30 November 2011

The Head of Science Department
All Secondary Schools, Junior Colleges and Centralised Institutes

Through: The Principal

SECONDARY & PRE-UNIVERSITY SHELL SCIENCE FAIR 2012
(Monday to Tuesday, 21 to 22 May 2012)

1. Introduced in 1978, the Singapore Youth Science Festival (SYSF) has undergone a couple of title modifications to reflect the changing times. Originally known as Singapore Youth Science Fortnight and later, Singapore Youth Science Festival (SYSF), it has now been re-named as Shell Singapore Youth Science Festival (SSYSF).

This shall be the 35\textsuperscript{th} year that the event has been annually organised in 1978; known as the Singapore Youth Science Fortnight (SYSF) and renamed the Shell-Singapore Youth Science Festival (SSYSF) in 1997, the SSYSF has become a key event in the school calendar. Every year, the series of Festival activities, designed to promote science education, attract mass participation of students at the Primary, Secondary and Pre-University levels. This annual celebration of science learning is co-organised by the Science Teachers Association of Singapore, the Singapore Science Centre and Shell Companies in Singapore.

2. One of the anchor events of the SSYSF is the Science Fair. This year marks the 35\textsuperscript{th} Anniversary of the SSYSF and coincides with the biennial Secondary & Pre-University Science Fair. The SSYF will be held from 21 to 22 of May 2012 at the Singapore Science Centre.

3. This year, in line with 2012 being the International Year of Sustainable Energy for All, the theme for the competition is also on ‘Achieving Sustainable Energy for All’.

4. The categories for this year’s Science Fair are Engineering Sciences, Information Technology, Life Sciences, Environment and New Endeavours. (Further details are furnished in Annex A.)

5. The objectives of the Science Fair are to:
   i. promote scientific study through investigative-type projects in science and mathematics
   ii. encourage the use of creative and innovative methods in problem solving
   iii. heighten students’ awareness and generate their interest in science and mathematics research and technology development

6. We would like to extend an invitation to your school to participate in this Science Fair.
7. We request that the participants for each entry should:
   i. work on an investigative-type of project
   ii. prepare and submit a project report for preliminary judging
   iii. exhibit the project at the Science Fair (if selected)
   iv. prepare a video on their presentation (if selected)

8. Participants at the Science Fair will be encouraged with a number of awards that affirm good efforts at various project processes. These include:
   • Outstanding Projects (Gold)
   • Good Projects (Silver, Bronze)
   • Projects of Merit
   • Most Innovative Projects
   • Most Enterprising Projects
   • Best Written Reports
   • Best Oral Presentations
   • Best Displays & Exhibits

9. We are pleased to inform schools that there will be institutional awards for 'Most Outstanding Participation'. These will be awarded on the basis of the number and the quality of entries from the institution. The maximum number of entries per institution is ten. The quality of entries is judged by the number that is selected for the finals and the number that won prizes as well as the type of prizes won.

10. Certificates of Participation will be awarded to each participant (even if the project is not selected for the Finals.)

11. Annexes A to F are attached.
   • Annex A: Brief Descriptions of the Theme and Categories
   • Annex B: Rules and Regulations
   • Annex C: Project Report Guidelines
   • Annex D: Judging Criteria
   • Annex E: Timeframe and Summary of Submission Requirements
   • Annex F: “Summary of Entries” Form
   • Annex G: Entry Form

12. All Entry Forms and the Summary of Entries must be emailed to Ms Jessica Lew, ssysf2012@gmail.com by 9 March 2012 (Friday). (We will not accept faxed entries as from past experience handwritten, faxed entries are often illegible.)
13. Entries MUST be emailed by the Head of Science. Please look out for an acknowledgement email to confirm receipt of your entry. Participants should be properly briefed on the contents of Annexes A to G.

All **Project Reports** must be submitted by **13 April 2012 (Friday)** to:

The SSYSF 2012 Science Fair Committee  
Attn: Ms Jessica Lew  
c/o Ang Mo Kio Secondary School  
Ang Mo Kio Street 22  
Singapore 569362

14. For enquiries, please correspond via email: Ms Jessica Lew and address the email to me. You may also visit the following website ([http://www.science.edu.sg/events/Pages/SSYSF.aspx](http://www.science.edu.sg/events/Pages/SSYSF.aspx)) for updates on Science Fair.

15. We look forward to your support and keen participation from your students.

Best Wishes.

Ms Jessica Lew  
Chairman  
SSYSF 2012 Science Fair Committee
35\textsuperscript{th} SHELL-SINGAPORE YOUTH SCIENCE FESTIVAL
SECONDARY & PRE-UNIVERSITY SCIENCE FAIR 2012

BRIEF DESCRIPTIONS OF THE THEME AND CATEGORIES

THEME: "Achieving Sustainable Energy for All"

In recognition of the importance of energy access for sustainable economic development and supporting achievement of the Millennium Development Goals, the United Nations General Assembly has designated 2012 as the International Year of Sustainable Energy for All. The SSYSF will also adopt this as the theme for this year’s science fair.

The purpose of Science is to learn about and explore everything that surrounds us. The real joy of Science emerges when one realises that when one marvels at the intriguing nature of biodiversity that exists all around us. As we move towards a society that values research and development, it is timely that we create opportunities for our students to explore and appreciate the world of Science and Engineering through events like Science Fairs.

As Singapore is scaling up her efforts to spearhead research and innovation strategies to move the nation forward, the SSYSF is a platform for the students from our Secondary Schools, Junior Colleges and Centralised Institute to showcase their innovative scientific investigations in the five exciting categories of Engineering Science, Life Sciences, Information Technology, Environment and New Endeavours. These categories are broad enough to encompass all possible projects traditionally classified under Physics, Chemistry, Biology and Mathematics. The intent is to fuel a growing desire for scientific inquiry and investigations amongst our youths.

CATEGORY 1: ENGINEERING SCIENCES

This category encompasses projects with research applications in the fields of engineering like biochemistry, communications, electronics, nanotechnology etc.

CATEGORY 2: LIFE SCIENCES

This category encompasses projects with research applications in the fields of life sciences like molecular genetics of disease, pharmaceuticals, disease diagnosis etc.

CATEGORY 3: INFORMATION TECHNOLOGY

This category encompasses projects with research applications in the fields of computing like programming, development of cutting-edge digital multimedia, high speed processors, etc.

CATEGORY 4: ENVIRONMENT

This category encompasses projects with research applications in the fields of environmental conservation and/or management, alternative energy sources, etc., with a great scope for multidisciplinary projects.
CATEGORY 5: NEW ENDEAVOURS

Projects under this category would have novel research applications in the fields that hitherto have not been discovered and explored. Further, projects which do not lend themselves well into the above-mentioned categories may be placed under "New Endeavours".
35th SHELL-SINGAPORE YOUTH SCIENCE FESTIVAL
SECONDARY & PRE-UNIVERSITY SCIENCE FAIR 2012

RULES AND REGULATIONS

1. ENTRIES FOR THE SCIENCE FAIR
   1.1. All entries to the Science Fair must be made using the Entry Form (Annex G).
   1.2. Each Entry Form must be sponsored by a teacher and approved by the Head of Science or Mathematics.
   1.3. Each school is allowed a maximum of ten entries (total of all categories).
   1.4. The number of participants for each entry should not exceed six.
   1.5. The Organisers reserve the right to reject any entry.
   1.6. The Organisers will not be held responsible for any accidents or injuries incurred by the participants as a result of their participation in the Science Fair.
   1.7. Please email all completed Entry Form(s) and the Summary of Entries to ssysf2012@gmail.com.
   1.8. E-mails of entries MUST be entitled “SSYSF Science Fair 2012” and emailed by the Head of Science or Maths who should properly identify himself/ herself in the email with school name.
   1.9. The closing date for the submission of Entry Form(s) and Summary of Entries is 9 March 2012 (Friday).
   1.10. All Project Reports must be submitted to:
           The SSYSF 2012 Science Fair Committee
           Attn: Ms Jessica Lew
           c/o Ang Mo Kio Secondary School
           Ang Mo Kio Street 22
           Singapore 569362
   1.11. The closing date for the submission of project reports is 13 April 2012 (Friday).

2. ELIGIBILITY
   2.1. All students currently attending Secondary Schools, Junior Colleges or Centralised Institutes in Singapore are eligible to participate in the Science Fair.
3. PROJECTS

3.1. All participants must undertake an investigative-type project in any one of the categories stipulated. Each entry must illustrate at least one scientific or mathematical principle. Each entry should also include a write-up on the practicability of the project.

3.2. All participants must submit a printed Project Report in simple, clear English describing their project and findings. This report should not exceed

(i) 1000 words for Lower Secondary level projects
(ii) 2000 words for Upper Secondary level projects
(iii) 3000 words for Pre-University level projects

3.3. The Project Report Guidelines (Annex C) MUST be adhered to. The Organisers reserve the right to reject any entry if the guidelines are not adhered to.

3.4. Hard and soft copies of the project report must be submitted to Ang Mo Kio Secondary School (General Office) by 13 April 2012 (Friday). Details of project submissions can be found in Annex E.

3.5. Each team of participants must be prepared to exhibit their project at the Science Fair, if they are selected for the Finals.

3.6. The Organisers reserve the right to re-categorise any project where appropriate.

3.7. No comparative experiment as well as qualitative or quantitative analysis of any commercial product is allowed.

3.8. Exhibits using dangerous items such as exposed high tension wires, explosive chemicals, open fires and ferocious or poisonous animals are strictly prohibited.

3.9. Participants using live animals in their exhibits are required to conform to the following Regulations for Experiments with Animals:

3.9.1. The basic aim of scientific studies involving animals is to achieve an understanding of life and to advance our knowledge of life processes. Therefore, studies should lead to a respect for life.

3.9.2. A qualified supervisor must assume primary responsibility for the purpose and conditions of the experiment involving live animals.

3.9.3. Where the animals used in the experiments are likely to be exposed to pain, appropriate anaesthesia must be used.

3.9.4. All participants must ensure that animals used in their experiments are not at any time in serious discomfort. The animals must be properly handled and fed. Proper sanitary quarters for the animals must be provided.

3.9.5. Experiments in nutritional deficiency may proceed only to the point where symptom(s) of the deficiency appear. Appropriate measures must then be taken to correct the deficiency, if such action is feasible.

3.9.6. Experiments involving the use of anaesthetic drugs, surgical procedures, pathogenic organisms, toxicological products, carcinogens, or radiation must be directly supervised by qualified persons.
4. SPONSORSHIP AND CONSULTATION
   4.1. The printed project report and the work on the project and exhibits must be done by the participants themselves.
   4.2. Sponsor teachers can only provide advice.

5. PUBLICATION OF REPORTS
   5.1. The Organisers reserve the right to publish the reports or part thereof submitted by the participants to the Science Fair.

6. JUDGING OF ENTRIES
   6.1. The Organisers reserve the right to decide on the mode of preliminary selection and final judging.
   6.2. The Organisers will appoint the judges.
   6.3. The decision of the judges will be final.
   6.4. Enquiries on the judging will not be entertained.

7. AWARDS AND CERTIFICATES
   7.1. The Main Organising Committee of the SSYSF 2012 will decide on the categories and the quantum of awards.
   7.2. Certificates of Participation will be awarded to each participant.

8. DECISIONS PERTAINING TO THE SCIENCE FAIR
   8.1. The Organisers reserve the right to decide on issues pertaining to the Science Fair that is not explicitly stated in the Rules and Regulations.

9. ACCEPTANCE OF THE RULES AND REGULATIONS
   9.1. All institutions and participants will, by submitting Entry Form(s), bind themselves to these Rules and Regulations.
PROJECT REPORT GUIDELINES

General
1. The report must be A4 size, securely bound and typed in Arial font 12 with double line spacing.
2. Supporting tables, graphs, charts, diagrams, pictures or photos, etc. should be properly labelled in sequential order and captioned. E.g.:
   (i) Table 1, 2, 3 etc.
   (ii) Figure 1, 2, 3, etc.
   (iii) Diagram 1, 2, 3, etc.
   (iv) Chart 1, 2, 3, etc.
3. Attachments should be sequentially labelled as Annexes A, B, C, etc., page-numbered and reflected in the Contents Page.
4. Fanciful decoration of the report should be avoided – all graphics or colours used should support the contents of the report rather than be for purely decorative purposes.
5. Each Project Team must submit a printed Report in simple, clear English describing their projects and findings. This report should not exceed
   (i) 1000 words for Lower Secondary level projects
   (ii) 2000 words for Upper Secondary level projects
   (iii) 3000 words for Pre-University level projects
6. The report should be organised for easy reading. It should be concise and direct (to the point). All diagrams, pictures and photographs should be clear and sharp.

Project Title
1. The project title should throw light on your investigations. It should not be an advertisement-type of slogan.
2. Examples of good project titles:
   (i) Investigations on the Breakdown of Aspartame
   (ii) The Multi-Purpose Red Cabbage Indicator
   (iii) Effects of Refrigeration and Room Temperature on Proliferation of Yeast on Honey
3. Examples of bad project titles:
   (i) Small Things Great Wonders
   (ii) A Magical Solution
   (iii) Save the World with Vegetables
Invitation Letter to Schools - ANNEX C (Page 2 of 4)

Organisation of Report

1. Cover Page
   Please refer to the sample shown on page 4 of Annex C. The cover page should be kept neat and simple. Any cover design should be relevant to the project.

2. Contents Page
   The contents page should list the sections in the report with page numbers.

3. Abstract
   The abstract is a one-page summary of the whole project, stating its purpose, method, main findings and conclusion(s).

4. Declaration of Degree of Guidance from External Mentors / Establishments
   Students must declare in this section the extent of guidance which they received from external mentors (outside the school) or establishments (such as tertiary institutions). Entries which, in the judgement of the Organisers or judges, receive excessive guidance to the extent that they are no longer the original works of the students may be disqualified.

5. Introduction
   • What the project is all about?
   • Why it is chosen?
   • Why it is important, significant or interesting?
   • What you hope to achieve from your investigation?

6. Investigative Approach / Theoretical Background
   • What theoretical background drives the investigation of the project?
   • What approaches are considered?
   • How is the final approach decided upon?
   • Are there any initial assumptions or hypotheses made?
   • Are there any key questions you hope to answer from your investigation?
   • What is the main focus of your project?

7. Resources
   • What resources (human, physical and time) have been utilised in the project?
   • How have they been procured?

8. Methodology / Procedure
   • Describe in detail the steps in your study or investigation, including timeframe, repetitions, and changes made to original plans.
   • How does your method lead towards answering the key question(s) in your study?

9. Findings
   • What data is collected from the study?
   • Your data must be organised and presented in a reader-friendly format.
10. Analysis of Findings
   • How is the analysis of the data collected conducted?
   • Why is the data analysed the way you did?
   • Present your analysis in a way that makes for easy interpretation by the reader.
   • The use of tools, such as tables, graphs, charts will improve your presentation.
   • The tables, graphs, etc. have to be interpreted. I.e. what do they mean?

11. Relevance to Practical Application
   • What are the practical applications of the project and the results obtained?
   • Highlight the feasibility, advantages and relevance of any ideas proposed in the course of the research.

12. Conclusion
   • What significant conclusions can you make from the analysis of the findings?
   • Do the conclusions fit your initial assumptions or hypotheses?
   • If they do not, can you explain the cause of any deviations?
   • Can you explain any interesting or unexpected results of your investigations?
   • Are your research questions sufficiently answered by your investigation?
   • What further investigations can your team or other investigators do as a follow-up?

13. References
   • List your references in alphabetical order of family names of author.
   • The list should include the author’s name, year of publication, title of publication, relevant chapters and pages (if applicable), and publisher. E.g.:
   • References can either be from printed or non-printed media. State the type of media, if non-printed.

14. Acknowledgement (to be included only in one hard copy and the soft copy – CD ROM – for submission)
   • List those who have assisted the team in one way or another in the process of the investigation and report writing. The more significant persons should be listed first.
Sample of Project Report Cover Page

**35th SHELL-SINGAPORE YOUTH SCIENCE FESTIVAL**
**SCIENCE FAIR 2012**

<table>
<thead>
<tr>
<th>Level:</th>
<th>Upper Secondary</th>
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<tbody>
<tr>
<td>Category:</td>
<td>Life Sciences</td>
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<tr>
<td>Project Title:</td>
<td><em>Effects of Refrigeration &amp; Room Temperature on Proliferation of Yeast on Honey</em></td>
</tr>
</tbody>
</table>
| Team Members: | *Shah Siva Raja (Leader)*  
*Lee Ming*  
*Ng Ling Lin, Helen*  
*Ismail b Abdullah* |
| Sponsor Teacher(s): | *Mr Patrick Sung*  
*Mdm Chan Geok Choo* |
| School: | *Utama Secondary School*  
*(The school name should be included *only* in *one* Hard Copy and the Soft copy - CD ROM - submission.)* |
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JUDGING CRITERIA

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>APPXIMATE WEIGHTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 The Project</td>
<td></td>
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<tr>
<td>Depth of analysis of selected principle(s)</td>
<td>10</td>
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<tr>
<td>Experimental / Investigative design</td>
<td>20</td>
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<tr>
<td>Creativity / Innovativeness</td>
<td>10</td>
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<td>Practical Application</td>
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<td>2 The Written Report</td>
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<td>Clarity</td>
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<td>Organisation</td>
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<td>Conciseness</td>
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<tr>
<td>3 The Display (Exhibit)</td>
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<td>Aesthetics</td>
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<td>4 Multimedia presentation</td>
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<td>Knowledge of principle(s) involved</td>
<td>10</td>
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<tr>
<td>Oratorical cum new media skills</td>
<td>10</td>
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Please Note:
- A preliminary selection of submitted project reports will be made based on Criteria 1 and 2.
- Participants whose projects are selected for the Finals will be invited to display their projects at the Science Fair held at the Singapore Science Centre. The Final Judging would be based on all four Criteria.
## TIMEFRAME & SUMMARY OF SUBMISSION REQUIREMENTS

<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
<th>Form of Submission</th>
<th>Remarks</th>
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</thead>
</table>
| 9 March 2012    | Submission of Entry Forms and Summary of Entries                       | Soft copies to be submitted via email to ssysf2012@gmail.com                       | Please entitle your email:  
  - “Science Fair 2012”  
  - Please name your files as follows:  
    - (For Summary of Entries)  
    - “SOE name of school”  
    - e.g. SOE UtamaSS  
    - (For Entry Form)  
    - “EF name of school ##”  
    - e.g. EF UtamaJC 01  
    - EF UtamaJC 02 etc.                                                                 |
<p>| 13 April 2012   | Submission of Project Reports                                           | 3 hard copies with name of school omitted from cover page, and acknowledgements excluded from report. | 3 copies per project group.                                      |
|                 |                                                                        | 1 hard copy with name of school and acknowledgements included.                     | 1 copy per project group.                                                                                                           |
|                 |                                                                        | 1 CD-ROM with soft copies of ALL projects from the school. The name of the school and acknowledgements must be included in the soft copy. | 1 CD-ROM per school. The school’s name must be labelled on the CD-ROM.                                                   |
| 20 April 2012   | Schools selected to submit multimedia presentation of their projects.  | Selected schools will be informed of details in due time.                          |                                                                                                                                          |</p>
<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
<th>Details</th>
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<tbody>
<tr>
<td>20 April 2012 to 4 May 2012</td>
<td>Judging of Oral Presentation using multimedia presentation.</td>
<td>Selected schools will be informed of details in due time.</td>
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<tr>
<td>18 May 2012</td>
<td>Putting up of exhibits</td>
<td>Selected schools will be informed of details in due time.</td>
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<td>21 May 2012 (Monday)</td>
<td>Opening ceremony of SSYSF 2012 and GOH to grace the event. Results will also be announced on that day. All finalists to present at the SSYSF 2012 held at the Singapore Science Centre.</td>
<td>Selected schools will be informed of details in due time.</td>
</tr>
<tr>
<td>22 May 2012</td>
<td>All finalists to present at the SSYSF 2012 held at the Singapore Science Centre.</td>
<td>Selected schools will be informed of details in due time.</td>
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35th SHELL-SINGAPORE YOUTH SCIENCE FESTIVAL
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SUMMARY OF ENTRIES FORM

To: Chairman
SSYSF 2012 Science Fair Committee

Date:
Name of School / JC / CI:
Fax:
Name of HOD Science / Maths:
Email of HOD Science / Maths:
Contact No.: (School)
Contact No.: (H.P.)

Summary of Entries:

<table>
<thead>
<tr>
<th>Entry</th>
<th>Project Title</th>
<th>Category (Engineering Science / Life Sciences / Information Technology / Environment / New Endeavours)</th>
<th>Level (Pre – U / Upper Sec / Lower Sec)</th>
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<tbody>
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</table>
Please Note:

Closing date for submission of Entry Form and Summary of Entries:

**9 March 2012 (Friday)**

Please email completed Annex F to ssysf2012@gmail.com

Closing date for the submission of Project Reports: **13 April 2012 (Friday)**.

Late entries will be disqualified.
ENTRY FORM

To: Chairman
SSYSF 2012 Science Fair Committee

| Date: |  
|---|---|
| Name of School / JC / CI: |  
| Level (Pre – U / Upper Sec / Lower Sec): |  

Category (Engineering Science/ Life Sciences/ Information Technology/ Environment/ New Endeavours):

**Engineering Science**

Project Title: 

**Abstract of the Project: (please type)**

Findings:

Conclusion:
### S/N | Name of Participants (as in NRIC) | Gender (M / F) | Contact No. | Email Address
---|---|---|---|---
1 | Leader: | | | |
2 | | | | |
3 | | | | |
4 | | | | |
5 | | | | |
6 | | | | |

### S/N | Name of Sponsor Teacher(s)-in-charge | School Contact No. | H.P. No. | Email Address
---|---|---|---|---
1 | | | | |
2 | | | | |

**Please Note:**

Closing date for submission of Entry Form and Summary of Entries: **9 March 2012 (Friday).**

Please email completed Annex G to **ssysf2012@gmail.com**

Closing date for the submission of Project Reports: **13 April 2012 (Friday).**

Late entries will be disqualified.