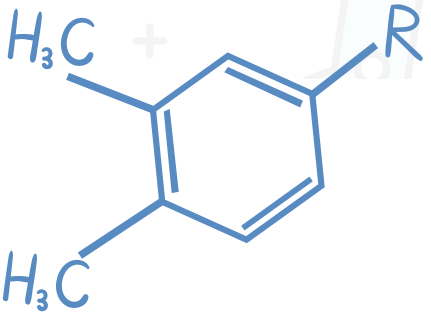
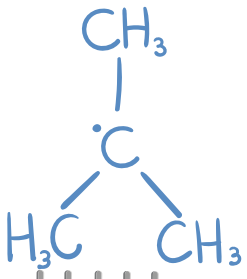
GUIDE TO BEING LIMITLESS

CLASS 10

THE OXFORD SCHOOL

JHIRI, BURHANPUR (M.P)





WHY THIS BOOK MATTERS ?

Public speaking is an essential skill and helps a person leave an impression at every stage of their life.

EDUCATION

THEN v/s NOW

Exam-Centric Model, prioritizing high scores and rote memorization.

Dependent on school timetable; learning often stops after the final exam.

Limited opportunities, leading to high stage fear and interview nervousness after Class 12.

Confidence tied to marks; often hesitant to interact with "big personalities.

Skill-Centric Model, prioritizing essential life skills: Leadership, Time Management, and Problem Solving.

Cultivating a "**Life-Long Learning Habit**" and commitment to "**daily self-upgrade until the last breath.**"

Introduction of the **VR (Virtual Reality) Lab** (Currently in Progress) to provide high-stakes practice, eliminating fear and building the quality of a Great Speaker.

Confidence built on content and effective **communication**, allowing students **to hold discussions with national leaders** without fear.

VISION

The Oxford School envisions a generation of fearless pioneers defined not by their degrees, but by their intrinsic drive for perpetual growth and contribution. Our ultimate aspiration is to cultivate the Life-Long Learning Habit in every student, ensuring they are perpetually equipped to "daily upgrade themselves until their final breath." We aim to forge citizens of profound self-worth and confidence, empowering every child to achieve the quality of a Great Speaker ready to lead dialogues, execute innovative ideas brilliantly, and shape the nation's future with clarity and conviction.

MISSION

Our Mission is to revolutionize education by establishing a Skills-Centric Pedagogical Model, moving definitively away from exam-only dependency. We are dedicated to the holistic development of essential competencies: Leadership, Effective Communication, Strategic Problem Solving, and Time Management. We achieve this through a rigorous curriculum that integrates UPSC/Competitive Exam Standards from Class VI, driven by the daily reading of articles and editorials. Recognizing that the ability to speak and present is the most powerful lever for lifelong success, we commit to leveraging cutting-edge tools, such as the new VR Public Speaking Lab. This builds unmatched confidence that ensures students can excel—from academic achievements and career success to ultimately influencing the next generation. We prepare students for every challenge life offers, ensuring their voice is always heard and respected.

THE PATH WE FOLLOW

Instilling the practice of reading 365 days, articles and editorials to build a rich content base across all subjects. You cannot change your future, but you can change your habits, and surely your habits will change your future.

DEFINING THE PATH:

THE ROAD AHEAD

DIRECTOR

Mr. Mayank Kamrani

"The Oxford School, Burhanpur, is built upon a profound and enduring philosophy: Future success is not determined by a single examination, but by the habits cultivated daily. Our vision extends far beyond achieving high scores; it is about forging individuals who are continuously self-improving, confident, and committed to "daily self-upgrade until their last breath."

PRINCIPAL

Mrs. Shilpa Jadwani

"We recognize a critical gap in conventional schooling: While students master written exams after 12 years of practice, they often falter in high-stakes personal interactions, such as college entrance interviews. This nervousness stems from a lack of practice and, crucially, content. When they go on vacation, they engage their families in discussions about current events and policies, demonstrating a well-rounded awareness that elevates their thinking and confidence.

Our students are not just studying; they are becoming informed thinkers."

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NOBEL PRIZE IN CHEMISTRY 2025

For Bridging Metals and Organics

Winners

fig:1.1

fig:1.2

fig:1.3

(fig:1.1)

Richard Robson

Nationality: Australian

Institution: University of Melbourne

Contribution: First conceived the idea of linking metals and organic molecules (1970s). and developed ultra-stable, functional versions.

(fig:1.2)

Omar Yaghi

Nationality: Jordanian-American

Institution: University of California, Berkeley

Contribution: Coined the term Metal-Organic Frameworks (MOF)

(fig:1.3)

Susumu Kitagawa

Nationality: Japanese

Institution: Kyoto University

Contribution: Created **porous, flexible frameworks** that could absorb and release gases.

Year	Scientist	Discovery / Contribution
1970s	Richard Robson	Combined copper ions with four-armed organic molecules → formed spacious, crystal-like networks (but unstable).
1990s	Susumu Kitagawa	Developed porous, flexible MOFs that could absorb gases and change shape **"breathing" MOFs.**
2000s	Omar Yaghi	Created stable MOFs with rational design; capable of storing water, hydrogen, CO_2, etc. Also coined the term "MOF."

Why Are MOFs Revolutionary?

They bridge the gap between:

- Metals → strong, rigid, conductive
- Organic compounds → light, flexible, tunable

Before MOFs, these two types of materials were considered chemically incompatible.

MOFs have huge surface areas — a single gram can have as much surface area as a football field! This makes them ideal for trapping, storing, and filtering molecules.

How Were They Developed? (Simplified Timeline)

Field	Application	How it helps
Envionment	Capturing CO_2 from air.	Helps fight climate change.
Water	Extracting water from desert air.	Cleans contaminated water.
Pollution Control	Filtering PFAS (toxic "forever chemicals").	Cleans contaminate-d water.
Energy	Storing hydrogen for clean fuel.	Supports green energy transition.
Health-care	Controlled drug delivery.	Enables targeted therapies.
Sensors / Catalysis	MOFs can act as chemical sensors or catalysts.	Useful in industrial chemistry.

Quick Revision Pointers (1-Minute UPSC Recap)

- 2024 Nobel Prize in Chemistry: For discovery & creation of Metal-Organic Frameworks (MOFs).
- Laureates: Richard Robson (Australia), Susumu Kitagawa (Japan), Omar Yaghi (Jordan-USA).
- MOF = Metal ions + Organic linkers → forms porous, flexible 3D crystals.
- Key features: Lightweight, stable, customizable, high surface area.
- Uses: CO_2 capture, desalination, drug delivery, hydrogen storage, pollution clean-up.
- Replaces zeolites → "soft, flexible, smart" materials.
- Environmental significance: Aids climate, water, and energy sustainability.
- UPSC relevance: GS-3 (Science & Tech, Environment), Essay (Innovation for Sustainability).

Questions

Q. With reference to Metal–Organic Frameworks (MOFs), consider the following statements:

1. They are a class of compounds containing metal ions coordinated to organic ligands to form 3D structures.
2. They are often highly porous materials that act like a sponge.

Which of the statements given above is/are correct?

[A] 1 only
[B] 2 only
[C] Both 1 and 2
[D] Neither 1 nor 2

✅ Answer: (C) Both 1 and 2

Detailed Explanation

"They are a class of compounds containing metal ions coordinated to organic ligands to form 3D structures."

✅ Correct

MOFs (Metal–Organic Frameworks) are hybrid materials made up of:

- Metal ions or clusters (the "nodes"), and
- Organic molecules (ligands) (the "linkers").

These combine to create rigid 3D crystalline frameworks — kind of like **molecular scaffolding**.
The metal provides structural stability, while the organic ligand provides flexibility and tunability.

Example: Copper ions + organic carboxylate linkers → form porous crystal structures.

Nobel Prize 2024 Connection

Winners:

- Richard Robson (Australia)
- Susumu Kitagawa (Japan)
- Omar Yaghi (Jordan–USA)

Contribution: Developed and popularized MOFs hybrid materials combining metal strength + organic flexibility.

Impact: Revolutionized clean energy storage, gas separation, and sustainable chemistry.

Quick Revision Pointers (1-Minute Recall)

- MOFs = Metal ions + Organic ligands → 3D porous structures
- Discovered by Robson, Kitagawa, Yaghi (Nobel 2024)
- Act like molecular sponges → absorb gases/liquids
- Applications: CO_2 capture, water harvesting, hydrogen storage, catalysis
- Represent **"Green Chemistry meets Material Science"**.

Applications of MOFs

Field	Application	Purpose
Environment	CO_2 capture, water harvesting.	Combat climate change, desert water supply.
Chemistry	Catalysis	Accelerate chemical reactions.
Industry	Gas storage (hydrogen, methane).	Clean fuel technology.
Healthcare	Drug delivery.	Controlled release systems.
Pollution control	PFAS/toxin filtration.	Clean water technology.

Figure 1:

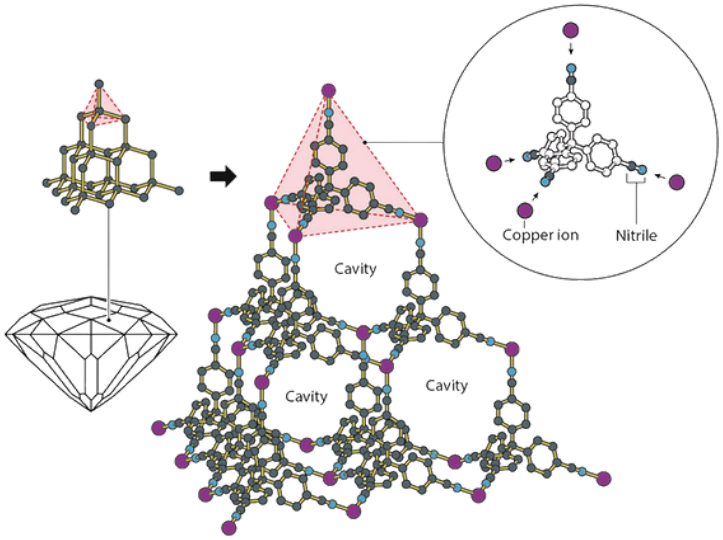

Figure 2:

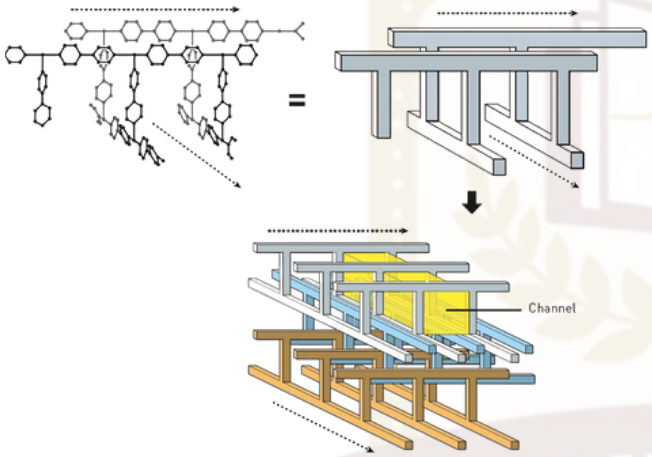

Figure 3:

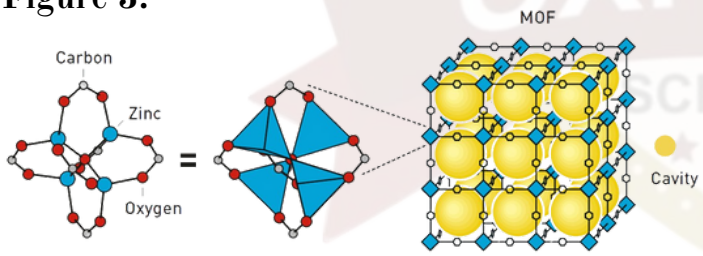

Figure 4:

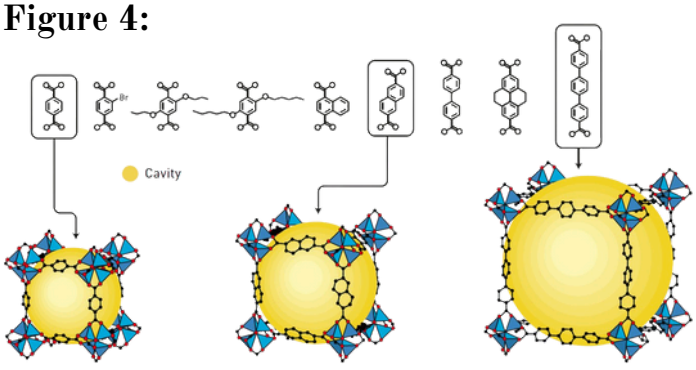

Figure 1:

Richard Robson was inspired by the structure of diamond, in which every carbon atom is linked to four others in a pyramid- like shape. Rather than carbon, he used copper ions and a molecule with four arms, each with a nitrile at the end. This is a chemical compound that is attracted to copper ions. When the substances were combined, they formed an ordered and very spacious crystal

Figure 2:

In 1997, Kitagawa succeeded in creating a metal-organic framework that was intersected by open channels. These could be filled with different types of gas. The material could release these gases without its structure being affected.

Figure 3:

In 1999, Yaghi constructed a very stable material, MOF-5, which has cubic spaces. Just a couple of grams can hold an area as big as a football pitch.

Figure 4:

In the early 2000s, Yaghi showed that it is possible to produce entire families of MOF materials. He varied the molecular links. which resulted in materials with different properties. These include 16 variants of MOF-5, with cavities of various sizes.

Differences Between

Article

1. Provides detailed information on a subject.
2. Mostly neutral, based on facts, data, and research.
3. To inform or explain the reader.
4. Newspapers, magazines, websites, and journals.
5. Reporters, specialists, or professional writers.

Editorial

1. Reflects the opinion of the editor/board.
2. Opinionated and comments on current events/issues.
3. To persuade, criticize, or suggest solutions.
4. Dedicated editorial page in a newspaper.
5. Editor or the editorial board.

Newspaper

1. Delivers timely news and information.
2. Includes news, articles, editorials, and ads.
3. To help people stay updated (local/global).
4. Comprehensive publication with various sections.
5. Large team of reporters, editors, and designers.

Academic Success

Excels in cluster and government competitions. Clear Presentation Mastery for high grades.

Career Launchpad

Confidence in Entrance Exams, Interviews, and Competitive Exam communication sections.

Leadership Growth

Motivating Teams; Negotiation; Creative Thinking & Effective Professional Writing (e.g., contributing to publications).

Expertise & Legacy

Inspiring Vision; Strategic Communication , including thought-leadership articles for major papers (e.g., The Hindu, Times of India).

THE OXFORD SCHOOL

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