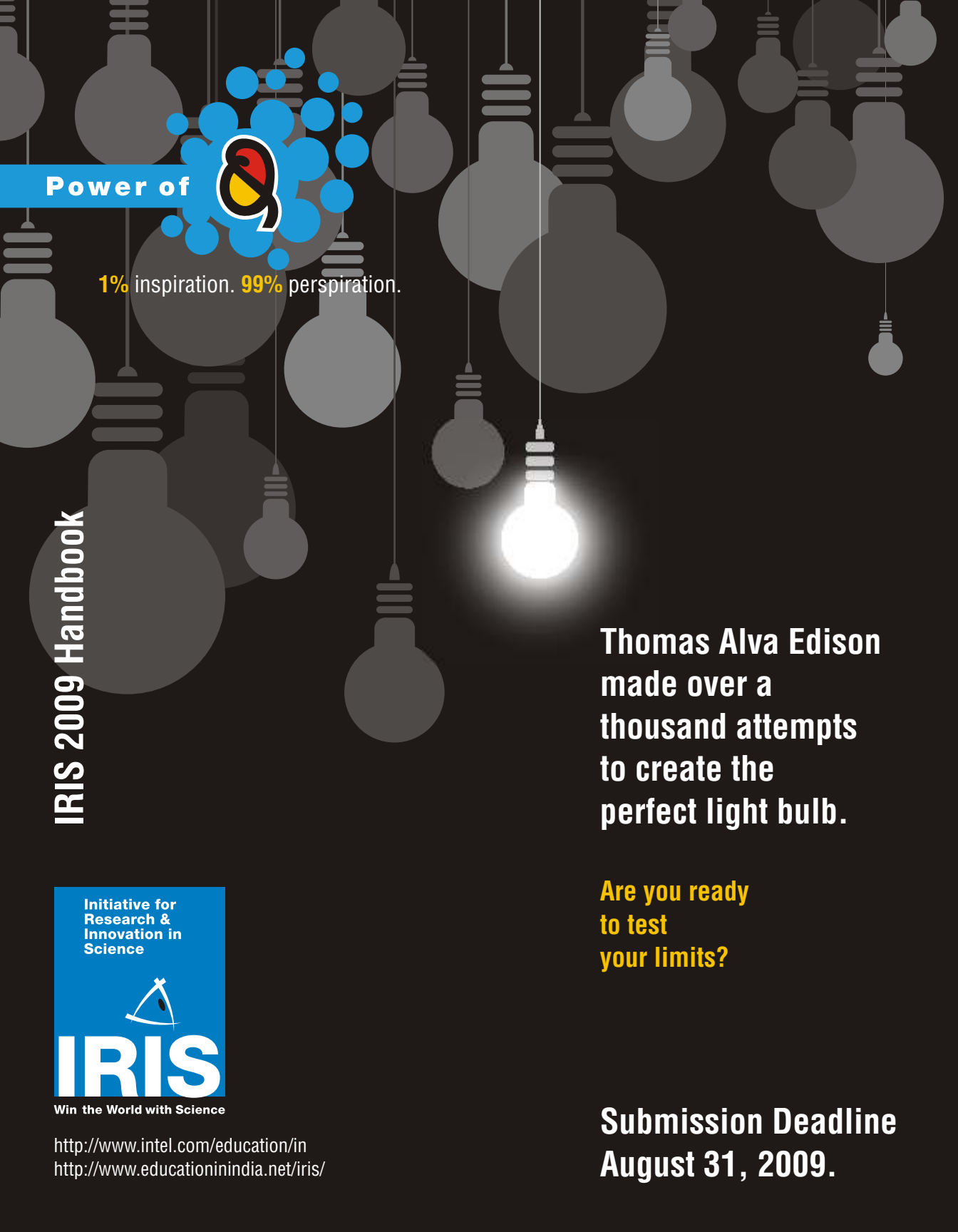
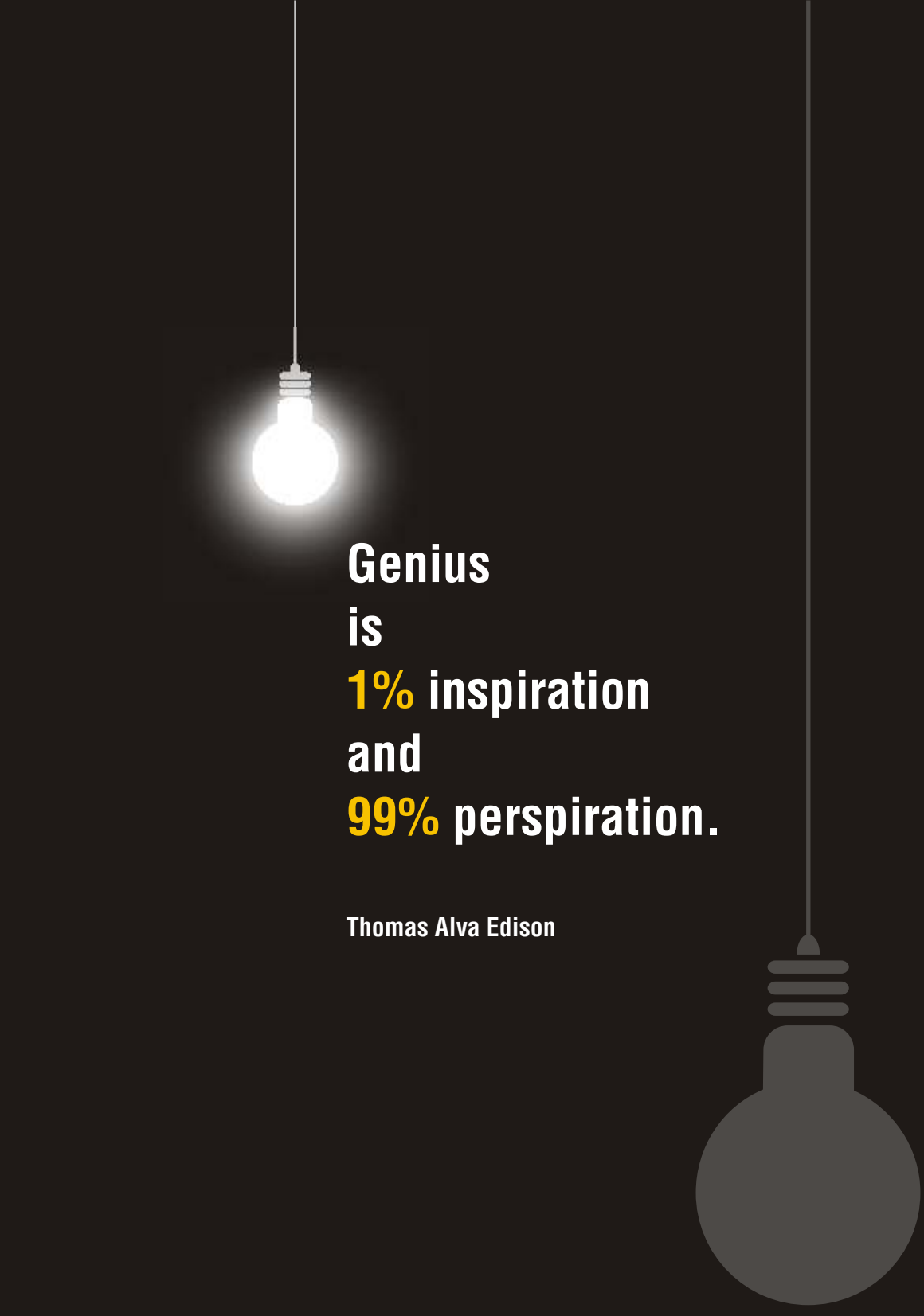

Power of
1% inspiration. 99% perspiration.
IRIS 2009 Handbook
Thomas Alva Edison made over a thousand attempts to create the perfect light bulb.
Are you ready to test your limits?
Initiative for Research & Innovation in Science
IRIS
Win the World with Science
http://www.intel.com/education/in
http://www.educationinindia.net/iris/
Submission Deadline August 31, 2009.


Genius
is
1% inspiration
and
99% perspiration.
Thomas Alva Edison

There’s a way. Find it

These famous words best describe the indefatigable spirit of geniuses like Thomas Edison, Albert Einstein, Alexander Fleming and many more.

One needs more than a questioning mind to probe the frontiers of science. One needs belief in and idea and true perseverance in order to transform it into reality.

Thomas Alva Edison, in creating the perfect lightbulb succeeded only after having made over a thousand attempts.

He believed that in every wrong attempt discarded, there was another step forward.

Edison and many other scientists over the centuries have used their failures to isolate what they needed to know.

Each one of you is blessed with the Power of Questioning. Use it well and persevere until you achieve success.

“**Many of life’s failures are people who did not realize how close they were to success when they gave up.**”
Thomas Alva Edison

Contents:

कपिल सिब्बल
KAPIL SIBAL

सत्यमेव जयते

विज्ञान एवं प्रौद्योगिकी तथा पृथ्वी विज्ञान मंत्री
भारत सरकार, नई दिल्ली
MINISTER FOR SCIENCE & TECHNOLOGY
AND EARTH SCIENCES
GOVERNMENT OF INDIA
NEW DELHI

MESSAGE

Dear Young Scientists,

I am glad to see that the Department of Science and Technology, Intel, and CII have brought out the IRIS handbook.The Initiative for Research and Innovation in Science (IRIS) is a platform for you not only to prove your scientific genius but also win public recognition.

Further more national level winners will also have an opportunity to represent India at International Science Fairs like Intel International Science and Engineering Fair (Intel ISEF) held in the USA every year.

Wish you all the best and “Win the World with Science” and make our country proud.

(KAPIL SIBAL)

Science in India

The development of science and technology in India since Independence has been based on Jawaharlal Nehru's unswerving faith in the importance of science and scientific institutions for national progress. India's large network of institutes and laboratories has grown steadily over the past half a century. One of the key requirements of the country today is to help build scientific temperament and a culture of innovation amongst the youth of the country, as well as help popularize science and technology in the schools and amongst students. This would go a long way in contributing to the development of the country as a knowledge economy.

Background

What is IRIS?

The DST-CII-Intel partnership is the merger of two programs with a common mission of promoting the spirit of science, the "Intel Science Talent Discovery Fair" and CII-DST's "Steer the Big Idea" into one program, 'IRIS – Initiative for Research & Innovation in Science'. Intel has joined hands with the Department of Science and Technology (DST) and Confederation of Indian Industry (CII) to jointly promote inventions and innovations among students and youth in India. IRIS has participants from across the country converging at the National level Fair. Projects shortlisted from the National Fair represent India at Intel International Science and Engineering Fair (ISEF).

Department of Science and Technology (DST)

Department of Science & Technology (DST) was established in May 1971, with the objective of promoting new areas of science & technology and to play the role of a nodal department for organizing, coordinating and promoting S&T in the country. **Rashtriya Vigyan Evam Prodyogiki**

Sanchar Parishad (RVPSP)

RVPSP's aim is popularization of Science and Technology (S&T) and stimulation of science and technological temper among the people. RVPSP supports research and development in the area of S&T communication, develops software in different languages, helps prepare competent science communicators through short- and long term courses, encourages and recognizes outstanding communicators and institutions involved in S&T popularization and organizes state/country-wide field projects. RVPSP maintains up-to-date databases in areas of relevance to S&T communication.

NCSTC - Network

The National NCSTC network includes science based non-government and government organizations. NCSTC-Network has been organizing the National Children's Science Congress (NCSC) since 1993. Teams of young scientists (10 to 17 years in age) work on projects around a theme. They present their findings at district, state and national level events in a language of their choice. The congress reaches about 600 districts through coordinator volunteers.

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Confederation of Indian Industry (CII)

CII works to create and sustain an environment conducive to growth of industry in India, partnering industry and government alike through advisory and consultative process. CII is a non-government, not-for-profit, industry led to industry managed organization, playing a proactive role in India's development process. Founded over 110 years ago, it is India's premier business association, with a direct membership of over 5300 companies from the private as well as public sectors, including SMEs and MNCs, and indirect membership of over 80,000 companies from around 300 national and regional sectoral associations.

Intel® Education

Intel® Education is a multifaceted education program by Intel to encourage originality of thought in the digital world, amongst students and teachers. The overall goal is to prepare today's students and teachers for tomorrow's demands. Intel aims at improving education through the effective use of technology in classrooms; and broadening access to technology and technical careers.

International Science and Engineering Fair (Intel ISEF), USA

Intel ISEF is the world's largest pre-collegiate celebration of science. Held annually in May, Intel ISEF brings together more than 1,200 students from over 40 nations to compete for over 900 prizes. There is US$ 2 million to be won including scholarships, tuition grants, internships, scientific field trips and the grand prize: a trip to attend the Nobel Prize Ceremony in Stockholm, Sweden. Society for Science & the Public (SSP) and Intel are the title sponsor of this prestigious international competition.

The world is nothing but a canvas to the imagination.

Participation Details

Who is eligible to participate?

IRIS Participating Categories :

- Category I: 5th - 8th Std
- Category II: 9th - 12th Std

If you have an idea that is original and innovative, you are eligible to participate, individually or in a team of 2.

Research-based projects alone qualify to participate at the IRIS National Fair. Hence, your project must be original in content and should be substantiated with data collected from experimentation, if appropriate.

Subject Categories for participation at IRIS are one of the following

1. Behavioural & Social Sciences
2. Biochemistry
3. Botany / Plant Sciences
4. Chemistry
5. Computer Science
6. Engineering
7. Environmental Sciences
8. Mathematics
9. Physics, Astronomy & Earth Sciences
10. Zoology / Animal Sciences

Forms to be submitted along with your project synopsis:

1. Students' Participation Form
2. Synopsis & Screening Report
3. Supporting Data/Additional Information/Ethics Statement

*These forms must reach us before the submission deadline which is **August 31, 2009**. These forms are attached in the Handbook and are also available on our website: http://www.educationinindia.net/iris/. You can download additional forms for yourself and your friends from this website. Online Submission is highly encouraged. This will enable students to receive selection e-notification & also enable them to check the status of their synopsis online. Visit http://www.educationinindia.net/iris/ to get the more details about Online Submission.*

Our Scientific Review Committee (SRC) will evaluate your synopses. The scientists from various IITs (Indian Institute of Technology) Indian Institute of Science (IISc), Bhabha Atomic Research Centre (BARC), and Tata Institute of Fundamental Research (TIFR) etc. are part of our SRC. The SRC reviews all the synopses received for participation and selects the most promising ones. Short-listed synopses will be invited to participate at the National Fair.

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Participation through affiliated Fairs

Various Science Fairs in the country are affiliated with IRIS :

All India/ Central level Science Fairs:

1. Navodaya Vidyalaya Samiti – NVS
2. Central Board of Secondary Education Union Territory/ State level Science Fairs organized by: Andhra Pradesh, Chandigarh, Goa, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Uttar Pradesh, Rajasthan.
3. NCSC (National Children's Science Congress)

We are currently working on opportunities to affiliate with other major Science Fairs and science institutions in India. Please visit our site for the latest developments and tie ups.

Projects will be selected from these Science Fairs **based on IRIS judging criteria. These projects must be research based projects and simple models of existing scientific mechanisms or principles will not be considered.** In case of a team project, if you have worked as a larger group, please nominate 2 people to represent your project. If selected for IRIS, the other members of your group need to give a No Objection Certificate to the nominees.

The projects selected from the Affiliated Fairs together with the short-listed direct entry projects participate at the IRIS National Fair.

Participation Process

Call for Entries
In case of direct entries, students can fill the application form in the Handbook.

The Handbook can be obtained through your school, on the IRIS website or through IRIS workshops.

Synopsis Submission
1. Students respond with the Participation Form, Project Details and Project Synopses, latest by **August 31, 2009.**
2. In case of Affiliated Fairs, IRIS shortlists the projects from the affiliated fairs.
3. The SRC screens and short-lists projects from direct entries as well as Affiliated Fair entries.
4. **Online Submission is highly encouraged this year.** Online submission will enable students to receive selection notification & status of their synopsis.
   You can upload your synopsis on http://www.educationinindia.net/iris/

National Fair
At the National Fair upto 8 projects (5 individual and 3 team projects) from Category II will be declared as National Winners. From these, 6 projects (4 individual and 2 team projects) will be selected to represent India at Intel International Science and Engineering Fair (ISEF). The cost of participation at ISEF for the projects selected by SRC will be borne by IRIS.

Coaching Camps
The winners of the National Fair undergo 2 coaching sessions with the scientists to gear up for their participation at the International level. At the end of second Coaching camp, the SRC will short list and announce 6 projects (4 individual and 2 team projects) that are finally selected for ISEF participation.

Points to remember when applying through the Affiliated Fairs
IRIS has entered into a Memorandum of Understanding (MOU) with the Affiliated Fairs who select projects that meet IRIS judging criteria. (Please refer to IRIS judging criteria given in this handbook for further details). IRIS does not appoint or in any way monitor the judging or the conducting of these Affiliated Fairs.

A problem is a chance for you to do your best.

Subject Categories for Projects

Which subject should you choose for your project?

Select a topic of interest from any of the following subjects for your project. Affiliated Fairs may have a theme; however for IRIS you must select one of the 10 subject catagories below. In case you are not sure of this classification the IRIS SRC will evaluate your project and classify it suitably. Depending on the number of projects received in various categories the SRC may recategorise projects if necessary.

Examples of projects have been given along with each subject category to illustrate the kind of projects that have participated previously at the Fairs.

1. **A. Behavioural Sciences**

   Behaviour and thought processes of humans and other animals in their interactions with the environment studied through observational and experimental methods; study of progressive behavioural changes from birth until death; study of mental processes that underlie behaviour, e.g. thinking, reasoning, motivation and emotion; relationships between the nervous system, especially the brain, and mental functions such as language, memory, and perception.

   B. Social Sciences

   Study of human social behaviour, especially of the origins, organization, institutions, and development of human society.

   Examples: • The Effects of Colour on Memorization Tasks • The Effect of Mobile Phone Usage on Reaction Time • A Novel Low Cost Design of Tic Tac Toe Boardgame for the Visually Challenged

2. **Bio-chemistry**

   Chemistry of life processes - Molecular Biology, Molecular Genetics, Enzymes, Photosynthesis, Blood Chemistry, Protein Chemistry, Food Chemistry and Hormones.

   Examples: • Bioinformatics Discovery of Novel Stem Cell Regulatory Mechanisms • Probing Gap Junction Dynamics in Cells • Identifications of Bacterial Adhesion Antagonists for Contact Lens and Intraocular Lens

3. **Botany/Plant Sciences**

   Plant diversity and ecological adaptations; unusual physiological mechanisms, biochemical pathways and hereditary phenomena; improved growth and productivity in agricultural/horticultural crops and forest trees; novel plant products and innovative uses of plants and their products; bio-control of plant, animal and human diseases; plant-animal interactions; plants as renewable sources of energy; application of micro-organisms in food processing, industry, health, agriculture and energy generation; conservation of rare and endangered plants; utilization of waste agricultural residue and non-timber tree products; plant based crafts that can generate rural income.

   Examples: • Agricultural impact of Detrimental Weeds on Wheat Cultivators • The in vitro propagation of A. palmantum and its various cultivators • Biosynthesis of a commercially important compound in tissue culture

4. **Computer Science**

   Study and development of Computer Hardware, Software, Engineering, Internet Networking and Communications, Graphics (including human interface), Simulations / Virtual Reality or Computational Science (including Data Structures, Encryption, Coding and Information Theory).

   Examples: • Signature Recognition • Identification of Differential Surface Properties on a Triangle Mesh for Facial and Object Recognition • FDIS (A Fast Frequency Distribution Based Interpolation Search Algorithm For Sorted Arrays)

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5. **Chemistry**

The study of nature and composition of matter and laws governing it - Physical Chemistry, Organic Chemistry (other than bio-chemistry), Inorganic Chemistry, Materials, Plastics, Fuels, Pesticides, Metallurgy and Soil Chemistry.

Examples: • Can lettuce seeds be used as a bioassay medium for testing toxicity? • Is soil a type of electrical system? • Organic chemistry without solvents

6. **Engineering**

Technology-projects that directly apply scientific principles to manufacturing and practical uses - Civil, Mechanical, Aeronautical, Chemical, Electrical, Photographic, Sound, Automation, Marine, Heating and Refrigeration, Transportation and Environmental Engineering.

Examples: • Evaluation of a Multi-Freewing UAV with the Concurrent Development of a Flying Test Platform to Assist in Evaluation of Turbulence Reduction and Flight Performance • Elevating Wheelchair Seat • Foot operated device for people without upper limbs

7. **Environmental Sciences**

Study of pollution (air, water and land) sources and their control, Ecology, conservation of wild life, waste management and the means to control environmental degradation.

Examples: • Hydroponic Phytofiltration of Arsenic in Drinking Water • Electricity Production Using Magnetic Field Generated by Magnetotactic Bacteria in a Microbial Generator • Fungal Bio Pesticides for Eco-Friendly Management of insect pests.

8. **Mathematics**

Development of formal logical systems or various numeral or algebraic computations and the application of these principles -- Calculus, Geometry, Abstract Algebra, Number Theory, Statistics, Complex Analysis and Probability.

Examples: • Complete Sequences of Positive Integers • Programmable Quantum Computing: A New Framework with von Neumann Type Architecture • Universality Properties of Positive-Definite Integral Quadratic Forms

9. **A. Physics**

Theories, principles and laws governing energy and the effect of energy on matter - Solid State, Optics, Acoustics, Particle, Nuclear, Atomic, Plasma, Superconductivity, Fluid and Gas Dynamics, Thermodynamics, Semiconductors, Magnetism, Quantum Mechanics and Bio-physics.

Examples: • Analysis of a simple Prototype for magnetic levitation • What are the applications of consumable oil Encapsulated Spheroids? • How to create an Ultrasonic detector for gas Chromatography? • Research on Dye-sensitized Solar Cells

B. Astronomy & Space Sciences

Meteorology, Climatology, Astronomy, Planetary Science

Examples: • Fractal Dimension Analysis of Putative Martian Coastlines • New Algorithm for Multiple Hypothesis-based Tracking and Discovery of Potentially Hazardous Near Earth Objects

C. Earth Sciences

Geology, Mineralogy, Physiography, Oceanography, Speleology, Seismology and Geography.

Example: • Phytoplankton Community Response to Nutrient Enrichment

10. **Zoology/Animal Sciences**

Study of animals--Animal Genetics, Ornithology, Ichthyology, Herpetology, Entomology, Animal Ecology, Paleontology, Cellular Physiology, Circadian Rhythms, Animal Husbandry, Cytology, Histology, Animal Physiology, Invertebrate Neurophysiology, Studies of Invertebrates.

Examples: • Olfactory Learning and Brain Plasticity in Honey Bees (Apis mellifera) in the Absence of Visual Cues • Testing Adaptive Models of Sex Allocation in a Polymorphic Species • The effects of protein levels on growth in young chickens

Twelve Steps to a Prize Winning Research Based Project:

IRIS is a stepping-stone to the Intel ISEF. The judges therefore, select projects that are of a certain standard, and have global benchmarks. Your project should reflect that quality and be innovative, original and follow scientific methodology. Take the help of a guide - she/he could be a research scientist or a teacher. If you have decided to participate in IRIS, choose your topic and start early. This will enable you to organize your project in the correct format, with sufficient data and results of the experiment. Read the flow of activity mentioned below to carry out your research based project.

1. Select your topic: The first step, selecting a project idea, is the most important. This is the first question or dilemma a student faces when starting a science fair project, because it can make the difference between a good and an excellent project. Keep two important things in mind while selecting your topic:

- First, choose a topic that interests you - you'll have a lot more fun (and probably learn more)
- Second, while you're choosing a topic, check all the resources around you. This will help you in doing your project with ease. For eg. - If you are doing a project on Eucalyptus leaves, ensure that you have the Eucalyptus tree in the surrounding region where you live

2. Sourcing information on your project: After selecting your project topic, learn everything about it. Books on your topic are likely to be found in your local library or bookstore. You can use the many search engines available to find information or try various Science related sites on the internet. In particular, do check the scientific literature by searching databases e.g. at www.scholar.google.com, www.scirus.com or www.pubmed.gov to see if related work has been done before.

3. Make a plan: Make a plan as to how you will conduct your experiment. Your plan should include the following:

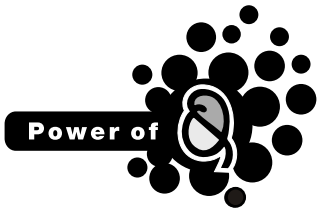
• The purpose of your experiment • The variable or the things that you are going to change during the experiment • Also note the parameters which remain constant during the experiment • Your hypothesis or what you think the outcome of the project will be • A detailed procedure outlining how you will conduct the experiment. Include the type of experiment to be conducted

Make a timetable and allot sufficient time to all stages of your work. Stick to the timetable as far as possible so that you finish your project on time.

4. Make a hypothesis: When you think you know what variables may be involved, think about ways to change one at a time. If you change more than one at a time, you will not know what variable is causing your observation. Sometimes variables are linked and work together to cause something. At first, try to choose variables that you think act independently of each other. At this point, you are ready to translate your questions into hypothesis. **Hypothesis is a tentative theory that can be proved or disproved through further investigation and analysis.** There is usually one hypothesis for each question you have. You must do at least one experiment to test each hypothesis. This is a very important step. If possible, ask a scientist to go over your hypothesis with you.

5. Design experiments to test your hypothesis: Design an experiment to test each hypothesis. Make a step-by-step list of what you will do to answer each question. This list is called an experimental procedure. For an experiment to give answers you can believe, it must have a "control". A control is a neutral "reference point" for comparison that allows you to see what changing a variable does by comparing it to not changing anything. It is difficult to develop effective controls. Without a control you cannot be sure that changing the variable causes your observations. A series of experiments that include a control is called a "controlled experiment".

Experiments are usually repeated to guarantee that what you observe is reproducible. It is also repeated to obtain an average result. Reproducibility is a crucial requirement. Without it you cannot trust your results. Think of possible errors and record them or correct them if possible. Your results should be predictable, i.e. the same results should be obtained when the experiment is repeated. It is useful to choose a statistical test that will validate your results. This will also ensure that your results are not due to mere chance but are scientific in nature.



6. Do the experiments and record data: During each experimental 'run', you measure how much the variable affects the system under study. Each change of variable produces a different response in the system. You measure this response or record data in a table for this purpose. This is considered "raw data" since it has not been processed or interpreted yet. When raw data gets processed mathematically, for example, it becomes results.

7. Record your observations: Observations can be written descriptions of what you noticed during an experiment or problems encountered. Keep careful notes of everything you do and everything that happens. Observations are valuable when drawing conclusions and useful for locating experimental errors. But maintain a record of experimental details and data-log book. Do not rely on your memory.

8. Consult your guide: Discussion with your guide should be an ongoing activity. Your guide is very important in guiding you through your project till the end. He/ she will be able to give you all the required inputs to develop a research-based project. The guidance will ensure that you are working in the right direction and the methodology being used by you is correct.

9. Do your calculations: Use your raw data to calculate and arrive at conclusions. For example, you weighed a container. This weight is recorded in your raw data table as 'wt. of container'. You then added some soil to the container and weighed it again. This would be entered as 'wt. of container + soil'. In the calculation section, do the calculation to find out how much soil was used in this experimental run:
(wt. of container + soil) - (wt. of container) = wt. of soil used.

Each calculated answer is entered into a table in a 'Results' section using proper units.

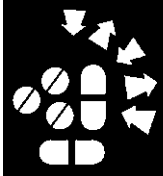
10. Summarize results: Summarize what happened. This can be in the form of a table of processed numerical data or graphs. It could also be a written statement of what occurred during experiments. Studying tables and graphs, we can see trends that tell us how different variables cause our observations. Based on these trends, we can draw conclusions about the system under study. These conclusions help us confirm or deny our original hypothesis. Often, mathematical equations can be made from graphs. These equations allow us to predict how a change will affect the system without the need to do additional experiments. Apply appropriate statistics to analyse your data so that valid conclusions can be drawn.

11. Make your conclusions: Using the trends in your experimental data and your experimental observations, try to answer your original questions. Is your hypothesis correct? Now is the time to put together what happened and assess the experiments you did.

It is possible that your observations lead you to conclude something different from your starting hypothesis. Do not alter results to fit a theory. If your results do not support your hypothesis, it doesn't matter. You still have done successful scientific research. The spirit of scientific inquiry requires an open mind.

12. Cost feasibility: If your project involves making a 'device' then put down the estimated cost of all the components required for that device. You must do a cost comparison with the existing products, if applicable. You should also state the source from which these components can be obtained.

Never innovate to compete, innovate to change the rules of the game.



Tips on Writing a Synopsis

A synopsis gives the essence of the project in brief. Ideally a synopsis should not exceed 250 words. Judges and other viewers should have a fairly accurate idea of the project from reading the synopsis. The synopsis must focus on the current year's research and give only minimal reference to previous work as applicable. Details, discussions and acknowledgements should not be included in the synopsis, but may be put in the longer research paper or given on the project exhibit board.

The following should be the elements in your synopsis:

a) Purpose of the experiment:
- An introductory statement of the reason for investigating the topic of the project
- A statement of the problem and/or the hypothesis being studied

b) Procedures used:
- A summary of the key points and an overview of how the investigation was conducted.
- A synopsis does not give details about the materials used unless they greatly influenced the procedure or had to be developed to conduct the investigation
- A synopsis should only include procedures done by the student. Work done by a mentor (such as surgical procedures) or work done prior to student involvement must not be included

c) Data:
- This section should provide key results that lead directly to the conclusions you have drawn
- It should not give too many details about the results nor include tables or graphs

d) Conclusions:
- Conclusions from the investigation should be described briefly
- The summary paragraph should reflect on the process and possibly state some applications and extensions of the investigation

Tips on Writing a Good Screening Report

The Screening Report should present an accurate idea of your project to the judges during the screening stage. It is a very important document and you need to fill it in completely, to indicate the what, why & how of the project.

It would include the following details:

- Origin of the idea
- Objectives
- Place of research and time frame followed
- Type of work done
- Present status of the project leading to future research plans.
- Focus on the research methodology followed and the various resources utilized
- Important experimental results as quantitative values with proper units
- Key diagrams and graphs to support your research
- Financial aspects of the project including comparative costs with similar, available products and technology would help gauge the feasibility of the idea
- The Judges would also like to know your creative contribution and the unique aspects of the project

Carefully read through the sample synopsis, screening report and award winning projects at IRIS in the appendices at the end of the handbook. This will give you an idea on the content as well as the expected standard of quality at IRIS.

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Tips for Parents

- Give encouragement, support, and guidance
- Make sure your child feels it is his/her project. Make sure the work is primarily the work of the child
- Realize the main goal of a science fair project is to help your child use and strengthen the skills he/she has learned and develop higher-level skills.
- The main goal should not be the ribbon or prize
- Provide transportation to libraries, nature centers, or universities that can help your child find project information
- Locate Internet access, either at home or at a school or library
- Help your child design a project that is safe and properly supervised
- Help at your local school Science Fair. Contact your child's teacher to volunteer
- Help your child plan a mutually agreed upon timeline to prevent a last minute project. It is suggested you allow at least 12 weeks to conduct an experiment and prepare the presentation.
- Do not worry or get upset if your child doesn't win a prize at the Science Fair. The skills the child has gained are worth all the effort.
- Help your child begin to plan for next year

What is NOT accepted as an IRIS Project

Of the thousands of entries that we receive every year, many do not make it past the screening stage because they do not follow the scientific method, are not research projects or innovative ideas. Typical examples of projects that are not selected are:

- Merely repeating an experiment in your science textbook. For e.g. generating oxygen from hydrogen peroxide solution, germination of seeds etc.
- Writing an essay on a science topic. For e.g. uses of nuclear energy
- Making a wild hypothesis without personally doing any experiment or showing proof to support the concept. For e.g. generating electricity from speedbreakers
- Making unsubstantiated claims that violate known laws and principles of science. For e.g. perpetual motion machines, generating energy out of nothing etc.
- Toxicity studies and experiments that lead to the death of vertebrate animals (even mice)
- Simple posters and models explaining science/technology principles e.g. model of a hydroelectric power station, models illustrating pollution control etc.

Online Resources

There are a number of excellent websites providing information on how to select and develop a research-based science project. One very comprehensive website is www.sciencebuddies.com, which provides science project ideas, topic selection help, detailed guidance and planning, an online bulletin board and a lot more. You may also want to check out the Intel ISEF website www.societyfor science.org/isef which has links to a lot of useful resources.

Please Note: IRIS is not affiliated to any of the website and they are trademarks of respective companies.

A truly creative person rids him or herself of all self-imposed limitations.

What should be the Essential Elements of Your Project?

Ideally your project should have the following elements:

Project data book

The project data book should have accurate and detailed notes of your research.

Synopsis

This is a summary of your idea and should include the purpose of the experiment, procedure used, data and conclusion.

Research paper

A research paper should be prepared and must be available along with the project data book with relevant written material. A research paper helps organize data as well as thoughts. A good paper includes the following sections:

a) Title page: Center the project title, and put your name, address, school, and grade at the bottom right.

b) Table of Contents: Include a page number for the beginning of each section.

c) Introduction: The introduction sets the stage for your report. The introduction includes your hypothesis, an explanation of what prompted your research and what you hoped to achieve.

d) Method: This section describes how you did the study. Describe in detail the methodology used to collect your data or make your observations. Your report should be detailed enough for someone to be able to repeat the experiment from the information in your paper. Include photographs or drawings of self-designed equipment. Also specify the material used in the study. The research work conducted by you may have taken more than a year. In such case, include this year's work only.

e) Discussion: This is the essence of your paper. The results and conclusions should flow smoothly and logically from your data. Be thorough. Allow your readers to see your train of thought, letting them know exactly what you did. Compare your results with theoretical values, published data and expected results. Include a discussion of possible errors. How did the data vary between repeated observations of a similar event? How were your results affected by uncontrolled events? What would you do differently if you were to repeat this project? What other experiments should be conducted?

f) Conclusion: This section describes the findings and conclusion of the project . Briefly summarize your results. Be specific, do not generalize. Never introduce anything in the conclusion that has not been discussed.

g) Acknowledgements: You should always credit those who assisted you, including individuals, business and educational or research institutions. Identify any financial support or material donations received, but do not put it on the display board.

h) Reference list: Your reference list should include any documentation that is not your own (i.e. books, journal articles, include specific internet url's).

Project set up & display

Since you want to attract and inform interested spectators and judges, make it easy for them to access your project and the results you have obtained.

a) Display - Make the most of your space using clear and concise displays. Please refer to the diagram below. These are maximum measurements, so your display may be smaller than the above sizes. Make sure the display reflects the current year's work only.

Stall Dimensions (In metres):
Center panel: Length: 2 m & Breadth: 1.5 m
Side panel: Length: 2 m & Breadth: 2 m
Table Display: Length: 1.5 m & Breadth: 0.5 m

b) A good title - Your title should be simple and must accurately represent your research.

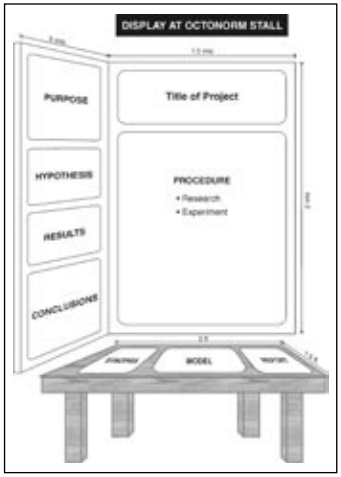
c) Take photographs - Many projects involve elements that may not be safely exhibited at the fair, but are an important part of the project. You might want to take photographs of important parts/ phases of your experiment to use in your display.

d) Models - Prepare a miniature of your project in case your prototype is too large to be transported or carried along.

e) Be organized - Make sure your display is logically presented and easy to read. A glance should enable anyone (particularly the judges) to locate the title, experiments, results, and conclusions quickly. When you arrange your display, imagine that you are seeing it for the first time.

f) Eye-catching display - Make sure your display stands out. Use neat, colorful headings, charts and graphs to present your project. Pay special attention to the labeling of charts, diagrams, graphs, and tables. Each item must have a descriptive title.

g) Correctly presented and well constructed - Be sure to adhere to the size limitations and safety rules when preparing your display. All forms required for the project should be displayed. Make sure your display is sturdy, as it will need to remain intact for quite a while. Do not hesitate to ask for advice from adults if you need it.



(For more details regarding this table refer page no. 16)

Sr.No.	IRIS Judging Criteria	Individual	Team
1.	Creativity & Originality	30	25
2.	Scientific Methodolog Or Application/Engineering Goals	30	25
3.	Thoroughness	15	12
4.	Skill	15	12
5.	Clarity	10	10
6.	Teamwork	-	16
TOTAL		**100**	**100**

It is not enough to have a good mind; the main thing is to use it.

Important Do's and Dont's

Choosing a guide

You can take guidance from your teachers, research scientists or any qualified person who is capable of guiding your research project. The guide will have to certify that the work has been done under his/her supervision and that necessary care has been taken while carrying out research on living organisms, human subjects, recombinant DNA, controlled substances, non-human vertebrate animals, human and animal tissues, pathogenic agents, etc.

Conducting research for the project

Students are allowed to conduct experiments at home, in school or in laboratories of research institutions, universities, and colleges or at other recognized research facilities. The data reflected in the report must not be more than 12 months old. However, the project could be an extension of earlier work done by the student.

Display Guidelines

What are the display rules?

1. Allowed for display
   - i) Dried plant materials if permanently sealed in acrylic or other similar material.
   - ii) Soil or waste samples if permanently sealed in acrylic or other similar material.
   - iii) Empty tanks that previously contained combustible liquids or gases.
   - iv) Personal photographs, accomplishments, acknowledgements, addresses other than the finalist's address, telephone, fax numbers, e-mail and web addresses are allowed only on the inside of research papers or data books.
   - v) Any apparatus with unshielded belts, pulleys, chains or moving parts with tension or pinch points may not be operated.
   - vi) Class II lasers:
     - a) May be operated only by the finalist.
     - b) Posted sign must read "Laser Radiation: Do not stare into beam".
     - c) Must have protective housing that prevents access to beam.
   - vii) Class III and IV lasers may not be operated.
   - viii) Large vacuum tubes or dangerous ray-generating devices must be properly shielded.
   - ix) Pressurized tanks that contain non-combustibles may be allowed if properly secured.
   - x) Any apparatus producing temperatures that will cause physical burns must be adequately insulated.

2. Prohibited for display
   - i) Living organisms.
   - ii) Taxidermy specimens or parts.
   - iii) Preserved vertebrate or invertebrate animals.
   - iv) Human/animal parts or body fluids (e.g., blood, urine).

   (Exceptions: teeth, hair, nails, dried animal bones, histological dry mount sections and completely sealed wet mount tissue slides)

v) Human/animal food.

vi) Laboratory/household chemicals.

(Exceptions: water integral to an enclosed apparatus or water supplied by the Display and Safety Committee)

vii) Poisons, drugs, controlled substances, hazardous substances or devices (e.g., firearms, weapons, ammunition, reloading devices)

viii) Dry ice or other sublimating solids.

ix) Sharp items (for example: syringes, needles, pipettes, knives)

x) Flames or highly flammable display materials.

xi) Batteries with open top cells.

xii) Awards, medals, business cards, flags.

xiii) Photographs or other visual presentations depicting vertebrate animals in surgical techniques, dissection, necropsies, other lab techniques, improper handling methods, improper housing conditions, etc.

3. Electrical power supply and usage specifications

i) 220 Volt 50Hz single phase AC power will be available at the National Fair. Maximum circuit amperage/wattage available is determined by the electrical circuit capacities of the exhibit hall and may be adjusted on site by the Display and Safety Committee.

ii) Heavy electrical machinery such as large compressors, electric hot plates etc. may not be used.

4. Computer facilities for display

While access will be provided to a computer, if required for your project at the National Fair, you will need to bring your own laptop.

Restrictions on Human, Animal Subjects, Controlled and Hazardous Substances

Human subjects

- Research must be reviewed and approved by organizers before experimentation begins
- Both the student and the organizers must carefully evaluate psychological and physical risks
- Informed consent is strongly recommended for all the projects using human subjects and is required for all subjects when the risk is determined as more than minimal by the organizers

Recombinant DNA

- Non-exempt rDNA studies must be conducted in a registered research institution under the direct supervision of a qualified scientist
- Non-federally registered laboratory (including school laboratory) under direct supervision of a trained teacher or qualified scientist

Controlled substances

- Students must adhere to all federal and state regulations governing controlled substances
- Students under 21 may not purchase and/or handle smokeless powder for science projects

Non-human vertebrate

- Research must be reviewed and approved by the SRC before experimentation begins
- Alternatives to the use of vertebrate animals for research must be explored
- All animals must be legally acquired from reputed animal breeders
- Experiments involving laboratory animals cannot be conducted in a student's home; the governing organizers for behavioural studies can make exceptions
- Proper animal care must be provided
- Experimental procedures that cause unnecessary pain or discomfort are prohibited
- Experiments designed to kill vertebrate animals are not permitted. Students may not perform euthanasia
- LD (50) or higher in any group or subgroup is not permitted
- Alcohol acid rain, insecticide, herbicide and heavy metal toxicity studies are prohibited

Human and animal tissue

- Human blood (and products) must be documented free of HIV and hepatitis viruses. And/or must be handled by acceptable containment procedures applicable to blood borne pathogens
- Students using their own blood do not need HIV or hepatitis certificates
- For the purpose of student research, all body fluids, including saliva and urine (but excluding hair), are not to be considered tissues

Pathogenic agents

- Micro-organisms collected, isolated, and /or cultured from any environment should be considered potentially pathogenic

If your project is related to any of the above topics, and has been short listed for participation at the National Fair, you would be required to submit relevant forms. Details of the forms are available on the Handbook. To download the forms log onto the website: http://www.societyforscience.org/isef/about/rules_regulations.asp

Patent and Copyright

If you consider that your project is worth patenting, it can be done so by registering it with the Patent Office in your state. But IRIS does not own the responsibility to help the participant to patent his or her idea. We suggest that you can either contact the patent office in your state, or contact: The Department of Science and Technology, New Mehrauli Road, New Delhi - 16.
Tel.: 011 - 26567373 / 26962819

IRIS Judging Criteria

I. Creative Ability (Individual - 30, Team - 25)

1. Does the project show creative ability and originality in the questions asked?
   - The approach to solving the problem? The analysis of the data? The interpretation of the data?
   - The use of equipment? The construction or design of new equipment?
2. Creative research should support an investigation and help answer a question in an original way.
3. A creative contribution promotes an efficient and reliable method for solving a problem. When evaluating projects, it is important to distinguish between gadgeteering and ingenuity.

II a. Scientific Thought (Individual - 30, Team - 25)

If an engineering project, the more appropriate questions are those found in IIb. Engineering Goals.

1. Is the problem stated clearly and unambiguously?
2. Was the problem sufficiently limited to allow plausible approach? Good scientists can identify important problems capable of solutions.
3. Was there a procedural plan for obtaining a solution?

4. Are the variables clearly recognized and defined?
5. If controls were necessary, did the student recognize their need and were they correctly used?
6. Are there adequate data to support the conclusions?
7. Does the finalist or team recognize the data's limitations?
8. Does the finalist/team understand the project's ties to related research?
9. Does the finalist/team have an idea of what further research is warranted?
10. Did the finalist/team cite scientific literature, or only popular literature (i.e., local newspapers, Reader's Digest).

OR II b. Engineering Goals (Individual - 30, Team - 25)

1. Does the project have a clear objective?
2. Is the objective relevant to the potential user's needs?
3. Is the solution workable? Acceptable to the potential user? Economically feasible?
4. Could the solution be utilized successfully in design or construction of an end product?
5. Is the solution a significant improvement over previous alternatives?
6. Has the solution been tested for performance under the conditions of use?

III. Thoroughness (Individual - 15, Team - 12)

1. Was the purpose carried out to completion within the scope of the original intent?
2. How completely was the problem covered?
3. Are the conclusions based on a single experiment or replication?
4. How complete are the project notes?
5. Is the finalist/team aware of other approaches or theories?
6. How much time did the finalist or team spend on the project?
7. Is the finalist/team familiar with scientific literature in the studied field?

IV. Skill (Individual - 15, Team - 12)

1. Does the finalist/team have the required laboratory, computation, observational and design skills to obtain supporting data?
2. Where was the project performed? (i.e., home, school laboratory, university laboratory) Did the student or team receive assistance from parents, teachers, scientists or engineers?
3. Was the project completed under adult supervision, or did the student/team work largely alone?
4. Where did the equipment come from? Was it built independently by the finalist or team? Was it obtained on loan? Was it part of a laboratory where the finalist or team worked?

V. Clarity (Individual - 10, Team - 10)

1. How clearly does the finalist discuss his/her project and explain the purpose, procedure, and conclusions? Watch out for memorized speeches that reflect little understanding of principles.
2. Does the written material reflect the finalist's or team understands of the research?
3. Are the important phases of the project presented in an orderly manner?
4. How clearly is the data and results presented?
5. How well does the project display explain the project?
6. Was the presentation done in a forthright manner, without tricks or gadgets?
7. Did the finalist/team perform all the project work, or did someone help?

VI. Teamwork (Team Projects only - 16)

1. Are the tasks and contributions of each team member clearly outlined?
2. Was each team member fully involved with the project, and is each member familiar with all aspects?
3. Does the final work reflect the coordinated efforts of all team members?

IRIS National Fair Prizes

National level - *Category I to II*

Upto 8 projects (5 individual and 3 team projects) from category II at the National Fair will win either or all of the below:

- A Medallion and a Certificate of Recognition
- A special award of recognition
- An opportunity to improve your project at the IRIS Coaching Camp
- From these 4 individual and 2 team projects will be selected for participation at ISEF.

Best of subject category

In category II at National Fair, one best project from each of the subject categories is awarded a Certificate of Recognition.

Workshops

IRIS is organizing science workshops for students and teachers. The objective of these workshops is to give the participants information about the program details and learnings on how to do research-based projects with a scientific approach. Eminent scientists from renowned institutes of India support these workshops with their valuable inputs.

Please send in your forms to: Direxions Marketing Solutions Pvt. Ltd. 83-C, Hansaraj Pragji Building, Dr. E. Moses Road, Worli, Mumbai - 400 018. Tel: (022) 2498 4427 Fax: (022) 2496 1622

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*Project Code*_____
(For office use only)

IRIS Entry Form

PART 1: Synopsis and Screening Report *(Mandatory to fill all fields)*

Title of Project: _____

Category (choose one): Category I (5th - 8th Std.) ☐ Category II (9th - 12th Std.) ☐

I/We would like to participate in IRIS Fair as an Individual ☐ or Team ☐

Name of the Participant(s): 1 _____

2 _____

Subject Category (Tick only ONE)

- ☐ Behavioural & Social Sciences
- ☐ Biochemistry
- ☐ Botany/Plant Sciences
- ☐ Chemistry
- ☐ Computer Science
- ☐ Engineering
- ☐ Environmental Sciences
- ☐ Mathematics
- ☐ Physics, Astronomy & Earth Sciences
- ☐ Zoology/Animal Sciences

Please answer ALL the questions below, from to 1-9 on a separate sheet of paper

1. Please provide a synopsis (brief summary) of your project (250 words or less). If your project is in a language other than English, you must provide an English translation of your synopsis.
2. What do you think is **innovative** or novel about your project? You may highlight the merits of your project, and specific relevance in the Indian context, if any.
3. Where did you get the idea for the project?
4. What is the **work done** by you so far? Please provide **specific results** you have obtained till now. Where did you perform your experiments? When did you start your laboratory experiments/data collection?

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*Project Code*_____
(For office use only)

5. Approximately, what are the expenses on your project so far?
6. Please provide details of references (URLs, journals, books etc.) that you have consulted to see if similar work has been done elsewhere.
7. For multi-year projects: If this is an extension of earlier work/project, please mention what is the additional work performed this year.
8. Restricted Items/Regulated Research: If your research involves human subjects, vertebrate animals, potentially hazardous biological agents, hazardous chemicals, radiation, lasers, etc., these may be either prohibited, or possible only under specific guidelines.
   Please check the ISEF rules at: http://societyforscience.org/isef/document/index.asp
   Does your project deal with any of the above? ☐ Yes or ☐ No. If YES, please provide specific details of what is involved, and fill the relevant form available at http://societyforscience.org/isef/document/index.asp

   Some important forms:
   1. For use of Human Subjects: Form 4 with Informed Consent Statement
   2. For use of Vertebrate Animal - Form 5A or 5B
   3. For use of Potentially Hazardous Biological Agents: Form 6
9. What is the contribution from your guide, or from the laboratory you have worked at?

PART 2: Participant Details *(Mandatory to fill all fields)*

1. Name of First Participant

Mr./Ms.: First Name: _____ Last Name:_____

Residential Address: _____

_____

_____

City: _____ State: _____ Pin: _____

Tel. STD Code: _____ Res: _____ Mobile No: _____

Email: _____ Age: _____

Name of School/Institute: _____

Studying in Std: _____ School Phone No.: _____

Subject Category for participation (Only One): _____

Name of Parent: _____ Parent's Signature: _____

*Project Code*_____
(For office use only)

2. Name of Second participant *(In case of team project)*

Mr./Ms.: First Name: _____ Last Name:_____

Residential Address: _____

_____

_____

_____

City: _____ State: _____ Pin: _____

Tel. STD Code: _____ Res: _____ Mobile No: _____

Email: _____ Age: _____

Name of School/Institute: _____

Studying in Std : _____ School Phone No.: _____

Name of Parent: _____ Parent's Signature: _____

Name of Guide

Mr./Ms.: First Name: _____ Last Name: _____

Residential Address: _____

_____

_____

_____

City: _____ State: _____ Pin: _____

Tel. STD Code: _____ Res: _____ Mobile No: _____

Email: _____ Age: _____

Relationship of the Guide to the participant: _____
(Teacher/Scientist/Friend/Other)

For how long have you known the participant? _____

I certify that the project is done under my guidance.

Signature of Guide: _____ Date: _____

*Project Code*_____
(For office use only)

PART 3: Supporting Data/Additional Information & Ethics Statement

A) Supporting Data/Additional Information

Please attach relevant calculations, graphs, diagrams, photographs, program code, results etc. Any information that helps quantitatively support your project will be useful in evaluating your work. Use additional sheets of paper as required.

B) Ethics Statement

Scientific fraud and misconduct are not condoned at any level of research or competition. Such practices include plagiarism, forgery, use or presentation of other researcher's work as one's own, and fabrication of data. Fraudulent projects will fail to qualify for competition in IRIS or affiliated fairs.

By submitting a project to IRIS I/we hereby declare that the project effectively reflects my/our own work. I/We also declare that I/we have not copied this project from any source.

_____	_____	_____	
Participant 1 Signature	Participant 2 Signature	Guide Signature	Date : _____

For Online Submission, please visit http://educationinindia.net/iris/

IRIS, C/o **Direxions Marketing Solutions Private Ltd.**,
Hansraj Pragji Building, 83-C, Dr. E. Moses Road, Worli, Mumbai - 400018. Tel. No: (022) 2496 0033.

SAMPLE FORM

PART 1: Synopsis and Screening Report

Project Title: PHYSICS OF A SIMPLE PROTOTYPE FOR STATIC MAGNETIC LEVITATION

Category (choose one): Category I (5th - 8th Std.) ☑ Category II (9th - 12th Std.) ☐

I/We would like to participate in IRIS Fair as an Individual [✓] or Team [ ]

Name of the Participant(s):

1 HAMSA PADMANABHAN 2 _____

Subject Category (Tick only ONE)

☐ Behavioural & Social Sciences ☐ Biochemistry ☐ Botany / Plant Sciences

☐ Chemistry ☐ Computer Science ☐ Engineering

☐ Mathematics ☑ Physics, Astronomy & Earth Sciences ☐ Zoology / Animal Sciences

Please answer ALL the questions below. You may use separate sheets of paper answer questions 1-9.

1. Please provide a synopsis (brief summary) of your project (250 words or less).

This project aims at analyzing the stability and force balance of a simple prototype that demonstrates the principle of magnetic levitation. The prototype consists of a pencil suspended in midair essentially under the action of forces exerted by four ring magnets fixed in a sponge base on two similar magnets attached to the pencil. The configuration is found to be in perfectly stable equilibrium; the pencil can perform small oscillations and also rotate about its long axis.

The six magnets used in the system can be arranged in a total of $2^6 = 64$ different polarity configurations. By direct experimentation, it was found that only two independent configurations among these could lead to stable levitation.

The field lines of all the magnets were mapped using a compass. This was used to understand the various forces acting in the system. It was found that an upward repulsive force exerted by the base magnets balances the weight of the pencil and a horizontal magnetic force along the pencil was balanced by a normal reaction force exerted by a thin plastic chip fitted on the sponge.

Various practical applications of this concept are being explored. This project provides an understanding of magnetic levitation of static extended bodies and shows that a prototype can be built with inexpensive, everyday, materials.

2. What do you think is innovative or novel about your project? You may highlight the merits of your project, and specific relevance in the Indian context, if any.

The unique thing in the configuration I have analyzed is static and does not use diamagnetic properties. The first innovation in the design of this gadget lies in displacing one of the magnets on the pencil slightly with respect to the base and also making the front base magnets attract the magnet on the pencil. The second innovation lies in realizing that both these can be supplied by just a contact force at the tip of the pencil by resting it on a rigid, vertical, plastic sheet. Under such conditions, the configuration almost works itself out uniquely.

3. Where did you get the idea for the project?

The original gadget described in this paper was made and analyzed in collaboration with guide and a commercially available toy marketed as “pen-ultimate toy”, in which all the magnets are hidden by packaging.

4. What is the work done by you so far? Please provide specific results you have obtained till now. Where did you perform your experiments? When did you start your laboratory experiments/data collection?

I have completed an analysis of all the possible combinations of base magnet and pencil magnet orientations and their implications on stability. I mapped the field lines of all the magnets using a compass to understand the various forces acting in the system. On detailed study, I found that only two combinations are independent, and two more can be obtained from these by reversing all the polarities. The polarities of the magnets in these two configurations are shown in Figure 2 of Part 3 in the form.

The experimentation was started on June 1, 2005

Please refer to the figure in part 3. In this configuration the base magnets exert a repulsive force on the pencil magnets along the line joining their centers. The vertical component of the force balances the weight of the pencil. There is a nonzero horizontal component, along the direction of the pencil, which arises because of the slight offset in the position of the magnets due to which the pencil may move forward. The plastic piece in front prevents this by exerting a reaction force & hence the equilibrium is stable

5. **Approximately, what are the expenses on your project so far?**
   The project can be made from materials found easily at home. And the total cost will be around Rs. 10.

6. **Please provide details of references (URL's, Journals, books etc) that you have consulted to see if similar work has been done elsewhere.**
   Magnetic levitation is a well-known concept in several practical applications the most famous of which is the Levitron. While there are many technical papers dealing with the Levitron there is virtually no discussion in the literature on the particular configuration analyzed. I could find only a brief reference to this toy in D. Featonby, "Toys and Physics", Physics Education, 40, 537-543 (2005).

7. **For multi-year projects: If this is an extension of earlier work/project, please mention what is the additional work performed this year.**
   This is not a multi year project. All the work was done in the past 6 months.

8. **Restricted Items / Regulated Research: If your research involves human subjects, vertebrate animals, potentially hazardous biological agents, hazardous chemicals, radiation, lasers, etc., these may be either prohibited, or possible only under specific guidelines. Please check the ISEF rules at http://societyforscience.org/isef/document/index.asp**
   [✓] Yes / [x] No (If Yes, please provide details)

9. **What is the contribution from your guide, or from the laboratory you have worked at?**
   Contribution of guide and laboratory was to from the guide and with the team at Muktangan Vigyan Shodika, IUCAA.

PART 2: Participant Details *(To be filled as per your details)*

PART 3: Supporting Data / Additional Information & Ethics Statement

A) Supporting Data / Additional Information

Please attach relevant calculations, graphs, diagrams, photographs, program code, results etc. Any information that helps quantitatively support your project will be useful in evaluating your work. Use additional sheets of paper as required.

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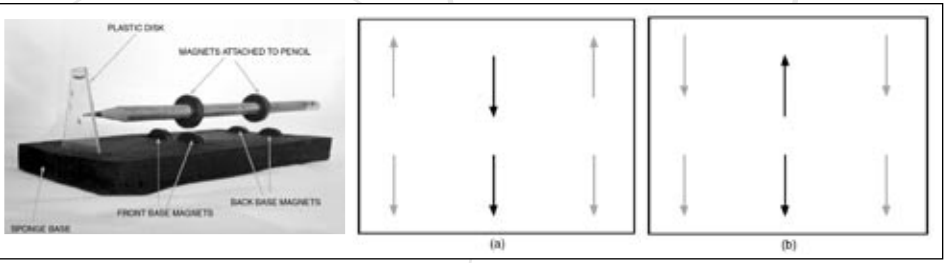
Sample Image



The polarities of the magnets in the two configurations that lead to stable levitation are shown in Figure 2. The tip of the arrow corresponds to the North Pole and the tail to the South Pole. The red arrows indicate the four magnets at the base and the blue arrows, the pencil magnets.

*The ethics statement will have to be filled and signed as per the format given.

Winning Projects at ISEF

Year	Name of the Participants	Awards at Intel ISEF	Name of School
2008	Ambud Sharma. "A Low Cost Water Based Evaporative Cooling Device for Computers"	Fourth Award of $500 for Electrical & Mechanical Engineering - Presented by Intel Foundation and Scholarship Award of $12,500 per year from Florida Institute of Technology	Sunbeam School, Varanasi
	Swathi Soman "Fusarium Pallidoroseum, II: Can It Control Water Hyacinth?"	Third Award of $1,000 for Environmental Management - Presented by Kendeda Fund and Third Award of $500 from American Phytopathological Society	Bhavan's B P Vidyamandir, Nagpur
	Divya Venkataraman & Neha Kulkarni "Larvicidal and Insecticidal Properties of Carica papaya Leaf Extract against Mosquitoes"	Third Award of $1,000 for Team Projects - Presented by Science News and Second Award of $500 U.S. Savings Bond from Ashtavadhani Vidwan Ambati Subbaraya Chetty (AVASC) Foundation	Modern English School, Mumbai
	Riddhi Dasani & Pooja Dholakiya "Eco-Friendly Ink for Color Pens"	Third Award of $1,000 for Team Projects - Presented by Science News	Late Shree S. G. Dholakiya Memorial High School, Rajkot
	Lavanya Giriraj "Natural Color from Ixora Flowers"	Second Award of $500 from the American Society for Horticultural Science	Jawahar Navodaya Vidyalaya, Mandya

** Pre 2005, India has won over 45 awards since 1999, when India first participated at ISEF.*

Year	Name of the Partcipants	Awards at Intel ISEF	Name of School
2007	Hamsa Padmanabhan 'Analysis of simple prototype for magnetic levitation'	Second Grand Award of $1500in Individual Category for Physics, 2 Special Awards ($2000 and $1000)	Kendriya Vidyalaya, Pune
	Apurv Mishra 'Glabenator - an advanced alternative & augmentative communication device'	Third Grand Award of $1000 inIndividual Category forEngineering 1 Special Award ($500)	DAV Public School, Bhubneshwar
	Swathi Soman 'Fungal bio-pesticides for eco-friendly management of inscet pests'	Third Grand Award of $1000 in Individual Category for Environmental Science	Christ Nagar Senior Secondary School, Trivandrum
	Varun Mittal and Kanishka Tiwary 'Effect of chinaberry fruit extract on feeding, growth & fecundity of DBM (Diamond Black Moth)'	Fourth Grand Award of $500 in Team Category for Zoology	Sanatan Dharam Public School, New Delhi

Year	Name of the Partcipants	Awards at Intel ISEF	Name of School
2006	Mallika Desai & Suvrata Desai 'Traditional spices as bio pesticides'	Second Award, Ashtavadhani Vidwan Ambati Subbaraya Chetty (AVASC) Foundation Awards: $ 500 US Savings Bond	Jawahar Navodaya Vidyalaya, Canacona, Goa
	Mihir Tandon & Riddhiman Yadava 'Improvised artificial limb'	Scholarship Award, National Collegiate Inventors and Innovators Alliance/The Lemelson Foundation: $ 1000	Modern School, Vasant Vihar, Delhi
	Malavika Tiwari 'Foot operated vehicle device for the physically challenged'	The Intel Foundation Award in Engineering, Third Place $1000	St. Mary's Convent High School, Kanpur, Uttar Pradesh

** Pre 2005, India has won over 45 awards since 1999, when India first participated at ISEF.*

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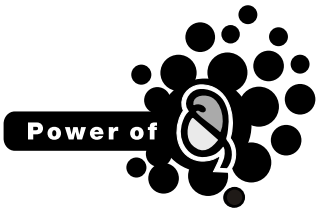

Notes

Notes

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For more information please contact:

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New Delhi – 110016
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