



Aakash
Medical | IIT-JEE | Foundations

KNOWLEDGE BYTES

JANUARY 2021

CLASS 9





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PREFACE

What is Knowledge Bytes ?

Knowledge Bytes is a collection of riddles, interesting facts, mnemonics, and puzzles that will make your learning fun and engaging.

We want you to be delighted about studying. Knowledge Bytes helps you to know more about the subject in a fun, motivating and educational way and helps to implement what you learn in a creative way.

Benefits



Saves Time



Develops Learning Skills



Stimulates Interest



Leads to Increased Comprehension

EXPLORE

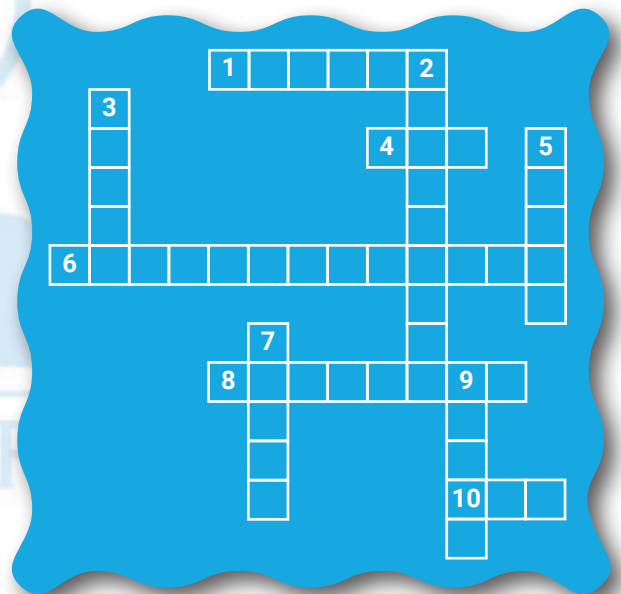
- | | |
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| 1. Circles and Constructions | 1-4 |
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Circles and Constructions

Crossword

ACROSS

1. If the sum of a pair of opposite angles of a quadrilateral is 180° , then the quadrilateral is _____. [6]
4. The number of circle(s) passing through three non-collinear points is _____. [3]
6. The line drawn through the centre of a circle to bisect a chord is _____ to the chord. [13]
8. The longest chord of a circle is the _____. [8]
10. A portion of the circumference of a circle is known as an _____. [3]



DOWN

2. Circle which cover each other completely are _____. [9]
3. The number of parts into which a circle divides the plane is _____. [5]
5. A line segment joining any two points on a circle is a _____. [5]
7. Angle in semicircle is a _____ angle. [5]
9. Angles subtended by equal chords of a circle at the centre are _____. [5]

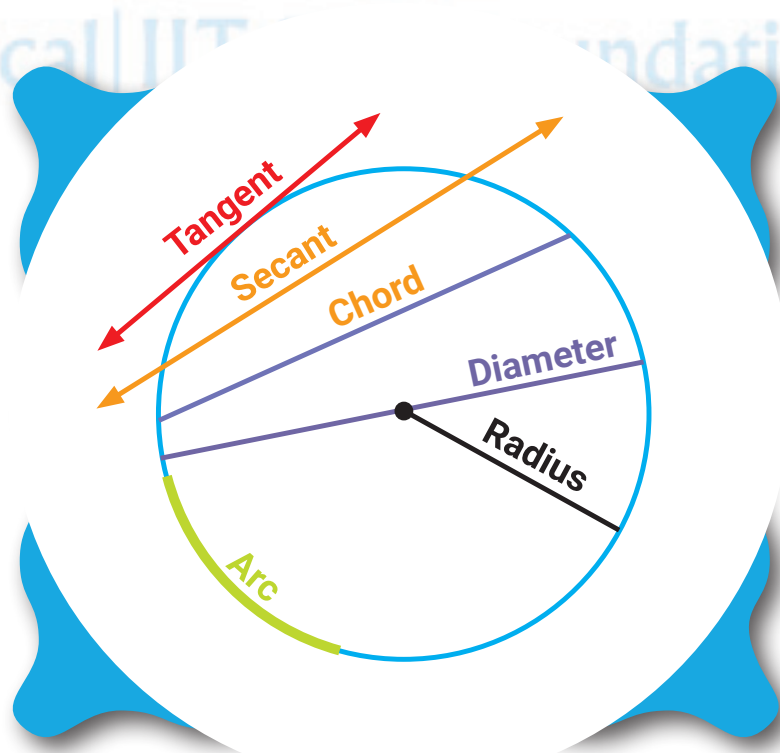


Introduction to Circles

- ☛ The set of all the points in a plane which are at a fixed distance from a fixed point makes a circle.
- ☛ A Fixed point from which the set of points are at fixed distance is called the centre of the circle.
- ☛ A circle divides the plane into 3 parts : interior (inside the circle), the circle itself and exterior (outside the circle).

Tangent and Secant

- ☛ A line that touches the circle at exactly one point is called it's tangent.
- ☛ A line that cuts a circle at two points is called a secant.



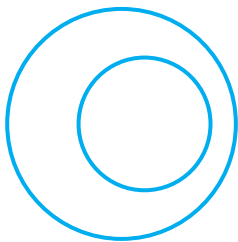
Number of Tangents from a point on a circle

- ☛ There is no tangent passing through a point lying inside the circle.
- ☛ There is one and only one tangent passing through a point lying on a circle.
- ☛ There are exactly two tangents through a point lying outside a circle.

Common tangents of two circles

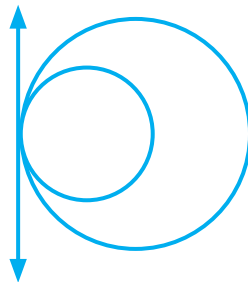
The number of common tangent(s) to two circles can be 0, 1, 2, 3, 4

Case : 1



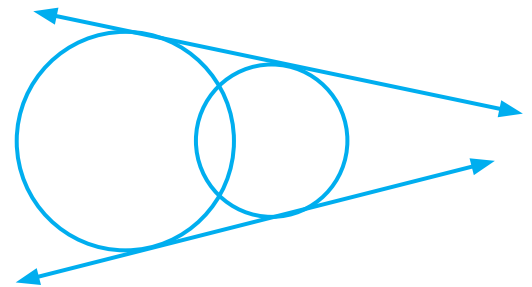
No Tangent

Case : 2



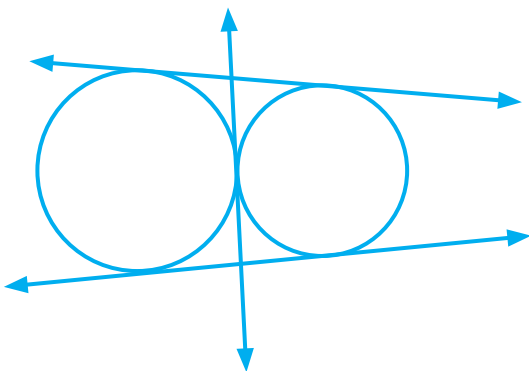
One Tangent

Case : 3



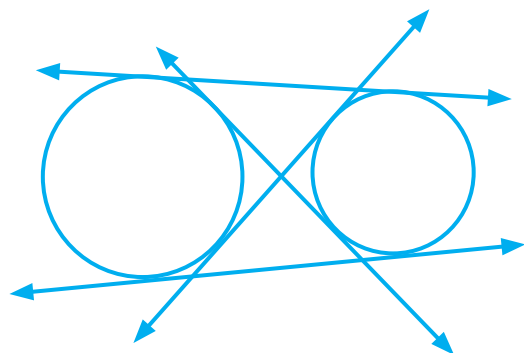
Two Tangents

Case : 4



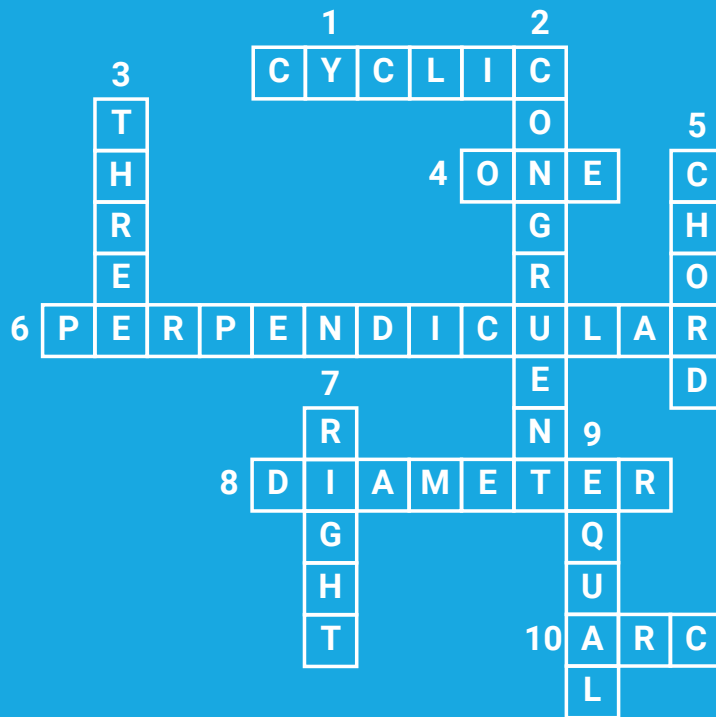
Three Tangents

Case : 5



Four Tangents

Answer (Crossword)



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Blood Relation and Brain Teaser

Quiz



Quiz

1.

What will replace
Question
Mark?

If

$$8 = 80$$

$$5 = 35$$

$$9 = 99$$

$$4 = 24$$

$$\text{then, } 6 = ?$$



2.

Can you solve
this?

$$\text{May} = 358$$

$$\text{June} = 4610$$

$$\text{July} = 4711$$

$$\text{August} = 6814$$

$$\text{September} = ?$$



Riddles

1

Riya and I are daughters of Piyush. Piyush is son of Neelema and Rakesh. Divya is Riya's mother, who is sister of Rishav. How am I related to Rishav's mother?

2

Priyanka's birth date is 08 - November - 2011
Kriti's birth date is 06 - August - 2008
Priya's birth date is 09 - September - 2009
If my birth month is February, then what is my exact birth date?

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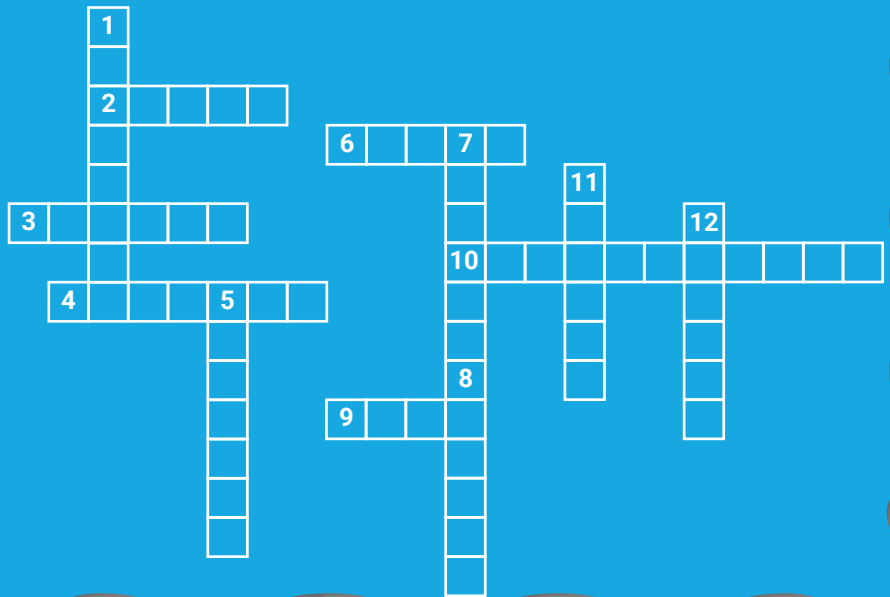
Crossword

ACROSS

Directions of (2), (3), (4), (6), (9) & (10)

- A is the brother of B.
- B is the mother of C.
- C is the sister of E.
- E is married to F.
- G is the father of B.
- G has only one daughter.
- G is married to H.
- A is brother of I.
- L is the father-in-law of I.

- 2** How is A related to E?
- 3** How is G related to I?
- 4** If F is wife of E, then how is E related to C?
- 6** How C is related to I?
- 9** If M is the only daughter and only child of L, then how is M related to I?
- 10** How C is related to F?



DOWN

- 1** 'C' is B's son and 'A' is C's mother. E is C's son and D is E's sister. How is D related to C?
- 5** Pointing towards a man in the photograph a lady said, 'his sister's maternal grand mother's only daughter is my mother-in-law'. How is the man related to the lady?
- 7** Pointing to a girl Rishav said, "She is the daughter of the only sister of my father". How is Rishav related to the girl?
- 8** A is C's grandfather and B's father, D is C's sister and E is D's son. How is E related to C?
- 11** If $A \times B$ means A is the wife of B; $A - B$ means A is the brother of B; $A \div B$ means A is the father of B. Then $P \times R \div T - S$ means P is the ____ of S.
- 12** Pointing towards a photograph Ram says, 'She is the daughter of the only son of my paternal grandfather'. How is the woman in the photograph related to Ram?



Quiz

Answer

?

1.

$$8 \times (8 + 2) = 8 \times 10 = 80$$

$$5 \times (5 + 2) = 5 \times 7 = 35$$

$$9 \times (9 + 2) = 9 \times 11 = 99$$

$$4 \times (4 + 2) = 4 \times 6 = 24$$

$$\therefore 6 \times (6 + 2) = 6 \times 8 = 48$$



2.



May = 358

First digit tells the number of letters in the given month

June = 4610

Second digit tells the order of the month in a year

July = 4711

Remaining number at the end is the sum of the first two digits.

August = 6814

September = 9918

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Answer (Riddles)



1

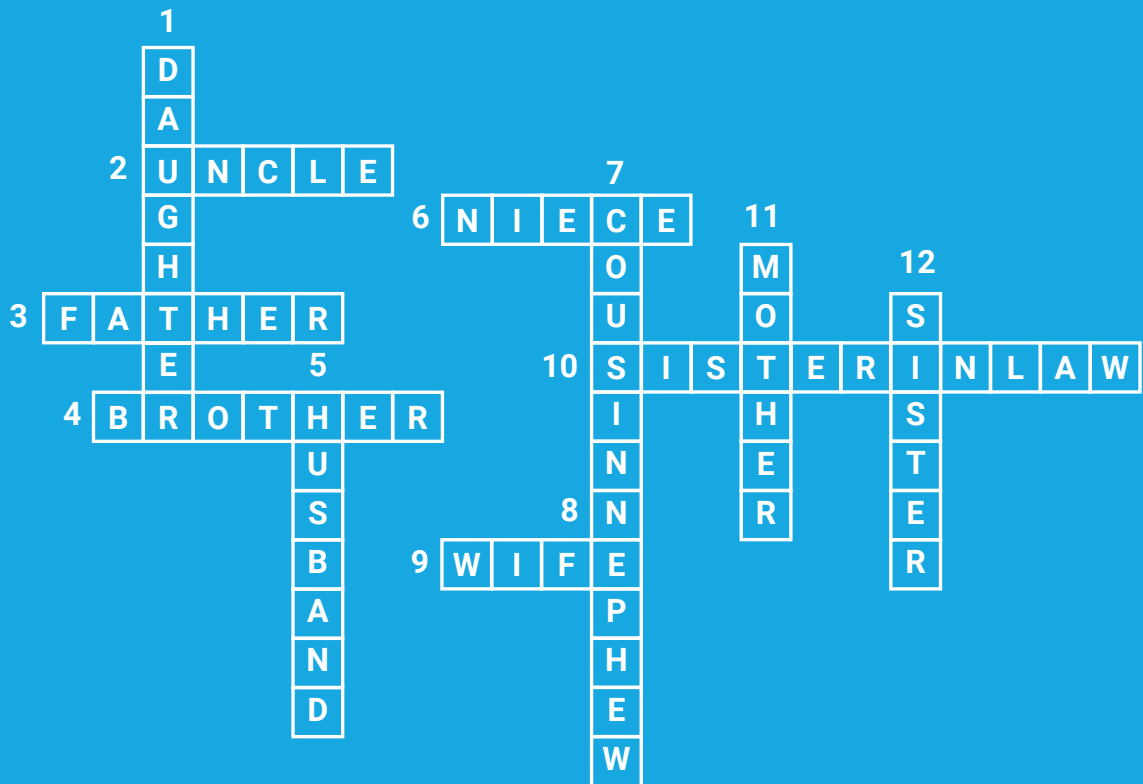
Grand daughter

2

08 - February - 2002



Answer (Crossword)

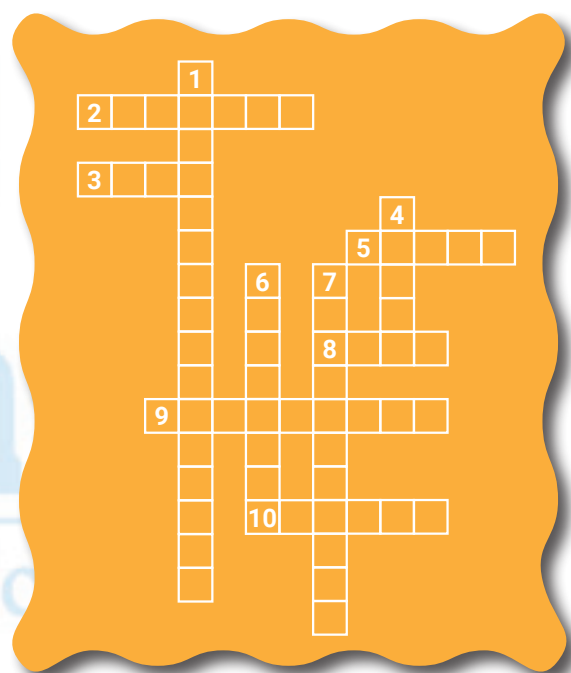


Work and Energy

Crossword

ACROSS

2. Which type of energy is possessed by an object due to its motion?
3. The energy used in 1 hour at the rate of 1kW is called
5. The unit of energy is
8. The product of force and displacement is
9. Energy can neither be created nor be
10. An object having the capability to do work is said to be possess



DOWN

1. The sum of kinetic energy and potential energy is called
4. Rate of doing work is called
6. The work done by force can either be positive or
7. Unit of work is



Scientists info and their contributions



1

Between 1842 and 1847, Julius Robert Van Mayer, James Prescott Joule and Helmholtz discovered and formulated the basics of what we refer to today as the law of conservation of energy.



2

The word "Energy" comes from the Greek *energeia*.

3

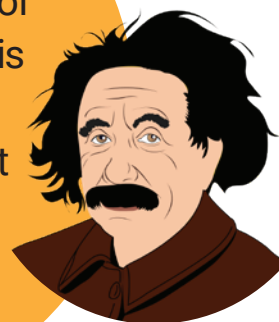
Energeia concept was developed by Aristotle (384 BC – 322 BC).

4

By 1686, Gottfried Wilhelm Von Leibniz (1646-1716), had developed concept that corresponds to our understating of kinetic and potential energy.

5

In 1905, Albert Einstein established the general equivalence of energy and mass with his theory of relativity. From, there the concept of energy was generalised into the form used today.



Quiz



Quiz

_____ is stored energy at height.

- (a) Potential
- (b) Kinetic
- (c) None of these
- (d) Both (i) and (ii)

Device that converts chemical to electrical energy is

- (a) Battery
- (b) Loudspeaker
- (c) Solar cell
- (d) Electric moter

Which of following is the best example of work done?

- (a) Studying
- (b) Lifting a box
- (c) Carrying groceries to house
- (d) Holding a box

When energy given to the body

- (a) Positive work is done
- (b) Negative work is done
- (c) Zero work is done
- (d) None of these

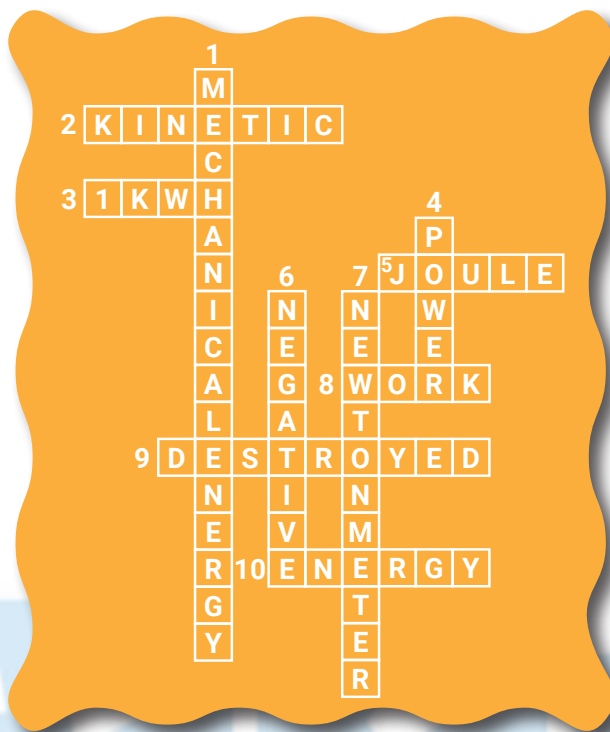
Quiz

The factor that has greater effect on kinetic energy is

- (a) Mass
- (b) Weight
- (c) Speed
- (d) time



Answer (Crossword)



Answer (Quiz)

- 1 **Ans.** (b) Lifting a box
- 2 **Ans.** (a) Potential
- 3 **Ans.** (a) Battery
- 4 **Ans.** (a) Positive work is done
- 5 **Ans.** (c) Speed



Atoms and Molecules

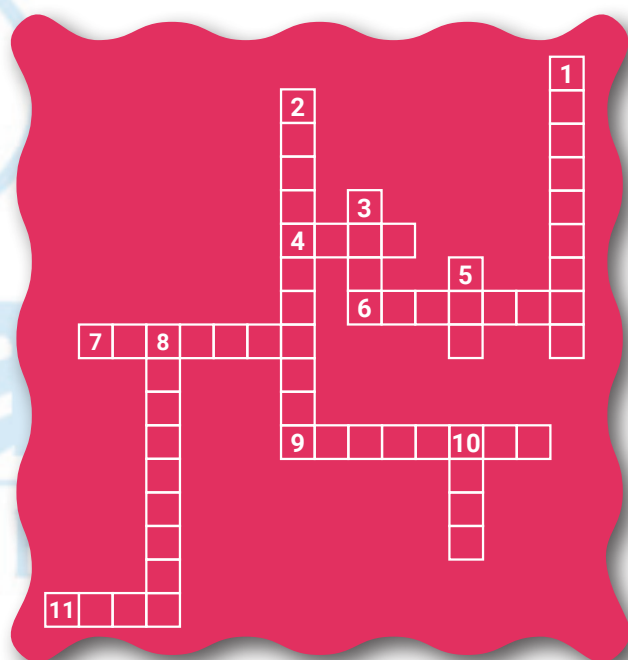
Crossword

ACROSS

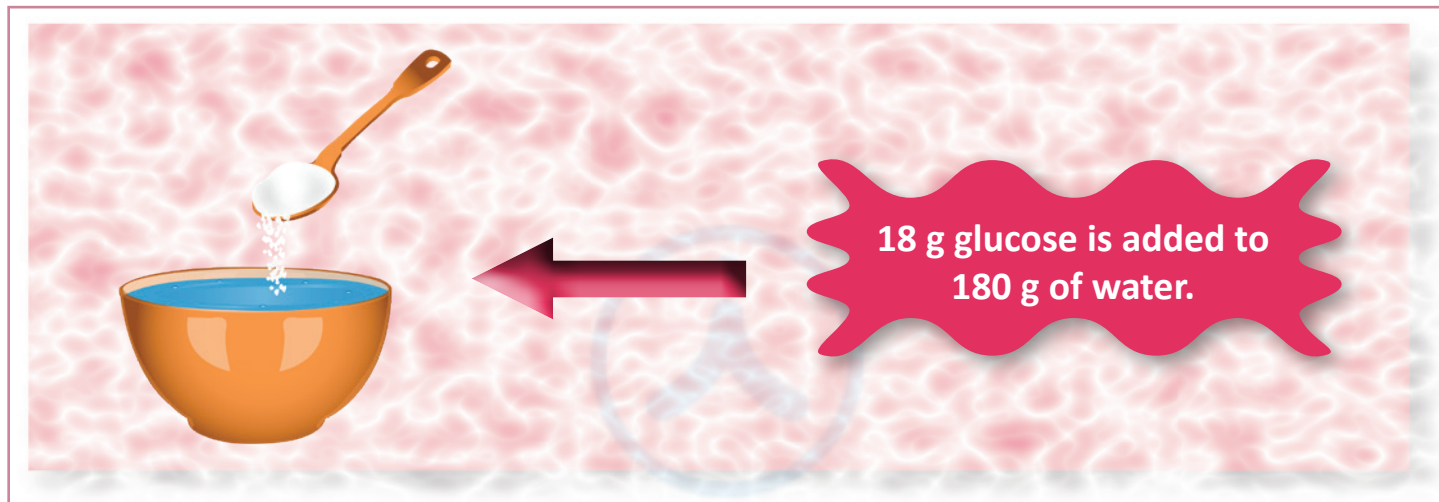
- Smallest particle of an element which can take part in a chemical reaction is called [4]
- Substance which is made from similar kind of atoms is called [7]
- Combining capacity of an element to form a compound is called [7]
- Moles of solute dissolved in one Kg of solvent is [8]
- Atomicity of Phosphorous molecule is [4]

DOWN

- Total number of atoms constituting a molecule is called [9]
- Latin name of mercury (Hg) is [11]
- The amount of a substance which has mass equal to its gram atomic mass or gram molecular mass is called [4]
- Unit of atomic mass is abbreviated as [3]
- Law of conservation of mass was given by [9]
- Charged species are [4]



Quiz
? Quiz



- 1** Mole fraction of glucose is
(a) 0.009 (b) 0.09
(c) 0.90 (d) 0.91
- 2** Mole fraction of water will be
(a) 0.91 (b) 1.1
(c) 0.991 (d) 1
- 3** Molality of the solution is
(a) 100 (b) 0.55
(c) 0.50 (d) 90.9
- 4** % w/w for the solution is
(a) 9.09 (b) 90.9
(c) 10 (d) 18



5 Sum of mole fractions of both the components present in the solution is

- (a) 100 (b) 10
(c) 1 (d) None of these

6 Total number of gram-atoms of hydrogen in the solution is

- (a) 21.2 (b) 10.1
(c) 20.2 (d) $10.1 N_A$

7 Total number of gram-atoms of carbon in the solution is

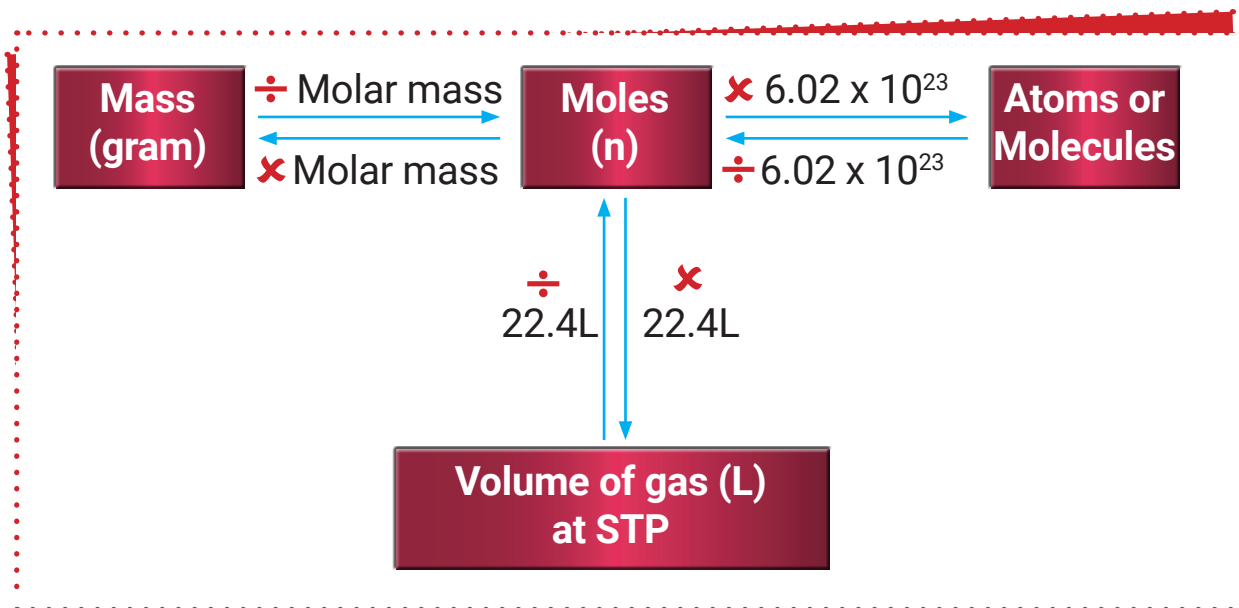
- (a) 0.1 (b) $0.1 N_A$
(c) $0.6 N_A$ (d) 0.6

8 What will be the total number of nucleons in this mixture?

- (a) $198 N_A$ (b) $180 N_A$
(c) $18 N_A$ (d) None of these



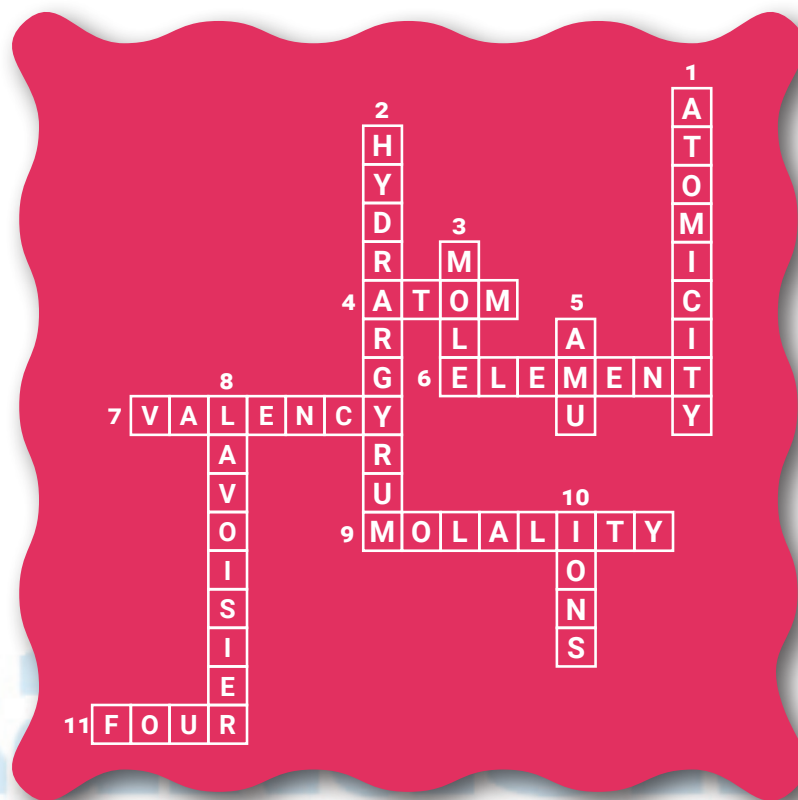
Sorted Way to Remember Mole Concept



Fun Facts About Mole Day

- October 23 (or 10/23, as it's written the American way), from 6:02 am to 6:02 pm, is Mole Day.
- It's the day to celebrate the chemical unit the "MOLE."
- The mole is attributed to 18th century Italian scientist Amedeo Avogadro, whose full name is Lorenzo Romano Amedeo Carlo Avogadro di Queregna e di Cerreto. That's a long name, but it somehow fits the long number that now bears his name (6.02×10^{23} is called Avogadro's Constant).
- Mole Day was proposed in an article in The Science Teacher in early 1980s. Inspired by the article, Maurice Oehler, a chemistry teacher (passed away on 23rd January 2020) in Prairie du Chien, Wisconsin, created the National Mole Day Foundation in 1991.
- The Mole Day has annual themes also.

Answer (Crossword)



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Answer (Quiz)

1 Ans. (a) 0.009

2 Ans. (c) 0.991

3 Ans. (b) 0.55

4 Ans. (a) 9.09

5 Ans. (c) 1

6 Ans. (a) 21.2

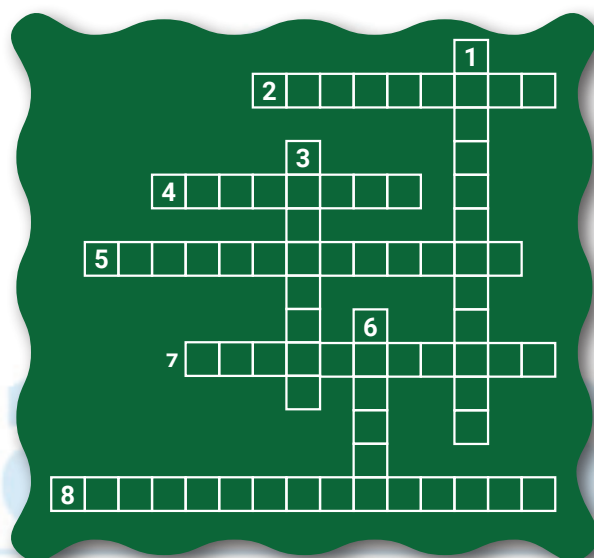
7 Ans. (d) 0.6

8 Ans. (a) 198 NA



Natural Resources

Crossword

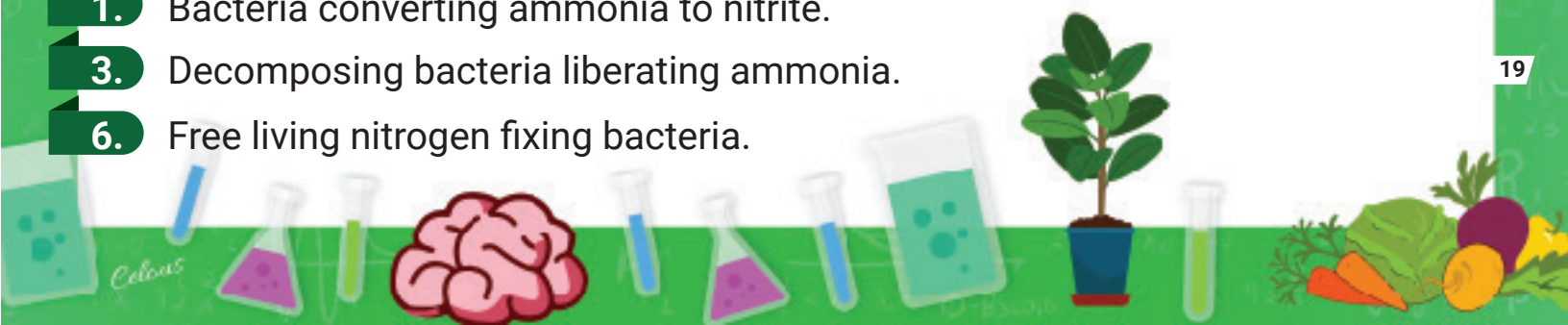


Across

2. Bacteria present in root nodules of legumes.
4. Cyanobacteria in association of *Azolla*.
5. Conversion of ammonia into nitrates is called.
7. Bacteria responsible for denitrification.
8. Process releasing free nitrogen into atmosphere.

DOWN

1. Bacteria converting ammonia to nitrite.
3. Decomposing bacteria liberating ammonia.
6. Free living nitrogen fixing bacteria.



Jumbled Words

Here is a list of jumbled words which have to be rearranged.
(Hints are given in the bracket)

1 RHEPRHMEEOTS

Hint : A layer of atmosphere

ANS.

4 IOUEOTCPHTNARI

HINT : Consequence of water pollution

ANS.

2 RONXHAMBOGCOLEBYAI

HINT : Compound of respiratory pigment

ANS.

5 YOELGDPO

HINT : Study of soil

ANS.

3 MISPBLUM

HINT : Disorder due to water contaminated with a poisonous metal

ANS.

6 OURBCRCRNFLYOLHOODRASOOH

HINT : Alternative to one potent ODS

ANS.



Interesting Facts

Ecosanitation

It is a sustainable system for handling human excreta using dry composting toilets. This composting method recycles human excreta into a natural fertiliser which reduces the need of chemical fertilisers. It is a practical, hygienic, efficient and cost-effective solution to human waste disposal. Such toilets are called 'EcoSan toilets' and are working in many areas of Kerala and Sri Lanka.

What is blue-baby Syndrome?

Fertilisers like nitrates and phosphates are also a source of water pollution. When such water is used by animals, the nitrates of polluted water get reduced to toxic nitrites in their body by intestinal bacteria. The nitrites in the body combine with haemoglobin to cause a serious disease called **methemoglobinemia** or **blue-baby syndrome**. It reduces the oxygen-carrying capacity of the blood. It damages respiratory and vascular systems and sometimes cause suffocation.

International Initiative For Controlling Ozone Depletion

Regarding the deleterious effects of the ozone depletion, an international treaty, known as **Montreal Protocol** was signed at Montreal (Canada) in 1987 (effective in 1989) to control the emission of ozone-depleting substances (ODS).

National Pollution Prevention Day

Bhopal gas disaster occurred in the night of 2nd December 1984 due to the release of methyl isocyanate (MIC), a fatal gas, from Union Carbide India Limited, a pesticide plant in Bhopal, Madhya Pradesh, India. So, 2nd December is observed as **National Pollution Prevention Day** in India to mark the anniversary of this disaster.





1 What is stone leprosy?



2 Conversion of $\text{NH}_3 \rightarrow \text{NO}_2^- \rightarrow \text{NO}_3^-$ is called

- (a) Ammonification (b) Nitrification
(c) Denitrification (d) Biological N_2 -fixation

3 Match the column.

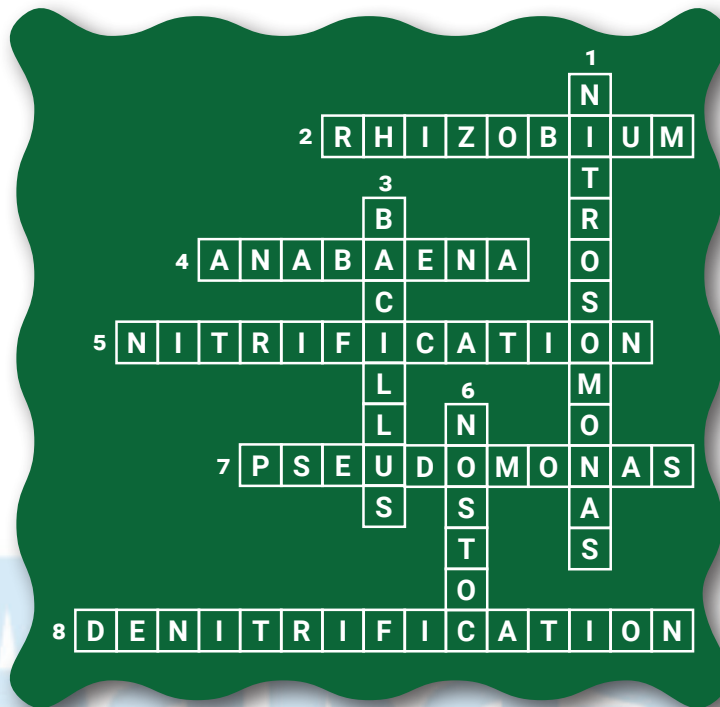
Column I

Column II

- | | |
|---|------------|
| (a) Environmental Protection Act | (i) 1988 |
| (b) Air (Prevention and Control of Pollution) Act | (ii) 1987 |
| (c) Water (Prevention and Control of Pollution) Act | (iii) 1981 |
| (d) Montreal Protocol | (iv) 1974 |
| (e) National Forest Policy | (v) 1986 |



Answer (Crossword)



Answer (Jumbled Words)

1 ANS. THERMOSPHERE

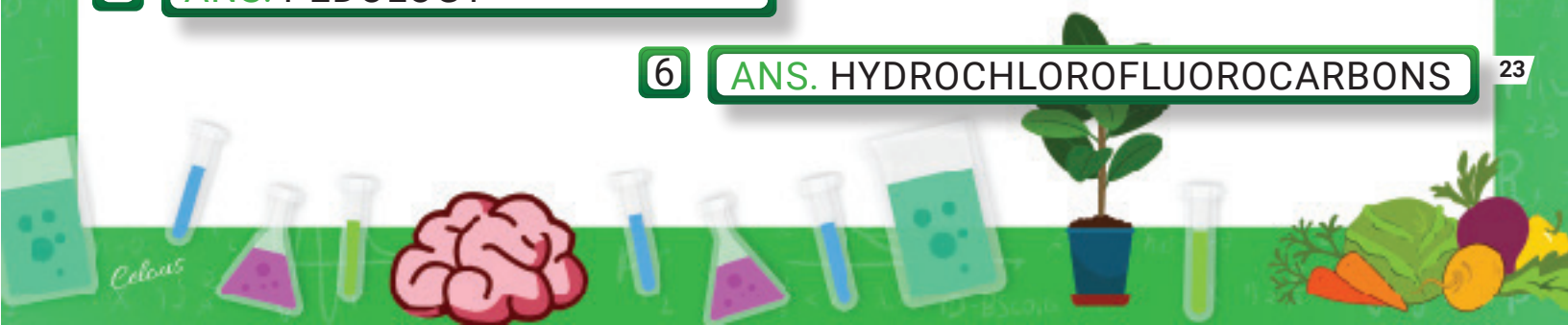
2 ANS. CARBOXYHAEMOGLOBIN

3 ANS. PLUMBISM

4 ANS. EUTROPHICATION

5 ANS. PEDOLOGY

6 ANS. HYDROCHLOROFLUOROCARBONS



Answer

Quiz
(?)

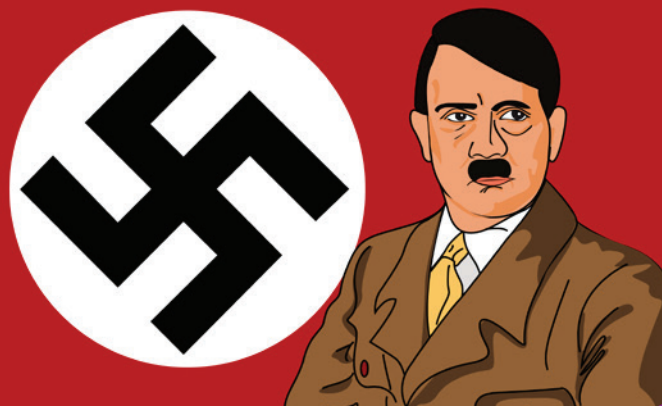
- 1 Acid rain corrodes metals, marble, painted surface, slate, stone etc. This phenomenon is known as stone leprosy. e.g., Taj Mahal at Agra is threatened by the corrosive action of acid deposition.
- 2 (b) Nitrification
- 3 a(v) b(iii) c(iv) d(ii) e(i)

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Nazism and the Rise of Hitler

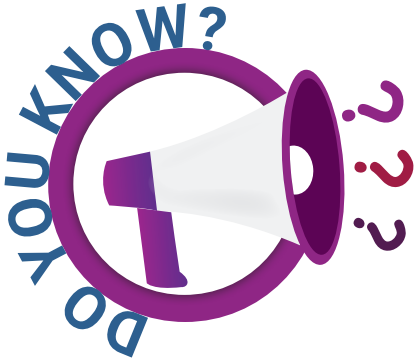
Nazism in Germany was much more sinister than any other ideologies. The Nazis, under the leadership of Adolf Hitler, established the most barbarous dictatorship of modern times.



Interesting Facts

- 1 Hitler was born in 1889 at Austria
- 2 He moved to Germany in 1913 and was decorated during his service in the German Army in World War I.
- 3 In 1919, he joined the German Workers' Party (DAP), the precursor of the Nazi Party, and was appointed leader of the Nazi Party in 1921.
- 4 In 1923, he attempted to seize governmental power in a failed coup in Munich and was imprisoned with a sentence of five years.
- 5 In jail, he dictated the first volume of his autobiography and political manifesto Mein Kampf which means My Struggle.





- The book Mein Kampf expressed some of the most monstrous ideas of the Nazi movement.
- Hitler glorified the use of force & brutality, and the rule by a great leader and ridiculed internationalism, peace and democracy.
- He preached extreme hatred against the German Jews who were blamed not only for the defeat of Germany in the First World War but for all the ills of Germany.
- He glorified violent nationalism and extolled war.

And these ideas of Hitler found support of the army; the industrialists, the big landowners and the anti-republican politicians and they began to look upon Hitler as the saviour of Germany.

Hitler capitalized the sense of humiliation done by the Treaty of Versailles, 1919 and held Jews responsible for the sufferings of Germany and German People and in order to solve this problem he ordered the extermination of Jews.

There is no exact data available which can tell us about the death toll of Jews during Hitler's rule in Germany but approximately 11 million people died.



Prepositions

Quiz

?

Quiz

1

The dog is _____ the kennel.

- (a) at
- (b) over
- (c) above
- (d) in

2

Children jumped _____ the cliff into the water.

- (a) at
- (b) in
- (c) off
- (d) of

3

Can I get some gravy _____ with my steak?

- (a) on
- (b) along
- (c) over
- (d) of

4

Cat is giving birth _____ the table.

- (a) over
- (b) above
- (c) under
- (d) on

5

I was thinking _____ how to go around him.

- (a) above
- (b) over
- (c) around
- (d) about

6

Children are playing _____ the tree house.

- (a) at
- (b) into
- (c) in
- (d) under

7

They were all going gaga _____ the new house.

- (a) over
- (b) above
- (c) on
- (d) of

8

What he said went _____ my head.

- (a) above
- (b) over
- (c) under
- (d) through

9

Mark is a member _____ the school's drama club.

- (a) off
- (b) of
- (c) in
- (d) on



1

The dog is **in** the kennel.

2

Children jumped **off** the cliff into the water.

3

Can I get some gravy **along** with my steak?

4

Cat is giving birth **under** the table.

5

I was thinking **about** how to go around him.

6

Children are playing **in** the tree house.

7

They were all going gaga **over** the new house.

8

What he said went **over** my head.

9

Mark is a member **of** the school's drama club.



Advantages of Starting Early in Foundation Years

With the competition getting stiffer with each passing day, students need to develop the right skills and aptitude from an early stage in order to gain a competitive edge over others. It gives the right direction in terms of career planning and exposes students to efficacious strategies that would help them to smoothly cruise through their exams.

If you are still pondering over whether or not to start your preparation early in foundation years, reading further may prove to be of some help.

Advantages of Starting Early in Foundation Years

Develops Skills

Cracking competitive examinations is all about having adept skills. Training your mind at an early stage helps to develop logical, reasoning and analytical skills which require gradual grooming. Once your mind gets accustomed to rational thinking and develops cogent thought process, preparing for competitive exams in senior classes doesn't appear to be a tough nut to crack. The ability to visualise and bloom ahead isn't a product of mere rote-learning. It requires innovative learning and discussion-based adaptive learning right from the start.

Gives Competitive Edge & Lays Strong Foundation

Once you start developing your critical thinking skills, you'll acquire an edge over others right from the beginning. Your fundamental understanding and problem-solving skills will already be developed by the time your peers start their preparation in senior classes.

Bridges the Gap between School Exam Pattern & Competitive Exam Pattern

The school curriculum and exam pattern are different from competitive examinations. While the school exam pattern focuses more on knowing the concepts, competitive exam pattern focuses on the application of the concepts. Starting early in foundation years helps you to bridge this gap at an early stage and prepare for both school and competitive examinations simultaneously.

Exposure to Competitive Environment

Starting early in foundation years provides you with the necessary exposure by preparing you for scholarship examinations such as NTSE and several Olympiads, conducted at national and international levels. It fosters an environment that promotes discipline and drives you to work hard and dedicatedly towards your goal. It instils in you a competitive spirit that is essential to succeed in life.



/// Builds Time Management Skills

Success in competitive examinations depends on good time management skills. Starting early in foundation years will not only teach you time management among other skills at an early age but also help you to manage your time between school and competitive exam preparation in an effective way.

/// Prepares for the Future

No learning or training is effective unless it prepares you to overcome challenges from an early stage by gradually developing your skills, temperament and instilling in you immense confidence. Moreover, you will learn to strive ahead under academic pressure at an early stage.

What makes Foundation @Aakash the smartest choice ?

- Nurtures you with personalized attention in a competitive atmosphere.
- Improves your performance in school & board examinations.
- Builds your analytical & reasoning skills to succeed in Olympiads & Scholarship examinations such as NTSE.
- Lays the strong groundwork for entrance examinations such as NEET, JEE, UPSC, IAS, IFS, CAT, MAT, etc.
- Introduces you to innovative learning methods to make learning fun, engaging and easy.
- Focuses on conceptual and application-based learning, thereby debunking old rote-learning methods.
- Indulges in more than just academic syllabi.
- Offers you competitive exposure through national level test series that enables you to know your potential at all India level.

Fundamentally, "the key to success is to start before you are ready". Starting early in foundation years can help you in planning strategically for the future. You can utilise the early years wisely by focusing on in-depth learning where you can give more time to understanding lessons and grasping concepts. Foundation @Aakash is an opportunity to build the tomorrow you want today. Aakash Foundation courses not only help you pass school/board exams with flying colours but also crack competitive scholarship exams and Olympiads held at national as well as international level.





Aakash

Medical | IIT-JEE | Foundations

Our Result in Medical & Engineering Entrance Exams-2019

80081 in NEET

69826 Classroom +
10255 Distance & Digital

AIR - 1, 2, 3

688 in AIIMS

576 Classroom +
112 Distance & Digital

AIR - 1, 2, 3

7879 in JEE (Main)

7250 Classroom +
629 Distance & Digital

AIR - 1*, 4*, 11*, 16, 26, 35*, 39

1633 in JEE (Adv.)

1441 Classroom +
192 Distance & Digital

AIR - 7*, 17*, 36*, 45*, 46*, 53*, 58*

Rank from Distance Learning Program

Our Achievements in Olympiads & Scholarship Exams 2019-2020

949

832 Classroom + 117 Distance & Digital

NTSE (Stage-I) 2019-2020

366

317 Classroom + 49 Distance & Digital

NTSE (Stage-II) 2019

1598

1556 Classroom + 42 Distance & Digital

PRMO 2019

115

111 Classroom + 4 Distance & Digital

RMO 2019



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