determines the elemental composition of the surface. ISRO specifically mentions magnesium, aluminum, silicon, potassium, calcium, titanium, and iron as elements the rover will hunt.

The lander has four payloads:

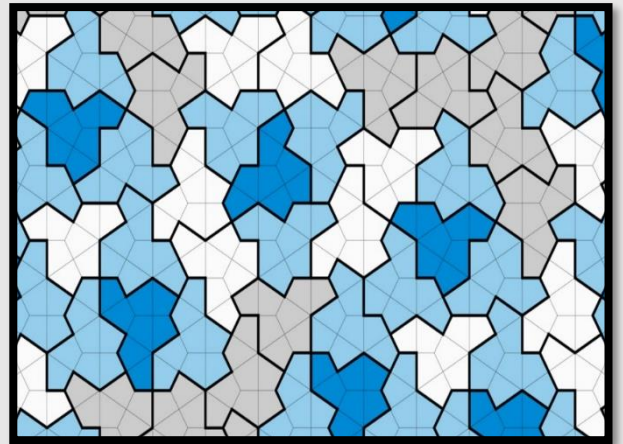
- Radio Anatomy of Moon Bound Hypersensitive ionosphere and Atmosphere (RAMBHA): Measures how the local gas and plasma environment changes over time.
- Chandra's Surface Thermophysical Experiment (ChaSTE): Studies the surface's thermal properties.
- Instrument for Lunar Seismic Activity (ILSA): Measures seismic activity at the landing site in order to delineate the subsurface crust and mantle.
- Laser Retroreflector Array (LRA): A NASA-provided retroreflector that allows for lunar ranging studies.



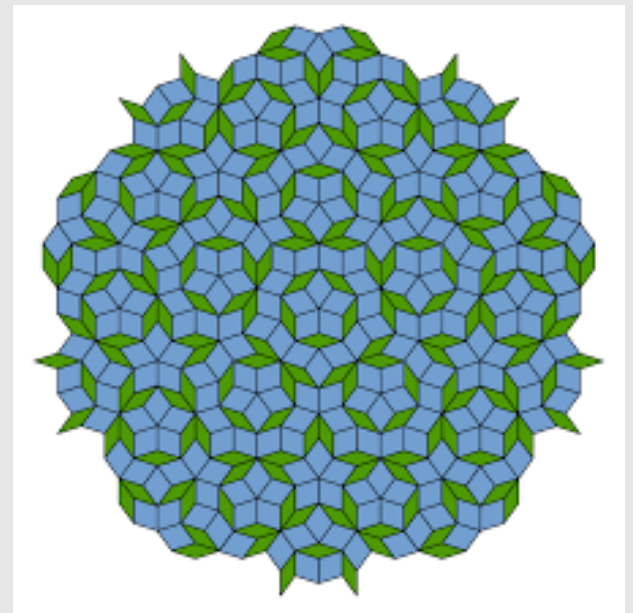
Mathematics

Mathematicians have finally discovered an elusive 'Einstein' tile

A 13-sided tile called “the hat” forms a pattern that covers an infinite plane yet it cannot repeat, making it a long-sought shape known as an “Einstein.” A sample of that pattern is shown here.



A geometry problem that has been puzzling scientists for 60 years has likely just been solved by an amateur mathematician with a newly discovered 13-sided shape. Called “The hat” because it vaguely resembles a fedora, the elusive shape is an “Einstein” (from the German “Ein stein,” or “one stone”). That means it can completely cover a surface without ever creating a repeated pattern – something that had not yet been achieved with a single tile.



VEDIC MATH TRICK OF THE MONTH

Subtraction From 1000, 10000, 100000: To subtract a number from 100's multiple such as 1000, 10000, etc. quickly, one could employ the Vedic Math Tricks. For example, to subtract $1000 - 573$, one could subtract each figure in 573 from 9 and then subtract the last figure from 10.

Step 1. $9 - 5 = 4$

Step 2. $9 - 7 = 2$

Step 3. $10 - 3 = 7$.

Thus, the answer is: $(1000 - 573) = 427$.



CHAPTER OF THE MONTH: TRIGONOMETRIC FUNCTIONS

<p>Definition of Trigonometric Functions</p>	$\sin x = \frac{\text{opp side}}{\text{hypotenuse}}$ $\cos x = \frac{\text{adj side}}{\text{hypotenuse}}$ $\tan x = \frac{\text{opp side}}{\text{adj side}} = \frac{\sin x}{\cos x}$ $\cot x = \frac{\text{adj side}}{\text{opp side}} = \frac{\cos x}{\sin x}$ $\sec x = \frac{\text{hypotenuse}}{\text{adj side}} = \frac{1}{\cos x}$ $\operatorname{cosec} x = \frac{\text{hypotenuse}}{\text{opp side}} = \frac{1}{\sin x}$	<p>Trigonometric Ratios of Multiple Angles (2x)</p>	$\sin 2x = 2 \sin x \cos x$ $= \frac{2 \tan x}{1 + \tan^2 x}$ $\cos 2x = \cos^2 x - \sin^2 x$ $= 2 \cos^2 x - 1$ $= 1 - 2 \sin^2 x$ $= \frac{1 - \tan^2 x}{1 + \tan^2 x}$ $\tan 2x = \frac{2 \tan x}{1 - \tan^2 x}$ $\cot 2x = \frac{\cot^2 x - 1}{2 \cot x}$														
<p>Trigonometric Identities</p>	$\sin^2 x + \cos^2 x = 1$ $\sec^2 x - \tan^2 x = 1$ $\operatorname{cosec}^2 x - \cot^2 x = 1$	<p>Trigonometric Ratios of Multiple Angles (3x)</p>	$\sin 3x = 3 \sin x - 4 \sin^3 x$ $\cos 3x = 4 \cos^3 x - 3 \cos x$ $\tan 3x = \frac{3 \tan x - \tan^3 x}{1 - 3 \tan^2 x}$														
<p>Trigonometric Ratios of Sum and Difference of two angles</p>	$\sin(x + y) = \sin x \cos y + \cos x \sin y$ $\sin(x - y) = \sin x \cos y - \cos x \sin y$ $\cos(x + y) = \cos x \cos y - \sin x \sin y$ $\cos(x - y) = \cos x \cos y + \sin x \sin y$ $\tan(x + y) = \frac{\tan x + \tan y}{1 - \tan x \tan y}$ $\tan(x - y) = \frac{\tan x - \tan y}{1 + \tan x \tan y}$ $\cot(x + y) = \frac{\cot x \cot y - 1}{\cot x + \cot y}$ $\cot(x - y) = \frac{\cot x \cot y + 1}{\cot y - \cot x}$	<p>Range of $a \sin x + b \cos x$</p>	$\left[-\sqrt{a^2 + b^2}, \sqrt{a^2 + b^2} \right]$														
<p>Sum to Product Conversion of Trigonometric Functions</p>	$\sin(x + y) + \sin(x - y) = 2 \sin x \cos y$ $\sin(x + y) - \sin(x - y) = 2 \cos x \sin y$ $\cos(x + y) + \cos(x - y) = 2 \cos x \cos y$ $\cos(x + y) - \cos(x - y) = -2 \sin x \sin y$ $\sin A + \sin B = 2 \sin \left(\frac{A+B}{2} \right) \cos \left(\frac{A-B}{2} \right)$ $\sin A - \sin B = 2 \cos \left(\frac{A+B}{2} \right) \sin \left(\frac{A-B}{2} \right)$ $\cos A + \cos B = 2 \cos \left(\frac{A+B}{2} \right) \cos \left(\frac{A-B}{2} \right)$ $\cos A - \cos B = -2 \sin \left(\frac{A+B}{2} \right) \sin \left(\frac{A-B}{2} \right)$	<p>Period of Trigonometric Functions (P)</p> <table border="1"> <thead> <tr> <th>Function</th> <th>Period (P)</th> </tr> </thead> <tbody> <tr> <td>$\sin(a\theta + b)$</td> <td>$\frac{2\pi}{a}$</td> </tr> <tr> <td>$\cos(a\theta + b)$</td> <td>$\frac{2\pi}{a}$</td> </tr> <tr> <td>$\tan(a\theta + b)$</td> <td>$\frac{\pi}{a}$</td> </tr> <tr> <td>$\csc(a\theta + b)$</td> <td>$\frac{2\pi}{a}$</td> </tr> <tr> <td>$\sec(a\theta + b)$</td> <td>$\frac{2\pi}{a}$</td> </tr> <tr> <td>$\cot(a\theta + b)$</td> <td>$\frac{\pi}{a}$</td> </tr> </tbody> </table>		Function	Period (P)	$\sin(a\theta + b)$	$\frac{2\pi}{a}$	$\cos(a\theta + b)$	$\frac{2\pi}{a}$	$\tan(a\theta + b)$	$\frac{\pi}{a}$	$\csc(a\theta + b)$	$\frac{2\pi}{a}$	$\sec(a\theta + b)$	$\frac{2\pi}{a}$	$\cot(a\theta + b)$	$\frac{\pi}{a}$
Function	Period (P)																
$\sin(a\theta + b)$	$\frac{2\pi}{a}$																
$\cos(a\theta + b)$	$\frac{2\pi}{a}$																
$\tan(a\theta + b)$	$\frac{\pi}{a}$																
$\csc(a\theta + b)$	$\frac{2\pi}{a}$																
$\sec(a\theta + b)$	$\frac{2\pi}{a}$																
$\cot(a\theta + b)$	$\frac{\pi}{a}$																
<p>*Note : $(a, b \in R, a \neq 0)$</p>																	



Science & Technology

Digital Braille-Polly

When visually impaired children learn braille in a classroom, their teachers can let them know how they're doing. But many of those students don't have braille readers at home to help them. Now they can use Polly—a wi-fi-enabled device developed by American Printing House for the Blind and Thinkerbell Labs that provides braille learners with instant audio feedback and allows teachers to assign and assess homework remotely. Instead of a standard metal or plastic slate used with paper, learners can write (and correct mistakes) using Polly's electronic braille slate and stylus—the world's first.



Smooth 3D Images

Canon RF5.2mm F2.8 L Dual Fisheye Lens

Despite its name, the Dual Fisheye lens was actually inspired by the human face. Featuring two round lenses about the same size and distance apart as a pair of human eyes, the first-of-its-kind lens captures 180 degrees in 8K-equivalent resolution when mounted to Canon's EOS R5 and EOS R5c mirrorless cameras. According to Canon USA's Brandon Chin, the compact, award-winning lens simplifies 3D image capture by eliminating the need to stitch together multiple images from multiple cameras, putting high-end VR content creation within reach for more visual artists.



DID YOU KNOW?

1. Saturn can float on water like ice.
2. Steel is more elastic than rubber.



CHAPTER OF THE MONTH: WORK , ENERGY AND POWER

- Scalar product

$$\vec{A} \cdot \vec{B} = AB \cos \theta$$

- Distributive law:

$$\vec{A} \cdot (\vec{B} + \vec{C}) = \vec{A} \cdot \vec{B} + \vec{A} \cdot \vec{C}$$

$$\vec{A} \cdot (\lambda \vec{B}) = \lambda (\vec{A} \cdot \vec{B})$$

- For unit vectors $\hat{i}, \hat{j}, \hat{k}$ we have

$$\hat{i} \cdot \hat{i} = \hat{j} \cdot \hat{j} = \hat{k} \cdot \hat{k} = 1$$

$$\hat{i} \cdot \hat{j} = \hat{j} \cdot \hat{k} = \hat{k} \cdot \hat{i} = 0$$

- Work done by a force F such that the point of application of force is displaced by displacement d :

$$W = \vec{F} \cdot \vec{d} = Fd \cos \theta$$

where θ is the angle between F and d

- Work done by a variable force $F(x)$:

$$W = \int_{x_i}^{x_f} F(x) \cdot dx$$

- Relation between a conservative force and potential energy:

$$F(x) = -\left(\frac{dV(x)}{dx}\right)$$

$$V_i - V_f = \int_{x_i}^{x_f} F(x) dx$$

- For a conservative force, work done for closed path is zero:

$$\oint \vec{F} \cdot d\vec{x} = 0$$

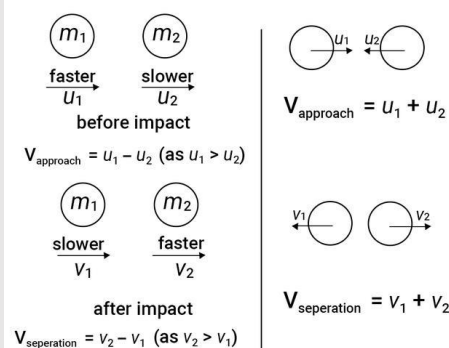
- Total mechanical energy conservation for a system:

$$\Delta K + \Delta V = 0$$

if the forces, doing work on the system, are conservative.

- Coefficient of restitution (e):

$$e = \frac{\text{velocity of separation}}{\text{velocity of approach}} = \frac{v_2 - v_1}{u_2 - u_1}$$



- Collision in 1-D:

Momentum conservation

$$m_1 u_1 + m_2 u_2 = m_1 v_1 + m_2 v_2$$

1. Completely inelastic collision ($u_2 = 0$):

Final common velocity $v_1 = v_2 = v_f$

$$v_f = \frac{m_1}{m_1 + m_2} u_1$$

Loss in K.E.

$$\Delta K.E. = \frac{1}{2} \frac{m_1 m_2}{m_1 + m_2} u_1^2$$

2. Completely elastic collision ($e=1$):

- Kinetic energy is conserved

$$K_i = K_f$$

- When $m_1 = m_2$

$$v_1 = u_2 \text{ and } v_2 = u_1$$

- When $m_1 \ll m_2$

$$v_1 = -u_1 \text{ and } v_2 = u_2 = 0$$

1. Completely elastic collision ($e=1$):

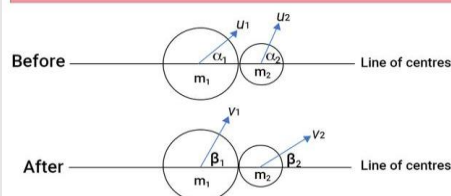
Kinetic energy is conserved

$$K_i = K_f$$

$$\frac{1}{2} m_1 v_{1i}^2 = \frac{1}{2} m_1 v_{1f}^2 + \frac{1}{2} m_2 v_{2f}^2$$

2. Inelastic collision ($e < 1$):

$$e = \frac{\text{velocity of separation}}{\text{velocity of approach}} = \frac{v_2 - v_1}{u_2 - u_1}$$



Velocities \perp to line of impact are unaffected

$$v_1 \sin \beta_1 = u_1 \sin \alpha_1 \text{ and}$$

$$v_2 \sin \beta_2 = u_2 \sin \alpha_2$$

The mentors Digest

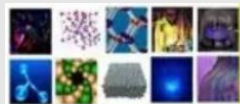


ABOUT US

Affordable Quality education

By understanding the need of aspiring students, India's renowned Academic experts in the field of school education- Mr. Jayasankar Prasad (Son of Late Padmasree Dr Vellayani Arjunan and former Director Vivekananda group of schools) and Ms. Chitra Jaya Sankar (Former Educational advisor, Tagore Educational trust) are there to bridge the gap of ensuring quality education for the students. We have formulated an online platform for providing significantly exceeding educational experience through online tuitions (classes 8-12), IAS bridge programs and finishing school for fresh engineers and other professionals. We will ensure excellent learning experience to students and 100% satisfaction level to parents.

Interested parents who are willing to associate with this concept are requested to contact



The mentors... time to change the way

Quality education with Very affordable fees

Online TUTORING

Grade 8 - Mathematics
Grade 10 - Science , Social Science & French
Grade 11 - Mathematics
Grade 12 - Physics , Chemistry & Mathematics
Grade 9 & 10 - Basic Mathematics (Short Term Course)
Grade 9 & 10 - English Grammar (Short Term Course)



CALL OR WHATSAPP ON **+918075999747** (Course Coordinator)

Disclaimer: The news published is directly picked up from the website and newspapers. The views expressed need not be those of The mentors