



India's Stellar Performance at the 2024 International Physics and Chemistry Olympiads

The 54th International Physics Olympiad (IPhO) and the 56th International Chemistry Olympiad (IChO) held in July 2024 showcased the exceptional talent and dedication of Indian students in the field of science. With two gold and three silver medals in physics, and one gold, two silver, and one bronze in chemistry, India continues to solidify its reputation for excellence in science education. This article delves into the details of these achievements, highlighting the problems tackled by the students, the training processes, and the historical performance of Indian teams at these prestigious events.



[Source: The Indian Express]

Overview of the 54th International Physics Olympiad

1. Event Details and Participation

The 54th IPhO took place in Isfahan, Iran, from July 21 to July 29, 2024. This year, the event saw participation from 193 students across 43 countries. The competition was fierce, with a total of 18 gold, 35 silver, and 53 bronze medals being awarded. India, with its impressive tally of two gold and three silver medals, was placed fourth overall, jointly with Vietnam. The top three positions were secured by China, Russia, and Romania, respectively.

2. The Indian Medalists

India's medalists at the 54th IPhO were:



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Rhythm Kedia (Gold) from Raipur, Chhattisgarh

Ved Lahoti (Gold) from Indore, Madhya Pradesh

Akarsh Raj Sahay (Silver) from Nagpur, Maharashtra

Bhavya Tiwari (Silver) from Noida, Uttar Pradesh

Jaiveer Singh (Silver) from Kota, Rajasthan

These students demonstrated exceptional knowledge and problem-solving skills in both theoretical and experimental physics.

3. Theoretical and Experimental Challenges

The theoretical component of the competition consisted of three problems, each designed to test the students' understanding of complex physical phenomena:

a. Global Warming Model: This problem required students to analyze a simple model of global warming due to the greenhouse effect.

b. Paul Trap and Doppler Cooling: This challenge involved understanding the trapping of ions using the Paul trap and the Doppler cooling techniques.

c. Binary Star System Dynamics: Students had to delve into the dynamics and stability of an accreting binary star system.

In the experimental component, contestants performed two tasks:

a. Heat Conduction: An experiment on heat conduction through a copper rod.

b. Diffraction: A task involving diffraction from phase steps.

Historical Performance and Training

1. Consistent Excellence

India's performance at the IPhO over the past 25 years has been commendable. The country has secured 41% gold, 42% silver, 11% bronze, and 6% honourable mentions. In the last decade, these numbers have improved, with Indian students achieving 46% gold and 52% silver medals.

2. Training and Selection

The success of Indian students at international Olympiads can be attributed to the rigorous training and selection processes. Students are chosen through a series of national-level exams and training camps organized by the Homi Bhabha Centre for Science Education (HBCSE) under the Tata Institute of Fundamental Research (TIFR). The Department of Atomic Energy (DAE), Department of Science and Technology (DST), and the Ministry of Education support these initiatives.

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3. Delegation Leaders and Observers

The Indian delegation to the 54th IPhO was led by:

Prof Deepak Garg from DAV College, Chandigarh

Dr Shirish Pathare from HBCSE, TIFR

They were supported by scientific observers:

Prof AC Biyani (Retired, Govt Nagarjuna Post Graduate College of Science, Raipur)

Prof Vivek Bhide (Gogate-Jogalekar College, Ratnagiri)

The 56th International Chemistry Olympiad

1. Event Details and Participation

The 56th IChO was held in Riyadh, Saudi Arabia, from July 21 to July 30, 2024. This year's competition included participants from 83 countries. The Indian team performed admirably, securing one gold, two silver, and one bronze medal.

2. The Indian Medalists



[Source: Mint]



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The Indian medalists at the 56th IChO were:

Devesh (Gold) from Jalgaon, Maharashtra

Avaneesh (Silver) from Kota, Rajasthan

Harshin (Silver) from Hyderabad, Telangana

Kashyap (Bronze) from Mumbai, Maharashtra

These students excelled in both the theoretical and practical components of the competition.

3. Theoretical Examination

The theoretical examination at the IChO consisted of nine problems from various chemical fields, including:

- a. Gas Sensing Resistors:** Problems related to semiconducting metal oxides used in gas sensing devices.
- b. Neurotransmitter Production:** Questions on the production of dopamine, a crucial neurotransmitter.
- c. Antibiotic Synthesis:** Challenges involving the synthetic route to penicillin.
- d. Polymer Chemistry:** Problems on the formation mechanisms of ethene-based polymers and self-healing polymers.

4. Practical Examination

The practical examination tested the students' experimental skills and ability to apply theoretical knowledge to real-world problems. This included tasks related to synthesis, analysis, and characterization of chemical compounds.

5. Delegation Leaders and Observers

The Indian team was accompanied by:

Prof Gulshanara Shaikh (Head Mentor, Formerly of St. Xavier's College, Mumbai)

Dr Shraeddha Tiwari (Mentor, Assistant Professor, ICT, Mumbai)

Prof Seema Gupta (Scientific Observer, Acharya Narendra Dev College, Delhi)

Dr Amrit Mitra (Scientific Observer, Govt. General Degree College, Singur, West Bengal)

Historical Performance and Training

1. India's Journey at the IChO

This was India's 25th appearance at the IChO. Over the years, Indian students have secured 29% gold, 53% silver, and 18% bronze medals. In the last decade, the performance has improved, with 33% gold and 57% silver medals.



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2. Training and Selection

Similar to the IPhO, the selection and training process for the IChO is rigorous. The HBCSE organizes national-level exams and training camps, preparing students for the challenges they will face at the international level. The support from DAE, DST, and the Ministry of Education plays a crucial role in these preparations.

Broader Impact and Implications

1. Boosting Science Education

India's consistent performance at international Olympiads highlights the strength of its science education system. These achievements inspire young students across the country to pursue careers in science and technology. The success stories of Olympiad winners often motivate schools and educational institutions to invest more in science education and nurture young talent.

2. Encouraging Gender Diversity

While the current list of medalists is predominantly male, efforts are being made to encourage greater participation of female students in STEM (Science, Technology, Engineering, and Mathematics) fields. Initiatives aimed at reducing gender disparity in science education are crucial for ensuring a more inclusive and diverse scientific community in the future.

3. International Recognition

The achievements of Indian students at the IPhO and IChO bring international recognition to the country's educational standards. This recognition enhances India's reputation in the global scientific community and fosters international collaborations and exchanges in the field of education and research.

The 2024 International Physics and Chemistry Olympiads have once again demonstrated the exceptional capabilities of Indian students. Their success is a testament to the rigorous training and support provided by institutions like the Homi Bhabha Centre for Science Education, and the backing of national agencies like the Department of Atomic Energy, the Department of Science and Technology, and the Ministry of Education. As India continues to excel in these international competitions, the future of science education in the country looks bright, promising even greater achievements in the years to come.