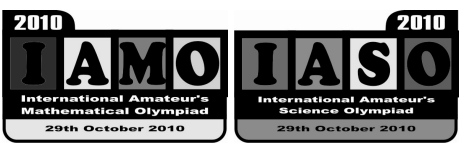
IAAMS

Integral Association of Amateur
Mathematicians and Scientists

Olympiad 2010
(Research-based Olympiad Examinations)



STUDENT HANDBOOK

Class II to Class X
(To be circulated Free of cost to the students)

Visit www.iaamsolympiad.com

About IAAMS

Integral Association of Amateur Mathematicians and Scientists (IAAMS) is a Registered, Not-for-profit organization started by eminent educators and professionals with an objective of creating a common forum for amateurs to share, discuss, express and learn.

IAAMS' members come from renowned institutions like IITs, IIMs, RECs and foreign universities. IAAMS has its regional offices at Hyderabad, Chennai and Georgia, USA.

IAAMS aims to identify and nurture the talent in school students through research based Olympiad examinations.

IAAMS encourages the natural inquisitiveness in students by providing an amiable nurturing environment and making them contribute to our planet through 'Pure pursuit' of Mathematics and Sciences.

Pierre De Fermat (Lawyer)

The First Amateur Mathematician

Handbook Contents

Who is an Amateur?

Amateur can be defined as a person who is not a professional, one who has the interest and passion for the subject, one whose heart is in the specific discipline, one who needs help, one who needs expression, one who needs like-minded individuals, one who needs avenues to observe, learn, experiment, share, reconfirm, discuss and debate.

Therefore, in our view, students are the first amateurs.

What is 'True Amateur Spirit'?

The Amateur Spirit is to open up and identify that passion, that calling and start the search for like minded people and being a part that group.

One way of meeting such individuals is through participation in **IAAMS Olympiad 2010**.

The History of Olympiad Examinations

The history of Olympiad examinations dates back to 1895 when the first Olympiad examination in Mathematics was conducted in Hungary.

Thereafter, it became customary for all the European countries to conduct Olympiad examinations in their respective countries to identify the apex talent and gifted brains so that such talent can be nurtured and fine tuned.

The first International level Mathematical Olympiad was conducted in 1959 at Romania. Till today, this event remains the 'Curtain Raiser' for the Olympiad activity in all other subjects like Science, Physics, Chemistry and Biology.

But let us ask ourselves what 'Olympiad' signifies!!

Olympic Games represent the pinnacle of human endeavor and resilience. They originated in ancient Greece and were held every four years.

The word 'Olympiad' denotes the period of four years between two games and is characterized by rigorous and arduous preparations for the impending games.

Across the passage of time, the word 'Olympiad' has come to refer to **any event that brings out the best talent and human excellence**.

IAAMS Olympiad Examinations – Olympiad 2010

The scale and the quality of the 'High School Olympiad' activity in our country is relatively poorer compared to other countries.

IAAMS' presence and research in USA made it possible for us to compare the kind of awareness and preparation standards of the US students with Indian students. We have also distilled the best of the Olympiad examinations as they happen in other continents and countries like Canada, China and Australia.

*"We have observed the different types of question patterns from various state level competitions across **USA** and **Canada**. Few of the question models are taken from various entrance exams in the international arena. It is customary that in **USA,** various universities collaborate with high schools to identify the talent in a particular area or province like **University of South Carolina**, **North Carolina**, **University of Wisconsin**, **and Harvard & MIT**.*

*Their expertise and research has really taken the High School students community to great heights in flaunting their talents in subjects like **Mathematics** and **Science**. The **Canadian Mathematics Competitions** is must to mention as it was also of great inspiration for us to float IAAMS Olympiad Exams in India"*

Kastala. R, Head, Research Cell, IAAMS, Georgia, USA

Talent should be identified, nurtured and should be given proper direction and dimension. Otherwise, it will just slip in to darkness. Identification of the talent is not a simple task, although many claim it to be. The need is for the right assessment methods, both qualitative and quantitative. IAAMS is a research oriented organization driven by amateur Mathematicians and Scientists, eminent educators and alumni from the most respected institutions from around the world and it adopts a scientific approach to talent identification – through Olympiad Examinations.

Olympiad 2010

Olympiad 2010 will be conducted in **Mathematics, Science,** for students from classes 2nd to 10th. Students studying in any of the various syllabi (CBSE. ICSE. State Boards, IB, IGCSE) can appear for the exams as the syllabus for the examination is holistic and integrated.

The 5 Qs:

IAAMS Olympiad Exams culminate in a 360^0 Evaluation of the student (testing his/her Concepts, Comprehension, Analysis, Application and Vision). Through the different varieties of questions, the following are derived for each student:

- Knowledge Quotient
- Understanding Ability Quotient
- Reasoning and Analytical ability Quotient
- Problem Solving Skill Quotient
- Awareness and Vision Quotient

This is first of its kind in the history of Olympiad Examinations in India.

IAAMS is conducting the Olympiads under the following names:

Name of the Exam	Full Form
IAMO Mathematics	International Amateurs Mathematical Olympiad
IASO Science	International Amateurs Science Olympiad

Eligibility

All students from Class II to Class X studying in State Board or CBSE or ICSE or IB/IGCSE schools.

Examination Fees (For Prelims)

IAMO: **Rs.120/-;** IASO: **Rs.120/-**
Government School students can write these Olympiads for Rs.60/- each only.

There will no extra examination fees for the Mains exams.

Structure and Pattern of Olympiad 2010

1. Objective Type with responses captured on OMR sheets
2. The Duration of the exam is 90min.
3. The number of questions is 50.
4. Some Sections in the question paper will have negative marking scheme.
5. There will be separate question paper for each class.
6. The top 7-10% students enrolled in each class will qualify for Mains 2010 (Level - 2). Separate admit cards will be issued to the selected students through their respective schools.

Student Analytics

IAAMS will provide the 'Student Evaluation Chart' to the student, subject wise, after the Prelims with the following:

- Absolute Score
- Percentile Score
- Grade (High Distinction (HD) / Distinction (D) / Satisfactory(S) / Remedial (R))
- Category and Sub Category wise Response report
- Difficulty level Response report
- 5 Qs
- Generic Inferences for Improvement
- Graphical Analysis Tools

Scholarship Program

Successful students in the Olympiad Mains exam will be awarded scholarships.

- For the student at National Position 1 in each class :
  Medal of Honour "Amateur Scientist 2010".
  A Laptop Computer and a Memento.
  For the student at National Position 2 in each class :
  Medal of Honour "Amateur Scientist 2010".
  A Cash award of Rs. 5000.
  For the student at National Position 3 in each class :
  A Cash award of Rs. 3000.
  For the student at National Position 4 in each class :
  A Little Science Library Kit worth Rs. 2000.
  For the student at National Position 5 in each class :
  A Little Science Library Kit worth Rs. 1000.
  The next 5 National positions in each class :
  A Little Science Library Kit worth Rs. 500.
  Consolation Prizes will be awarded for all the worthy students there after.

Integrated Syllabus

The syllabus is designed in an integrated manner, amalgamating the topics across multiple syllabi (ex: CBSE and ICSE). Syllabus for the higher classes will include previous class syllabus also.

MATHEMATICS - IAMO	
2ND Standard	**3RD Standard**
Number line, Expanded notation, Three digit single digit additions, two digit additions and subtractions, pictorial additions and subtractions, word problems, multiplication, fractions picture representation ,ordinal numbers & cardinal numbers, basic Shapes.	Four digit Numbers, Addition, Multiplication, Division, Fractions, Money, Length (conversions), Weight, Capacity, Time, Point, Line and plane Figures
4TH Standard	5TH Standard
5 digit Numbers, Place value, Roman Numerals, Addition and Subtraction, Geometry : Square, Rectangle, Circle, Closed,Open Figure, Multiplication, Factors and Multiples, Fractions, Divisions, Measurement, Pictorial representation of data, Money, Time, Series and Pattern Formation of Numbers and Figures.	7 and 8 digit Numbers, Rounding off, Roman Numbers, Addition, Subtraction, Multiplication, Division, Factors & Multiples, Rules of divisibility, Prime and composite numbers, Fractions, Decimals, Basics geometry, Circles, Symmetry, Measurement of Length, Mass, Capacity, Perimeter & Area of rectangle & Square, Measurement of Volume, Temperature, Time, Money.
6TH Standard	7TH Standard
Core Math Number System-Integers-Fractions & Decimals-Factors & Multiples-Powers &Roots-Ratio & Proportion-Percentages-Basic Algebra-Equations-Basic Geometry-Mensuration General Math Numerical simplification-Number Patterns-Puzzles	Core Math Number System-Integers-Fractions & Decimals-Rational numbers-Real numbers-Basic Number Theory-Ratio & Proportion-Percentage-Algebra-Equations-Geometry-Mensuration General Math Numerical simplification-Number Patterns-Puzzles

8TH Standard	9TH Standard	10TH Standard
Core Math Number System-Rational Numbers-Squares & Square Roots-Cubes and Cube roots-Properties of numbers-Divisibility Conditions-Algebra-Identities-Simplification(Arithmetic and Algebra)-Equations & Inequations-Geometry (Triangles-Quadrilaterals-Circles)-Statistics-Basic Inequalities-Commercial Arithmetic- General Math Patterns – The student recognizes, describes, extends, develops, and explains relationships in patterns in a variety of situations. Visualization and Geometric Models	Core Math Pure Arithmetic(Rational numbers-Irrational numbers-Real numbers)-Number Theory-Polynomials-Identities and Factorization-Linear Equations and Graphs-Geometry(Triangles-Quadrilaterals-Circles)-Mensuration-Statistics- -Basic Inequalities General Math Geometry From An Algebraic Perspective – The student relates geometric concepts to a number line and the first quadrant of a coordinate plane in a variety of situations. Number Series-Counting Principles	Core Math Pure Arithmetic(Rational numbers-Irrational numbers-Real numbers)-Number Theory-Polynomials-Identities and Factorization-Simplification-Analytical Geometry-Quadratic Expressions & Equations-Number Series-Geometry-Inequalities-Sets and Relations General Math Patterns –Student recognizes, describes, extends, develops, and explains relationships in patterns in a variety of situations. Visualization & Geometric models Counting principles

Science IASO

2nd class	3rd class
(Mental ability): Numerals and number name, Addition, Subtraction, Fractional numbers, Geometrical shapes. **(Science) :** Body and their functions, Our family, Clothes, Food , Air, Sources of water ,My home, Good habits , Safety habits and first aid, Means of transport, Places of worship, Services in neighborhood, Plant life. **(General Knowledge)**	**(Mental ability):** Numerals and number name, Addition, Subtraction, Fractional numbers, Multiplication, Division, Time, Straight and curved lines, Calendar, Measurement of weight and capacity, Geometrical shapes, Money. **(Science):** Plant and Animal Life, Matter, Earth & its Surroundings, Human Body, Place to Live, Means of Transport. **(General Knowledge)**
4th class	**5th class**
(Mental ability): Numerals and number name, Addition, Subtraction, Fractional numbers, Multiplication, Division, Time, Straight and curved lines, Calendar, Measurement of weight and capacity, Geometrical shapes, Money. **(Science):** Plant and Animal Life, Human Body, Environment, Matter, General Science, Universe. **(General Knowledge)**	**(Mental ability) :** Numerals and number name, Addition, Subtraction, Fractional numbers, Multiplication, Division, Time, Straight and curved lines, Calendar, Measurement of weight and capacity, Geometrical shapes, Money. **(Science) :** Living Science, Health and diseases, Earth and Universe, Matter, Physical Science, General Science. **(General Knowledge)**
6TH Standard	**7TH Standard**
General Science **Our Universe-Materials in daily use-Things around us-Food-Human body-Plants & Animals-Our Earth** **Physical Science** **Measurement-Force-Pressure-Work-Energy**	**General Science** **Air, Water, Weather-Materials in daily use-Pollution-Wind, Rain, Thunder, Cyclone - Our Universe-Human body-Living & Non-living things** **Physical Science** **Measurement-Force-Work-Energy-Heat-Light-sound-Electricity-Matter and its changes**

8TH Standard	9TH Standard	10TH Standard
Core Science Measurement-Motion and Various Types of Motion-Speed, Velocity & Acceleration and their relationships-Force-Friction-Pressure-Sound-Heat-Light-Electricity- physical Changes-Language of Chemistry-Types of Chemical changes-Laws of Chemical combination-Water-Hydrogen- Biology and its Scope -Human Body-Plant and animal Life--Agriculture-Microorganisms Science in General Our Universe-Everyday Physics- Matter around us-Chemistry in daily life-Materials in Daily life-Fuels Food - Environment and conservation-Pollution-Food Production and its management	Core Science Measurement and Experimentation-Kinematics-Laws of Motion-Simple Machines-Fluids-Dynamics-Gravitation-Light-heat-Sound-Electricity- Matter-Materials in Daily use-Elements compounds and mixture-Atomic Structure-molecules-language of Chemistry-Behavior of Gases-Carbon and its compounds- Biology and its Scope-Cell and its structure-plant and animal cell-Tissues-Life Processes-Diversity in living organisms-Plants and animals-Ecology Science in General Our Universe-Everyday Physics- Matter around us-Chemistry in daily life- Human Body-Agriculture-Health and Hygiene- Environment and conservation	Core Science Measurement - Kinematics-Dynamics-Gravitation-Light-Heat-Sound-Electricity-Magnetism-Electromagnetic Spectrum-Machines-Atomic Structure-language of Chemistry-Chemical Bonding-Periodic Classification-behavior of Gases-Carbon & its compounds-Solutions-Mole Concept – Biology, its Scope-Diversity in Living organisms-Life processes-Chemical coordination in Plants-Chemical coordination in animals-Nervous system & sense organs. Science in General Our Universe-Everyday Physics, Matter around us-Chemistry in daily life- Human Body-Agriculture-Health and Hygiene-Ecology-Environment and conservation

If you observe, in each subject there are Core and General Syllabi. Core syllabus is the prescribed syllabus and is part of the text books.

General Syllabus is the syllabus that does not appear explicitly in any single book and rather is the domain of the student's observation and visualization in everyday world.

Suggested Reading and Cues

IAMO

Suggested Reading

- School Text Books of Current Year. IAAMS suggests the text books of previous academic year also.
- Text books of other syllabi.
  E.g. : ***A student of ICSE should also read the CBSE and State Board text books of the current academic year***
- Olympiad Mcyclopedia Kit by ***Math Tree Learning Media***
- Elementary Algebra by ***Hall and Knight***
- Higher Algebra by ***Hall and Knight (For VIII, IX, X)***
- General Mathematical Puzzle books

Cues

- Knowledge about the basic applications of Mathematics in daily life

IASO

Suggested Reading

- School Text Books of Current Year. IAAMS suggests the text books of previous academic year also.
- Text books of other syllabi.
  E.g. : ***A student of ICSE should also read the CBSE and State Board text books of the current academic year***
- Basic terminology related to **'Universe'**

Cues

- Knowledge about **'Everyday Science'** ***[Children's Knowledge Bank]***

IASO (Physics

Suggested Reading

- School Text Books of Current Year. IAAMS suggests the text books of previous academic year also.
- Text books of other syllabi.
  E.g. : ***A student of ICSE should also read the CBSE and State Board text books of the current academic year***
- Physics by ***Cutnell & Johnson***
- Books on 'Physics problem solving'

Cues

- Knowledge about 'Universe'
- Knowledge about the basic applications of Physics in daily life

IASO (Chemistry)

Suggested Reading

- School Text Books of Current Year. IAAMS suggests the text books of previous academic year also.
- Text books of other syllabi.
  E.g. : ***A student of ICSE should also read the CBSE and State Board text books of the current academic year***
- IAAMS recommends ICSE chemistry text books of your Class

Cues

- Knowledge about materials around you
- Knowledge about the basic applications of Chemistry in daily life

IASO (Biology)

Suggested Reading

- School Text Books of Current Year. IAAMS suggests the text books of previous academic year also.
- Text books of other syllabi.
  E.g. : ***A student of ICSE should also read the CBSE and State Board text books of the current academic year***
- IAAMS recommends ICSE biology text books of your Class

Cues

- Knowledge about plants and animals around you
- Knowledge about the basic applications of Biology in daily life

General Preparation Tips

- Please check the eligibility criteria and subjects in which you want to take the Olympiad exam. Please apply well in advance and plan for the same.
- Check and prepare for the Integrated Syllabus as released by IAAMS *You can check the same in our website www.iaams.in*
- Also have a look at the Suggested Reading and Cues for the preparation. Take help from the concerned Subject Teacher *You can check the same in our website www.iaams.in*
- Your school books are more than sufficient for the preparation. But please make it a point to have a look at the syllabus topics from the other syllabi text books also. Take help wherever required.
- We all know that any exam will assess only the fundamental grip on the subject. This can be achieved only when your basics are right and are in tact. So please give a quick revision of the previous class text books possibly from the other syllabi also. Take the help of your teacher.
- Practice the non-routine MCQs (Multiple Choice Questions) from the various sources available in the market. Request your teacher to provide for the same.
- Do the preparation in groups which will help you a lot.
- For general syllabus, read Science magazines and Science articles from the news papers. Use internet to search for the specific topics and exhaust yourself.
- Be inquisitive about things around you and try to gather as much information as possible.
- The resources page of www.iaams.in will be the next best place to have the specific preparation for General syllabus

Student FAQ

How to prepare for the general syllabus?

Rigorous study of the syllabus prescribed is a must. In addition, IAAMS Olympiad examinations also test a student's native intelligence and observation skills. We recommend the student to keep an open mind and study Mathematics and Sciences in his everyday surroundings. We recommend the student to keep an open mind and study Mathematics and Sciences in his everyday surroundings.

How to prepare for the Essay in Mains?

The essay is a descriptive question testing the student on the depth of his knowledge, insight and passion on the subject. Regular practice on writing small essays and précis writing is recommended.

How are students shortlisted for Mains?

Students who fall in the top 20% of the merit list of Prelims will be qualified for Mains. The merit list is prepared separately for each subject and for each class.

What will happen in Mains?

In Mains, students will be assessed through unique Comprehension models, Contextual and situational questions, questions that check the correlation ability, critical analysis and appreciation of the subject

Are there any additional reference books needed apart from school text books?

The prescribed reference books are the regular text books. For integrated learning experience, IAAMS suggests text books of previous classes and text books of other syllabi also. No other books are needed for preparation.

What are the examination centers for Prelims and Mains?

For Prelims the examination centre is the participating School itself
For Mains: the examination centre will be intimated for qualifying students

Can the student directly apply without schools?

Currently, the examinations are conducted only through schools. No direct applications are accepted.

My school has already dispatched the registration form. Can I still register?

Please contact your school and ask them to send us a mail at olympiad2009@iaams.in stating your details and interest. We shall consider the request on a case-by-case basis and respond to your school.

What about the Model Questions for IAAMS Olympiad Examinations?

The Model questions for all the exams are available on our website www.iaams.in

When and how are the results declared?

The results of the Prelims examination will be declared in the months of December / January. The results will be announced on our website www.iaamsolympiad.com. The 'Student Evaluation Chart' and the 'School Analytics Report' will be made available to the schools after the results are announced.

Is it enough to just read the regular text books?

Yes. The regular text books are the prescribed books. However, studying text books of previous class and text books of other syllabi is also recommended. Please find the suggested reading sheet with this Communication Kit.

Are IAAMS Olympiad Examinations conducted in English?

Yes. The exams are conducted only in the medium of English.

Will the ranks and marks be given separately for IAMO and IASO.

YES. The ranks and marks will be given separately.

To take part in Olympiad 2010, please contact your
Principal / Correspondent / Teacher

Important Dates:

Last Date for the school to send SRF&SPDF, and Demand Drafts to IAAMS
Contact your school

Olympiad 2010

Prelims: October 29, 2010
Mains: December 19, 2010

Advantages of Olympiad 2010

Exposure

Exposure to a larger pool of students from different syllabus backgrounds

Rigorous Preparation

Opportunity for all participating students to re-explore the subjects through arduous preparation and a chance to prepare from the other syllabi text books

Revision of Previous Academic Years

Revision of text books of the previous class and the opportunity to appreciate the connection

Awareness and Vision

You will develop an awareness towards your surroundings and start enjoying Mathematics and Sciences rather than thinking of them as just school subjects

Nurture Programs

Chance to win scholarships and unique opportunities to meet the professional scientists by being a part of the nurture programs of IAAMS

Analytics

Every student will get the strength and weakness analysis in the respective subjects. The five Q's will really enrich the inferences you are going to make about your performance.

Assessment

You will have the assessment of your abilities vis-a-vis other students who are your peers and those who might compete with you in the future in entrance exams like IIT-JEE, JIPMER, AIIMS, GRE, GMAT and CAT.