

# Delhi Public School, Dwarka

presents

IGNITE & AXIOM 2017

Science & Mathematics Festival

**Organisers:** 

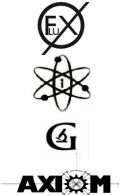


Ionista, the Chemistry Club

Genesis, the Biology Club

Axiom, the Mathematics Club

Tuesday, 24 October, 2017 and Wednesday, 25 October, 2017



The Principal,

Date:

Dear Sir/Madam

#### 'STEM is the artery through which the solutions of tomorrow's problems flow'

Keeping in mind the theme 'STEM (Science, Technology, Engineering, Mathematics)' Delhi Public School Dwarka is organising Ignite and Axiom 2017, the Science and Mathematics festival on 24 and 25 October 2017.

We cordially invite the students of your school to participate in this event. The core idea of this event is to promote Science, Technology, Engineering and Mathematics (STEM) among the young and innovative minds.

Please find enclosed the Event Details, Rules & Regulations and the Registration Form.

Schools may register Online at www.dpsdwarka.com from 01 to 11 October 2017.

Looking forward to the enthusiastic participation of the students of your school.

With regards,

Yours sincerely,

### Principal

# **GENERAL GUIDELINES:**

- All schools must report by 8:00 am sharp for registration.
- The participants are requested to bring their identification proof along with them.
- The schedule, venue and the rules are subject to last minute changes.
- A student may take part in more than one event. However, it is the responsibility of the participant to ensure that the timings of the events do not clash. In case any last minute changes are required in the event schedule, we might not be able to accommodate the participant in both the events.
- A school may send only 1 team per event.
- The decision of the judges will be final and binding.
- Participants have to be present in their school uniform.
- To compete for the Overall Trophy, a school must participate in all the events.
- The Overall Winner's Trophy and the Runners up Trophy will be awarded to the school securing the highest and the second highest aggregate score respectively in the events.
- Aggregate scored for Ignite and Axiom will be calculated separately.
- In case of a tie for the overall position, the team with the maximum number of winning positions shall get the trophy.
- There will be separate Overall Winners and Runners Up trophies for the Science and the Mathematics events.
- The host school will not participate in any event.

# **Contact us**

School Address	:	Delhi Public School, Dwarka, Sector-III, Phase-I, Dwarka,
		New Delhi – 78
Phone Number	:	011 2507 4472-75
Email ID	:	mail@dpsdwarka.com
		Or
		ignite.dpsdwarka@gmail.com

### **Teacher Coordinators:**

Name	Designation	Phone No	Email ID
Ms. Vanita Dewan	Coordinator Mathematics Department and Axiom	9811842732	dewanvanita26@gmail.com
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## **Student Coordinators:**

Name	Designation	Phone No	Email ID
Ankur Tiwari	President Axiom	9560949859	ankur190300@gmail.com
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# **IGNITE 2017**

# **Events at a Glance**

### **Events by Flux – The Physics Club**

S. No.	Event	No. of Participants	Eligibility
1	Circuitron	2	VIII – XII
2	Aquajet	2	VI – X
3	Spectrum	1	IX – XII
4	Interstellar	2	VIII – XI

#### **Events by Ionista – The Chemistry Club**

S. No.	Event	No. of Participants	Eligibility
1	Elementary	1	IX – XII
2	Enigma	2	X – XII
3	Chemi-Con	2	VIII – XII
4	Curieosity	2	IX – XII

# Events by Genesis – The Biology Club

S.	Event	No. of	Eligibility
No.		Participants	
1	Science Of Life	2	IX – XII
2	Diagnostics	2	X – XII
3	Bio Box Office	6	IX – XII
4	Make Or Break	2	VIII – XI

### **Integrated Science Events**

S. No.	Event	No. of Participants	Eligibility
1	Group Discussion	1	IX – XII
2	Quiz	2	IX – XII
3	Be Like Bohr	1	IX – XII
4	Surprise	2	IX – XII

# **Axiom 2017**

# **Events at a Glance**

S. No.	Event	No. of Participants	Eligibility
1	Crossword	1	IX – XII
2	Algorithmics	1	IX – XII
3	Bayes' Bid	2	IX – X
4	Quiz	2	IX – XII
5	Problem Solving	2	IX – X
6	Olympiad	2	XI – XII

# **IGNITE Event Details** Events by Flux – The Physics Club

### 1. Circuitron:

#### **General Rules:**

- Participants will be required to build circuits on breadboards using components such as LEDs, transistors etc.
- Participants will be provided all the necessary components on the spot.
- They should be well-versed with the basics of circuits and breadboards.
- Circuit diagrams may or may not be provided according to the round.

### **Rounds:**

- **Preliminaries:** A pen and paper test will test your theoretical aspects about circuits. 10 teams will qualify after this round.
- **Breadboard circuitry:** This round will test your practical circuit building techniques on a breadboard. 5 teams will qualify after this round.
- **Bug fixing:** This round will test your analysis about circuits and you have to correct the given circuits.

Eligibility	: Classes VIII - XII
Number of participants	:2
Day	: Tuesday, 24 October 2017

## 2. Aquajet:

#### **General Rules:**

- Participants have to build a water-propelled rocket from home, using a 2litre water bottle. Only three rockets can be used by a team for the whole event.
- Only manual bicycle pumps and 12V DC pumps will be allowed. Participants have to **bring** their own launchers, air pump and suitable cork as per the requirement. No launchers from our side will be provided.
- Use of soft chemicals such as baking soda and vinegar is allowed, while use of hard chemicals will lead to disqualification.
- The event will consist of two rounds. 10 teams will qualify after round I, for round II

### **Judgement Criteria:**

- Distance covered by each rocket will be measured in round I.
- Height as well as distance will be measured in round II.

Eligibility	: Classes VI - X
Number of participants	:2
Day	: Tuesday, 24 October 2017

### 3. Spectrum:

#### **General Rules:**

- This event will consist of subjective problems on physics provoking analytical thinking and a deep level of understanding of concepts of physics down to the basic level.
- Topics will include everything covered in XI and XII curriculum, as well as understanding and basic problem solving ability in concepts of modern physics, namely quantum mechanics and special relativity.

Eligibility	: Classes IX - XII
Number of participants	:1
Day	: Tuesday, 24 October 2017

## 4. Interstellar

### **General Rules:**

- Each team is required to build a remote controlled rover to cover an obstacle course in the Minimum amount of time, while answering questions based on astronomy (placed in the obstacle course).
- Maximum dimensions of rover: 30 x 30 x 30 cm.
- The rover should be waterproof and fireproof.
- The length of the wire should be 3-5 m.
- Maximum voltage allowance is 12V.

### Judgement Criteria:

- Time taken to complete the obstacle course.
- Number of questions correctly answered.
- Design of the rover.

Eligibility	: Classes VIII - XI
Number of participants	:2
Day	: Wednesday, 25 October 2017

# Events by Ionista – The Chemistry Club

### 1. Elementary:

The event will consist of subjective problems testing students on various fields of chemistry, namely organic chemistry, inorganic chemistry and physical chemistry. The questions will cover topics from class XI and XII CBSE curriculum.

Eligibility	: Classes IX - XII
Number of participants	:1
Day	: Tuesday, 24 October 2017

### 2. Enigma:

A Sherlockian event of two stages that is designed to test practical problem solving skills of the participants. The teams that get past the undisclosed prelims will take on the role of separate detective squads and try to uncover the provided mystery using practical based chemistry.

Eligibility	: Classes X –XII
Number of participants	:2
Day	: Tue, 24 Oct 2017 & Wed, 25 Oct 2017

### Each finalist must bring their own gloves and lab coats.

## 3.Chemi-Con:

Participants will create a comic strip depicting the history, discussion and formation of a particular theory in chemistry. All the information related to theory will be provided to the participants. The theories may be from any field of chemistry. Please note that participants have to bring their own drawing boards.

### Judgement criteria:

- Relevance to the topic
- Originality and Creativity
- Clarity of thought and expression

Eligibility	: Classes VIII - XII
Number of participants	:2
Day	: Wednesday, 25 October 2017

Each participant must bring their own material like colors, pastel sheets, brushes etc.

# 4. Curieosity:

Participants that make it past the prelims will have to use their wit and logic to form a hypothesis to answer a question and uphold it against opposing theories.

### Judgement criteria:

- Relevance of theory and reasoning
- Originality
- Defence against opposition

Eligibility	: Classes IX - XII
Number of participants	:2
Day	: Wednesday, 25 October 2017

# **Events by Genesis – The Biology Club**

## 1. Science Of Life:

Participants will be tested on their ability to solve real life biology problems on the spot.

Eligibility	: Classes IX - XII
Number of Participants	:2
Day	: Tue, 24 Oct 2017 & Wed, 25 Oct 2017

# 2. Diagnostics:

Students will be provided with a case study which will include symptoms, history of patient and day to day diagnosis attempts of rare diseases. The main aim is to identify the disease and suggest its cure.

Eligibility	: Classes IX - XII
Number of Participants	:2
Day	: Wednesday, 25 October 2017

## 3. Bio Box Office:

Create and enact a script on any one of the topics for 4 to 5 minutes in this <u>ONLINE</u> event. Make a film and send to <u>bioboxoffice@gmail.com</u> on Google Drive. First 15 entries would be entertained and judged (First come, First serve basis). Three entries would be selected, adjudged winners and given prizes. Judging criteria includes use of props, costumes and relevance to the given topic. Topics would be revealed shortly on the event website. Send your entries before  $15^{\text{th}}$  October 2017.

Eligibility	: Classes IX - XII
No. Of Participants	: 6
Day	: Wednesday, 25 October 2017

## 4. Make or Break:

Participants will have to make working models related to a field of biology. Participants will have to bring the materials themselves and assemble their model on the spot. Topics will be declared on the event website soon.

Eligibility	: Classes VIII - XI
Number of Participants	:2
Day	: Tuesday, 24 October 2017

# **Integrated Science Events**

# 1. Group Discussion:

Let's talk science. The event will be held in a 2 tier process - a preliminary round followed by a final round. Participants can expect topics related to any domain of science. The format of the GD and the topics are to be disclosed on the day of the event itself.

Eligibility	: Classes IX - XII
Number of Participants	:1
Day	: Tuesday, 24 October 2017

# 2. Quiz:

A test of scientific trivia, problem solving and thinking skills consisting of a written preliminary round and a non-stage final round. Top six teams from the preliminary round qualify for the finals.

Eligibility	: Classes IX - XII
Number of Participants	:2
Day	: Tue, 24 Oct 2017 & Wed, 25 Oct 2017

# 3. Be like Bohr:

#### **General Rules :**

- Participants are provided with 6 topics (enclosed).
- Each participant must select only one of these topics and submit a quality research paper with the contents being relevant to the chosen topic.
- The research paper's length must be between 600 1200 words. Any diagrams or illustrations will not be included in the length.
- The paper has to be emailed to *ignitebohr2017@gmail.com* latest by 17 October 2017.
- Based on the research paper, top 6 participants will qualify. List of finalists will be revealed on Ignite & Axiom's Facebook page latest by 19 October 2017
- The finalists will have to prepare a pitch to present their research projects and demand an appropriate amount of funding required for their research, from a panel of judges. The finalists may or may not use power point presentations.
- The objective of their pitch is to get as much as possible of the demanded amount.
- The participants will be scored according to the fraction of demand that is granted by the judges. For example, if team A has demanded Rs 1000 and manages to get a funding of Rs500 from the panel then their score will be 5/10.

### **Judgement Criteria:**

- Originality and creativity
- Depth of Research
- Feasibility of Application

Eligibility	: Classes IX - XII
Number of participants	:1
Day	: Tuesday, 24 October 2017

## 4. Surprise:

Expect the unexpected!

Eligibility	: Classes IX - XII
Number of participants	:2
Day	: Wednesday, 25 October 2017

# <u>Topics for Be like Bohr</u>

A description of each objective is provided, with a few suggestions to get you started. Don't feel limited by the suggestions, feel free to explore outside of them. It is recommended that you explore the applications of your topic in various fields of science. Enclose observation tables for any controlled experiment you conduct for your objective. Include diagrams to illustrate your points. It is understood that the main idea is that you will have to pitch your <u>research project</u> to us, so your paper should not merely be a reflection of internet articles about the topic. Plagiarism is strictly prohibited and any participants found to pass off others' intellectual property as their own will be disqualified.

### 1) Zipf's Law

Zipf's law states that given some corpus of natural language utterances, the frequency of any word is inversely proportional to its rank in the frequency table. Thus the most frequent word will occur approximately twice as often as the second most frequent word, three times as often as the third most frequent word and so on. However language is just one of the many fields this dynamic law is applicable to.

Some Suggestions:

- Deeply explore the linguistic aspect of zipf's law by creating your own language with a small vocabulary and grammar and make the following observations:
  - $\circ~$  Distribution of the words before and after the language starts following zipf's law
  - Extent of deviation from zipf's law
  - The relation of most used words with their meaning
- Explore the correlation of zipf's law in physical sciences such as its use in plotting the distribution of solar flare intensities, during pattern of neurons, earthquake magnitudes, protein sequences, diameter of moon craters etc.
- Explain the role of the Principle of Least Effort and human psychology in deciding the most commonly used words.
- Explore the ways Zipf's Law can be used in our favour, such as in fields like cryptography.

### 2) Symmetry

Symmetry in everyday language refers to a sense of harmonious and beautiful proportion and balance. In mathematics, it has a more precise definition that focuses on the 'invariance' of a symmetrical system in the face of various transformations.

Some suggestions:

- Explore the concept of symmetry in body design and features of organisms. Explain how symmetry helps life forms to function and survive.
- Explore the aspects of symmetry in architecture such as the golden ratio and the higher stability of triangular structures over other shapes.

- Explain the symmetry of the Brachistochrone curve and what enables it to be the path of fastest descent.
- Delve into the concept of optical activity and chirality of chemical compounds.

### **3)** The Science of Star Wars

What would the Star Wars universe look like if all the science and technology was realistic with respect to modern times? Develop scientifically accurate technologies that can be used as substitutes in the star wars universe.

Some suggestions:

- Research the scientific inaccuracies of The Force. Draw a parallelism of the force with dark energy.
- Think of ways to harness the destructive capabilities of a light sabre as an energy source or how plasma arcs can be turned into weapons.
- Take into account relativistic and biological effects of interstellar travel and suggest realistic spacecraft designs. Focus on perfecting particular components of the spacecraft like the life support system, thermal control or fuel and propulsion.

### 4) Enhancing the human brain

The brain is the most complex and arguably the most vital component of human life. Explore ways to enhance its functions in specific ways.

Some suggestions:

- Suggest ways to better access the subconscious and peripheral memory.
- Explore the brain's mechanism of relaying messages and suggest ways to increase its efficiency.
- Explore the limiting factors the brain places on our body functions and discuss ways to overcome them.
- Delve into certain mystifying neurological phenomena such as every human's unique inner monologue or the gateway theory of pain. Suggest how gaining control over these mechanisms can enhance the brain.

### 5) Protecting Cities against Harmful Radiations

Radiations can pose a threat to all kinds of life, whether they come from nuclear accidents, harmful astronomical phenomena or a looming nuclear war. How do we prepare for such a scenario?

Some suggestions:

- Model cities based on preparing to protect citizens against the above-mentioned threat.
- Research ways in which safety regulations to combat harmful radiation can be included in day-to-day life, or scientific methods for 'radiation proofing'.
- The topic can be extended to include the effect of harmful radiations on astronauts and how their effect can be minimized.

### 6) Any other topic of your choice

Any topic you choose should have potential to help progress the society, and that is what you should explore.

- Try to conduct as many controlled experiments for your research as possible, enclose the findings in your paper.
- Explore your problem statement, and what research has been done in the past on that topic.
- Explore ways to address your problem statement.

# Format for the Research Paper

- Give a title to your paper.
- State your name and your school's name.
- State the objective(s) of your paper.
- Include a table of contents
- Include an introductory paragraph.
- Include all observational tables and experiments conducted with appropriate labels and references.
- Preferably include illustrations.
- Include a concluding paragraph.
- State all your sources at the end. The citations must include the link of the website or the name and edition of any book you referred for your paper.

# **AXIOM Event Details**

## 1. Crossword:

Conventional crossword based on cryptic clues.

Eligibility	: Classes IX – XII
Number of participants	:1
Day	: Tuesday, 24 October 2017

## 2. Algorithmics:

Design a function f(x) according to the given problem statement which gives the correct value for 'x' within the given limits.

Eligibility	: Classes IX – XII
Number of participants	:1
Day	: Wednesday, 25 October 2017

## 3. Bayes' Bid:

Participate in an auction for questions to be solved. Topics can include anything related to mathematics.

Eligibility	: Classes IX – X
Number of participants	:2
Day	: Wednesday, 25 October 2017

# 4. Quiz:

A mix of mathematical trivia and logical puzzles consisting of a written preliminary round and an on-stage final round.

Top 6 teams qualify for the finals.

Eligibility	: Classes IX – XII
Number of participants	:2
Day	: Tue, 24 Oct 2017 & Wed, 25 Oct 2017

# 5. Problem Solving:

Subjective and objective problems based on various fields of mathematics, algebra, geometry and combinatorics.

Eligibility	: Classes IX – X
Number of participants	:2
Day	: Tuesday, 24 October 2017

# 6.Olympiad:

Objective problems testing students on various fields of mathematics. The average score of the participating students will be taken as the school score.

Eligibility	: Classes XI – XII
Number of participants	:2
Day	: Tuesday, 24 October 2017

# **POINTS TALLY: IGNITE**

S No	Event	First	Second	Third
1	Circuitron	100	80	60
2	Aquajet	100	80	60
3	Spectrum	100	80	60
4	Interstellar	100	80	60
5	Elementary	100	80	60
6	Enigma	100	80	60
7	Chemi-Con	100	80	60
8	Curieosity	100	80	60
9	Science of Life	100	80	60
10	Diagnostics	100	80	60
11	Bio Box Office	100	80	60
12	Make or Break	100	80	60
13	Group Discussion	120	100	80
14	Quiz	120	100	80
15	Be Like Bohr	150	120	100
16	Surprise	150	120	100

# **POINTS TALLY: AXIOM**

S No	Event	First	Second	Third
1	Crossword	100	80	60
2	Algorithmics	100	80	60
3	Bayes' Bid	100	80	60
4	Quiz	100	80	60
5	Problem Solving	100	80	60
6	Olympiad	100	80	60

# DELHI PUBLIC SCHOOL, DWARKA IGNITE & AXIOM 2017 Science & Mathematics Festival

# DAY 1 (Tuesday, 24 October 2017)

Venue Time	Open air stage	Auditorium	Basement	Physics lab	Biology lab	General science lab	Library	Classroom	Football field
8:00- 8:30			D	FC	гол	<b>TRAT</b>	ΊΩΝ	T	
8:30- 9:00			Γ	ĽG	121			l	
9:00- 9:30					INA	UGRAL			
9:30- 10:00	P2	11	13	P1	B1	B1	M4	P3 C1 C2 M1 M5 M6	B4
10:00-10:30	P2	11	13	P1	B1	B1	M4	P3 C1 C2 M1 M5 M6	B4
10:30-11:00	P2	11	13	P1	B1	B1		P3 C1 C2 M1 M5 M6	B4
11:00-11:30	P2	11	13	P1	B1	B1	12	P3 C1 M5 M6	B4
11:30-12:00	P2	11		P1	B1	B1	12	P3 C1 M5 M6	B4
12:00-12:30		11						P3 C1 M5 M6	
12:30-1:00									
1:00- 1:30									

### Key for events

- Physics: P1: Circuitron, P2: Aquajet, P3: Spectrum, P4: Interstellar
- Chemistry: C1: Elementary, C2: Enigma, C3: Chemicon, C4: Curieosity
- Biology: B1: Science of life, B2: Diagnostics, B3: Bio box office, B4: Make or break
- Integrated Science: I1: Group discussion, I2: Quiz, I3: Be like Bohr, I4: Surprise
- Maths: M1: Crossword, M2: Algorithmics, M3: Bayes' Bid, M4: Quiz, M5: Problem solving, M6: Olympiad

# DELHI PUBLIC SCHOOL, DWARKA IGNITE & AXIOM 2017 Science & Mathematics Festival

# DAY 2 (Wednesday, 25 October 2017)

Time	Open air stage	Auditorium	Basement	Physics lab	Chemistry lab	Biology lab	General science lab	Library	Classroom
8:00- 8:30		1	DT		CTD			1	
8:30- 9:00			Kľ	G	<b>SIR</b>		ION		
9:00- 9:30	P4	M4	C3		C2	B1	B2	B2	C4, M2, M3, I4
9:30- 10:00	P4	M4	C3		C2	B1	B2	B2	C4, M2, M3, 14, B3
10:00-10:30	P4	M4	C3		C2	B1	B2	B2	C4, M2, I4, B3
10:30-11:00	P4	12	C3	M3	C2	B1	B2	B2	C4, M2, I4, B3
11:00-11:30	P4	12	C3	M3	C2	B1	B2	B2	C4, M2, I4
11:30-12:00	P4	12	C3	M3					
12:00-12:30									
12:30-1:00		D	DI7	F F	TCT		UTIO	N	
1:00- 1:30						NID		1 N	

## Key for events

- Physics: P1: Circuitron, P2: Aquajet, P3: Spectrum, P4: Interstellar
- Chemistry: C1: Elementary, C2: Enigma, C3: Chemicon, C4: Curieosity
- Biology: B1: Science of life, B2: Diagnostics, B3: Bio box office, B4: Make or break
- Integrated Science: I1: Group discussion, I2: Quiz, I3: Be like Bohr, I4: Surprise
- Maths: M1: Crossword, M2: Algorithmics, M3: Bayes' Bid, M4: Quiz, M5: Problem solving, M6: Olympiad

# DELHI PUBLIC SCHOOL, DWARKA IGNITE &AXIOM 2017 Science & Mathematics Festival

## Tuesday, 24 October 2017 & Wednesday, 25 October 2017

## **REGISTRATION FORM**

Name of the School and Address	:	
Contact Number	:	
E-mail Address	:	
Name and Contact number		
of the accompanying teacher	:	

### **Events by Flux– Physics Club**

S No	Event	Name of the Participants	Class
1	Circuitron	1.	
		2.	
2	Aquajet	1.	
		2.	
3	Spectrum	1.	
4	Interstellar	1.	
		2.	

### **Events by Ionista- The Chemistry Club**

S No	Event	Name of the Participants	Class
1	Elementary	1.	
2	Enigma	1.	
		2.	
3	Chemi-Con	1.	
		2.	
4	Curieosity	1.	
		2.	

# Events by Genesis – The Biology Club

S No	Event	Name of the Participants	Class
1	Science Of Life	1.	
		2.	
2	Diagnostics	1.	
		2.	
3	Bio Box Office	1.	
		2.	
		3.	
		4.	
		5.	
		6.	
4	Make or Break	1.	
		2.	

# **Integrated Science Events**

S No	Event	Name of the Participants	Class
1	Group Discussion	1.	
2	Quiz	1.   2.	
3	Be Like Bohr	1.	
4	Surprise	1.	
		2.	

S No	Event	Name of the Participants	Class
1	Crossword	1.	
2	Algorithmics	1.	
3	Bayes' Bid	1.	
		2.	
4	Quiz	1.	
		2.	
5	Problem Solving	1.	
		2.	
6	Olympiad	1.	
		2.	

# Events by Axiom- The Mathematics Club

NOTE:		
<b>Online Registration</b>	:	01 to 11 October 2017
By post last date	:	11 October 2017.

Date

Signature & Stamp of the Principal