



JULY 2022

CLASS 8





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Edition: 2022-23

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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

1. Cubes and Cube Roots	1
2. Latest info on Sound Waves	7
3. Materials : Metals and Non-metals	9
4. Cell-Structure and Functions	12
5. Models of Secularism, Northern and Southern Lights	18
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7. Move the Tiger (MAT)	22

Crossword

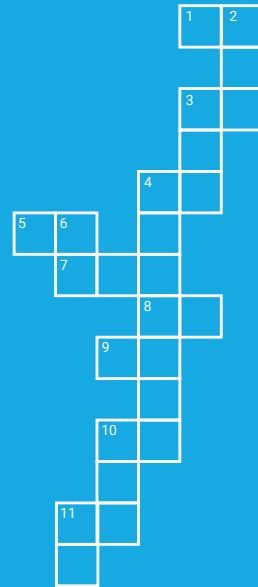
Cubes and Cube Roots

Across

1. _____ is the cube root of 1728.
3. $3^3 + 9 =$ _____.
4. 2197 is the cube of _____.
5. $3^3 + 3^3 + 3^3 =$ _____.
7. 6 less than cube of 9 is _____.
8. If $(6859000)^{1/3} = 190$, then $(6859)^{1/3}$ equals _____.
9. If the cube root of 512×27 is 24, then the cube root of 512×125 is _____.
10. $4^3 + 3^3 + 2^3 + 1$ is the square of _____.
11. If $42875 = 343 \times 125$, then cube root of 42875 is _____.

Down

2. Cube of 6 is _____.
3. $(7)^3 =$ _____.
4. If $(1331)^{1/3} = 11$, then the cube of 110 is _____.
6. If $(4913000)^{1/3} = 170$, then the cube root of 4913 is _____.
10. $7^3 - 6^3 =$ _____ + 2
11. $512^{(1/3)} \times 4913^{(1/3)} / 64^{(1/3)} =$ _____.



Fastest and universal way to calculate square of a number

$$(a + b)^2 = a^2 + 2ab + b^2$$

Let 'b' be units digit and 'a' be the remaining number, then

$$\begin{array}{rclcl}
 (a + b)^2 & = & a^2 & + & 2ab & + & b^2 \\
 & & \downarrow & & \downarrow & & \downarrow \\
 ((1)(5))^2 & = & 1^2 & & 2 \times 1 \times 5 & & 5^2 \\
 \begin{array}{c} \text{---} \text{---} \\ | \quad | \\ \boxed{a=1} \quad \boxed{b=5} \end{array} & & \downarrow & & \downarrow & & \downarrow \\
 & & 1 & & 10 & & 25 \\
 & & \downarrow & & \downarrow & & \downarrow \\
 (15)^2 & = & \frac{+1}{2} & & \frac{+2}{12} & & 5 \\
 & & 2 & & 2 & & 5 \\
 \boxed{(15)^2 = 225} & & & & & &
 \end{array}$$

Fastest and universal way to calculate cube of a number

$$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

Let 'b' be units digit and 'a' be the remaining number, then

$$\begin{array}{rclclcl}
 (a + b)^3 & = & a^3 & + & 3a^2b & + & 3ab^2 & + & b^3 \\
 & & \downarrow & & \downarrow & & \downarrow & & \downarrow \\
 ((1)(4))^3 & = & 1 & & 3 \times 1 \times 4 & & 3 \times 1 \times 4^2 & & 4^3 \\
 \begin{array}{c} \text{---} \text{---} \\ | \quad | \\ \boxed{a=1} \quad \boxed{b=4} \end{array} & & \downarrow & & \downarrow & & \downarrow & & \downarrow \\
 & & 1 & & 12 & & 48 & & 64 \\
 & & \downarrow & & \downarrow & & \downarrow & & \downarrow \\
 (14)^3 & = & \frac{+1}{2} & & \frac{+5}{17} & & \frac{+6}{54} & & 4 \\
 & & 2 & & 7 & & 4 & & 4 \\
 \boxed{(14)^3 = 2744} & & & & & & & &
 \end{array}$$

Cubes and Cube Roots

$0^3 = 0$	$4^3 = 64$	$8^3 = 512$
$1^3 = 1$	$5^3 = 125$	$9^3 = 729$
$2^3 = 8$	$6^3 = 216$	$10^3 = 1000$
$3^3 = 27$	$7^3 = 343$	

Interesting Facts

- i. Last digit of a perfect cube is same as that of the last digit of its cube root except that

2 becomes 8 8 becomes 2 and

3 becomes 7 7 becomes 3

- ii. Difference between cubes of two consecutive numbers is 1 more than 3 times their product

Eg: $5^3 - 4^3 = 3 \times (5 \times 4) + 1 = 61$

Or $m^3 - (m - 1)^3 = [3m(m - 1) + 1]$

Given $14^3 = 2744$, find 15^3 .

Sol. $15^3 = 14^3 + [3 \times 15 \times 14 + 1]$
 $= 3375$

Puzzle

⊕ On a particular day in a village of Sonbhadra, which is very ⊕ underdeveloped district of U.P., a shepherd found a gold cubical block of side 60 cm and the district administration recovered it from the shepherd. Then each year, they divide the gold block into smaller identical cubical gold blocks and distribute them among poor persons just for one year and at the end of the year, all the blocks were recovered and moulded to form the original gold block, this process was continued for 6 years.

No person gets benefited for more than one time. If for the first year, the identical distributed blocks were of 1 cm side, in second year they were of 2 cm side, in third year they were of 3 cm side and so on for 6 ⊕ years, then how many total persons were benefited? ⊕

Sol.:- For 1st year :- Side of each block = 1 cm

$$\text{Number of smaller blocks} = \frac{60}{1} \times \frac{60}{1} \times \frac{60}{1} = 60^3$$

For 2nd year :- Side of each block = 2 cm

$$\text{Number of smaller blocks} = \frac{60}{2} \times \frac{60}{2} \times \frac{60}{2} = 30^3$$

⋮ ⋮ ⋮ ⋮ ⋮

For 6th year :- Side of each block = 6 cm

$$\text{Number of smaller blocks} = \frac{60}{6} \times \frac{60}{6} \times \frac{60}{6} = 10^3$$

$$\begin{aligned} \text{Total number of benefited persons} &= 60^3 + 30^3 + 20^3 + 15^3 + 12^3 + 10^3 \\ &= 257103 \end{aligned}$$

Approximation of cube root of perfect cube number

$$\sqrt[3]{262144}$$

make the pair of 3-digits from right

2 6 2

1 4 4

Tenth place
digit should be 6

Unit digit must
be 4

6^3 is the nearest perfect cube to 262.

$$\text{So, } \sqrt[3]{262144} = 64$$

$$\sqrt[3]{300\ 763}$$

6 7

Because 7^3 will give
us units digit as 3.

$\therefore 6^3$ is the nearest perfect cube to 300.

$$\text{So, } \sqrt[3]{300763} = 67$$

$$\sqrt[3]{135\ 005\ 697}$$

5 x (say) 3

$$= 5 \times 3$$

We can find the unit digit and first digit by approximation method other digit can be determined by taking the help of options or by doing complete calculation. The value of x can be any digit.

$$\sqrt[3]{1\ 824\ 793\ 048}$$

1 x y 2 [$\because 2^3$ gives
units digit as 8]

So, $\sqrt[3]{1824793048}$ will be of the form

$\overline{1 \times y 2}$ where tenth place and hundredth place digits can be any digit.

Sum of cubes of first n-natural numbers

$$1^3 + 2^3 + 3^3 + 4^3 + 5^3 + \dots n^3 = \left[\frac{n(n+1)}{2} \right]^2$$

? Find the sum of $1^3 + 2^3 + 3^3 + \dots 12^3$.

Sol.:- We know that,

$$1^3 + 2^3 + 3^3 + \dots n^3 = \left[\frac{n(n+1)}{2} \right]^2$$

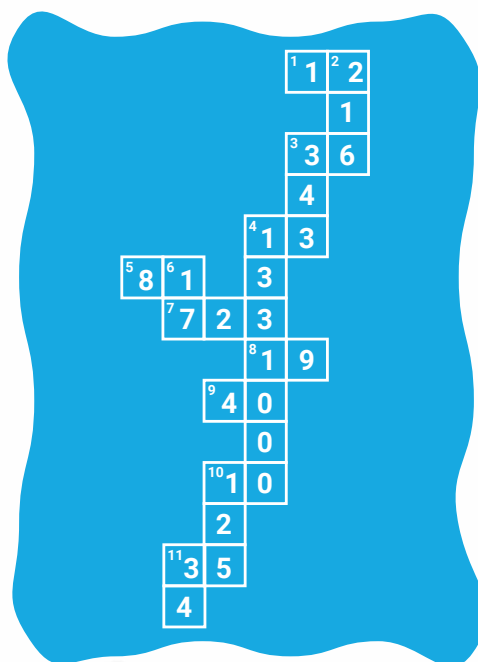
$$\text{So, } 1^3 + 2^3 + 3^3 + \dots 12^3$$

$$= \left[\frac{12(12+1)}{2} \right]^2 \quad [\because n = 12]$$

$$= 6084$$

Answer (Crossword)

ACROSS		DOWN	
1.	12	2	216
3.	36	3.	343
4.	13	4.	133100
5.	81	6.	17
7.	723	10.	125
8.	19	11.	34
9.	40		
10.	10		
11.	35		



Latest info on Sound Waves



A Revolutionary Nebuliser

Using sound wave technology, scientist have designed a revolutionary nebuliser called 'Respite' that can administer the next generation of drugs, such as immunotherapies, with precise doses to patients with debilitating lung conditions.

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Cell Re-Engineering

The sound wave technology has also been used in the emerging medical field of cell engineering, which has recently seen considerable success, particularly in treating some forms of cancer.

The new technique used the force of sound to push against the cell walls, allowing drugs to enter the cells more efficiently than current approaches.



Facts

About Sound

1. A human baby cries at about 115 decibels, which is louder than a car horn.
2. Scientists have used sound waves to manipulate object. Using focussed sound waves and ultrasonic waves, objects have been levitated into the air and moved around.
3. The eruption of a volcano at Krakatoa in the western Pacific Ocean is the loudest natural sounds ever generated on the planet earth.
4. Most animals, like dogs, are capable of detecting sound at higher frequencies.
5. If a human being could yell for 8 years, 7 months and 6 days straight, it would produce enough sound energy to warm up a cup of coffee.
6. Birds create sound maps to navigate their migration and travel through the air. It is thought that birds can use both the beak magnetite and the eye sensors to travel long distances over areas that do not have many landmarks, such as the ocean.
7. The blue whale produces one of the loudest sounds within the animal kingdom measuring around 188 decibels.
8. If you tried to recite the letters of the alphabet without moving your tongue or lips, every letter would sound exactly the same.
9. A digital recording of our voice is exactly how other people hear how we sound.
10. People who suffer from melophobia have fear of music and people with acousticophobia have fear of noises.



Word Search

Metals and Non-metals

1 Identify the metal which is used for construction of bridges. This metal is also found in our body.

2 Identify the important non-metal present in hydrocarbons.

3 Find the non-metal that is yellow in color.

4 Identify the metal which is used for wrapping food.

5 Name the metal used for making vessels for storing water in old days.

6 Identify the non-metal which we inhale during breathing.

A	X	T	M	S	P	K	L	G
X	T	S	U	L	P	H	U	R
I	L	R	H	M	N	D	I	L
C	I	R	O	N	S	E	J	K
A	L	U	M	I	N	I	U	M
R	M	U	Q	T	R	S	T	U
B	N	P	C	O	P	P	E	R
O	X	Y	G	E	N	V	W	X
N	Y	Z	T	A	B	G	H	K





Quiz

Q.1 Na and K are stored under

- (1) Water
- (2) Kerosene
- (3) Alcohol
- (4) Ether

Q.2 All of the following metals are solid, except

- (1) Sodium
- (2) Calcium
- (3) Mercury
- (4) Copper

Q.3 The non-metal which is liquid at room temperature, is

- (1) Oxygen
- (2) Bromine
- (3) Chlorine
- (4) Sulphur

Q.4 The metals which can be cut with a knife are

- (1) Sodium and potassium
- (2) Barium and calcium
- (3) Sodium and mercury
- (4) Potassium and calcium

Q.5 When non-metals are added to water,

- (1) Hydrogen gas is formed
- (2) Carbon dioxide gas is formed
- (3) Generally no reaction takes place
- (4) Basic hydroxide is formed



Answer (Word Search) Metals and Non-metals

1. Iron
2. Carbon
3. Sulphur
4. Aluminium
5. Copper
6. Oxygen

A	X	T	M	S	P	K	L	G
X	T	S	U	L	P	H	U	R
I	L	R	H	M	N	D	I	L
C	I	R	O	N	S	E	J	K
A	L	U	M	I	N	I	U	M
R	M	U	Q	T	R	S	T	U
B	N	P	C	O	P	P	E	R
O	X	Y	G	E	N	V	W	X
N	Y	Z	T	A	B	G	H	K

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(Answer) Quiz

Q.1 (2)

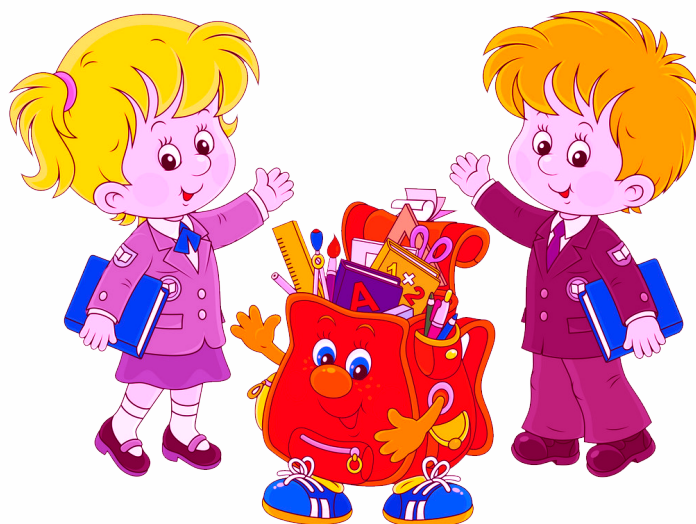
Q.2 (3)

Q.3 (2)

Q.4 (1)

Q.5 (3)

U'S





Word Search (Cell-Structure and Functions)



Find Them ?

DNA, SER, Gene, Cell Wall,
Lysosome, Cytoplasm, Nucleus

A	P	Q	F	N	O	L	Y	W
D	D	E	L	C	P	Y	G	O
N	U	C	L	E	U	S	P	T
A	V	Y	F	L	K	O	K	E
F	M	T	O	L	Y	S	B	N
K	A	O	N	W	P	O	L	X
P	T	P	P	A	Z	M	E	S
Z	A	L	Q	L	G	E	N	E
W	E	A	T	L	O	P	S	R
A	F	S	B	N	O	Q	L	W
A	Q	M	C	O	A	F	N	Z

Fact

WE GOT MITOCHONDRIA FROM OUR MOTHER:

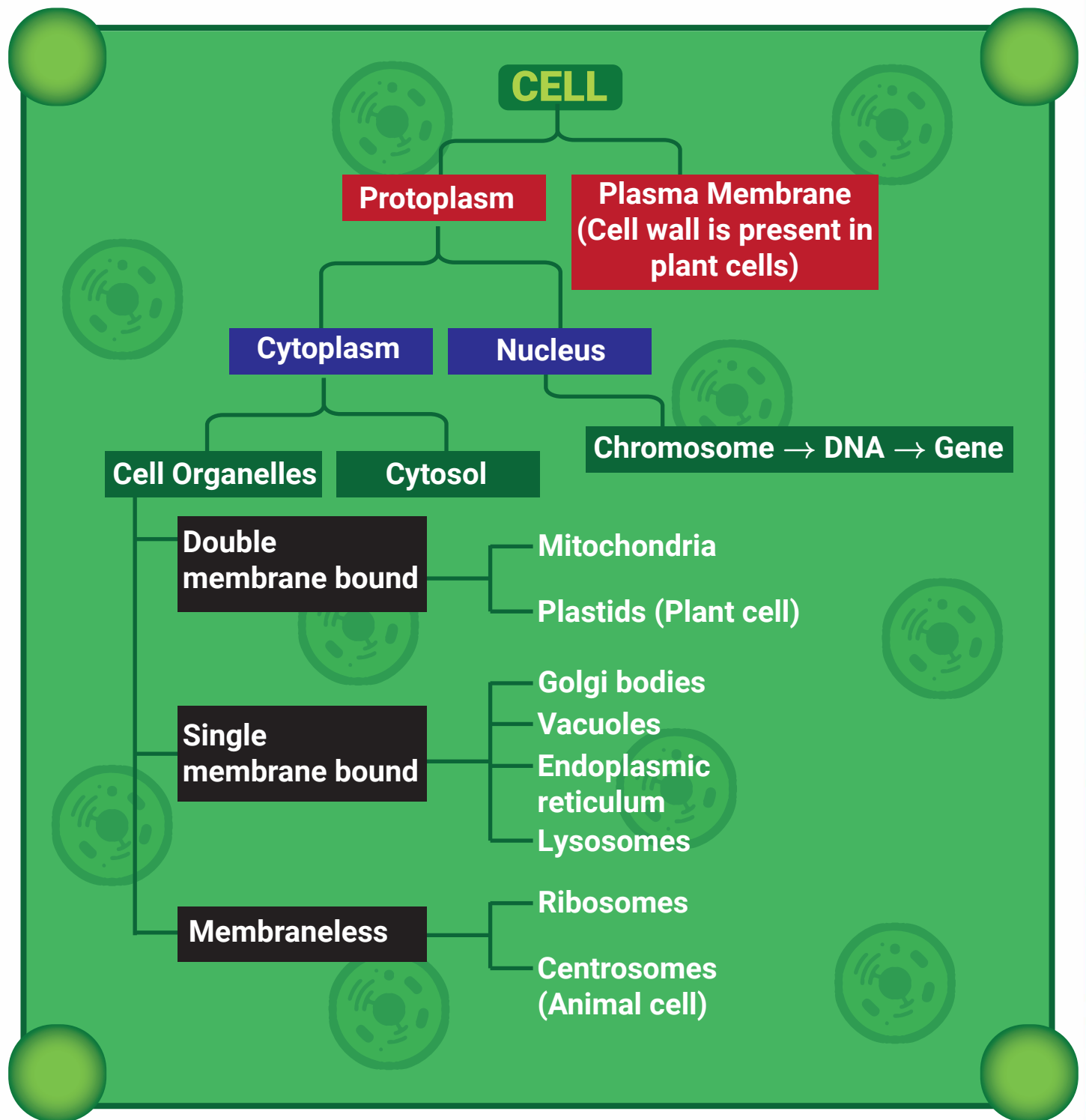
Yes, we got almost all mitochondria present in each of our cells from our mother. About 200,000 of mitochondria are present in human ovum while only about 5 are present in the sperm. So, basically they get diluted after fertilization. So, chronologically we take the mitochondria from an ancient mother ancestor, scientist called her "Mitochondrial Eve".

What is "Cell Eating" and "Cell Drinking" ?

Pinocytosis is also called cell drinking process, as fluid materials such as proteins, fats, etc having high molecular weight in the form of globules of fluid enter the cytoplasm by invagination of plasma membrane.

Phagocytosis is bulk intake of large sized solid particles by cell using plasma membrane. It is also called cell eating process.

Flow Chart:



Puzzle (Cell-Structure and Functions)



Find the words using hints.

1

Hint: Organelle involved in protein synthesis : ORBIOEMS

2

Hint: Brain of the cell : ULENSCU

3

Hint: An additional layer in plants : LACWELL

4

Hint: DNA is an example of : ULCANCEIIDC



5

Hint: Digest cellular macromolecules :
YSOLSOEM

Hint: Digest cellular macromolecules :
YSOLSOEM

Hint: Cell having a true nucleus
CRAEKYTUOI

Hint: Cell having a true nucleus
CRAEKYTUOI

6

7

Hint: Energy currency is synthesized by :
MITCRANIDOOH

Hint: Energy currency is synthesized by :
MITCRANIDOOH

Region in the prokaryotic cell, that contains the genetic material.

???



What's My Name ?

1. I am the cell organelle that sort proteins and other cellular materials and put them into structures known as vesicles. What am I?
2. I am the cell's transport system. I am of two types : Rough and Smooth. When I am rough, it is actually ribosome which is responsible. What am I?
3. I am the brain of the cell and so they say I regulate activities from day to day. What am I?
4. I am flexible and thin, I control what gets out and what comes in. What am I?

Answer (Word Search)

A	P	Q	F	N	O	L	Y	W
D	D	E	L	C	P	Y	G	O
N	U	C	L	E	U	S	P	T
A	V	Y	F	L	K	O	K	E
F	M	T	O	L	Y	S	B	N
K	A	O	N	W	P	O	L	X
P	T	P	P	A	Z	M	E	S
Z	A	L	Q	L	G	E	N	E
W	E	A	T	L	O	P	S	R
A	F	S	B	N	O	Q	L	W
A	Q	M	C	O	A	F	N	Z



Answer (Puzzle)

1 R I B O S O M E

2 N U C L E U S

3 C E L L W A L L

4 N U C L E I C A C I D

5 L Y S O S O M E

6 E U K A R Y O T I C

7 M I T O C H O N D R I A

NUCLEOID



Answer (What's My Name ?)

1 Golgi Bodies

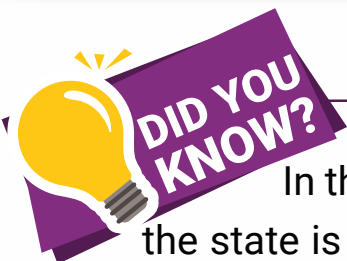
3 Nucleus

2 Endoplasmic Reticulum

4 Cell membrane



Models of Secularism



In the American model of secularism, separation of religion and the state is understood as mutual exclusion i.e. the state will not intervene in the affairs of religion and in the same manner, religion will not interfere in the affairs of the state.

Indian secularism works on the strategy of intervention as well as non-intervention in the religion. There is no strict separation of religion and the state.

Northern and Southern Lights



Most of us get fascinated when we look at the sky, especially at night. We see many sources of light like stars but how many of you have heard about the Northern Lights/Southern Lights or Aurora Borealis/Aurora Australis? Let's learn about it.

Where do they occur ?

It is a natural phenomenon that commonly occurs at higher northern and southern latitudes that is, the North Pole and the South Pole. It is usually a milky greenish color light, however, can also show red, blue, violet, pink, and white colors.

Why do they occur ?

1. The protective magnetic field around Earth shields us from most of the energy and particles.
2. During solar storms, the sun throws out electrified gas that can travel through space at high speeds.
3. When a solar storm comes towards earth, some of the energy and small particles can travel down the magnetic field lines at the north and south poles into the upper Earth's atmosphere.
4. This leads to the creation of Aurora.

In Northern Polar region, it is known as Aurora Borealis and in Southern Polar region, it is known as Aurora Australis.



Conjunctions



What are Conjunctions?

We can understand a conjunction with one word that is a bridge. Just as a bridge connects two places, similarly a word which connects two words, two clauses, two phrases and two sentences is called a conjunction.

Conjunction has three types:

Correlative
conjunction

Coordinating
conjunction

Subordinating
conjunction

Let's talk about coordinating conjunction.

1. Cumulative conjunction (**add**) - Ram and shyam are going to market.
2. Alternative conjunction (**choice**) - Give me a pen or a pencil.
3. Adversative conjunction (**contrast**) - She is a good girl but doesn't help others.
4. Illative conjunction (**result**) - She is 88 years old. So she can't walk.



For Example:

Q1. He does not enjoy eating vegetables, _____ does he enjoy eating fruit.

(or/nor)

Q2. The class was difficult, _____ everyone ended up receiving a passing grade.

(yet/but)

Explanation: Q1

In the given sentence, to present negative choice we use 'nor'.

Explanation: Q2

In the given sentence, to show contrast we use 'but'.

The seven chief coordinating conjunctions are: **For, And, Nor, But, Or, Yet, So**. They can be remembered using the acronym **FANBOYS**.

Fill in the blanks with appropriate coordinating conjunctions.

1. She bought a mango, _____ she was hungry.
2. Desiree lives in Alaska, _____ she is a park ranger at the National Forest there.
3. We can see a horror movie, _____ we can see an action movie.
4. The test was difficult, _____ everyone received higher than a "C" grade.
5. I was broke all week, _____ I had to eat Top Ramen noodles for every meal.

Answers

1. for

2. and

3. or

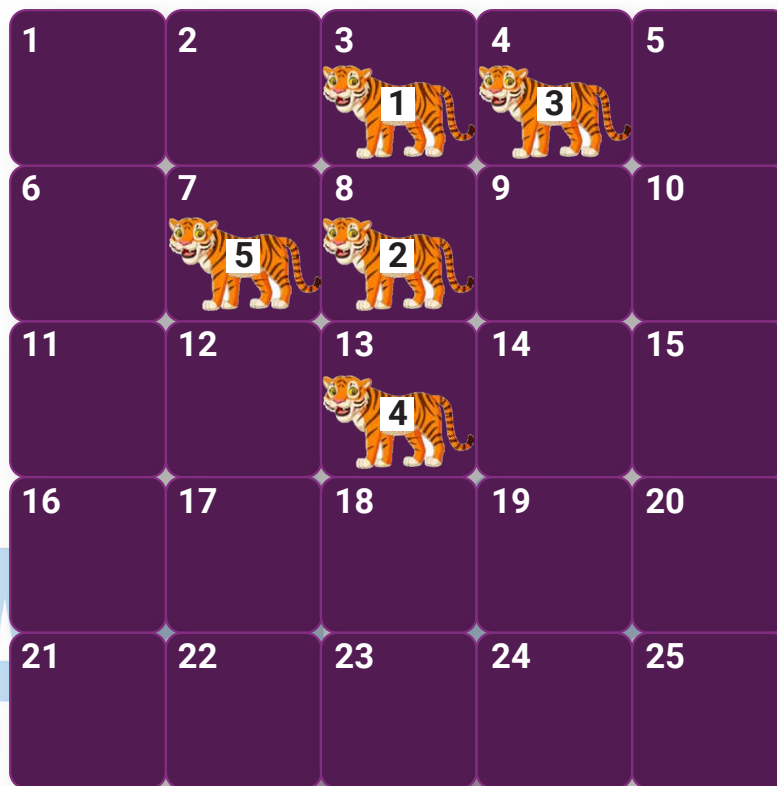
4. yet



5. so



MAT

Move The Tiger



Each tiger can jump over one or several  but not diagonally. But it can not jump over an empty cell. If a tiger jump from one box to another box then it is called one move. In how many minimum number of moves  (T1) will reach in box 19 ?

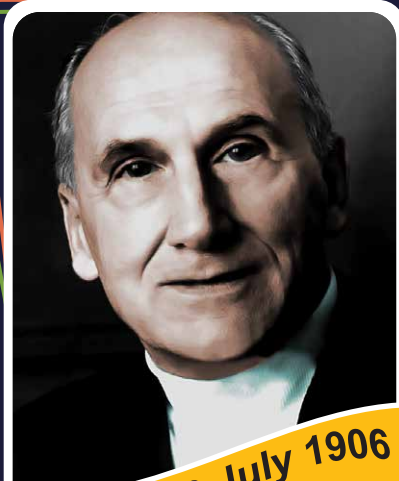
Answer (MAT)

Steps			Movement between Boxes	No. of move
I	⇒	T3	: 4 → 2 → 12	2
II	⇒	T5	: 7 → 17	1
III	⇒	T1	: 3 → 18 → 16	2
IV	⇒	T2	: 8 → 18	1
V	⇒	T1	: 16 → 19	1
				7

NOBEL PRIZE FOR CHEMISTRY

Happy Birthday

Vladimir Prelog



Born - 23 July 1906
Died - 07 Jan 1998

Yugoslavian-Swiss chemist who shared the 1975 Nobel Prize for chemistry with John W. Cornforth for his work on the stereochemistry of organic molecules and reactions. Stereochemistry is the study of the three-dimensional arrangements of atoms within molecules. He authored systematic naming rules for molecules and their mirror-image version, that is, which configuration will be referred to as “dextra” and which will be the “levo” (right or left). Also, by X-ray diffraction, he elucidated the structure of several antibiotics.

Upcoming Workshops (Starting 16th July Onwards)

NTSE

JULY

8 Weeks Workshop
2 Days/Week



Online

IOQM

JULY

12 Weeks Workshop
2 Days/Week



Online

IOQJS

JULY

12 Weeks Workshop
4 Days/Week



Online

Workshop Planner

	NTSE	IOQM	IOQJS
Subjects	MAT, Social Science, P,C,B,M	Mathematics	Physics, Chemistry, Biology
Total Days	8 Weeks	12 Weeks	12 Weeks
Total Classes	48 (MAT-12; Phy-6; Che-6; Bio-6; Maths-8; SSC-10)	24 (Maths-36)	48 (Phy- 16; Chem-16; Bio-16)
Class duration	1 Hour	1.5 Hours	1 Hour
No. of Days / Week	2	2	4
Total Teaching Hours	48	36	48
Total Tests	8	8	8
Course Fee	1999	3999	3999



NSO (LEVEL-I) 2021-22 Result



Our Top International & Zonal Rankers in Class VIII

Intl.
Rank
2
Zonal
Rank
1



Nirmay Joseph

Intl.
Rank
2
Zonal
Rank
1



Arnav Garg

Intl.
Rank
6
Zonal
Rank
2



Samridh Gupta

Intl.
Rank
6
Zonal
Rank
2



Maulik Goyal

Intl.
Rank
8
Zonal
Rank
2



Sushant Kumar Agarwal

Intl.
Rank
9
Zonal
Rank
2



Somdutta Mondal

Intl.
Rank
9
Zonal
Rank
3



Aarav Srivastav

Intl.
Rank
9
Zonal
Rank
3



Mitra Maiti

Intl.
Rank
12
Zonal
Rank
3



Mukesh Kumar

Intl.
Rank
13
Zonal
Rank
5



Bhargavi Gole

Intl.
Rank
17
Zonal
Rank
4



Aishmeen Kaur

Intl.
Rank
17
Zonal
Rank
9



Aaditya Raj

Intl.
Rank
21
Zonal
Rank
5



Guru Lipika Madana

Intl.
Rank
22
Zonal
Rank
8



Anubhab Chakraborty

Intl.
Rank
23
Zonal
Rank
9



Anushka Chanak

Intl.
Rank
24
Zonal
Rank
4



Navaneeth K A

1908^{*}
1741 Classroom
167 Distance & Digital

**Aakashians Outshine
in NSO (Level-I) 2021-22**

IMO (Level-I) 2021-22 Result



Our Top International & Zonal Rankers in Class VIII

Intl.
Rank
1



Aarav Srivastav

Intl.
Rank
1



Anmol Kumar

Intl.
Rank
1



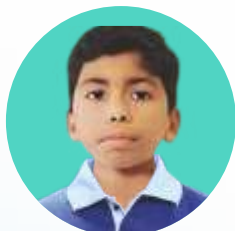
Bhavyaa Gunwal

Intl.
Rank
1



Nandita Jha

Intl.
Rank
1



Sidhesh Shivaji Musale

Intl.
Rank
1



Adrika Saha

Intl.
Rank
1



Navonil Das

Intl.
Rank
5



Ananya Sharma

Intl.
Rank
10



Shanmuga Priya

Intl.
Rank
12



Ushnik Mandal

Intl.
Rank
15



Aarushi Jindal

Intl.
Rank
20



Mitra Maiti

Intl.
Rank
21



Nakul Syam

Intl.
Rank
21



Mohit Shekher

Intl.
Rank
21



Ayat Saleem

Intl.
Rank
21



Nirmay Joseph

and many more...

1723*

1485 Classroom
238 Distance & Digital

Aakashians Outshine in IMO (Level-I) 2021-22

*Includes students from Classroom, Distance & Digital Courses

IOQJS 2021-22 Result

Indian Olympiad Qualifier in Junior Science



Our Top Performers from Classroom Programs



Banibrata Majee
Class-IX



Shanmathi Vasudevan
Class-X



Ketan S Hegde
Class-IX



Bidisha Majee
Class-IX



Tamayan Bera
Class-IX



Visaka muralidharan
Class-X



Aksh Gogi
Class-IX



Tanooj Kumar Kanike
Class-IX



Tejasvi Shrivastava
Class-X

and many more...

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Aakashians Outshine in IOQJS (Part-I) 2021-22

IOQM 2021-22 Result

Indian Olympiad Qualifier in Mathematics



Our Top Performers from Classroom Programs



Ananshi
Class-IX



Malavika Suja
Class-IX



Koustuv Sahoo
Class-X



Zaman Husain
Class-X



Gautham Pa
Class-X



Madhav Manu
Class-X



Bismit Sahoo
Class-X



Mohit Raj
Class-IX



Shubham Nair
Class-X



Abhisri Das
Class-X



Arnab Bhandari
Class-X

and many more...

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Aakashians eligible for IOQM (Part-B) 2021-22