

# International Indian School Dammam



## STUDY MATERIAL FOR TALENT SEARCH EXAM 2024-25 (Class: VI)



### **SYLLABUS @ A GLANCE**

1. 40% of the questions will be from the given portions including study material.
2. 60% of the question will be general related to the subject.

### **Talent Search Examination Portion: 2024 – 25**

<b>SUBJECT</b>	<b>WEIGHTAGE</b>	<b>CLASS VI</b>
<b>ENGLISH</b>	15	Subject Verb Agreement, Tenses (Simple Past, Past Continuous, Simple Present, Present Continuous), Active and Passive Voice, Compound Adjectives, Order of Adjectives, Phrases and Clauses, Present and Past Participles, Books, Authors, Literature Awards (From the given list)
<b>MATHS</b>	25	General Concept- Mental Mathematics, Logical Reasoning, Puzzles and Patterns, Odd One Out, Geometrical Concept L-3 Playing with numbers, L-6 Integers, L-7 Fraction, L-10 Mensuration,.
<b>SCIENCE &amp; TECHNOLOGY</b>	25	L- Sorting of materials into groups, L- Separation of Substances, L- Living Organisms and their surroundings, L- Motion and Distance, L- Electricity and Circuits, L- Fun with Magnets. General questions from Science & Technology , uploaded study material.
<b>SOCIAL SC.</b>	15	History: L-7 From a Kingdom to an Empire. L-8 Villages, Towns & Trade Geography: L-5 Major Domains of the earth, L -6 Our Country India Civics: L-4 Panchayati Raj, L- 6 Urban Administration Uploaded study material.
<b>GK / CURRENT AFFAIRS</b>	20	Awards, Space mission, Events ( Sports), Natural Disasters, People in News, Books and Authors, Nobel Prize, Current Affairs ( Who's Who) , Uploaded study material.

# TALENT SEARCH STUDY MATERIAL

## SUBJECT: ENGLISH

### 1. Subject-Verb Agreement

Subject-Verb Agreement means that the subject and the verb in a sentence must match in number (singular or plural).

If the subject is singular, verb must be singular.

**For singular subject- is/was/has/does/verb - Add s to the verb**

**For eg:** The dog barks loudly. (The dog= singular subject; barks= singular verb)

If the subject is plural, verb must be plural

**For Plural subject - are/were/have/do/ verb - Remove s from verb**

**For eg:** The dogs bark loudly.(The dogs=plural subject, barks= plural verb)

<b>Singular Subject + Singular Verb</b>	Use a singular verb with a singular subject (one person or thing).	<ul style="list-style-type: none"> <li>- She <b>plays</b> soccer.</li> <li>- The dog <b>barks</b>.</li> <li>- The teacher <b>explains</b>.</li> <li>- This/That book <b>is</b> interesting.</li> </ul>
<b>Plural Subject + Plural Verb</b>	Use a plural verb with a plural subject (more than one person or thing).	<ul style="list-style-type: none"> <li>- They <b>play</b> soccer.</li> <li>- The dogs <b>bark</b>.</li> <li>- The teachers <b>explain</b>.</li> <li>- These books <b>are</b> interesting</li> </ul>
<b>Compound Subject (joined by "and")</b>  <b>Exception:</b>	A compound subject joined by "and" takes a plural verb. When two nouns joined by "and" refer to a single entity or idea, use a singular verb.	<ul style="list-style-type: none"> <li>- Tom and Jerry <b>are</b> best friends.</li> <li>- My mom and dad <b>work</b> together.</li> <li>- Bread and butter <b>is</b> my favourite breakfast.</li> </ul>
<b>Subject with "Or" or "Nor"</b>	When subjects are joined by "or" or "nor," the verb agrees with the nearest subject.	<ul style="list-style-type: none"> <li>- Either my brothers or my sister <b>is</b> coming.</li> <li>- Neither the dog nor the cats <b>are</b> hungry.</li> </ul>
<b>Indefinite Pronouns (Singular)</b>	Use a singular verb with singular indefinite pronouns (e.g., everyone, each, neither, anybody, someone, no one)	<ul style="list-style-type: none"> <li>- Everyone <b>is</b> invited.</li> <li>- Each student <b>has</b> a book.</li> <li>- Neither of the answers <b>is</b> correct.</li> </ul>
<b>Indefinite Pronouns (Plural)</b>	Use a plural verb with plural indefinite pronouns (e.g., both, few, many).	<ul style="list-style-type: none"> <li>- Both <b>are</b> available.</li> <li>- Many <b>seem</b> excited.</li> <li>- Several boxes <b>were</b> found.</li> </ul>

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<b>Collective Nouns (Singular)</b>	Collective nouns (group, team, family) take a singular verb when acting as a unit.	<ul style="list-style-type: none"> <li>- The team <b>is</b> practicing.</li> <li>- The family <b>is</b> going on vacation.</li> <li>- The class <b>has</b> finished the exam.</li> </ul>
<b>Collective Nouns (Plural)</b>	Collective nouns take a plural verb when acting as individuals.	<ul style="list-style-type: none"> <li>- The team <b>are</b> celebrating.</li> <li>- The family <b>are</b> arguing.</li> </ul>
<b>Uncountable Nouns</b>	Uncountable nouns are always treated as singular, so they take singular verbs.	<ul style="list-style-type: none"> <li>- <b>Water is</b> essential for life.</li> <li>- <b>Rice is</b> on the stove.</li> <li>- <b>Music is</b> playing softly.</li> </ul>
<b>Amounts, Measurements and Percentages</b>	When an amount, distance is treated as a single unit, it takes a singular verb	<ul style="list-style-type: none"> <li>- A hundred miles is a long distance.</li> <li>- Seventy percent of the team <b>has</b> arrived.</li> <li>- Thirty riyals <b>is</b> sufficient.</li> </ul>
<b>Words ending in "s" but Singular in Meaning</b>	Some nouns that end in "s" are singular and take singular verbs.	<ul style="list-style-type: none"> <li>- Mathematics <b>is</b> interesting.</li> <li>- The news <b>is</b> surprising.</li> <li>- Physics <b>is</b> complex.</li> </ul>
<b>Plural Nouns with Singular Meaning</b>	Nouns that are plural in form but refer to a single object made of two parts take plural verbs.	<ul style="list-style-type: none"> <li>- The scissors <b>are</b> on the table.</li> <li>- Her pants <b>are</b> new.</li> <li>- The glasses <b>are</b> on the shelf.</li> </ul>

### 2. Tenses

Tenses are verb forms which indicate **the time of an action**.

#### Present Tense (Simple Present and Present Continuous)

Aspect	Simple Present Tense	Present Continuous Tense
<b>Form</b>	<b>Subject + base verb</b> (add <b>-s/-es</b> for he, she, it)	<b>Subject + am/is/are + ing form of verb</b>
<b>Use</b>	Describes habitual actions, routines, facts, and general truths.	Describes actions happening at the moment of speaking or temporary actions around the present time.

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<b>Example 1</b>	He <b>plays</b> soccer every weekend.	He is <b>playing</b> soccer right now.
<b>Example 2</b>	They <b>go</b> to the gym every morning.	They <b>are going</b> to the gym now.
<b>Example 3</b>	I <b>speak</b> English fluently.	I <b>am speaking</b> to you in English.

### Past Tense (Simple Past and Past Continuous)

Aspect	Simple Past Tense	Past Continuous Tense
<b>Form</b>	<b>Subject + verb in past form (V2)</b>	<b>Subject + was/were + ing form of verb</b>
<b>Use</b>	Describes completed actions or events in the past.	Describes actions that were in progress or ongoing in the past.
<b>Example 1</b>	I <b>visited</b> the museum.	I was <b>visiting</b> the museum.
<b>Example 2</b>	She <b>studied</b> for hours before the exam.	She was <b>studying</b> for hours when the power went out.
<b>Example 3</b>	They <b>finished</b> their project by the deadline.	They were <b>finishing</b> their project when the teacher arrived.

### 3. Active and Passive Voice

Aspect	Active Voice	Passive Voice
<b>Definition</b>	The <b>subject</b> of the sentence performs the action (verb) on the object.	The <b>object</b> of the active sentence becomes the subject, and the focus shifts to the receiver of the action.
<b>Focus</b>	Focuses on the <b>doer</b> of the action.	Focuses on the <b>receiver</b> of the action.
<b>Structure</b>	Subject + Verb + Object	Object + correct form of "to be" (am/is/are/was/were etc.) + Past Participle of the verb + by + Subject
<b>Example</b>	John (subject) kicked (verb) the ball (object) to Rohan (indirect object).	The ball (object) was kicked (verb in past participle) to Rohan by John (subject).

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### Rules for Conversion:

- **Identify the subject, verb, and object in the active voice.**
- Direct object can be identified by asking 'What?' or 'Whom?' after the verb.
- The indirect object answers "To whom?" or "For whom?" after the verb.
- The **object** in the active sentence becomes the **subject** in the passive sentence.
- Use the appropriate form of "**to be**".
- Use the **past participle** of the main verb.
- The **subject** of the active sentence becomes the agent in the passive sentence (optional and usually introduced by "**by**").

### Examples of Active and Passive Voice

Tense	Active Voice Example	Passive Voice Example	Structure
<b>Present Simple</b>	She <b>reads</b> the book.	The book <b>is read</b> by her.	am/is/are + past participle
<b>Present Continuous</b>	He <b>is writing</b> a letter.	A letter <b>is being written</b> by him.	am/is/are + being + past participle
<b>Present Perfect</b>	I <b>have completed</b> the assignment.	The assignment <b>has been completed</b> by me.	has/have + been + past participle
<b>Past Simple</b>	They <b>played</b> football.	Football <b>was played</b> by them.	was/were + past participle
<b>Past Continuous</b>	She <b>was cooking</b> dinner.	Dinner <b>was being cooked</b> by her.	was/were + being + past participle
<b>Past Perfect</b>	They <b>had built</b> the house.	The house <b>had been built</b> by them.	had + been + past participle
<b>Future Simple</b>	John <b>will finish</b> the project.	The project <b>will be finished</b> by John.	will be + past participle
<b>Future Perfect</b>	By next year, I <b>will have finished</b> my project.	By next year, my project <b>will have been finished</b> by me.	will have been + past participle
<b>Modals</b>	We <b>can sing</b> a song.	A song <b>can be sung</b> by us.	modal + be + past participle



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## 4. Compound Adjectives

A **compound adjective** is an adjective made up of **two or more words** that work together to modify a noun. These adjectives are usually formed by combining two or more words, often nouns, verbs, or adjectives.

### Types of Compound Adjectives:

#### a. Adjective + Noun

Old-fashioned (old + fashioned)

High-pitched (high + pitched)

Cold-hearted (cold + hearted)

#### b. Noun + Adjective

School-related (school + related)

Fish-shaped (fish + shaped)

#### c. Adverb + Adjective

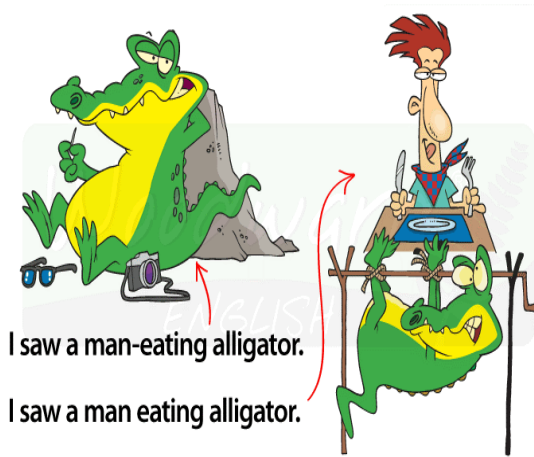
Well-known (well + known)

Bad-tempered (bad + tempered)

#### d. Noun + Past Participle

Time-bound (time + bound)

Sun-dried (sun + dried)



A hyphen can make a difference in meaning.

### Examples in Sentences:

1. She is a **well-dressed** woman.
2. The **high-speed** chase ended in a crash.
3. They live in a **three-storey** house.
4. The **user-friendly** interface makes the app easy to use.
5. His behaviour was completely **cold-hearted**.

## 5. Order of Adjectives

When using multiple adjectives in a sentence to describe a noun, they follow a specific **order**. This order helps make the sentence clear and grammatically correct. The general rule for the order of adjectives in English is represented by the acronym **NOSQASCOMP**.

Order	Category	Description	Examples
1	<b>Number (N)</b>	How many or which order	One, two, several, first, last
2	<b>Opinion (O)</b>	Opinion or feeling about the noun	Beautiful, interesting, ugly, delicious
3	<b>Size (S)</b>	Size of the noun	Big, small, tiny, large, huge

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4	<b>Quality (Q)</b>	Physical quality of the noun	Coarse, polished, sturdy, bumpy
5	<b>Age (A)</b>	How old the noun is	New, old, ancient, modern
6	<b>Shape (S)</b>	Shape of the noun	Round, square, oval, triangular
7	<b>Colour (C)</b>	Colour of the noun	Red, blue, green, black, yellow
8	<b>Origin (O)</b>	Where the noun is from	French, American, Chinese, Italian
9	<b>Material (M)</b>	What the noun is made of	Wooden, metal, plastic, cotton, silk
10	<b>Purpose (P)</b>	Purpose or use of the noun	Swimming (pool), sleeping (bag), writing (paper)

Example 1: Wooden old beautiful large round three tables

- Number: Three
- Opinion: Beautiful
- Size: Large
- Age: Old
- Shape: Round
- Material: Wooden

Answer: **Three beautiful large old round wooden tables**

Example 2: Italian ceramic red round small two vases

- Number: Two
- Size: Small
- Shape: Round
- Colour: Red
- Origin: Italian
- Material: Ceramic

Answer: **Two small round red Italian ceramic vases**

Example 3: Cheap new soft six leather office chairs

- Number: Six
- Opinion: Cheap
- Quality: Soft
- Age: New
- Material: Leather
- Purpose: Office

Answer: **Six cheap soft new leather office chairs.**



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### 6. Phrases and Clauses

A **phrase** is a group of words that work together to convey a single idea, but it **does not have a subject** and a predicate (**verb**). It lacks a complete thought and cannot stand alone as a sentence.

*Examples: under the table, to the store, on the table, after the storm*

A **clause** is a group of words that has both a subject and a predicate (verb). A clause can either be independent (main clause) or dependent (subordinate clause).

#### Types of Clauses

1. **Independent Clause:** Can stand on its own like a superhero.

Examples: 1. The dog barked loudly.

2. She laughed

2. **Dependent Clause:** Needs help to make sense, like a sidekick.

Examples: 1. When the dog barked loudly.

2. Because she was happy

Examples: Determine whether the highlighted parts are phrases or clauses.

- I didn't go to the party **because I was feeling sick.** — **Clause**
- He was playing the guitar **in the living room.** — **Phrase**
- **When the teacher arrived,** the students stood up. — **Clause**
- **While waiting for the bus,** he read a book. — **Clause**
- The dog barked loudly **in the backyard.** — **Phrase**
- **She studied all night,** but she still failed the test. — **Clause**
- He was laughing **at the funny joke.** — **Phrase**
- **After we ate dinner,** we went for a walk. — **Clause**
- She looked **out of the window** while waiting for the bus. — **Phrase**

### 7. Present and Past Participles

A **participle** is a verb form that functions as an adjective in a sentence. It describes or modifies nouns or pronouns, often providing more detail about an action or state.

Participles can be **present or past**, depending on their form and function.

#### Present Participle

The **present participle** is formed by **adding -ing to the base form of a verb.**

**Example:** walk → walking, eat → eating, run → running

#### Usage:

1. **As an Adjective: Example:** The running water is cold.  
(Here, running modifies water, showing the action of the water.)
2. **As Part of a Continuous Verb Tense: Example:** She is singing (Present Continuous)

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### Present Participle Sentences:

1. The children were **playing** (play) in the park, and the **laughing** (laugh) sound could be heard from a distance.
2. The dog is **barking** (bark) loudly at the strangers outside.
3. The **shining** (shine) stars lit up the night sky.
4. She was **crying** (cry) when she heard the bad news.
5. The **running** (run) water in the stream was crystal clear.

### Past Participle

- The **past participle** is usually formed by **adding -ed to regular verbs**, but irregular verbs have unique past participle forms.
  - **Regular verbs:** *walk* → *walked*, *play* → *played*
  - **Irregular verbs:** *eat* → *eaten*, *go* → *gone*, *write* → *written*

### Usage:

1. **As an Adjective: Example:** *The broken window needs to be repaired.*  
(Here, *broken* modifies *window*, indicating the result of an action.)
2. **As Part of Perfect Tenses: Example:** *She has finished her homework* (Present Perfect)
3. **In Passive Voice: Example:** *The book was read by many people.*

### Past Participle Sentences:

1. She was so tired after the long trip, but she still managed to finish the **written** (write) report.
2. The **fallen** (fall) leaves covered the ground, making the park look like autumn.
3. The book was **read** (read) by millions of people around the world.
4. I have **eaten** (eat) dinner already, so I'm not hungry.
5. The door was **closed** (close) quietly so as not to wake anyone.

### 8. Books, Authors, Literature Awards (From the given list)

Literature Award	Author	Work
<b>Nobel Prize in Literature</b>	Gabriel García Márquez	One Hundred Years of Solitude (1982)
	Toni Morrison	Beloved (1993)
	Kazuo Ishiguro	The Remains of the Day (2017)
<b>Booker Prize</b>	Salman Rushdie	Midnight's Children (1981)
	Margaret Atwood	The Blind Assassin (2000)
	Hilary Mantel	Wolf Hall (2009)
<b>Pulitzer Prize for Fiction</b>	Ernest Hemingway	The Old Man and the Sea (1953)
	Colson Whitehead	The Underground Railroad (2017)

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Literature Award	Author	Work
	Jhumpa Lahiri	Interpreter of Maladies (2000)
JCB Prize for Literature	Geetanjali Shree	Tomb of Sand (2022)
	Prayaag Akbar	Leila (2019)
Commonwealth Writers' Prize	Arundhati Roy	The God of Small Things (1997)
	Andrea Levy	Small Island (2004)
International Booker Prize	Han Kang	The Vegetarian (2016)
	Olga Tokarczuk	Flights (2018)
	David Diop	At Night All Blood Is Black (2021)

### Books and Authors:

Author	Important Book
J.K. Rowling	Harry Potter and the Sorcerer's Stone
Roald Dahl	Charlie and the Chocolate Factory
C.S. Lewis	The Lion, the Witch and the Wardrobe
Mark Twain	The Adventures of Huckleberry Finn
J.R.R. Tolkien	The Hobbit
Beatrix Potter	The Tale of Peter Rabbit
A.A. Milne	Winnie-the-Pooh
E.B. White	Charlotte's Web
Roald Dahl	Matilda
R.J. Palacio	Wonder
Rick Riordan	Percy Jackson and the Olympians: The Lightning Thief
Jeff Kinney	Diary of a Wimpy Kid
Harper Lee	To Kill a Mockingbird
George Orwell	1984
F. Scott Fitzgerald	The Great Gatsby
Toni Morrison	Beloved
Khaled Hosseini	The Kite Runner
Delia Owens	Where the Crawdads Sing
Sally Rooney	Normal People
Colson Whitehead	The Underground Railroad

**SUBJECT: MATHS**

**Chapter 3 - PLAYING WITH NUMBERS**

**FACTORS**

A factor of a number is an exact divisor of that number.

**PROPERTIES OF FACTORS**

- 1 is a factor of every number.

Eg :  $5 = 1 \times 5$  ,  $14 = 1 \times 14$

- Every number is a factor of itself.

Eg:  $7 = 7 \times 1$  ,  $10 = 10 \times 1$

- Every factor of a number is less than or equal to the given number.

Eg: Factors of 12 = 1, 2, 3, 4, 6, 12. Here greatest factor of 12 is 12. Other factors are less than 12.

- Number of factors of a given number is finite.

Eg: factors of 4 = 1, 2, 4

- Smallest factor of a number is 1.
- The greatest factor of a number is number itself.
- Every whole number except 1 has at least two different factors 1 and the number itself.

**MULTIPLES**

A number obtained by multiplying the number by a natural number.

Eg:  $15 = 3 \times 5$

15 is a multiple of 3, 15 is a multiple of 5

**PROPERTIES OF MULTIPLES**

- Every multiple of a number is greater than or equal to that number.

Eg: Multiples of 5 (5, 10, 15, 20...etc) (Each of these multiples is greater than or equal to 5)

- The number of multiples of a number is infinite. (Multiples are endless)

Eg: Multiples of 6 (6, 12, 18, 24, 30...etc )

- Every number is a multiple of itself.

Eg:  $7 \times 1 = 7$  ,  $16 \times 1 = 16$

- The first multiple of every number is the number itself.

## PERFECT NUMBER

- A number for which sum of all its factors is equal to twice the number is called a perfect number.

Eg: The numbers 6 and 28 are perfect numbers.

## PRIME NUMBERS

- The numbers other than 1 whose only factors are 1 and the number itself are called prime numbers.

Eg: 2, 3, 5, 7, 11, 13, 17

## COMPOSITE NUMBERS

- Numbers having more than two factors are called Composite numbers.

Eg: 4, 6, 8, 9, 10

## TWIN PRIME NUMBERS

- Two prime numbers whose difference is 2 are called twin primes.

Eg: 3 and 5, 5 and 7, 11 and 13, 17 and 19 are examples of twin prime numbers.

## EVEN NUMBERS:

- Numbers which are multiples of 2 are called even numbers.

Eg: 2, 4, 6, 8, 10

To check whether the number is even or not, we can check the number at one's place. If the number at ones place is 0,2,4,6 and 8 then the number is even number.

Eg: 23508, 17034

## ODD NUMBERS

Numbers which are not exactly divisible by 2 are called odd numbers.

Eg: 1, 3, 5, 7, 9,

A large number will be odd if its unit's digit is odd.

Eg: 2369, 8471

## Tests for Divisibility of Numbers

**Divisibility by 10:** If a number has 0 in the ones place then it is divisible by 10. 10, 20, 30, 100, 1000, 3200, 7010 are divisible by 10.

**Divisibility by 5:** A number which has either 0 or 5 in its ones place is divisible by 5. 15, 20, 25, 30, 35, 105, 215, 6205, 3500 are divisible by 5

**Divisibility by 2:** A number is divisible by 2 if it has any of the digits 0, 2, 4, 6 or 8 in its ones place

**Divisibility by 3:** If the sum of the digits is a multiple of 3, then the number is divisible by 3.

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**Divisibility by 6:** If a number is divisible by 2 and 3 both then it is divisible by 6 also.

**Divisibility by 4:** A number with 3 or more digits is divisible by 4 if the number formed by its last two digits (i.e. ones and tens) is divisible by 4.

**Divisibility by 8:** A number with 4 or more digits is divisible by 8, if the number formed by the last three digits is divisible by 8.

**Divisibility by 9:** If the sum of the digits of a number is divisible by 9, then the number itself is divisible by 9.

**Divisibility by 11:** Find the difference between the sum of the digits at odd places (from the right) and the sum of the digits at even places (from the right) of the number. If the difference is either 0 or divisible by 11, then the number is divisible by 11.

### CO-PRIME NUMBERS

- If 1 is the only common factor between two numbers then they are said to be Co-prime Numbers.

Eg: 2 and 3, 7 and 9, 8 and 15...etc

### PRIME FACTORISATION

- Prime Factorization is the process of finding all the prime factors of a number. There are two methods to find the prime factors of a number
  1. Prime factorization using a factor tree
  2. Repeated Division Method

### HIGHEST COMMON FACTOR (HCF)

- The Highest Common Factor (HCF) of two or more given numbers is the highest (or greatest) of their common factors. Its other name is (GCD) Greatest Common Divisor

### LOWEST COMMON MULTIPLE (LCM)

- The Lowest Common Multiple (LCM) of two or more given number is the lowest (or smallest or least) of their common multiples
- **Product of the two numbers = HCF × LCM**

**(Note: Refer TB for details)**

### QUESTIONS

1) Which of the following numbers is exactly divisible by 11?

- a) 235641      b) 245642      c) 315624      d) 415624

Ans: d) 415624



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2) How many prime numbers are there between 1 and 20?

- a) 7    b) 6    c) 8    d) 9

Ans: a) 7

3) What is the greatest common Divisor (GCD) of 18 and 24?

- a) 6    b) 8    c) 12    d) 4

Ans: a) 6

4) Which of the following are co-primes?

- a) 8, 10    b) 9,10    c) 6,8    d) 15,18

Ans) b) 9, 10

5) The LCM of 24, 36 and 40 is -----

- a) 4    b) 90    c) 360    d) 720

Ans: c) 360

6) If the HCF of two numbers is 12 and their LCM is 60, what is the product of the two numbers?

- a) 720    b) 7200    c) 600    d) 6000

Ans: a) 720

### CHAPTER 6 - INTEGERS

#### Integers

- The collection of numbers .... -4, -3, -2, -1, 0, 1, 2, 3, 4.... is called Integers.    -1, -2, -3....are negative integers and 1, 2, 3 ....are positive integers. The integer 0 is neither positive nor negative.

#### Addition of Integers

- **Rule 1:** If two positive or negative integers are added, we add their magnitude and give same sign to their sum.

E.g  $27 + 13 = 40$ ,  $(-27) + (-13) = (-40)$ .

- **Rule 2:** To add a positive and a negative integer, first we find the difference between the two and give the sign of the integer which has greater numerical value. (Note: We ignore the signs of the number to decide which is bigger.)

E.g  $(-36) + 20 = (-16)$

$36 - 20 = 16$ , Comparing  $(-36)$  and  $20$  without their signs,  $36$  is bigger. So the result should have a - sign.

$36 + (-20) = 16$ .

$36 - 20 = 16$ .

Comparing  $36$  and  $(-20)$  without their signs,  $36$  is bigger. So the result should have a + sign.

## Additive inverse:-

- Numbers such as - 3 and + 3, + 5 and - 5 when added to each other give the sum zero. They are called additive inverse of each other.

E.g. Additive inverse of 6 = (-6).

Additive inverse of (-7) = 7.

## Subtraction of Integers

- Subtraction is the opposite operation of addition. So, to subtract an integer from another integer, add the additive inverse of the integer that is being subtracted, to the other integer.

- Rule: If a and b are two integers,

$$a - b = a + (-b)$$

Eg:- Subtract -5 from 2

$$= 2 - (-5) = 2 + (+5) = 7$$

**(Note: Refer TB for details)**

## QUESTIONS

1) Find the smallest integer among the following:

a) -80   b) 78   c) -100   d) -215

Ans: d) -215

2) Subtract the sum of -20 and 40 from 35.

Ans: Sum of -20 and 40 = (-20) + 40 = 20

$$35 - 20 = 35 + (-20) = 15$$

3) What should be added to -12 to get -15?

a) -3   b) 3   c) -27   d) 27

Ans: a) -3

4) Find the integer that is 4 less than -18

a) -14   b) -22   c) -12   d) -24

Ans: b) -22

5)  $(-20) + 35 - 12 - 9 = \underline{\hspace{2cm}}$

a) -6   b) 6   c) -3   d) 3

Ans: a) -6

## TALENT SEARCH STUDY MATERIAL

6) The temperature in a city was  $5^{\circ}\text{C}$  in the morning. In the evening, it dropped by  $12^{\circ}\text{C}$ .

What is the temperature in the evening?

- a)  $7^{\circ}\text{C}$     b)  $-7^{\circ}\text{C}$     c)  $12^{\circ}\text{C}$     d)  $-17^{\circ}\text{C}$

Ans: b)  $-7^{\circ}\text{C}$

7) The successor of  $(-49)$  is \_\_\_\_\_.

- a) 49    b) 48    c) -50    d) -48

Ans: d) -48

8) Additive inverse of  $(-28)$  is \_\_\_\_\_

- a) 1    b) 0    c) 28    d) 82

Ans: c) 28

### CHAPTER 7 – FRACTIONS

**Fraction:** A fraction is a number representing the part of a whole. The whole may be a single object or a group of objects. The parts have to be equal.

A fraction means a part of a group or of a region.

$\frac{3}{7}$  is a fraction. 3 is the numerator and 7 is the denominator.

**Proper fractions:** In a proper fraction, the numerator is less than the denominator.    A proper fraction is less than 1.

Example:  $\frac{3}{5}$ ,  $\frac{12}{17}$ ,  $\frac{3}{10}$

**Improper fractions:** In an improper fraction, the numerator is greater than the denominator. An improper fraction is greater than 1.

Example:  $\frac{5}{3}$ ,  $\frac{7}{2}$ ,  $\frac{11}{8}$

**Mixed Fractions:** A mixed fraction is a combination of a whole and a part.

Example:  $-2\frac{2}{3}$ ,  $5\frac{1}{7}$ ,  $3\frac{5}{12}$

We can express improper fractions as a mixed fraction by dividing the numerator by denominator to obtain the quotient and the remainder. Then the mixed fraction will be written as

**Quotient**  $\frac{\text{Remainder}}{\text{Divisor}}$

**Equivalent Fraction:** To find an equivalent fraction you may divide or multiply both the numerator and the denominator of the given fraction by the same number.

**Simplest form of a fraction:** A fraction is said to be in the simplest form (or lowest form) if its numerator and denominator have no common factor except 1.

## TALENT SEARCH STUDY MATERIAL

**Like Fractions:** Fractions with same denominator are called like fractions.

Example:  $\frac{2}{7}, \frac{3}{7}, \frac{5}{7}, \frac{6}{7}$

**Unlike Fractions:** Fractions with different denominators are called unlike fractions.

Example:  $\frac{2}{3}, \frac{4}{10}, \frac{5}{7}, \frac{3}{5}$

**Comparing Fractions, Addition and Subtraction of fractions (Refer Textbook)**  
**(Note: Refer TB for details)**

### QUESTIONS

1) If  $\frac{1}{2}$  of a number is 18, what is the number?

a) 24   b) 27   c) 30   d) 36

Ans: d) 36

2) Consider the natural numbers from 1 to 50.

(a) What fraction of them are prime numbers?

(b) What fraction of them are divisible by 5?

© What fraction of them are divisible by both 2 and 3?

Ans:

a) Prime numbers between 1 and 50 (2,3,5,7,11....41,43,47) = 15 prime numbers

The fraction of prime numbers =  $\frac{15}{50} = \frac{3}{10}$

b) The numbers divisible by 5 between 1 and 50 are: (5,10.....40,45,50) = 10 numbers

The fraction of numbers divisible by 5 =  $\frac{10}{50} = \frac{1}{5}$

c) Numbers divisible by both 2 and 3 are divisible by 6. The numbers divisible by 6 between 1 and 50 are: (6, 12, 18, 24, 30, 36, 42, 48) = 8 numbers

The fraction of numbers divisible by both 2 and 3 =  $\frac{8}{50} = \frac{4}{25}$

3) Which of the following is an equivalent fraction of  $\frac{18}{45}$  with denominator 5?

a)  $\frac{4}{5}$    b)  $\frac{2}{5}$    c)  $\frac{5}{9}$    d)  $\frac{3}{5}$

Ans: b)  $\frac{2}{5}$

4) What is the simplest form of  $\frac{6}{36} + \frac{8}{12}$ ?

a)  $\frac{7}{18}$    b)  $\frac{14}{36}$    c)  $\frac{30}{36}$    d)  $\frac{5}{6}$

Ans: d)  $\frac{5}{6}$

## TALENT SEARCH STUDY MATERIAL

5) A school library has  $\frac{3}{4}$  of its books in English and the rest in Hindi.

a) What fraction of the books are in Hindi?

b) If there are 100 books in total, how many books are in Hindi?

Ans: Fraction of books in Hindi =  $\frac{4}{4} - \frac{3}{4} = \frac{1}{4}$

Books in Hindi =  $\frac{100}{4} = 25$

6) The simplest form of  $\frac{330}{770} = \text{-----}$

a)  $\frac{1}{5}$       b)  $\frac{7}{3}$       c)  $\frac{5}{15}$       d)  $\frac{3}{7}$

Ans: d)  $\frac{3}{7}$

### CHAPTER 10 – MENSURATION

**Perimeter:**-Perimeter is the distance around a closed figure when we go around the figure once. Perimeter of a polygon can be obtained simply by adding lengths of all the sides.

- Perimeter of a rectangle =  $2 \times (\text{Length} + \text{Breadth})$
- Perimeter of a Square =  $4 \times \text{Length of a side}$

Perimeter of a regular polygon

A regular polygon is a plane figure whose all sides and all angles are equal. Regular polygons are also called regular closed figures.

- Perimeter of a regular polygon = Number of sides  $\times$  Length of a side
- Length of Each Side of the Regular Polygon =  $\frac{\text{Perimeter of the Regular Polygon}}{\text{Number of Sides of the Regular Polygon}}$
- Perimeter of an Equilateral Triangle =  $3 \times \text{length of a Side}$
- Perimeter of a regular Pentagon =  $5 \times \text{length of a Side}$
- Perimeter of a regular Octagon =  $8 \times \text{length of a Side}$

**Area :**

A Closed curve on a flat surface occupies some region on the surface. The shaded portion is the region occupied by the closed curves.

- The amount of surface enclosed by a closed figure is called its Area.
- Unit of Area is square units (For example: sq.cm, sq.m, sq.km,.....)
- Area of the square = Side  $\times$  Side
- Area of the Rectangle = Length  $\times$  Breadth

## TALENT SEARCH STUDY MATERIAL

**Note:** If the area of rectangle is given, we can find the length and breadth of the rectangle

- Length of the Rectangle =  $\frac{\text{Area of the Rectangle}}{\text{Breadth of the Rectangle}}$
- Breadth of the Rectangle =  $\frac{\text{Area of the Rectangle}}{\text{Length of the Rectangle}}$

(**Note:** Refer TB for details)

QUESTIONS :-

1) If a wire of length 267 cm be bent to form an equilateral triangle, then what is the length of side of the equilateral triangle?

- a) 69 cm    b) 79 cm    c) 89 cm    d) 99 cm

Length of the wire = 267 cm

Perimeter of an equilateral triangle = 3 x one side

The length of side of the equilateral triangle =  $\frac{267}{3} = 89$  cm

Ans: c) 89 cm

2) Area of rectangular garden of 50 m broad is 300 sq. m, the length of garden is

Ans: Area of the Rectangle = Length × Breadth

$$300 = L \times 50$$

$$L = \frac{300}{50} = 6\text{m}$$

The length of the garden is 6 m.

3) What will be the distance covered by Asif by taking three rounds around a square park of side 2 m

Ans: Perimeter of a square park =  $4 \times 2 = 8$  m.

Distance covered in 3 rounds =  $3 \times 8 = 24$  m.

The distance covered by Asif is 24 m.

4) The perimeter of a regular octagon is 240m. How long is its each side?

- a) 480m    b) 30m    c) 520m    d) 40m

Ans: b) 30m ( $\frac{240}{8} = 30$ )

5) A room is 10 m 20 cm long and 4 m wide. How many square metres of carpet is needed to cover the floor of the room?

- a) 40.8 sq. m    b) 40 sq. m    c) 42 sq. m    d) 41 sq. m

Length = 10 m 20 cm =  $10 + 0.20 = 10.20$  m ,    Breadth = 4 m

Area of a rectangle = Length × Breadth

$$= 10.20 \times 4 = 40.80 \text{ sq.m}$$

Ans: a) 40.8 sq. m



6) The side of a square is 4 cm. If its side is halved, what is its new perimeter?

- a) 12 cm      b) 8 cm                      c) 16 cm      d) 24 cm

Ans: b) 8cm ( $4 \times 2 = 8$ cm)

7) Find the area of square having perimeter 20 cm.

- a) 5 cm<sup>2</sup>      b) 10 cm<sup>2</sup>      c) 20 cm<sup>2</sup>      d) 25 cm<sup>2</sup>

$$\text{Perimeter} = 4 \times \text{side}$$

$$\text{Side} = \frac{20}{4} = 5\text{cm}$$

$$\text{Area} = \text{side} \times \text{side}$$

$$= 5 \times 5 = 25 \text{ cm}^2$$

Ans: d) 25cm<sup>2</sup>

8) The dimensions of a photograph are 30 cm × 20 cm. What length of wooden frame is needed to frame the picture?

Ans:  $P = 2 \times (\text{Length} + \text{Breadth})$

$$= 2 \times (30 + 20) = 2 \times 50 = 100\text{cm}$$

The length of the wooden frame needed to frame the picture is 100 cm.

### **Logical Reasoning:**

Logical reasoning consists of aptitude questions that require a logical level of analysis to arrive at the correct solution. Most of the questions are constructed based on concepts and the rest are out of the box thinking ones.

### **Steps To Solve Logical Reasoning Based Questions**

1. Read and understand the information carefully.
2. Analyze critical logical information.
3. Think of all the possible solutions.
4. Compare the answer obtained with other possibilities.
5. Come to a correct logical conclusion.

1. Look at this series: 2, 1, (1/2), (1/4), ... What number should come next?

- a). (1/3)    b)(1/8)                      c) (2/8)                      d)(1/16)

**Answer (b).**

It's a division series. Every number is half of the previous number. The number is divided by 2 successively to get the next result.  $4/2 = 2$ .  $2/2 = 1$ .  $1/2 = 1/2$ .  $(1/2)/2 = 1/4$ .  $(1/4)/2 = 1/8$  and so on

## TALENT SEARCH STUDY MATERIAL

2. Look at this series: 80, 10, 70, 15, 60, ... What number should come next?

- (a) 20      (b) 25      (c) 30      (d) 50

**Answer: (a).** This is an alternating addition and subtraction series. In the first pattern, 10 is subtracted from each number to arrive at the next. In the second, 5 is added to each number to arrive at the next.

3. SCD, TEF, UGH, \_\_\_\_\_, WKL

- (a) CMN      (b) UJI      (c) VIJ      (d) IJT

**Answer: (c)**

**Explanation:**

There are two alphabetical series here. The first series is with the first letters only: STUVW. The second series involves the remaining letters: CD, EF, GH, IJ, KL.

4. Look at this series: 53, 53, 40, 40, 27, 27, ... What number should come next?

- (a) 12    (b) 14      (c) 27      (d) 53

**Answer: (b)**

**Explanation:** In this series, each number is repeated, then 13 is subtracted to arrive at the next number.

5. Look at this series: 9 11 33 13 15 33 17.... What numbers should come next?

- (a) 19 33    (b) 33 35      (c) 33 19      (d) 15 33

**Answer: (a)**

**Explanation:**

In this alternating repetition series, a random number, 33, is interpolated every third number into a simple addition series, in which each number increases by 2.

**Mental Maths:**

Mental maths is, in a nutshell, the act of solving maths problems in your head! As learners progress, they'll be expected to gradually solve more and more complex problems, so it's important that the techniques and skills that they use to achieve this are mastered at an early age

1. An accurate clock shows 8 o'clock in the morning. Through how many degrees will the hour hand rotate when the clock shows 2 o'clock in the afternoon?

- (a) 144°    (b) 150°      (c) 168°      (d) 180°

**Answer (d)**

**Explanation:**

Angle traced by the hour hand in 6 hours =	$\frac{360}{12}$	$\times 6$	$= 180^\circ$
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2. Which one of the following is not a prime number?

- (a) 31      (b) 61      (c) 71      (d) 91

**Answer: (d)**

**Explanation:**

91 is divisible by 7. So, it is not a prime number.

3. Find  $617 + 6.017 + 0.617 + 6.0017 = ?$

- (a) 6.2963      (b) 62.965      (c) 629.6357      (d) None of these

**Answer: (c)**

4. The sum of the two numbers is 11 and their product is 30, then the numbers are \_\_\_\_\_

- (a) 8, 3 (b) 9, 2      (c) 7, 4 (d) 6, 5

**Answer: (d)**

5. The sum of first five prime numbers is:

- (a) 7      (b) 11      (c) 18      (d) 28

**Answer: (d)**

**Patterns in Maths**

**What are Patterns in Mathematics?**

In mathematics, a pattern is a sequence of numbers that are formed in a particular way. Every pattern contains a specific rule. For example, the sequence of even numbers is a pattern since each number is obtained by adding 2 to the previous number.

i.e., 2, 4, 6, 8, 10, 12, 14, ....

Here,  $2 + 2 = 4$

$4 + 2 = 6$

$6 + 2 = 8$

$8 + 2 = 10$  and so on.

# TALENT SEARCH STUDY MATERIAL

## Puzzles in Mathematics

A mathematical puzzle is a type of problem or game that involves using mathematical concepts, logic, and reasoning to find a solution. These puzzles often require creative thinking and a deep understanding of mathematical principles to solve

**Q) Which 4 shapes and number combinations are needed to complete the shape box?**

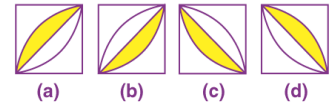
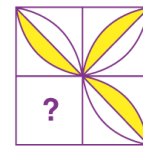
	1	1
		2
3		3

In each row all three shapes are there in first row 1 square, 2<sup>nd</sup> row one square and one triangle with 2 inside and in third row one triangle is missing

### Practice Questions:

1. Observe the below figure and identify the missing part.

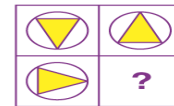
- i) a                      ii) b                      iii) c                      iv) d



**Ans.(ii)**

2. Observe the following figure and choose the correct option.

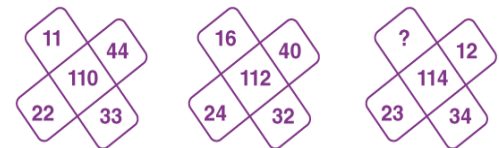
- i) a                      ii) b                      iii) c                      iv) d



**Ans.(i)**

3. Observe the pattern given below. Find the missing number.

- i) 21                      ii) 25                      iii) 45                      iv) 36



**Ans.(iii)**

Hints the given figure, we can observe that the sum of the four numbers is equal to the number written in the middle of the shape.

4. What will be the next number of the given sequence? 1, 5, 12, 22, 35, ?

- i) 15    ii) 16    iii) 18    iv) 19

**Ans.(iv)**

Hints: Let's write the difference between consecutive numbers.

$$5 - 1 = 4$$

$$12 - 5 = 7$$

$$22 - 12 = 10$$

$$35 - 22 = 13$$

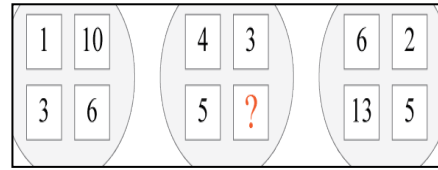
$$35 - ? = 16$$

## TALENT SEARCH STUDY MATERIAL

5. Which number completes the sequence?

- i) 10      ii) 11      iii) 12      iv) 15

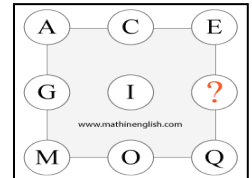
**Ans.(iii)**



6. What is the missing letter in the following letter sequence ?

- i) K      ii) D      iii) F      iv) H

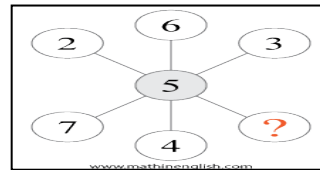
**Ans.(i)** Hint : The letter value increased by 2 each next cell



7. What is the missing number in this puzzle?

- i) 1      ii) 9      iii) 8      iv) 10

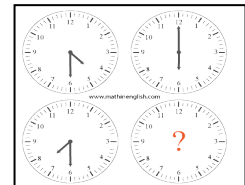
**Ans.(iii)**



8. What time is it on the 4th clock ?

- i) 6.30      ii) 12.30      iii) 8      iv) 9

**Ans.(iv)**



9. What kind of pattern in this 88,77,66,55,44,33.

- i) growing      ii) shrinking      iii) natural      iv) repeating

**Ans.(ii)**

10. What type of pattern rule is this? 500, 100, 20

- i) division by 5      ii) division by 10      iii) division by 50      iv) division by 2

**Ans.(i)**

### **ODD ONE OUT**

Odd one out is a phrase that is commonly used in mathematics where one number or value in a group is different from the others. The first step is to identify the common characteristics or relationships shared by the group. The second step is to check each option and find the one that do not display the relation.

Picking the "Odd one out" is an activity designed to develop a learner's observation, application, and analytical skills.

**Example 1:** Which one is the odd one out?

- a) 40      b) 60      c) 90      d) 100

**Answer:** d) 100 (It is the only number that is a perfect square.)

## TALENT SEARCH STUDY MATERIAL

**Example 2:** Which number is the odd one out?

- a) 9862    b) 4377    c) 8454    d) 9831

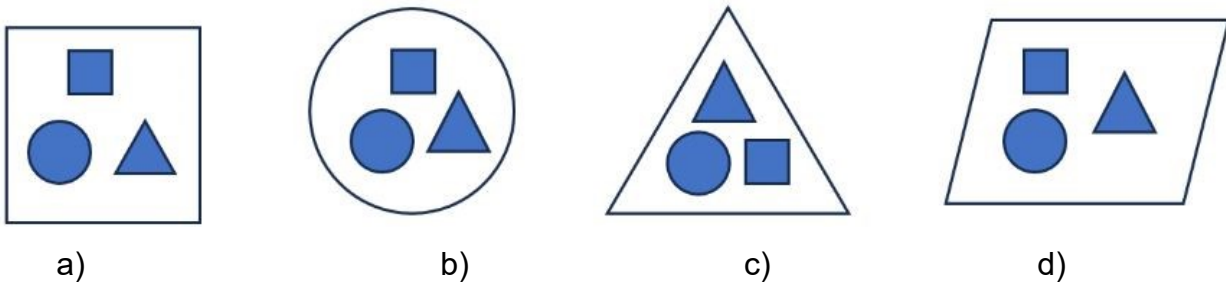
**Answer:** a) 9862 (Sum of the digits of all other numbers is 21, but sum of the digits 9862 is 25)

**Example 3:** Which alphabet is the odd one out

- a) **B**    b) **D**    c) **E**    d) **P**

**Answer:** c) All the other letters have rounded or curved segments in their designed. While E has straight lines and angles.

**Example 4:** Look at the given figures and find the odd one out:



**Answer:** d) In each of the figure, one of the inner shapes is same as the outer shape and the rest two of the shapes are different, except in (d), where there is no parallelogram as the inner shape.

**Example 5:** Pick the odd ones out from the given fractions:

- a)  $\frac{2}{3}$     b)  $\frac{6}{11}$     c)  $\frac{8}{7}$     d)  $\frac{1}{5}$

**Answer:** c) The odd one out is  $\frac{8}{7}$ , as it is an improper fraction.

### BASIC GEOMETRICAL CONCEPT

Geometry is the branch of mathematics that deals with shapes, angles, figures, dimensions, and sizes of a variety of things we see in everyday life.

The word Geometry is derived from the Greek word 'geometron' is made of two words 'Geo' means 'Earth' and 'Metron' means 'measurement'.

In a plane geometry two dimensional shapes such as triangles, squares, rectangles, circles are also called flat shapes. In solid geometry, three dimensional shapes such as cube, cuboid, cylinder, cone ...etc are also called solid shapes.

Basic Geometry terms: Point, line, line segment, ray, vertex, angle, collinear points, non collinear points, intersecting lines, parallel lines, perpendicular lines.



## TALENT SEARCH STUDY MATERIAL

**(Note: Refer Textbook)**

Q1) A polygon with four sides is called a \_\_\_\_\_.

**Ans) Quadrilateral**

Q2) The point where two lines meet to form an angle is called the \_\_\_\_\_.

**Ans) Vertex**

Q3) The distance around a circle is called its \_\_\_\_\_.

**Ans) Circumference**

Q4) A triangle with two equal sides is called an \_\_\_\_\_ triangle.

**Ans) Isosceles triangle**

Q5) If three or more points do not lie on a single straight line, they are called \_\_\_\_\_  
.points.

**Ans) Non-collinear points**

Q6) The number of diagonals in a quadrilateral is \_\_\_\_\_.

**Ans) 2**

Q7) The point where two intersecting lines meet is called the \_\_\_\_\_.

**Ans) Point of intersection**

Q8) An angle which measures more than  $180^\circ$  but less than  $360^\circ$  is called a \_\_\_\_\_.

**Ans) Reflex angle**

## SUBJECT: SCIENCE & TECHNOLOGY

### Measurement:

Three systems are developed for the measurement of length, mass and time, namely

- **MKS**(Metre , Kilogram and second)
- **CGS**( centimeter , Gram and Second)
- **FPS**( Foot, Pound and second), The MKS system is the most widely used.

Units obtained by combining two or more fundamental units of measurement are known as **derived units**. eg, **speed** is the distance travelled in unit time, and the unit is metres per second(**m/s,ms<sup>-1</sup>**)

**Vernier Callipers** and **Micrometre screw gauge** are instruments used for measuring very small lengths upto an accuracy of 0.1mm and 0.01mm respectively.

Temperature the degree of hotness or coldness of a body or environment. SI unit of temperature is **Kelvin**. But the most commonly used unit is degree **Celsius or Centigrade(°C)**. Our normal body temperature is 37°C or 98.6°F

To convert kelvin to Celsius unit add 273 to the value in°C

To convert to Celsius into Fahrenheit the following equation is used  $\frac{C}{5} = \frac{F-32}{9}$

The temperature at which centigrade and Fahrenheit have the same value -40°C = -40°F

The melting point of pure ice is 0°C/32°F / -273K and the boiling point of pure water is 100°C/212°F /373K

### FORCE:

An object can be in a state of rest or motion based on its relative position with the change of time with respect to the surroundings. Force is the physical cause that tends to change the state of rest or motion of an object, or the direction of motion of an object, or the shape or size of the object. **SI** unit of force is **Newton(N)**.

Force can be exerted on being in contact with the object -Contact force-Eg Muscular Force ,Friction.

Force can be exerted without being in contact with the object-NonContact force- Magnetic, Gravitational, Electrostatic,Electromagnetic.

Effect of Force depends on the magnitude and direction of the applied force.

**FRICION** is that force which opposes relative motion between two surfaces in contact with each other.It causes heat and produces wear and tear but it is necessary to get better grip and control speed of moving objects. Friction can be reduced by the use of lubricants , ball

## TALENT SEARCH STUDY MATERIAL

bearings , wheels and rollers or polishing the surface. The frictional force in fluids (liquids and gases) is called drag.

**PRESSURE** is the force exerted on unit area, for the same force the pressure exerted on a large area is much smaller than the pressure exerted on a small area. SI unit is  $\text{N/m}^2$

Newton per metre square or Pascal(Pa).  $\text{Pressure}(P) = \frac{\text{Force}}{\text{Area}}$

Pressure at any point in liquids and gases increases with the increase in depth.

**WORK** is done when an applied force moves an object in the direction of the force. There should be a displacement (change in position-distance between the initial and final position of a moving body), or change in shape or size of the object then work is said to be done. **SI Unit is Newton-metre (N-m) or Joule(J)**

$$\text{Work} = \text{Force} \times \text{Displacement}, \quad W = F \times S.$$

**ENERGY** is the capacity to do work. The different types of energy are-

**Mechanical Energy**: The energy possessed by a body due to its state of rest or state of motion

- **Kinetic Energy**: The energy possessed by a body due to its motion. It depends on the mass and velocity (speed in a particular direction) of the moving body
- **Potential energy**: The energy stored up in a body due to its position which has the potential to do work

**Energy in action**

- **Sound energy**: Energy is produced by the vibrations of an object. Vibrating bodies have kinetic energy.
- **Light Energy**: Light is a form of energy in the presence of which we can see objects.
- **Electrical Energy**: When two dry bodies are rubbed together, they produce electrical energy.
- **Heat or Thermal energy**: Most forms of energies change into heat energy before they are used. eg burning of fuels, steam engine.

**Stored Energy**:

- **Chemical Energy**: energy stored in matter like food and fuels is called chemical energy.
- **Magnetic energy**: magnet has the energy to attract and repel objects.
- **Nuclear Energy**: A large amount of energy is released when the nucleus of an atom splits into two nuclei (nuclear fission) or two nuclei of different atoms combine together. (Nuclear fusion) eg. Solar energy.

# TALENT SEARCH STUDY MATERIAL

- **Non conventional sources of energy-**

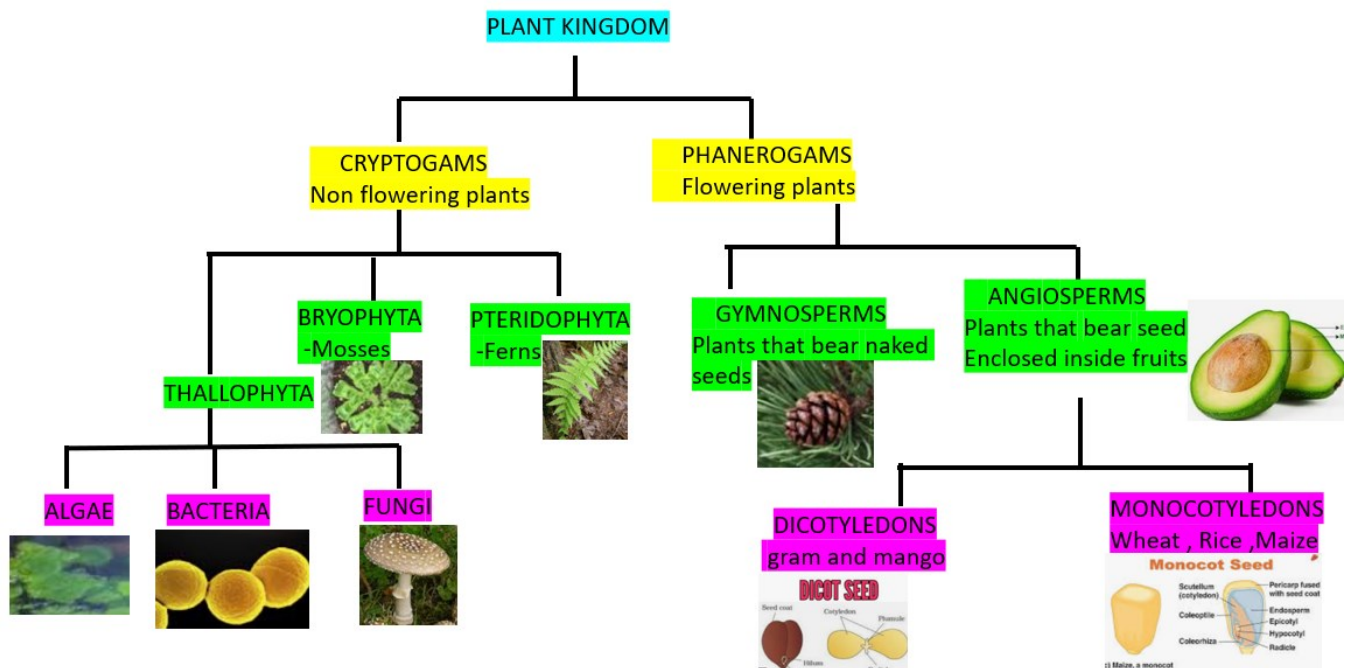
Solar energy, Energy from flowing water, Wind energy, energy from biomass, fossil fuels and sea waves.

## LIVING ORGANISMS



Living organisms are grouped according to specific common characteristics, this is called classification. All living organisms are divided into 5 kingdoms- **Monera, Protista, Fungi, Plantae and Animalia**. Kingdom is the largest unit of classification followed by phylum, further divided into class, order, family, genus and species. Species is the smallest unit of classification.

Individuals in a species resemble each other very closely, have similar type of body parts and can reproduce among themselves. **Carolus Linnaeus** is considered the father of taxonomy or the classification of living organisms. **Binomial nomenclature** is the binomial system of naming each organism, it's a two part latin name – first part is the genus and second is the species. Latin names of some common plants and animals are given here- Banana- *Musa paradisiaca*, Mango-*Mangifera indica*, China Rose -*Hibiscus rosasinensis*, Lion- *Panthera leo*, Tiger *Panthera tigris*. **Human- Homo sapiens**



## HUMAN ANATOMY & PHYSIOLOGY

### **Human Anatomy**

The branch of biology that deals with the study of structure and parts of the human body is called Human Anatomy.

### **Physiology**

Involves the study of chemical and physical functions carried out by organs and cells in a human body.

**The Major Systems under Human Physiology are:**

#### **1. Skeletal system**

The skeleton is a framework of bones, ligaments, and cartilage that gives the body shape. Also, it provides a protective casing for vital organs in our bodies. Like the thoracic cage for lungs, the skull for the brain, etc.

Every adult human being has 206 bones in the body.

**Orthopedics** is the branch of medicine that focuses on the care of skeletal system.

#### **2. Muscular system**

Muscles are an inseparable part of our body and are attached to bone through the tendons. They help us in locomotion along with the bones, maintain posture, and help circulate blood throughout the body.

Tongue is the strongest muscle in our body.

**Myology** is the branch of medicine that study about muscles.

#### **3. Circulatory System**

The heart and blood vessels constitute the circulatory system. The circulatory system is a network of arteries, capillaries, and veins all connected by the heart to supply oxygen and nutrients to different parts of the body. Another function of this system is to carry away waste products.

**Human Heart:** The heart is a muscular organ that is situated in the front of the chest. It pumps blood all through the body by a process called circulation. The human heart is divided into four chambers: two ventricles and two atria. The atria are the receiving chambers of the heart, accepting blood from the body (right atrium) and from the lungs (left atrium). The ventricles are the pumping chambers, moving blood to the lungs (right ventricle) and into the body (left ventricle). Valves control the movement of blood into the heart.

Largest Artery -Aorta, largest vein-Vena cava.

**Cardiology** is the study and treatment of disorders of heart and blood vessels.

### 4. Digestive system

The digestive system of the human body is the sum of alimentary canal and the associated glands. An alimentary canal consists of mouth, food pipe, stomach, intestine, rectum and anus. The glands associated are salivary glands, liver, gall bladder and pancreas.

**Gastroenterology** is the branch of medicine focused on this system.

### 5. Respiratory system

The human respiratory system consists of a pair of nostrils, nasal cavity, pharynx, larynx, trachea, bronchi and lungs. In humans, exchange of gases occurs in the alveoli that are surrounded by capillaries. The opening of larynx is guarded by a leaf like structure called epiglottis. Inhalation and exhalation are the two processes involved in breathing.

Study of respiratory system is **Pulmonology**.

### 6. Nervous system

The nervous system includes the brain, spinal cord and nerves which is responsible for the control and coordination of the body. The nervous system has 2 major parts. The central system is made up of the brain and spinal cord. The peripheral nervous system is made up of nerves that carry messages to and from the central nervous system. Human brain consists of 3 main parts cerebrum, cerebellum and medulla oblongata (Brain stem)

Study of nervous system is **Neurology**.

### 7. Excretory system

The human excretory system consists of two kidneys, two ureters, a urinary bladder and urethra. The functional units of kidneys are called Nephrons. Urine and sweat are the two excretory products in humans. Skin is the largest organ in the human body. The study of kidney function is called **Nephrology**.

### Plant Physiology

Plant physiology is a branch of study in Botany dealing with the physiological processes or functions of plants. **Father of plant physiology - Stephen Hales.**

Transportation in plants

Plants have pipe-like vessels to transport water and nutrients from the soil. The vessels are made of special cells, forming vascular tissue.

The vascular tissue for transport of water and nutrients in the plant is called **Xylem** and the vascular tissue that transport food to all parts of the plant is **Phloem**.



### Facts about Human Body

1. Largest bone -Femur (in thigh)
2. Smallest bone-Stirrup (in the middle ear)
3. Largest muscle in the body is Gluteus Maximus in Buttocks
4. Smallest muscle is Stapedius (in the middle ear)
5. Longest cell -Nerve cell
6. Smallest cell-Sperm cell
7. Largest cell-Ovum
8. Largest endocrine gland-Thyroid gland
9. Pulse rate -72-80 beats /minute
10. Breathing rate – 15-18 times/minute

### Cellular Organization

All organisms are made up of the basic building units called cells. **Cells were first observed in cork by Robert Hooke in 1665.** The cell has 3 main parts: the cell membrane, cytoplasm which contains smaller components called organelles and the nucleus.

**Cell biology** is the study of cell structure and function.

Tissues are groups of cells that have a similar structure and act together to perform a specific function. Organs are created by combining the functional groups of tissues.

**Unicellular Organisms:** Organisms which are made up of a single cell and perform all the metabolic functions. Example: Amoeba, Paramecium.

**Multicellular Organisms** – Organisms which are made of many cells and different cells perform different functions. Example: Humans, cows, trees etc.

### Matter Around Us

Everything in this universe is made up of material which scientists have named 'matter.' Matter on earth is in the form of solid, liquid and gas and are made of tiny particles called atoms and molecules.

Types of matter: Pure substances and mixtures

**Pure Substance:** Elements and compounds are the two types of pure substances. A Pure substance is made up of only one type of atom or molecule.

Example: water (H<sub>2</sub>O molecule), Oxygen (O<sub>2</sub> molecule), Iron, Silver etc.

**Elements:** If a pure substance cannot be broken into simpler substances by any means, it is called an element. Eg. Oxygen, Nitrogen, Sodium, Potassium etc.

## TALENT SEARCH STUDY MATERIAL

**Compounds:** A pure substance composed of two or more elements, chemically combined in a different proportion. Eg, Sodium Chloride, Water, Calcium Hydroxide etc.

**Mixtures:** A mixture is a physical combination of two or more substances that are not chemically joined. Eg. Water and salt are separate substances that once mixed, create a mixture. Mixtures can be either homogeneous or heterogeneous.

A mixture in which constituents are distributed uniformly is called a homogeneous mixture, such as salt in water. A mixture in which constituents are not distributed uniformly is called a heterogeneous mixture, such as sand in water.

### EFFECTS OF POLLUTION

**Global warming** is the phenomenon of gradual increase in the average temperature of earth. It is caused by the excess release of greenhouse gases like Carbon dioxide, methane, CFCs (Chlorofluorocarbon's) etc. into the atmosphere.

**Ozone depletion:** Ozone layer is a natural umbrella protecting the earth from the harmful **ULTRA VIOLET (UV) RAYS** released from the sun. Ozone depletion is the gradual thinning of earth's ozone layer in the Atmosphere, caused due to reaction of the ozone layer with chemical pollutants- CFC's (chlorofluorocarbons) used as coolants in refrigerator and airconditioners, fire extinguishers, aerosol sprayers.

This results in the **UV RAYS** from the sun reaching the earth's surface which can cause skin cancer, damage to the eye and immune system, sunburn etc.

**Acid rain:** The rain becomes acidic because of Carbon dioxide, Sulphur dioxide and Nitrogen dioxide which are released into air as pollutants dissolve in rain drops to form Carbonic acid, Sulphuric acid and Nitric acid respectively. Acid rain can cause damage to buildings, historical monuments (marble cancer-yellowing of Taj Mahal), plants and animals.

### **NOBEL PRIZES -2024**

#### **PHYSICS**

The Nobel Prize in Physics 2024 was awarded to John Hopfield and Geoffrey Hinton for developing the artificial neural networks, which are fundamental for machine learning- allowing computers to learn without explicit programming.

#### **CHEMISTRY**

Nobel Prize in Chemistry for 2024- One half was awarded to David Baker for "computational protein design" and the other half to Demis Hassabis and John Jumper for "protein structure prediction".

## TALENT SEARCH STUDY MATERIAL

### PHYSIOLOGY or MEDICINE

2024 Nobel Prize in Physiology or Medicine was awarded to Victor Ambrose and Gary Ruvkun for the discovery of microRNA and its role in post- transcriptional gene regulation .

Famous Inventors And Inventions Of India	
Inventors Name	Inventions
Prafulla Chandra Ray	India's first pharmaceutical company.
Salim Ali	Naturalist who helped develop Ornithology
Srinivasa Ramanujan	mathematical analysis, number theory, infinite series, and continued fractions
C. V. Raman	He was a physicist who won the Nobel Prize in 1930 for his Raman Effect.
Homi Jehangir Bhabha	The chief architect of the Indian atomic energy program.
Jagadish Chandra Bose	pioneered the investigation of radio and microwave optics.
Satyendra Nath Bose	Mathematician and physicist;
A.P.J. Abdul Kalam	development of India's missile and nuclear weapons programs.
Har Gobind Khorana	A biochemist who won the Nobel Prize
S.S. Abhyankar	contributions to algebraic geometry.
Meghnad Saha	Astrophysicist
Subrahmanyam Chandrasekhar	Astrophysicists won the Nobel Prize in 1983
Raj Reddy	A.M. Turing Award-winning computer scientist
Birbal Sahni	Paleobotanists are known for their research on the fossils of the Indian subcontinent.
Prasanta Chandra Mahalanobis	Statistician and physicist who founded the Indian Statistical Institute.

## TALENT SEARCH STUDY MATERIAL

<b>INVENTORS/DISCOVERERS AND THEIR INVENTIONS/DISCOVERIES</b>		
<b>Sl#</b>	<b>Invention/Discovery</b>	<b>Name of the Inventor</b>
1	Air Conditioner	Willis Carrier
2	Atom Bomb	Julius Robert Oppenheimer
3	Airplane	Wilber and Orville Wright
4	Aspirin	Dr. Felix Hoffman
5	Bifocal Lens	Benjamin Franklin
6	Barometer	Evangelista Torricelli
7	Celluloid	Alexander Parkes
8	Diesel Engine	Rudolf Diesel
9	Electroscope	William Gilbert
10	Electric Fan	Schuyler Wheeler
11	Electric Battery	Volta
12	Elevator	Elisha G. Otis
13	Electric Motor (DC)	Thomas Davenport
14	Helicopter	Igor Sikorsky
15	Laser	Theodore Maiman
16	Machine Gun	Richard Gatling
17	Theory of Relativity	Albert Einstein
18	Ozone	Christian Schonbein
19	Printing Press	Johannes Gutenberg
20	Periodic Table	Dmitri Mendeleev
21	Petrol for Motor Car	Karl Benz
22	Refrigerator	William Cullen
23	Rubber (vulcanized)	Charles Goodyear
24	Personal Computer	Steve Wozniak and Steve Jobs
25	Radio	Guglielmo Marconi
26	Steam Boat	Robert Fulton

## TALENT SEARCH STUDY MATERIAL

27	Internet	Vint Cerf and Bob Kahn
28	Stethoscope	Rene Laennec
29	Soft Contact lenses	Otto Wichterle
30	Xerox Machine	Chester Carlson

### Deficiency Diseases

S.N o.	Vitamins	Deficiency Diseases
1)	Thiamine (B1)	Beriberi, Extreme weakness
2)	Riboflavin(B2)	Glossitis (inflammation of the tongue)
3)	Niacin(B3)	Pellagra
4)	Pyridoxine(B6)	Seizures
5)	Cyanocobalamine(B12)	Pernicious Anaemia
6)	Folic acid (B9)	Megaloblastic Anaemia
7)	Pantothenic acid	Parasthesia(multiple sclerosis that affect brain)
8)	Biotin	Dermatitis
9)	Ascorbic acid (Vitamin C)	Scurvy
10)	Retinol (Vit. A)	Poor vision,Night blindness
11)	Calciferol (Vit. D)	Rickets, fragile bones
12)	Phylloquinone (Vit.K )	Excessive bleeding due to injury

### TECHNOLOGY

Technology is the use of tools, machines, and processes to solve problems or make life easier.

- **Examples:** Mobile phones, computers, calculators, electric fans.

#### Types of Technology

##### 1. Information Technology (IT):

- Involves computers and the internet.
- Examples: Emails, video calls, apps.

# TALENT SEARCH STUDY MATERIAL

## 2. Communication Technology:

- Helps us communicate over long distances.
- Examples: Phones, walkie-talkies, video conferencing.

## 3. Transportation Technology:

- Used to move people and goods.
- Examples: Cars, trains, airplanes.

## 4. Health Technology:

- Used in hospitals and for medical purposes.
- Examples: X-rays, vaccines, and robotic surgeries.

## Parts of a Computer

### 1. Hardware: The physical parts of a computer.

- **Monitor:** Screen for display.
- **Keyboard:** Used for typing.
- **Mouse:** Used to click and select items.
- **CPU (Central Processing Unit):** The brain of the computer.

### 2. Software: The programs or instructions a computer follows.

- Example: Games, MS Word, web browsers.

## Internet and Its Uses

### • What is the Internet?

The internet is a global network that connects computers all over the world.

### • Uses of the Internet:

1. Searching for information (Google, Wikipedia).
2. Sending messages (email, WhatsApp).
3. Entertainment (videos, games, music).
4. Online learning and classes.

## Technology Abbreviations

**IT** - Information Technology

**CPU** - Central Processing Unit

**ROM** - Read-Only Memory

**Wi-Fi** - Wireless Fidelity

**GPS** - Global Positioning System

**AI** - Artificial Intelligence

**RAM** - Random Access Memory

**HTML** - HyperText Markup Language

**IP** - Internet Protocol

**USB** - Universal Serial Bus

## SUBJECT: SOCIAL SCIENCE

### WHAT IS SOCIAL SCIENCE?

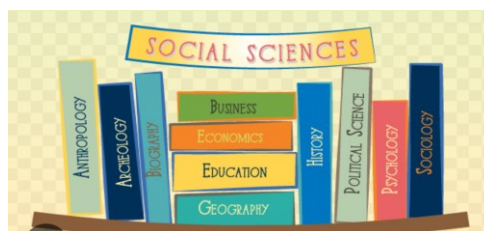
Social Science is a branch of science, devoted to the study of societies and the relationships among members within those societies.

The term "social science" was coined in French by Mirabeau in 1767.

David Emile Durkheim is considered as 'The Father of Social Sciences'.

Social Science encompasses a wide array of disciplines like :

1. **anthropology** : the scientific study of humanity, concerned with human behavior, human biology, cultures, societies, in both the present and past.
2. **archaeology** : the study of the ancient and recent human past through material remains.
3. **economics** :branch of social science that studies the production, distribution, and consumption of goods and services.
4. **geography** : the study of Earth and the forces that shape it, both physical and human
5. **history** : a branch of knowledge that records and explains past events.
6. **linguistics** : the scientific study of language and its structure, including the study of grammar, syntax, and phonetics
7. **management** : the science of planning, organising, staffing, directing and controlling the members in a work place
8. **communication studies**: an academic discipline that deals with processes of human communication and behavior, patterns of communication in interpersonal relationships, social interactions and communication in different cultures.
9. **psychology** : the scientific study of mind and behavior of humans and nonhumans and mental processes such as thoughts, feelings, and motives.
10. **culturology** : a field of academics that examines how societies differ and coexist with adherence to class, ethnicity, gender, race, ideology, nationality, etc.
11. **political science** : the scientific study of politics dealing with systems of governance and power, and the analysis of political activities, political thought and political behavior.



## TALENT SEARCH STUDY MATERIAL

### IMPORTANT SOCIAL SCIENCE TERMS :

TERM	DEFINITION
<b>Chronological order</b>	Listing events in the order of occurrence
<b>Era</b>	A period of time that is joined by cultural / historical factors
<b>Decade</b>	A unit of time that is equal to ten years
<b>Century</b>	A unit of time that is equal to one hundred years
<b>Millennium</b>	A unit of time that is equal to one thousand years.
<b>Palaeontology</b>	The study of fossils.
<b>Archive</b>	A storage of files or documents from the past
<b>Feudalism</b>	A medieval socio-political system with a hierarchy of kings, lords and knights
<b>Carbon Dating</b>	Refers to the chemical analysis used to estimate the age of organic articles.
<b>Inflation</b>	An increase in prices for goods and services, reducing the purchasing power of money
<b>Edicts</b>	The official order or royal command issued by rulers in ancient times.
<b>Artifacts</b>	The articles of archaeological value.
<b>Epigraphy</b>	The study of old inscriptions
<b>Numismatics</b>	The study of coins.
<b>Archipelago</b>	a group of islands such as the Galapagos or Hawaii.
<b>Cartography</b>	the art of making maps
<b>Oasis</b>	a fertile watering hole in a geographically arid place such as a desert.
<b>Geothermal</b>	a source of heat that originates from the Earth.
<b>Estuary</b>	a coastal area where freshwater from rivers mixes with saltwater from the ocean
<b>Antipodes</b>	Two points that are on the exact opposite sides of the earth
<b>Richter Scale</b>	numerical scale for expressing the magnitude of an earthquake
<b>Canyon</b>	a deep valley with steep sides



## TALENT SEARCH STUDY MATERIAL

### DID YOU KNOW?

1. Egypt is classified as the oldest country in the world, dating back to 3100 BCE.
2. The Statue of Unity in Gujarat, India, is the tallest in the world, standing at 182 meters.
3. The youngest person to be awarded the Nobel Peace Prize is Malala Yousafzai (aged just 17 in 2014), for her work as a child rights activist and girls' right to education.
4. The Great Wall of China, with a length of 21,196 km, is considered the 'Longest Cemetery in the World' as over one million people died during the wall construction.
5. Acacia trees in Africa communicate with each other. They emit gasses to alert other trees to produce the toxin tannin, which protects them from hungry animals.
6. Venus is the only planet to spin clockwise.
7. The Great Barrier Reef in Australia is the world's largest coral reef.
8. New Zealand was the first nation to give women the right to vote (in 1893 ).
9. Greenland is the largest Island.
10. Amazon is the world's largest river. It is also known as 'The River Sea'.
11. India & Fiji are the only countries, which have Hindi as an official language.
12. Saudi Arabia and Vatican City are the only two countries not to have any rivers.
13. Most spoken language in the world is Mandarin Chinese.
14. There is a glacier called "Blood Falls" in Antarctica that regularly pours out red liquid, making it look like the ice is bleeding. (It's actually oxidised salty water.)
15. Though Mount Everest is the highest peak, Mount Chimborazo in Ecuador is closer to the moon. This is because of the earth bulge at the equator.
16. The Indian Constitution is the world's longest written constitution, with 146,385 words in its English-language version, whereas the Monaco Constitution is the world's shortest written constitution, with 3,814 words.
17. The Moon is gradually drifting away from Earth at a rate of 4 cm per year.
18. Oceania is a region encompassing the Australian continent, New Zealand, and various island countries in the Pacific Ocean that are not included in the seven-continent model.
19. There are only four countries in the world that are non-members of the United Nations. They are Kosovo, Palestine, Taiwan and Vatican City.
20. There is only one country with a non rectangular National Flag - Nepal. It is shaped like two stacked triangles, representing the Himalaya Mountains .

## TALENT SEARCH STUDY MATERIAL

### IMPORTANT ABBREVIATIONS:

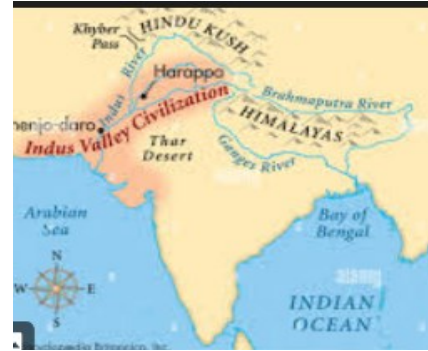
ABBREVIATION	EXPANSION
ASEAN	Association of South-East Asian Nations
BSF	Border Security Force
BSE	Bombay Stock Exchange
EDUSAT	Education Satellite
GCC	Gulf Cooperation Council
GST	Goods and Service Tax
GNP	Gross National Product
GOOGLE	Global Organisation Of Oriented Group Language of Earth
GSLV	Geosynchronous Satellite Launch Vehicle
ISO	International Standardisation Organisation
ISRO	Indian Space Research Organisation
KYC	Know Your Customer
NAM	Non-Aligned Movement
NATO	North Atlantic Treaty Organisation
NCERT	National Council Of Education Research And Training
NGO	Non-Governmental Organisation
NRI	Non-Resident Indian
NSE	National Stock Exchange
NCC	National Cadet Corps
OPEC	Organisation Of Petroleum Exporting Countries
RBI	Reserve Bank Of India
RADAR	Radio Detection and Ranging
TISCO	Tata Iron and Steel Company
UNICEF	United Nations International Children's (Emergency) Fund
VAT	Value-Added Tax
WTO	World Trade Organisation

# TALENT SEARCH STUDY MATERIAL

## MAJOR CIVILIZATIONS OF THE WORLD:

### Indus Valley Civilization:

Sir John H Marshall, a researcher was the first to use the term, 'Indus Valley Civilization'. It developed around 2500 - 1750 BC and spanned a wide area in modern-day Pakistan, northwest India and northeast Afghanistan. The term *Harappan* is sometimes applied to the Indus Civilisation after the first excavated site Harappa. The capital cities are Mohenjodaro and Harappa. The Indus valley people were well-acquainted with the use of both cotton and wool.



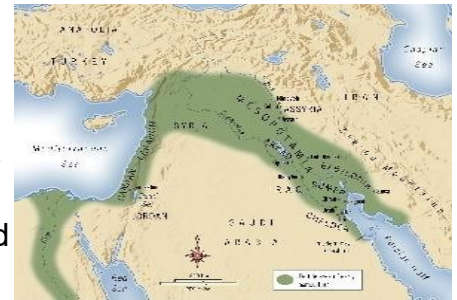
### Egyptian Civilization :

The Egyptian civilization developed in 3150 BC on the banks of River Nile in northeast Africa. It coincided with the political unification of Upper and Lower Egypt under Pharaoh Menes. It is widely known for its unique pyramid architecture, writing system and well-preserved mummies. Example : The Pyramids of Giza and The Sphinx. Egyptian Hieroglyphics is a form of writing that featured logographic, syllabic and alphabetic elements.



### Mesopotamian Civilization:

Around 3400–3000 BC, the key elements of urban civilization first appeared in ancient Mesopotamia, on the banks of River Tigris and River Euphrates in present-day Iraq. Mesopotamia, also called Jazira was later referred to as 'The Fertile Crescent' by Egyptologist J.H.Breasted. The earliest potter's wheel was invented in Mesopotamia. The wedge-shaped script called 'cuneiform', emerged in southern Mesopotamia around 3400 BC. Notable cities were Agade, Ur, Babylon, and Nineveh.



### Chinese Civilization:

The Chinese civilization developed around 1500 B.C.E. The Chinese civilization originated in Hwang Ho and Yangtze River basins. The first known Chinese dynasty is the Shang. The Great Wall of China was built by *Shi-Hwang-Ti*. The Chinese first used tea leaves for making *medicines*. The Chinese made beautiful vessels of *Porcelain*. The stupa-style temples of the Chinese were known as *Pagoda*. Paper making, printing, gun powder and the compass are the four major inventions of ancient China to the world.



# TALENT SEARCH STUDY MATERIAL

## UNIVERSE

- The word “Universe” comes from the Latin word “Universum”.
- The universe emerged 13.8 billion years ago with the the Big Bang - an explosion that produced all matter.
- The word Universe is used by scientists to refer to all existing matter and space. This includes the Solar System, the Milky Way, all known galaxies, and superstructures.
- Yet in all this immensity there is only one place we know of where life exists: Earth. Despite searches for intelligent signals, no sign of extra-terrestrial life has been found.
- The observable universe spans 93 billion light-years.
- The biggest star known to man is UY Scuti, which has a radius about 1,700 times larger than the Sun.
- It's estimated as many as 50 meteorites hit Earth every day. Many burn up in our atmosphere creating shooting stars and meteor showers. In 2018, the Hamburg meteor fireball streaked across the American Midwest sky.
- Edwin Hubble made a groundbreaking discovery in the 1929: the universe is expanding.

## THE EARTH

- Earth means “the ground” in English and German.
- Scientists think Earth was formed at roughly the same time as the sun and other planets around 4.6 billion years ago from a cloud of gas and dust known as the solar nebula.
- Earth’s rotation causes the planet to bulge at the equator and flatten at the poles, hence, earth is not a sphere, rather it is geoid.
- Some 300 million years ago, there was just one continent, a massive supercontinent called Pangaea. This means there was just one giant sea, called Panthalassa.
- Earth happens to orbit the sun within the "Goldilocks zone," where temperatures are just right to maintain liquid water on our planet's surface.
- The magnetic field of the earth, generated by the motion of molten iron in Earth's core, protects our planet from cosmic radiation and from the charged particles emitted by our Sun. The magnetic field is strongest at the equator and weakest near the poles.
- Oxygen, silicon, aluminum, and iron account for 88.1% of the mass of the Earth's crust. Other 90 elements make up the remaining 11.9% , with gold, silver, copper and other precious metals making up less than 0.03%,
- Earth’s interior is not solid, but rather semi-solid, owing to high temperatures and pressures. The temperature of the core reaches more than 5,000 degrees Celsius.
- The average gravitational pull of the Earth is 9.8 meters per second square.
- Every year on 22 April, we celebrate Earth Day. Established in 1970,

## INDIA

- The name 'India' is derived from the River Indus.
- India is officially known as 'The Republic of India'.
- In the 19<sup>th</sup> century, India was seen as the "Jewel in the Crown" of the British Empire **because** India's location, population and resources made it the most valuable of all British colonies.
- Today, India is the world's largest democracy, the 7<sup>th</sup> largest country in terms of area and since 2023, the world's most populous country .
- India is a Sovereign Socialist Secular Democratic Republic with a Parliamentary form of government which is federal in structure.
- The Parliament of India (Sansad Bhavan) is the supreme legislative body of India. It is a bicameral legislature composed of the Rajya Sabha (Council of States) and the Lok Sabha (House of the People).
- The President is the First Citizen of India and the Head of the Legislature.
- The Prime Minister of India is the head of the government of the Republic of India.
- The Constitution of India provides for a single citizenship for the whole of India.
- The Constitution of India is the longest in the world, with 448 articles, 12 schedules, and 101 amendments.
- Indian constitution has recognized 22 official languages, but only 2 of them, Hindi and English, are used by the central administration.
- Delhi, officially - the National Capital Territory of Delhi (NCT), is a city and a Union Territory of India containing New Delhi, the capital of India.
- Mumbai is called the 'Commercial Capital of India', because Mumbai houses important financial institutions such as the Reserve Bank of India & the National Stock Exchange,
- Kolkata, is referred to as the 'Cultural Capital of India' due to its association with literature, music, film, theater and art. The city has been home to famous poets and authors like Rabindranath Tagore and Sarat Chandra Chattopadhyay.
- Bangalore city is known as the Silicon Valley of India. It is also referred to as the IT (Information Technology) capital of India.
- Jamshedpur in Jharkhand is known as the 'Steel City of India' because the first steel plant TISCO was set up here by Jamshedji Tata.





## TALENT SEARCH STUDY MATERIAL

### SUBJECT: GENERAL KNOWLEDGE & CURRENT AFFAIRS

#### Nobel Prize Winners List 2024

Category	Nobel Prize Winners 2024 Name With Country	Awarded For
Nobel Prize Winners 2024 For Physiology or Medicine	Gary Ruvkun (USA) and Victor Ambros (USA)	"for their discoveries Medicine for their discovery of microRNAs, a class of small molecules essential for gene regulation"
The Nobel Prize 2024 In Physics	John Hopfield (USA) and Geoffrey Hinton (UK)	"for foundational discoveries and inventions that enable machine learning with artificial neural networks"
The Nobel Prize in Chemistry 2024	David Baker (USA) Demis Hassabis (UK) John M. Jumper (UK)	David Baker "for computational protein design" Demis Hassabis and John M. Jumper" for protein structure prediction"
Nobel Prize For Literature 2024	Han Kang (South Korea)	"for her intense poetic prose that confronts historical traumas and exposes the fragility of human life"
Nobel Peace Prize 2024 Winner	Nihon Hidankyo	"for his efforts to achieve a world free of nuclear weapons and for demonstrating through witness testimony that nuclear weapons must never be used again"
Nobel Prize in Economics 2024	Daron Acemoglu, Simon Johnson, James A. Robinson	"for studies of how institutions are formed and affect prosperity"

**The Nobel Prize** is one of the prestigious awards for persons who made discoveries for the person who conferred the greatest benefit to humankind in the fields of physics, chemistry, physiology or medicine, literature, and peace, collectively referred to as the **Nobel Prizes**. Alfred Nobel (1833-1896) was born in Stockholm, Sweden, on October 21, 1833. He is known for inventing dynamite. Agency responsible for selection is specifically designated by Alfred Nobel



## TALENT SEARCH STUDY MATERIAL

Nobel prizes are awarded by the list of organizations provided below.

Nobel Prize Category	Awarded By
Nobel Prize in <b>Physics</b>	Royal Swedish Academy of Sciences
Nobel Prize in <b>Chemistry</b>	Royal Swedish Academy of Sciences
Nobel Prize in <b>Economic Sciences</b>	The Royal Swedish Academy of Sciences
Nobel Prize in <b>Peace</b>	Norwegian Nobel Committee
Nobel Prize in <b>Literature</b>	Swedish Academy
Nobel Prize in <b>Physiology and Medicine</b>	Karolinska Institute

### Nobel Prize facts

- Marie Curie is the only one woman who has been honoured twice, with the 1903 Nobel Prize in Physics and the 1911 Nobel Prize in Chemistry.
- John Bardeen is the only Nobel Laureate who has been awarded the Nobel Prize in Physics twice, in 1956 and 1972.
- Despite being nominated five times, Mohandas Karamchand Gandhi (Mahatma Gandhi) never won the Nobel Prize
- John B. Goodenough is the oldest recipient of this prize in Chemistry 2019 at the age of 97yrs.
- Malala Yousafzai is the youngest Nobel Laureate to get the Peace Prize in 2014 at the age of 17 yrs.
- The first Indian to receive the Nobel Prize was Rabindranath Tagore.

### SPACE MISSION



.ISRO chief S.Somnath wins 'IAF World Space Award 2024' for Chandrayaan-3. The award, presented in Milan, Italy, recognizes individuals who make significant contributions to space science and technology.

- Major lunar mission was approved by the Cabinet in 2024 - Chandrayaan-4 mission

## TALENT SEARCH STUDY MATERIAL

Here is the list of ISRO's upcoming space missions

Year	Mission Name	Mission Description
2024	Gaganyaan-1	The first test flight of the Gaganyaan spacecraft, designed to carry three astronauts.
2024	NISAR	A joint project with NASA to launch the first dual-band radar imaging satellite for remote sensing.
2025	Gaganyaan-2	The second test flight before the inaugural crewed mission.
2025	Venus Orbiter Mission (Shukrayaan)	An orbiter mission to study the atmosphere of Venus.

### MOUNT EVEREST CLIMBING RECORDS

- Kami Rita Sherpa reached the Everest summit for the 30th time, successfully completing the 30th ascent.
- Dawa Finjok Sherpa- Fastest man **to climb Everest**
- Phunjo Lama- Fastest woman to climb Everest
- [Sir Edmund Hillary](#) (New Zealand )and [Tenzing Norgay](#)(Nepal) - First climbers confirmed as having reached the summit
- [Junko Tabei](#) - First woman to reach the summit



### LIST OF NATURAL DISASTERS IN INDIA IN 2024

- Cyclone Remal, the first storm of the 2024 North Indian Ocean cyclone season, struck West Bengal and Bangladesh's Sunderban Delta.
- Cyclone Fengal, which made landfall near Puducherry.
- Devastating landslide in Kerala's Wayanad.
- The Vijaywada floods, caused by heavy rains and overflowing rivers.
- Between June and August, Himachal Pradesh witnessed 51 cloudburst and flash flood incidents.





## TALENT SEARCH STUDY MATERIAL

### BOOKS AND AWARDS

- *Orbital: A Novel* by Samantha Harvey has been named the winner of the Booker Prize 2024.
- *Night Watch, a novel* by Jayne Anne Phillips, won the Pulitzer Prize 2024 for fiction.
- *2024 Booker International Prize Winner: Kairos* by Jenny Erpenbeck translated by Michael Hofmann
- Renowned Urdu poet Gulzar and Sanskrit scholar Jagadguru Rambhadracharya have been named the recipients of the 58th Jnanpith Award 2024.
- Booker Prize-winning author Arundhati Roy was honoured with the prestigious Pen Pinter Prize 2024 for her “unflinching and unswerving” writings

A writer only  
begins a book.  
A reader  
finishes it.

—SAMUEL JOHNSON

### Most Read Books in 2024 For Children

- *Kareem Between* by Shifa Saltagi Safadi
- *The Dictionary Story* by Oliver Jeffers & Sam Winston
- *Insectarium* by Dave Goulson & Emily Carter (illustrator)
- *Olivetti* by Allie Millington
- *Circus Maximus: Return of the Champion* by Annelise Gray

WORLD  
BOOK  
DAY

7 MARCH 2024

### Greatest Books Ever Written for children

- Harry Potter series by J.K. Rowling
- *The Chronicles of Narnia* by C.S. Lewis
- *Percy Jackson & the Olympians* by Rick Riordan
- *The Hobbit* by J.R.R. Tolkien
- *Charlotte's Web* by E.B. White
- *Anne of Green Gables* by L.M. Montgomery
- *The Secret Garden* by Frances Hodgson Burnett
- *Alice's Adventures in Wonderland* by Lewis Carroll
- *Matilda* by Roald Dahl
- *The Little Prince* by Antoine de Saint-Exupéry

“That’s the thing  
about books.  
They let you  
travel without  
moving your feet.”

—THE NAMESAKE  
BY JHUMPA LAHIRI



### 70<sup>th</sup> NATIONAL FILM AWARDS (2024)



The 70th National Film Awards ceremony was held at Vigyan Bhavan on October 8, where the film industry's top talents were honoured for their outstanding contributions in 2022. President Droupadi Murmu presented the prestigious awards, including the Dadasaheb Phalke Award to veteran actor Mithun Chakraborty.

## TALENT SEARCH STUDY MATERIAL

Category	Winner	Film
Best Feature Film	Aattam	Aattam
Best Actor	Rishab Shetty	Kantara
Best Actress	Nithya Menen, Manasi Parekh	Tiruchitrabalam, Kutch Express
Best Director	Sooraj Barjatya	Uunchai
Best Supporting Actress	Neena Gupta	Uunchai
Best Supporting Actor	Pawan Malhotra	Fouja
Best Feature Film Providing Wholesome Entertainment	Kantara	Kantara
Best Non-Feature Film Promoting Social and Environmental Values	Kutch Express	Kutch Express

### 55<sup>th</sup> INTERNATIONAL FILM FESTIVAL OF INDIA, IFFI (2024)

Satyajit Ray Lifetime Achievement Award: Australian filmmaker Phillip Noyce

Award	Winner	Film/Project
Golden Peacock (Best Film)	Saulė Bliuvaitė	Toxic
Silver Peacock (Best Director)	Bogdan Muresanu	The New Year That Never Came
Silver Peacock (Best Actor – Male)	Clément Faveau	Holy Cow
Silver Peacock (Best Actor – Female)	Vesta Matulytė, Ieva Rupeikaitė	Toxic
Special Jury Award	Louise Courvoisier	Holy Cow
Best Debut Feature Film	Sarah Friedland	Familiar Touch
Best Debut Director of Indian Film	Navjot Bandiwadkar	Gharat Ganpati
ICFT-UNESCO Gandhi Medal	Levan Akin	Crossing
Best Web Series (OTT)	Nipun Dharmadhikari	Lampan
Indian Film Personality of the Year	Vikrant Massey	12th Fail

## TALENT SEARCH STUDY MATERIAL

### SPORTS

#### India at the 2024 Summer Olympics

India competed at the 2024 Summer Olympics in Paris, France, held from 26 July to 11 August 2024. The Indian contingent consisted of 110 athletes who competed in 16 sports. P.V. Sindhu and Sharath Kamal were the flag-bearers for the opening ceremony. Manu Bhaker and P. R. Sreejesh carried the Indian flag during the closing ceremony. India won six medals including a silver and five bronze to be ranked 71st amongst the 206 NOCs.



Manu Bhaker	Bronze	Women's 10m air pistol shooting
Manu Bhaker-Sarabjot Singh	Bronze	Mixed team 10m air pistol shooting
Swapnil Kusale	Bronze	Men's 50m rifle 3 positions shooting
Indian hockey team	Bronze	Men's hockey
Neeraj Chopra	Silver	Men's javelin throw
Aman Sehrawat	Bronze	Men's 57kg wrestling

#### India's Paralympic Story: A Tale of Inspiration and Achievement

India's para-athletes delivered their best-ever performance at the Paris Games, earning an incredible 29 medals—7 gold, 9 silver, and 13 bronze—securing an 18th-place finish in the overall medal tally. This achievement represents a watershed moment for Indian para-sports, showcasing the potential of Indian athletes on the global stage.

Gold medalist are - Avani Lekhara (Shooting (Women's 10m air rifle SH1)), Nitesh Kumar (Badminton (Men's singles SL3)), Sumit Antil (Athletics (Men's Javelin throw F64)), Harvinder Singh (Archery (Men's individual Recurve)), Dharambir (Athletics (Men's club throw F51)), Navdeep Singh Athletics ((Men's Javelin F41)), Praveen Kumar (Athletics (Men's high jump T64))

## TALENT SEARCH STUDY MATERIAL

### CRICKET

- India won the T20 World Cup in 2024, with Jasprit Bumrah named the man of the series
- The Kolkata Knight Riders (KKR) clinched the IPL 2024 title
- In the IPL 2024, the Orange Cap was won by Virat Kohli.
- Harshal Patel of Punjab Kings with 24 wickets was the winner of the Purple Cap in IPL 2024
- The country which won ICC Women's T20 World Cup 2024 is New Zealand
- BCCI President – Roger Binny
- Team India men's captain - Rohit Sharma
- Team India T20I Captain: Suryakumar Yadav
- Team India women's captain - Harmanpreet Kaur
- Team India Head Coach – Gautam Gambhir
- Jasprit Bumrah has broken Kapil Dev's record by becoming the fastest Asian bowler to take 50 wickets in Australia.



### FOOTBALL



- FIFA- The Federation International de Football Association
  - FIFA President – Giovanni Vincenzo Infantino
  - FIFA Men's Player of the Year 2024 - Lionel Messi
  - Men's Ballon d'Or 2024 Winner - Rodri
  - Women's Ballon d'Or 2024 Winner - Aitana Bonmati

- Isaah Yeo has become the first Australian player to win the IRL Golden Boot in seven years.
- The host for the FIFA World Cup 2034 has been confirmed as Saudi Arabia



### HOCKEY

- The Canadian women's national team claimed gold at the 2024 IIHF Women's World Championship in Utica, New York, with a thrilling overtime win over the United States, marking Canada's 13th title.
- The 2024 Men's FIH Hockey5s World Cup was the first edition of the Hockey5s World Cup, held in Muscat, Oman. The Netherlands emerged victorious, defeating Malaysia in the final to claim their first title
- In 2024, the Indian men's hockey team achieved significant success by winning the bronze medal at the Paris 2024 Olympics.



## TALENT SEARCH STUDY MATERIAL

### BADMINTON

- BWF World Ranking is the official ranking of the Badminton World Federation.
- It is used to determine the qualification for the World Championships and Summer Olympic Games, BWF World Tour tournaments.
- A seven-member Indian team, including two-time Olympic medallist **PV Sindhu**, competed at the **Paris 2024 Olympics badminton** tournament.
- Lakshya Sen created history by becoming the first male **Indian badminton player** to make the semi-finals at the Summer Games. However, he fell one win short of a medal.

Men's BWF Singles World Rankings	Women's BWF Singles World Rankings
1. Shi Yuqi (PR China)	1. An Seyoung (Republic of Korea)
2. Anders Antonsen (Denmark)	2. Wang Zhiyi (PR China)

### KABBADI

- Pakistan defeated the United States to lift the second New Zealand Kabaddi World Cup in Auckland

### KHO-KHO

- The Kho Federation of India (KKFI) on Friday named the 24 nations that will participate in the inaugural Kho World Cup, scheduled to take place in January 2025, at New Delhi's IGI Stadium.

### BILLIARDS

- The Prime Minister, Shri Narendra Modi today lauded Pankaj Advani on being crowned Billiards Champion at World Snooker Championships 2024 as a phenomenal accomplishment



### MOTOR RACING

- 2024 Formula One World Championship/Winner- Max Verstappen
- The 2024 United States Grand Prix was a Formula One motor race held, at the Circuit of the Americas in Austin, Texas, United States. Charles Leclerc won a U.S. Grand Prix
- Red Bull's Max Verstappen won the title of Spanish Grand Prix 2024
- Japanese Grand Prix - The 2024 Japanese Grand Prix (officially known as the Formula 1 MSC Cruises Japanese Grand Prix 2024) was a Formula One motor race held on 7 April 2024 at the Suzuka International Racing Course in Suzuka, Japan.
- It was won by polesitter Max Verstappen driving for Red Bull, with teammate Sergio Pérez and Ferrari driver Carlos Sainz Jr. behind him.
- World Constructors' Championship- McLaren – clinched the 2024 Constructors' Championship at the season finale in Abu Dhabi



## TALENT SEARCH STUDY MATERIAL

- **CHESS**
- Viswanathan Anand won the 2024 Lyon Master Chess Championship for the 10<sup>th</sup> time



- India's D. Gukesh beat China's Ding Liren in the 14th round to claim the 2024 World Chess Championship at the Resorts World Sentosa in Singapore

### LAWN TENNIS

Grand Slam Tournaments - In running order, the four grand slam events held each year are: Australian Open, French Open, Wimbledon, US Open. The French Open is played on clay, Wimbledon on grass and the remaining two are held on hard courts.

Men's Grand Slam Title 2024 Winners		
TOURNAMENT	WINNER	RUNNER-UP
U.S. Open	Jannik Sinner	Taylor Fritz
Wimbledon	Carlos Alcaraz	Novak Djokovic
French Open	Carlos Alcaraz	Alexander Zverev
Australian Open	Jannik Sinner	Daniil Medvedev
Women's Grand Slam Title 2024 Winners		
TOURNAMENT	WINNER	RUNNER-UP
U.S. Open	Aryna Sabalenka	Jessica Pegula
Wimbledon	Barbora Krejckikova	Jasmine Paolini
French Open	Iga Swiatek	Jasmine Paolini
Australian Open	Aryna Sabalenka	Zheng Qinwen

DAVIS CUP: Italy was crowned tennis champions of the world in Málaga, Spain

## TALENT SEARCH STUDY MATERIAL

**THE 2024 CHAMPIONS OF THE EARTH** - the United Nations' highest environmental honor, were awarded to six extraordinary individuals and organizations for their outstanding leadership

### Meet the 2024 Champions of the Earth

1. **Sonia Guajajara (Brazil) – Policy Leadership**
2. **Amy Bowers Cordalis (United States) – Inspiration and Action**
3. **Gabriel Paun (Romania) – Inspiration and Action**
4. **Lu Qi (China) – Science and Innovation**
5. **Madhav Gadgil (India) – Lifetime Achievement**
6. **SEKEM Initiative (Egypt) – Entrepreneurial Vision**

### International Current affairs

- The country which hosted the 16<sup>th</sup> BRICS Summit in 2024 is Russia.
- The country which will host the ASEAN Summit in 2025 is Malaysia.
- India will host the Quad Leaders' Summit in 2025.
- The country that has recently launched the world' first 6G communication satellite is China
- The 18<sup>th</sup> Pravasi Bharatiya Divas 2025 will be held at Bhubaneshwar, Odisha
- Claudia Sheinbaum was sworn in as Mexico's first female President in 2024.
- The Bihar government has approved the development of Kaimur Wildlife Sanctuary as a tiger reserve
- Miss Universe 2024 - was the 73rd Miss Universe pageant, held at the Arena CDMX in Mexico City, Mexico. Sheynnis Palacios of Nicaragua crowned Victoria Kjær Theilvig of Denmark as her successor at the end of the event.
- The 2024 G20 Rio de Janeiro summit was the nineteenth meeting of Group of Twenty (G20), a Heads of State and Government meeting held at the Museum of Modern Art in Rio de Janeiro from 18–19 November 2024. It was the first G20 summit to be hosted in Brazil
- The Ramon Magsaysay Award the Ramon Magsaysay Award winners for 2024: Hayao Miyazaki, Phuntsho Karma, Nguyen Thi Ngoc Phuong, Farhan Farwiza, Rural Doctors Movement
- The Indira Gandhi Prize for Peace, Disarmament and Development for 2024 has been conferred on former Chilean president and prominent human rights voice Michelle Bachelet

## TALENT SEARCH STUDY MATERIAL

### Saudi Arabia Current affairs & facts



- IOC Announces Olympic Esports Games to Be Hosted in The Kingdom of Saudi Arabia
- The International Olympic Committee, announced that it has partnered with the National Olympic Committee of Saudi Arabia to host the inaugural Olympic Esports Games 2025 in the Kingdom of Saudi Arabia

- India Welcomes Egypt, Iran, UAE, Saudi Arabia and Ethiopia Joining BRICS
- Saudi Arabia Names Faisal bin Saud Al-Mejfel as Ambassador to Syria
- Indian Engineering Exports Surge: UAE, Russia, and Saudi Arabia Lead the Way
- UN Appoints Saudi Arabia to Lead Women's Rights Forum Despite Criticism
- Rumi Alqahtani, a 27-year-old model and influencer from Saudi Arabia, announced on Instagram that she will be the first participant from the country in the Miss Universe competition.
- Max Verstappen Triumphs at Saudi Arabian Grand Prix
- Saudi Arabia's First Luxury Train 'Dream of the Desert' is Launched First in The Middle East
- India, Saudi Arabia Explore New Avenues of Defence Cooperation
- Qiddiya City is an entertainment development project, spanning more than 334 square kilometers on the outskirts of Riyadh.
- Saudi Arabia officially announced as the 2034 World Cup host.
- The 2029 Asian Winter Games, to be held in Trojena, Saudi Arabia
- Cristiano Ronaldo, 38, joined Al-Nassr in early 2023 and signed a contract that runs until June 30, 2025. During his time in Saudi Arabia, he has continued to demonstrate his goal-scoring ability and has become an emblem of the Saudi league, attracting global attention.
- Riyadh Season 2024 will kick offed in October, 2024, and will run until May 2025, making it one of the longest entertainment events in the world.





# TALENT SEARCH STUDY MATERIAL



**INTERNATIONAL INDIAN SCHOOL DAMMAM**

**POST BOX 3320 – AL KHOBAR 31952 KINGDOM OF SAUDI ARABIA**

Telephone    Boys section    013-8142801/2/3/4  
                  Girls section    013-8140881/2/5/7/9  
                  Fax                    013-8142806

Email : [iisdammam@hotmail.com](mailto:iisdammam@hotmail.com)

Web site: <https://iisdammam.edu.sa/>