The mentors Digest

MAY 2025 ISSUE NO:24

The mentors Digest

Our Founder & 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

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From the Editors Desk.....

Dear Students & future leaders,

Embracing Growth and Possibility

As we step into the vibrant month of May, we're reminded that growth often begins with small, consistent steps. This season, nature is in full bloom—and so are you. Whether you're preparing for exams, exploring new hobbies, or simply learning to manage time better, every effort counts.

May is also a time of transition. For some, it's the closing chapters of the academic year; for others, it's a fresh start filled with goals and ambitions. No matter where you stand, remember that progress isn't always loud. Sometimes, it's found in quiet perseverance, thoughtful reflection, and the courage to try again.

This edition celebrates students who dared to innovate, teachers who went the extra mile, and moments that made school life memorable. Let it remind you that your voice, your story, and your dreams matter. Let May be the month where you trust your journey, nurture your talents, and support those around you. After all, the smallest spark can light the brightest flame. Here's to growth, resilience, and fresh beginnings.

WHAT IS SPECIAL ABOUT THE MONTH OF MAY ?

May 15 : The **International Day of Families**, observed on May 15th each year, was proclaimed by the United Nations in 1993 to promote awareness of the importance of families and the challenges they face. Families are the basic building blocks of society, and this day serves as a global reminder of the need to strengthen and support them through effective policies, education, and community programs. It provides a platform for governments, organizations, and individuals to reflect on issues such as poverty, education, health care, gender equality, work-life balance, and children's rights. Each year, the UN selects a specific theme .For instance, previous themes have explored how climate change, urbanization, or technological advances impact family dynamics. Activities to observe the day may include conferences, media campaigns, cultural programs, and local gatherings that aim to celebrate the role of families and promote their well-being. The day reminds us that by supporting families—whether through improved social protection, access to education, or fair work conditions—we are building stronger, healthier communities and contributing to sustainable development worldwide.

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WHEN AI STARTS ASKING THE QUESTIONS: A NEW ERA OF SCIENCE?

Artificial Intelligence (AI) is rapidly evolving from being just a scientific assistant to becoming a potential co-creator in the world of research. Traditionally, scientists like quantum physicist Mario Krenn relied on deep human reasoning to design experiments. But when he hit a dead end, Krenn turned to AI. He built a program called **Melvin** that eventually solved a tricky quantum problem—one that he and his colleagues couldn't crack. That moment marked a shift: could AI start to not only assist but also *ask* the big questions in science?

AI is now entering the creative side of research. Tools like **Melvin**, **AlphaFold** (which revolutionized protein folding), and Google's "AI co-scientist" show that machines can suggest experiments, generate hypotheses, and even mimic scientific reasoning. In some cases, they've matched or exceeded human intuition—finding solutions overlooked by experts stuck in familiar thinking patterns.

However, the rise of AI isn't just about breakthroughs—it's also creating tension. A study at MIT found that while AI made scientists much more productive, it also made many feel creatively sidelined. Researchers worried they were becoming assistants to machines, losing the joy and purpose they were trained for.

Some scientists, like Jennifer Listgarten, see AI as a powerful new tool—like the internet or the microscope—that opens new paths for creativity *if* used freely. Others, like Ana Bastos, warn against blind reliance on AI, fearing it could steer funding, publications, and priorities toward what machines can do best, not what truly matters in science.

In the end, AI might not replace human curiosity but rather reshape it. The key question remains: **Will AI enhance scientific discovery—or redefine it altogether?**

Did you know ?

The Earth's rotation is slowing down. This means that days are getting slightly longer, though the change is very gradual.

Did you know ?

Ants don't have lungs. They instead breathe through spiracles, nine or ten tiny openings, depending on the species.

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EOS: A GIANT STAR-FORMING CLOUD DISCOVERED SURPRISINGLY CLOSE TO EARTH

A vast hydrogen cloud, among the largest known structures in the sky, has been discovered surprisingly close to Earth. Named **Eos**, after the Greek goddess of the dawn, the cloud is located just **300 light-years away**—making it one of the **closest star-forming regions ever identified**. Though it spans an area of sky equivalent to **40 full Moons** and contains a mass approximately **3,400 times that of the Sun**, Eos had remained hidden until now due to its lack of carbon monoxide, the molecule astronomers typically rely on to detect such clouds.

Eos is a **"CO-dark" molecular cloud**, meaning traditional radio and infrared telescopes couldn't spot it. Instead, researchers detected it using an **unprecedented method**—observing **far-ultraviolet (FUV) fluorescence** emitted directly by hydrogen molecules. This marks the **first time** a molecular cloud has been discovered this way. "This cloud is literally glowing in the dark," said Prof Blakesley Burkhart, who led the team behind the discovery. The glow comes from hydrogen molecules fluorescing in the FUV range, captured by a spectrograph aboard Korea's **STSAT-1 satellite**, whose data became publicly available in 2023.

The discovery of Eos is a scientific milestone, offering a new window into the **earliest stages of star formation**. These molecular clouds are the **birthplaces of stars**, and Eos provides a rare chance to study the raw material before it collapses into new suns. "We can now directly measure how molecular clouds are forming and dissociating," said Burkhart, emphasizing its potential to improve our understanding of how galaxies evolve. Dr. Thavisha Dharmawardena, a co-author on the study, added, "It's wild that we can see this cloud in data that we didn't think we would see."

The hydrogen in Eos has a **cosmic legacy**, tracing its origin back to the **Big Bang**. Over billions of years, these ancient atoms drifted through the cosmos, eventually coalescing near our solar neighborhood. "The story of the cosmos is a story of the rearrangement of atoms over billions of years," said Burkhart. In Eos, we are witnessing a chapter in that story—a nearby, glowing cradle of potential new stars, hidden in plain sight until now.

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PROTOTAXITES: A MYSTERIOUS ANCIENT ORGANISM MAY BELONG TO A NEW BRANCH OF LIFE

In a startling new development, scientists may have uncovered evidence of a previously unknown branch of life. The subject of this revelation is Prototaxites, a strange, cylindrical organism that lived between 440 and 360 million years ago and could grow up to eight metres tall, resembling massive, trunk-like structures. Though long assumed to be a type of ancient fungus, new research challenges this belief, suggesting Prototaxites might not belong to any currently known group of life.This enigmatic lifeform existed during a transformative period in Earth's history when atmospheric oxygen levels rose enough to support complex organisms. "It was a time when atmospheric oxygen reached breathable levels," said Prof Benjamin Mills of the University of Leeds, who noted that plants and fungi were thought to have driven this shift. Yet Prototaxites seems to defy categorization.

In a new but not-yet-peer-reviewed study, researchers analyzed fossilised remains of Prototaxites taiti, a smaller species found in Scotland. The analysis focused on internal structures and molecular composition. While P. taiti shared superficial similarities with fungi—such as the presence of tubular structures—closer examination revealed significant differences. The tubes branched and reconnected in unusual ways, unlike typical fungal networks. More strikingly, chemical analysis showed that P. taiti lacked chitin, a key component in fungal cell walls. Instead, the organism contained lignin, a complex organic polymer usually found in plant structures like bark and wood. This molecular distinction casts doubt on the fungal classification and suggests Prototaxites may represent an entirely extinct and separate lineage. Prof Neil Gow, a microbiologist at the University of Exeter, acknowledged that while fungi can lack chitin in small amounts, the absence of it alongside the presence of lignin supports the new hypothesis. "This new work shows quite confidently that the Prototaxites was not part of this plant-fungal radiation and was something else entirely," added Mills.The implications are profound. If Prototaxites truly belongs to a lost lineage, it hints that Earth's biological history is more diverse and mysterious than previously thought. "We know these organisms didn't survive," said Mills, "but what if they had? Would our oxygen-rich atmosphere have lasted?" This discovery not only redefines our understanding of life's early evolution on land but also prompts deeper questions about what forms life could take on other planets—and what we might be missing in our current classification systems.

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MATHEMATICS TOPIC OF THE MONTH:

CONCEPT MAP

STATISTICS

Class XI

STATISTICS

Measures of Dispersion

Mean Deviation

It is the arithmetic mean of the absolute values of deviations about some point (mean or median or mode).

$$\text{Mean Deviation} = \frac{\text{Sum of Deviations}}{\text{Number of Observations}}$$

For Ungrouped Data

Let $x_1, x_2, \ldots, x_n$ be n observations, then mean deviation about mean is given by $\text{M.D.}(\bar{x}) = \frac{1}{n}\sum_{i=1}^{n}|x_i - \bar{x}|$;

Mean deviation about median is given by,

$$\text{M.D. } (M) = \frac{1}{n}\sum_{i=1}^{n}|x_i - M|$$

For Grouped Data

Let $x_1, x_2, \ldots, x_n$ be a set of n observations occurring with frequencies $f_1, f_2, \ldots, f_n$ respectively, then mean deviation about mean is given by $\text{M.D.}(\bar{x}) = \frac{1}{N}\sum_{i=1}^{n} f_i |x_i - \bar{x}|$;

Mean deviation about median is given by $\text{M.D.}(M) = \frac{1}{N}\sum_{i=1}^{n} f_i |x_i - M|$

Here, x_i are the mid-points of classes and $N = \sum_{i=1}^{n} f_i$ = Sum of frequencies

Shortcut Method

- **About mean :** $\text{M.D.}(\bar{x}) = \frac{1}{N}\cdot\sum_{i=1}^{n} f_i |x_i - \bar{x}|$, where mean, $\bar{x} = a + \frac{\sum_{i=1}^{n} f_i d_i}{N} \times h$, a is assumed mean, $d_i = \frac{x_i - a}{h}$ and h = size of interval.
- **About median :** $\text{M.D.}(M) = \frac{1}{N}\sum_{i=1}^{n} f_i |x_i - M|$, where median, $M = l + \frac{\frac{N}{2} - cf}{f} \times h$,

N is sum of frequencies, l, f, h and cf are respectively the lower limit, the frequency of the median class, the width of the class interval and the cumulative frequency of the class just preceding the median class.

Analysis of Frequency Distributions

If the given data has mean $(\bar{x})$ and standard deviation (σ), then

Coefficient of variation (C.V.) $= \frac{\sigma}{\bar{x}} \times 100, \bar{x} \neq 0$

The data whose C.V. is less is said to be more consistent.

Variance and Standard Deviation

Mean of the squares of the deviations from mean is called variance and is denoted by σ^2.

The positive square root of variance is known as standard deviation. It is denoted by σ.

For ungrouped data	$\sigma = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2}$
For grouped data	$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{n} f_i (x_i - \bar{x})^2}$
Shortcut method	$\sigma = \frac{h}{N}\left[\sqrt{N\sum_{i=1}^{n} f_i u_i^2 - \left(\sum_{i=1}^{n} f_i u_i\right)^2}\right]$ where $u_i = \frac{x_i - a}{h}$, a = assumed mean, h = width of class-intervals

Properties of Standard Deviation

- S.D. is independent of change of origin.
- S.D. is not independent of change of scale.

Combined Variance of Two Series

If n_1, n_2 are the number of elements, $\bar{x}_1$, $\bar{x}_2$ are the means and σ_1, σ_2 are the standard deviations of two series respectively, then variance of combined series is

$$\sigma^2 = (\text{S.D.})^2 = \frac{n_1\left(\sigma_1^2 + d_1^2\right) + n_2\left(\sigma_2^2 + d_2^2\right)}{n_1 + n_2}$$

where $d_1 = \bar{x}_1 - \bar{x}$, $d_2 = \bar{x}_2 - \bar{x}$ and $\bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2}{n_1 + n_2}$

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SCIENCE TOPIC OF THE MONTH:

BRAIN MAP

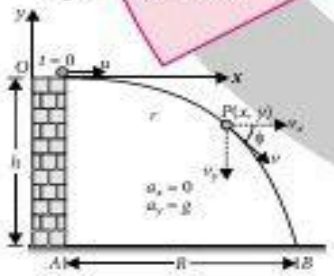
CLASS XI

PROJECTILE MOTION

PROJECTILE Motion

A body which is in flight through the atmosphere under the effect of gravity alone and is not being propelled by any fuel is called projectile and its motion is called projectile motion.

Horizontal Projectile Motion



- **Equation of Trajectory**

$$y = \frac{1}{2}\frac{gx^2}{u^2}$$

- **Time of Descent**

$$T = \sqrt{\frac{2h}{g}}$$

- **Horizontal Range**

$$R = u\sqrt{\frac{2h}{g}}$$

- **Instantaneous Velocity**

$$v = \sqrt{u^2 + 2gy} = \sqrt{u^2 + g^2t^2}$$

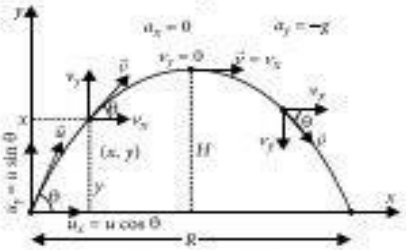
$$\tan\phi = \frac{v_y}{v_x} = \tan^{-1}\left(\frac{gt}{u}\right)$$

Oblique Projectile Motion

- **Equation of Trajectory**

$$y = x\tan\theta - \frac{1}{2}\frac{gx^2}{u^2\cos^2\theta}$$

This represents the parabolic path.



- **Maximum Height**

$$H = \frac{u^2\sin^2\theta}{2g}$$

- **Time of Flight**

$$T = \frac{2u\sin\theta}{g}$$

- **Horizontal Range**

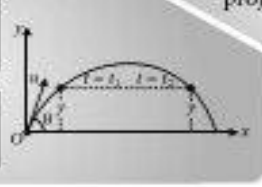
$$R = \frac{u^2\sin 2\theta}{g}$$

- Projectile passing through two different points on same height at time t_1 and t_2

$$y = \frac{gt_1t_2}{2}$$

$$t_2 = \frac{u\sin\theta}{g}\left[1 + \sqrt{1 - \left(\frac{2gy}{u\sin\theta}\right)^2}\right]$$

$$t_1 = \frac{u\sin\theta}{g}\left[1 - \sqrt{1 - \left(\frac{2gy}{u\sin\theta}\right)^2}\right]$$



- Ratio of time of ights for projectiles at complimentary angles θ and $90-\theta$

$$\frac{T_\theta}{T_{90-\theta}} = \tan\theta$$

- Range R is n times the maximum height H

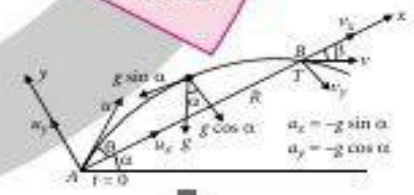
$R = nH; \theta = \tan^{-1}[4/n]$

- For complimentary angles θ and $(90-\theta)$ range remains unchanged
- Relation between horizontal range and maximum height

$R = 4H\cot\theta$

- If $R = H$ then $\theta = \tan^{-1}(4)$ or $\theta = 76°$
- If $R = 4H$ then $\theta = \tan^{-1}(1)$ or $\theta = 45°$

Projectile Motion on an Inclined Plane



- **Time of Flight**

$$T = \frac{2u\sin\theta}{g\cos\alpha}$$

- **Maximum Height**

$$H = \frac{u^2\sin^2\theta}{2g\cos\alpha}$$

- **Horizontal Range**

$$R = \frac{2u^2}{g}\frac{\sin\theta\cos(\theta+\alpha)}{\cos^2\alpha}$$

- Maximum range occurs when

$$\theta = \frac{\pi}{4} + \frac{\alpha}{2}$$

- Maximum range along the incline when projectile is thrown upwards

$$R_{max} = \frac{u^2}{g(1+\sin\alpha)}$$

- Maximum range along incline when the projectile thrown downwards

$$R_{max} = \frac{u^2}{g(1-\sin\alpha)}$$

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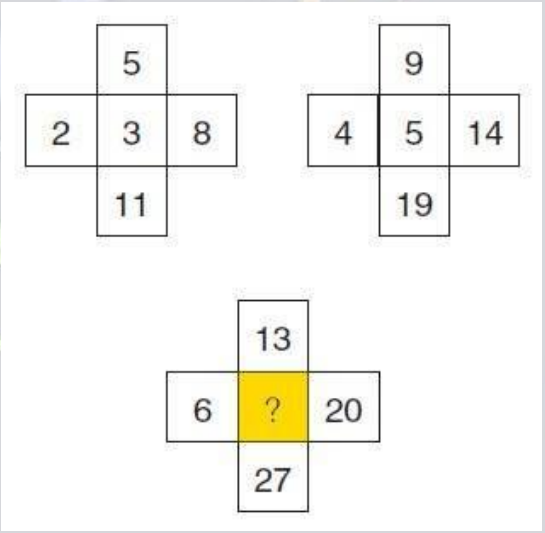
TWIST YOUR MIND

(Answers will be given in the June 2025 digest)

RIDDLLES

1. I have a neck, but no head. I have two arms, but no hands. What am I ?
2. What has many rings but no fingers ?
3. I sometimes run, but I can't walk. What am I?

PUZZLE



Bright Spots: Positive Events from April 2025

•The U.S. and Ukraine signed a historic agreement to establish the United States-Ukraine Reconstruction Investment Fund, promoting long-term collaboration.
•The International Summit on the Future of Energy Security took place in London, addressing emerging energy challenges and promoting sustainable solutions.
•World Immunization Week 2025 celebrated significant progress in reducing preventable diseases worldwide.
•Expo 2025 opened in Osaka, Japan, under the theme "Designing Future Society for Our Lives," attracting millions to explore innovations in sustainability and technology.
•India signed a $7.4 billion agreement with France to purchase 26 Rafale fighter jets for its navy, enhancing defense capabilities and reducing reliance on Russian military equipment.
•The FTSE 100 index achieved its longest winning streak since 2019, reflecting investor confidence amid global economic uncertainties.

word of the month

Debonair : Attractive and confident.

APRIL ANSWERS

RIDDLES : 1. The future. 2. He was bald.
PUZZLE : 27kg

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The Mentors website launched , please log onto **www.thementors.co.in**

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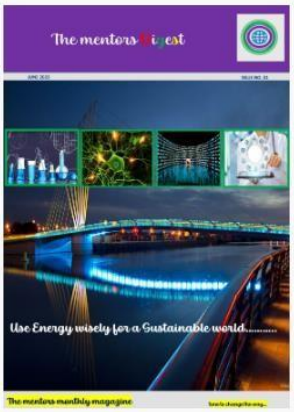

JULY 2023

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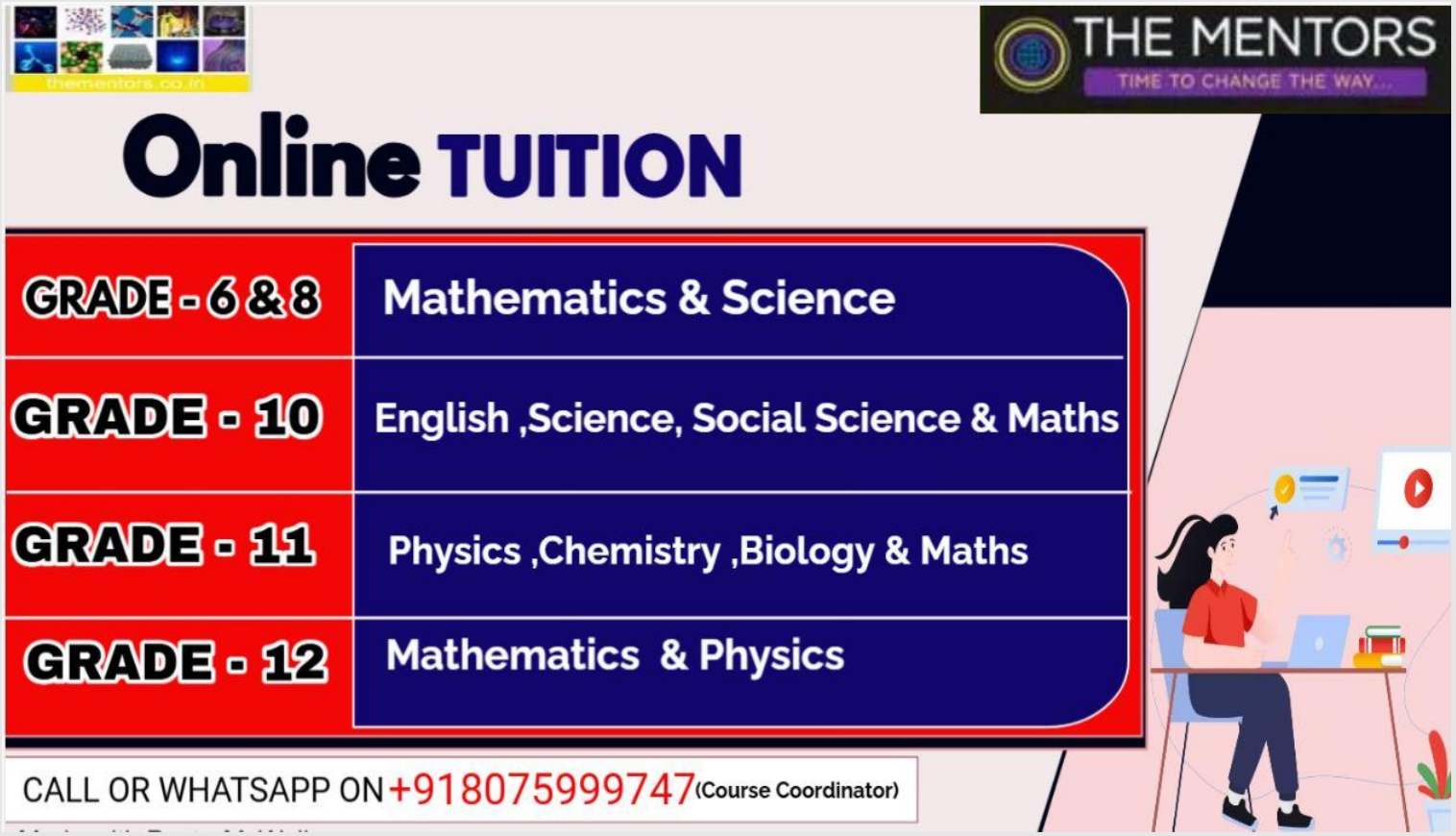
ABOUT US

Affordable Quality education …….

By understanding the need of aspiring students, India's renowned Industrial & Academic experts Mr. Manoj PL (Refining Specialist, Academician and founder Director Epinox Prompt Consulting Engineering Ltd), Ms. Chitra Jayasankar (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 6-12), 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



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