Republic of the Philippines
Department of Education

20 AUG 2018

DepEd MEMORANDUM
No. 134 s. 2018

NATIONAL SCIENCE AND TECHNOLOGY FAIR FOR SCHOOL YEAR 2018-2019

To: Undersecretaries
Assistant Secretaries
Bureau and Service Directors
Regional Directors
Schools Division Superintendents
Public and Private Elementary and Secondary School Heads
All Others Concerned

1. The Department of Education (DepEd), through the Bureau of Curriculum Development (BCD), announces the conduct of the **National Science and Technology Fair (NSTF) for School Year (SY) 2018-2019** from February 18 to 22, 2019 at the Tagaytay International Convention Center (TICC), Tagaytay City. The conduct of the school, division, and regional Science and Technology Fair (STF) levels shall be held on the following dates:

Level	Date
School	September 2018
Division	October 2018
Region	November 2018

2. The STF aims to:

a. promote Science and Technology consciousness, and a culture of innovation among the youth; and
b. identify the most creative and innovative student researchers from junior and senior high schools, who shall represent the country in the international Science research fairs.

3. The official participants from each region at the national level DepEd-BCD STF shall only be the Rank 1 Regional Winners in each of the different categories, whose entries have been approved by the national level Scientific Review Committee (SRC). Substitutes shall not be allowed. The description and maximum number of official participants are the following:

Maximum Number of Student Participants per Region = 16				
	Life Science Category	Physical Science Category	Robotics and Intelligent Machines Category	National Science Innovation Expo
Individual	1	1	1	1
Team	3	3	3	3

4. The number of other Official Party members are as follows:

Maximum Number of Other Official Party per Region = 7	
Regional Science Supervisor	1
Regional Math Supervisor	1
Research Advisers (Qualified Projects)	2
Observers • one observer for every 5 students (1:5) • one observer can only be a research adviser, or Math/Science Education Program Supervisors	3

5. The following documents are enclosed for information and guidance:

Enclosure No. 1	Guidelines on the National STF 2018–2019
Enclosure No. 2	Schematic Diagram on the Flow of STF Activities
Enclosure No. 3	2018–2019 Calendar of Important STF Activities and Requirements
Enclosure No. 4	Format of Research Paper
Enclosure No. 5	Format of Invention Report Paper
Enclosure No. 6	Checkpoints for SRC Review
Enclosure No. 7	SRC Review and Recommendation Report
Enclosure No. 8	Board of Judges (BOJ) Project Evaluation Form

6. Regional coordinators (RCs), division science and math supervisors, school heads, and participants are expected to download softcopies of the following documents from the corresponding links:

Document	**Link**
International Rules for Pre-college Science Research: Guidelines for Science and Engineering Fairs 2018–2019 and required forms	https://sspcdn.blob.core.windows.net/files/Documents/SEP/ISEF/2019/Rules/Book.pdf
Summarized updated Intel International Science and Engineering Fair (ISEF) Rules	https://sspcdn.blob.core.windows.net/files/Documents/SEP/ISEF/2019/Rules/Rules-Overview.pdf

7. The registration fee for each participant is as follows:

Level	**Participant**	**Registration Fee**
Division	• Students with entries • Research advisers • Supervisors in Science and Mathematics	P2,500
Regional		P5,000

8. Registration fee shall be charged to local funds, subject to the usual accounting and auditing rules and regulations. This fee will cover prizes, board and lodging of the participants and their advisers, science and mathematics supervisors, and the materials needed to the conduct of the STF. The subsidy to cover the payment for honoraria of the members of the SRC and BOJ relative to the conduct of Regional STF shall be downloaded to the regions.

9. The travel expenses of participants in the national level STF shall be charged to local funds or other sources; whereas, the expenses of the BCD staff, board and lodging of official participants, materials, transportation and communication relative to the activities, prizes and cash awards, and honoraria of members of the SRC, BOJ, and external or non-DepEd resource persons shall be charged to the BCD Fund, subject to the usual accounting and auditing rules and regulations.

10. The RCs are requested to submit reports using the format provided in Enclosure No. 5 to the BCD, through email address nstf@deped.gov.ph, on or before **December 3, 2018**. Failure to submit the report and projects on time shall **disqualify** the region in the national fair.

11. All other activities relative to Science, Technology, Engineering and Mathematics (STEM) research projects, including those of the private associations, shall be harmonized with the activities of the NSTF from **February 18 to 22, 2019**. All students, including those from other special interests programs, are strongly encouraged to participate in the school level STF.

12. For more information, contact **Ms. Anna Liza M. Chan**, Senior Education Program Specialist, BCD-Curriculum Standards Development Division (CSDD), Department of Education (DepEd) Central Office, 3rd Floor Bonifacio Building, DepEd Complex, Meralco Avenue, Pasig City at telephone nos. (02) 632-7746 and (02) 635-9822, or email at nstf@deped.gov.ph.

13. Immediate dissemination of this Memorandum is desired.

LEONOR MAGTOLIS BRIONES
Secretary

Encls.:
As stated

Reference:
DepEd Memorandum No. 175, s. 2017

To be indicated in the Perpetual Index
under the following subjects:

CELEBRATIONS AND FESTIVALS
CONTESTS
LEARNING AREA, SCIENCE
SCHOOLS
STUDENTS

DJP DM NSTF SY 2018-2019
0573 July 17/19, 2018

GUIDELINES ON THE NATIONAL SCIENCE AND TECHNOLOGY FAIR 2018 - 2019

Similar to the previous national level fair, the National Science and Technology Fair (STF) for 2018 -2019 is an Intel ISEF-affiliated fair. As such, the requirements for affiliated fairs should be met and followed as stated in the ISEF guidelines mentioned on page 2 of this Memorandum.

1. The Science Fair

The Bureau of Curriculum Development of the Department of Education (DepEd-BCD) shall conduct the **National STF 2018 -2019** on **February 18 - 22, 2018.**

The STF aims to promote Science and Technology consciousness and a culture of innovation among the youth. The NSTF also aims to identify the most creative and innovative student researchers from the Junior and Senior High School who shall represent the country in the international Science research fairs.

In addition to the existing research competition, there shall be other activities within the fair as described below.

1.1 National Science Innovation Expo

Innovation Expo is designed to showcase products and innovation of learners. It aims to crowd-source and display science and technology innovations and solutions to everyday challenges. Furthermore, it also serves as a venue to exchange ideas on Research and Development and Science and Technology.

The format of the paper is found in **Enclosure No. 5**.

The region can send two (2) inventions by an individual or by a team composed of a maximum of two (2) members only.

Gawad Likhang Agham shall be awarded to the most innovative invention exhibited at the fair.

2. The Research Competitions

The competitions will be conducted among Junior and Senior High School students from both public and private schools. The first place winners in each of the categories at the Regional level shall represent the region to the National STF competition as approved by the national Scientific Review Committee (SRC).

The competition will start at the school level advancing to the division, regional, national then to the international level. Regional Science High Schools (RSHSs) are **expected** to join the regional fair directly. RSHSs may submit only one entry per category or a maximum of six (6) projects in the regional fair.

The participation of schools in the NSTF shall be clustered into **three major categories**: life science, physical science and robotics and intelligent machines. These major categories are further classified into different subcategories. See Enclosure No.

Life Science (LS)		Physical Science (PS)		Robotics and Intelligent Machines (RIM)	
Individual Project	Team Project	Individual Project	Team Project	Individual Project	Team Project

3. Levels of Research Competition

School/Division Level

The conduct of the school/division level shall be done on a weekend to conform with **DepEd Order No. 26, s. 2010 (Calendar of School Events and Activities For SY 2010-2011).** The school and division level STF should refer to Enclosure No. 3 for the schedules of the competition.

The following are the forms and manuscripts to be submitted in all levels of the competition:

1. RESEARCH PLAN
2. FORMS for all the projects
   - A. Checklist for Adult Sponsor
   - B. Student Checklist (1A)
   - C. Research Plan (NOTE: No need to attach the Research Plan Instructions)
   - D. Approval Form (1B)
   - E. Regulated Research Institutional/Industrial Setting Form (1C)
3. FORMS depending on the type of research (e.g involving humans, vertebrate animals, hazardous chemicals, etc.)
   - A. Qualified Scientist Form (2)
   - B. Risk Assessment Form (3)
   - C. Human Participants Form (4)
   - D. Human Informed Consent Form
   - E. Vertebrate Animal Form (5A)
   - F. Vertebrate Animal Form (5B)
   - G. Potentially Hazardous Biological Agents Risk Assessment Form (6A)
   - H. Human and Vertebrae Animal Tissue Form (6B)
   - I. Continuation Project Form (7)
4. Abstract (Maximum of 250 words)
   The abstract should include the following:
   - A. Purpose of the experiment
   - B. Procedure
   - C. Data conclusion

   The abstract may NOT include the following:
   - A. Acknowledgement
   - B. Work of procedures done by the mentor
5. Research Paper (Include the Title Page, Abstract, Main Body, and References)
6. Project Evaluation Form (see Enclosure No.11)
7. Scanned copy of the log book in pdf format

Project of proponents should have been screened by the Institutional Review Board (IRB)/Scientific Review Committee (SRC) at the school-level. All school level winners must be certified by the division SRC to join in the division-level fair.

The Division Science/Mathematics Supervisor shall be a member of the BOJ who shall determine the school/division winners of the different categories and fair divisions.

With the exception of RSHSs and PSHSs, students of both regular and science high schools of private and public high schools shall participate in the division-level STF.

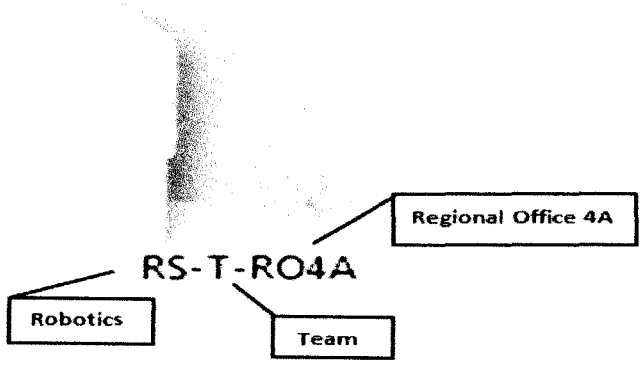
Winners at the school level shall be officially endorsed to the division office for the division-level. Likewise, the division-level winners shall be officially endorsed to the regional office.

Regional Level

The first place winners at the division level in both clusters shall be properly scrutinized by identified members of the SRC for the regional level competition.

The official list of the **first place winners at the regional level**, report on the conduct of STF, **hard and soft copies** of the manuscripts and other necessary documents shall be officially **endorsed by the Regional Office to DepEd Central Office through the Bureau of Curriculum Development**. The soft copies must be saved in the CD containing six (6) **folders representing the six projects from each category**. Each folder must contain the manuscripts in **Pdf format** and another folder containing all the required forms including the the research logbook.

Example:



Folder Code	Content of the Folder	Sample Content of the folder for Forms
LS-I-RO1 *life science-individual-region 1	Manuscript: **LS-I-RO1-School Name**	-
	Folder containing the needed forms: **LS-I-RO1-Forms** *name of the folder where all the soft copies of the necessary forms are found	**LS-I-RO1-Form1** **LS-I-RO1-Form 2** **LS-I-RO1-Logbook**
LS-I-RO1 LS-T-RO1 PS-I-RO1 PS-T-RO1 → LS-I-RO1-Forms → LS-I-RO1-Datalogbook.pdf LS-I-RO1-Form1.docx		

The Report of the Conduct of the STF shall include the following:

1. Title
2. Table of Contents
3. Introduction/Rationale
4. Detailed Information
   - General information
   - SRC Deliberation (include the results , findings and recommendations)
   - Program of Activities (day-to-day activities)
   - List of Entries (include the brief profile of the research adviser of each entry)
   - List of Winners (Research & Innovation Congress)
   - Trend Analysis (results from 3 consecutive years)
   - Financial Report
5. Conclusions
6. Recommendations
7. Appendix

National Level

The Finalists approved by the National SRCs of the six (6) categories shall represent the region to the national-level STF to be conducted on February 18 - 22, 2019 at a venue to be announced later.

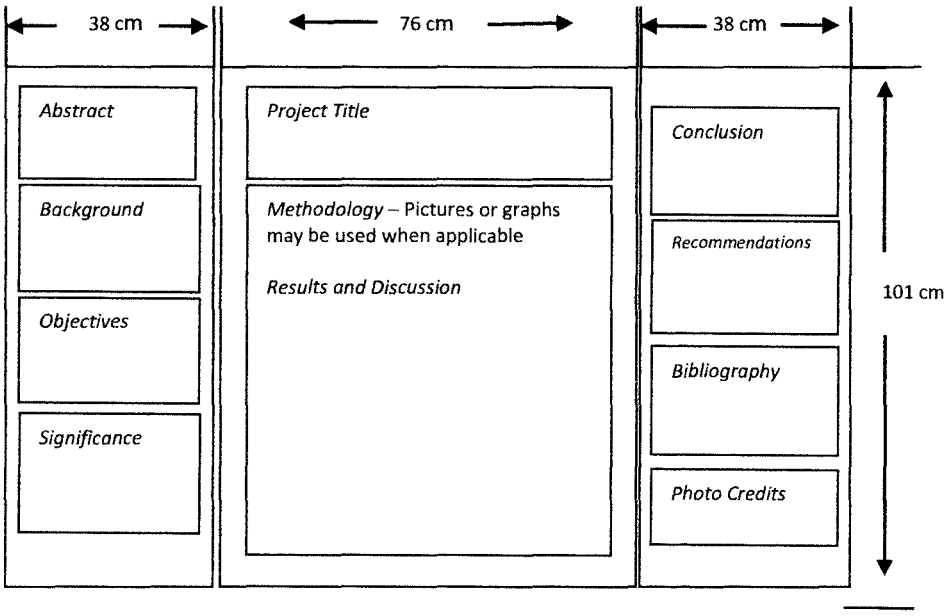
4. The Research Project

Science research projects must conform with international rules and standards published by the ***Intel International Rules for Pre-college Science Research: Guidelines for Science and Engineering Fair 2019.*** Each project is expected to have a Research Adviser and an Institutional Review Board (IRB) or a Scientific Review Committee (SRC).

The research project should cover a maximum of twelve (12) continuous months from January 2018 to December 2018.

Ethics Statement. Scientific fraud and misconduct is not condoned at any level of research or competition. Plagiarism, use or presentation of other research's work as one's own and fabrication of data will not be tolerated. Fraudulent projects are disqualified from the competition.

5. The Exhibit



5.1 Display and Safety Regulations

The project display using **sets of any paper or board** summarizes the research project and must focus on the proponent's work for this year's study, and if applicable, with only minimal reference to previous research. **Tarpaulins will not** be used in the NSTF in support of the environmental advocacy of the government in reducing the consumption of non-biodegradable or non-recyclable materials.

The safety regulations that must adhere to or should be consistent with the guidelines found on page 24 of the ISEF guidelines (https://sspcdn.blob.core.windows.net/files/Documents/SEP/ISEF/2019/Rules/Book.pdf) .

The following items should be seen in the project display: Abstract, Background, Objectives, Significance, Methodology, Results and Discussion, Conclusion, Recommendations, Bibliography and if applicable, Photo Credits (including illustrations and graphics).

*(Note: A proponent should **not** include his/her face in the project's procedure/illustration in the display.)*

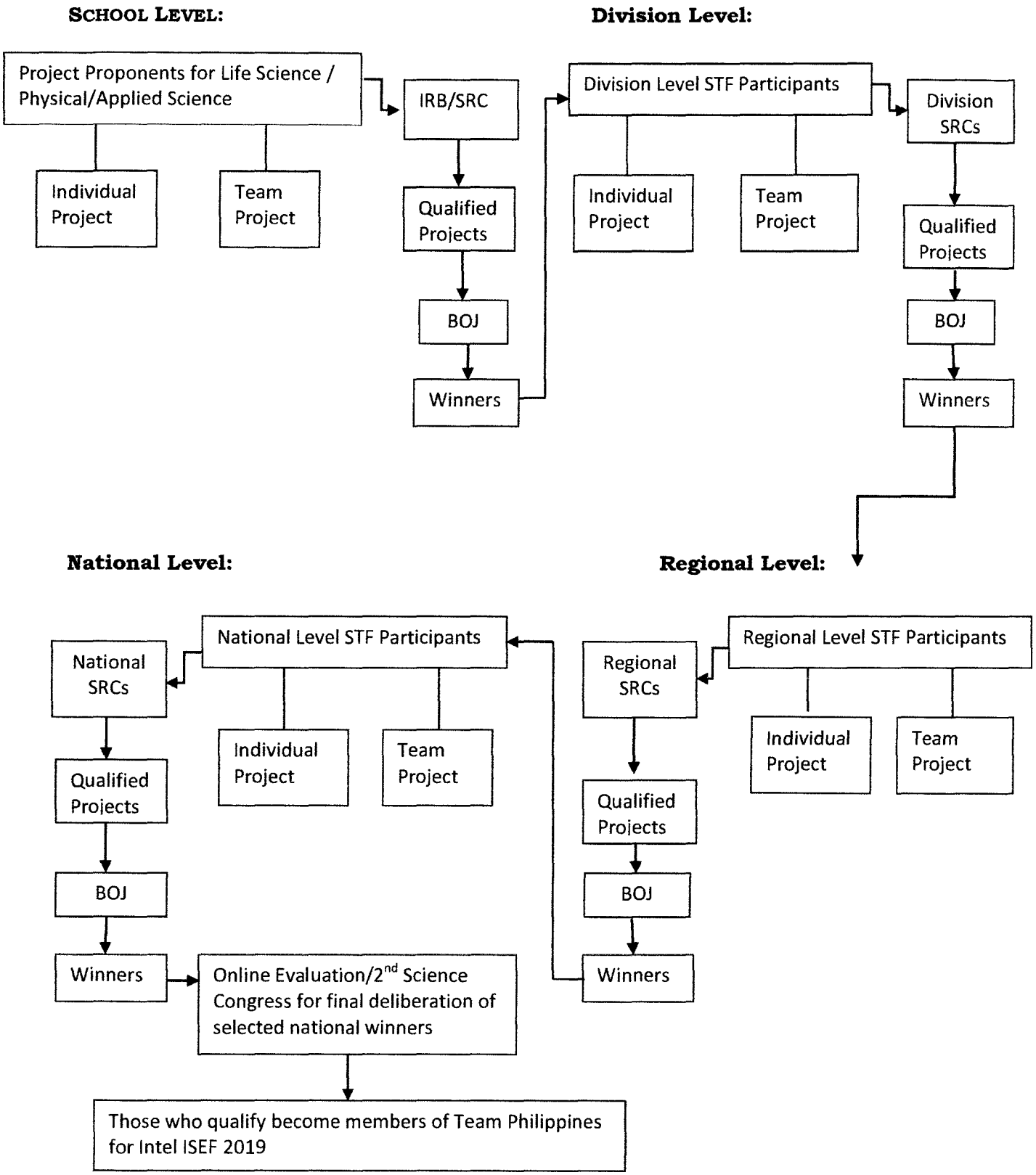
5.2 **Requirements for presentation by the Project Proponent/s to the BOJ during the exhibit are the following:**

- Copy of the required forms
- Copy of the research write-up
- Project data book or student journal complete with dates of entry, number of pages, and all other details (Refer also at ISEF Student Handbook website: https://student.societyforscience.org/international-rules-pre-college-science-research)

6. In addition to the usual research competition, the **National Science & Technology Fair Academy** shall be held to give the participants opportunity for learning and development through the attendance in various shop talks designed to promote innovation, creativity and excellence in science and research education.

(Enclosure No. 2 to DepEd Memorandum No. 134, s. 2018)

SCHEMATIC DIAGRAM OF THE FLOW OF STF ACTIVITIES



(Enclosure No. 3 to DepEd Memorandum No. 134 s. 2018)

CALENDAR OF IMPORTANT STF ACTIVITIES AND REQUIREMENTS

Activity	Date	Required Items	Persons Involved	Venue
Orientation Workshop for Innovation Expo	October 2018	DepEd Memo	BCD Staff, WIPO, ITSO	TBA
Submission to BCD of the Regional entries properly endorsed by the RO	on or before December 3, 2018	Hard copy and soft copy of write-ups in CD to be submitted to BCD or emailed to nstfs@deped.gov.ph.	BCD Staff Project proponents Project advisers Dept. Heads / Div. and Regional Science and Math Supervisors	RO to BCD-CSDD
Submission of entries to National SRCs	on or before December 10, 2018	Complete copies of write-ups (Hard and soft copies)	BCD Staff Regional Science and Math Supervisors	Identified addresses
Submission of entries to BCD of the regional entries for the National Science Innovation Expo	December 14, 2018	Complete copies of write-ups (Hard and soft copies)	BCD Staff Regional Science and Math Supervisors	Regional Science and Math Supervisors
Meeting of SRCs members for deliberation and submission of consolidated SRC forms	January 8 - 9, 2019	Master list of participants Master list of SRCs Write-ups Evaluation Form for SRCs List of qualified Projects	Identified SRCs BCD Staff	BCD Conference Room
First round of selection	January 11, 2019	Innovation Expo DepEd Memo, Complete copies of write up (hard and soft) and products		
Meeting of RCs and return of manuscripts /write-ups to RCs	January 10 -11, 2019	Affiliated Questionnaire matrix (master list of proponents using ISEF matrix) Evaluation Forms per project with SRC comments	RCs Project Proponents	BCD Conference Room
Submission of Revised Write-up to BCD	January 23, 2019	soft copy of revised write-ups in CD to be submitted to BCD or emailed at nstf@deped.gov.ph	Regional Coordinators BCD Staff	BCD-CSDD
Submission of write-ups to identified BOJs	January 25, 2019	one copy each of the identified BOJ	BCD Staff	Identified addresses
Actual conduct of the National STF	February 18 - 22, 2019	Display posters	Regional delegates Project advisers RCs and BOJ	To be announced
Online Mentoring of Top Entries	February to April 2019	Revised Research Papers	Participants, advisers, Research mentors, Regional supervisors and BCD staff	N/A
Science Cliniquing	May 6 - 10, 2019	Finalized Research Papers and Posters	Participants, advisers, Research mentors, Regional supervisors and BCD staff	To be announced

(Enclosure No. 4 to DepEd Memorandum No. 134 s. 2018)

Format of Research Paper

Investigatory papers that were reviewed by the national SRCs in the past years were found to have inadequacies in the content, particularly in the areas cited below. To ensure that the investigatory papers are of good quality, students must adhere to the guidelines shown below. These can be found in the Guidelines and in the Student Handbook and Research Plan Instructions published in the website (https://www.societyforscience.org).

I. **Research Plan:** (This is compiled separately from the rest of the investigatory paper):
All projects should include the following:

A. Question or Problem being addressed

B. Goals /Expected Outcomes /Hypotheses

C. Description in detail of method or procedures (The following are important and key items that should be included when formulating ANY AND ALL research plans.)
- Procedures: Detail all procedures and experimental design to be used for data collection.
- Data Analysis: Describe the procedures to be used to analyze the data/results that answer research questions or hypotheses.

D. Bibliography: List at least five (5) major references (e.g. science journal articles, books, internet sites) from your literature review. If you plan to use vertebrate animals, one of these references must be an animal care reference.

II. **Project Data Book**:

A project data book is your most treasured piece of work. Accurate and detailed notes make a logical and winning project. Good notes show consistency and thoroughness to the judges and will help you when writing your research paper. Data tables are also helpful. They may be a little 'messy' but be sure the quantitative data recorded is accurate and that units are included in the data tables. Make sure you date each entry.

III. **Research Paper:**

A research paper should be prepared and available along with the project data book and any necessary forms or relevant written materials. A research paper helps organize data as well as thoughts. A good paper includes the following sections.

a) **Title Page and Table of Contents**: The title page and table of contents allows the reader to follow the organization of the paper quickly.

b) **Introduction**: The introduction sets the scene for your report. The introduction includes the purpose, your hypothesis, problem or engineering goals, an explanation of what prompted your research, and what you hoped to achieve.

c) **Materials and Methods**: Describe in detail the methodology you used to collect data, make observations, design apparatus, etc. Your research paper should be detailed enough so that someone would be able to repeat the experiment from the information in your paper. Include detailed photographs or drawings of self-designed equipment. Only include this year's work.

d) **Results**: The results include data and analysis. This should include statistics, graphs, pages with your raw collected data, etc.

e) **Discussion**: This is the essence of your paper. Compare your results with theoretical values, published data, commonly held beliefs, and/or expected results. Include a discussion of possible errors. How did the data vary between repeated observations of similar events? How were your results affected by uncontrolled events? What would you do differently if you repeated this project? What other experiments should be conducted?

f) **Conclusions**: Briefly summarize your results. State your findings in relationships of one variable with the other. Support those statements with empirical data (one average compared to the other average, for example). Be specific, do not generalize. Never introduce anything in the conclusion that has not already been discussed. Also mention practical applications.

g) **Acknowledgements**: You should always credit those who have assisted you, including individuals, businesses and educational or research institutions. However, acknowledgments listed on a project board are a violation of D & S Display rules and must be removed.

h) **References/Bibliography**: Your reference list should be written based on the Chicago Manual of Style. For more information, you may visit the websites below:

- http://www.chicagomanualofstyle.org/home.html
- http://www.calvin.edu/library/knightcite/index.ph

IV. Abstract:

The abstract should be 250 words or less. Do not discuss specific aspects of the research in great detail, including experimental procedures and statistical methods. Any information that is unnecessary to include in a brief explanation should be saved for the written research paper or the project exhibit board.

If the project is a continuation from a previous year, the abstract should summarize the current year's work only. If mention of supporting research from previous year(s) is necessary, it must be minimal.

If the abstract text includes special characters, such as mathematical symbols, which won't be translated electronically, please spell out the symbol.

Do not include acknowledgements in the abstract. This includes any references to mentors, institutional facilities, and awards or patents received.

Title

Finalist's Name (or names, if a team project)

School Name, City and Region
Purpose

- An introductory statement providing background, namely the reason, for investigating the project topic.
- A statement of the problem the research is looking to solve or the questions being tested.

Procedure

- A brief overview of how the investigation was conducted, highlighting key points, and including methods and resources used.
- Do not provide details about materials used in the research unless they greatly influenced the procedure or were needed to conduct the investigation.
- An abstract should only include procedures done by the Finalist. Do not include work done by a mentor (such as surgical procedures) or work done prior to the Finalist's involvement.

Observations/Data/Results

- This section should provide key results that lead directly to the conclusions you have drawn.

- Do not include unnecessary data or observations about the results, nor tables, charts, graphs or other images. While these belong in the research paper or the project board, they do not belong in the formal Intel ISEF abstract.
- Unless significant, do not include any of the experimental design difficulties encountered in research.

Conclusions

- This section should be confined to a short summary in 1-2 sentences. It is a reflection on the research process and results, which may include conclusive ideas, important applications, and implications of the research.
- The Intel ISEF abstract does not include a bibliography. The Intel ISEF requires the bibliography as part of the research plan to be provided on Form 1A.

Sample Abstracts

2018 ISEF Second Grand Award, Energy Physical	**2018 ISEF Third Grand Award, Earth and Environmental Science**
Solar-Tracking Adaptive Robot PV Panels	**Biosorption of Manganese Mine Effluents Using Crude Chitin from Shell Wastes of Philippine Bivalves**
By Cadores, Keith Russel ; Rivera, Eugene ; Manzanero, Joscel Kent Adviser: Johnny T. Samino	By Saquin, Elaine ; Molejona, Randt Adviser: Ronilo Aponte
The leading sources of energy globally are oil, coal, and natural gas - fossil fuels that can be depleted, and whose access and use greatly impact the environment. Hence, much study has been made of renewable energy sources and use, including harnessing solar power through a photovoltaic cell. The study aimed to improve the power harvesting and generating capacity of photovoltaic cells by designing and building a solar device that mimics a flower opening when the sun is out, tracks the sun's movement, closes when the light source is no longer detected and responds to humidity and temperature to maximize power generation. Six (6) photovoltaic panels are mounted on a base operated by servo motors and controlled by Arduino module. Electronics, servo motors, Arduino, and humidity sensors were acquired commercially. Other material included those repurposed from a broken umbrella and electric fan, and scrap acrylic sheets. The device's performance was compared to that of a fixed-mounted photovoltaic panels at different angles. The fixed setup generated 4.71W while the petal panels produced 6.95W, a 47.72% increase. Taxing the power consumption of the device to the power it generates gives an average of 6.09W. This translates to a 29.29% improvement from the 4.71W generated by the fixed panel setup. T-Test for Dependent Means was used and showed that there is a significant difference between the power generations of the two setups ($p= 0.000261$, $\alpha= 0.05$). This robotic design amplifies capacity to harness solar power through a photovoltaic cell.	The area around Ajuy river in Iloilo, Philippines is currently being mined for manganese ore, and river water samples exceed the maximum manganese contaminant level set by US-EPA. At the same time, the surplus of local bivalve waste is another environmental concern. Studies show that chemical treatment compromises water quality leaving toxic residues, and an alternative treatment process is biosorption, or using the physical and chemical properties of a biomass to adsorb heavy metals in contaminated water. The study aims to extract crude chitin from shell wastes of Bractechlamys vexillum, Perna viridis, and Placuna placenta and determine its adsorption capacity on manganese in simulated and actual mine water. Crude chitin was obtained by pulverization, deproteinization, demineralization, and decolorization of shells. Biosorption by flocculation followed 5 g: 50 mL chitin-to-water ratio. Filtrates were analyzed using MP-AES after 24 hours. In both actual and simulated mine water respectively, B. vexillum yielded the highest adsorption percentage of 91.43% and 99.58%, comparable to P. placenta of 91.43% and 99.37%, while significantly different to P. viridis of -57.14% and 31.53%, ($p<0.05$). FT-IR validated the presence of chitin in shells based on carbonyl-containing functional groups at peaks 1530-1560 cm-1 and 1660-1680 cm-1. SEM micrographs showed the amorphous and non-homogenous structure of chitin. Thus, crude chitin from B. vexillum and P. placenta can be bio-sorbents for water treatment of manganese-impacted effluents, and promote appropriate waste management of local bivalves

(Enclosure No. 5 to DepEd Memorandum No. 134 s. 2018)

Format of Paper Invention Report

Invention Report Paper:

a) **Title Page and Table of Contents**: The title page and table of contents allows the reader to follow the organization of the paper quickly.

b) **Introduction**:

1)Features and Specifications – This describes the details of your invention.

2)Market Trends and Opportunities – This part of the report must include three items: what inspired you to develop this invention, an explanation of what problem your invention will solve, and describe in detail how you determined that the invention that you created did not already exist. Explain what products are already on the market that are somewhat like your invention and describe how yours differs.

c) **Materials and Methods**: Describe in detail how you made your invention. Explain what materials were used and how you put them together to make your invention. Your report should be detailed enough so that someone would be able to repeat the steps and make your invention. Directions on how to use the invention are also necessary here. You must include a detailed drawing(s) of your invention.

d) **Results and Discussion**: This is the essence of your paper. Compare your results with theoretical values, published data, literature and related studies, commonly held beliefs, and/or expected results. Include a discussion of possible errors, statistics, graphs, pages with your raw collected data, etc. How did the data vary between repeated observations of similar events? How were your results affected by uncontrolled events? What would you do differently if you repeated this project? What other experiments should be conducted?

f) **Conclusions**: This discusses the potential applications, possible customer benefits, and the impact of the problem in solving problems and issues of today and tomorrow.

g) **Acknowledgements**: You should always credit those who have assisted you, including individuals, businesses and educational or research institutions.

h) **References/Bibliography**: Your reference list should be written based on the Chicago Manual of Style. For more information, you may visit the websites below:

- http://www.chicagomanualofstyle.org/home.html
- http://www.calvin.edu/library/knightcite/index.php

For more information about this event please contact Ms. Anna Liza Chan at annaliza.chan@deped.gov.ph for details.

(Enclosure No. 6 to DepEd Memorandum No. 134, s. 2018)

Format of Display Board for the Innovation Expo

6.1 Sample Format of Display Board for Science Innovation Expo

Title	The title should be short but would capture the essence of the product/invention
Picture	picture of the product/invention only
Overview	What problem is solved by the invention? What are the existing solutions and what limitations do these solutions have?
Key Features	What are the novelty features of this invention?
Benefits and Impact	What are the benefits/impact of this invention to humans?
Developers' Name	Who is/are the inventors?

Specifications:

Each Display Board must have a 38" x 48" dimensions (portrait style)

Judging Criteria:

The following **criteria** are used to evaluate each project:

(a) *Originality & Innovation..... (30 %)*
(b) *Community Connection & Impact.....(25 %)*
(c) *Functionality and Quality.....(25%)*
(d) *Utilization of Patent Information.....(20%)*

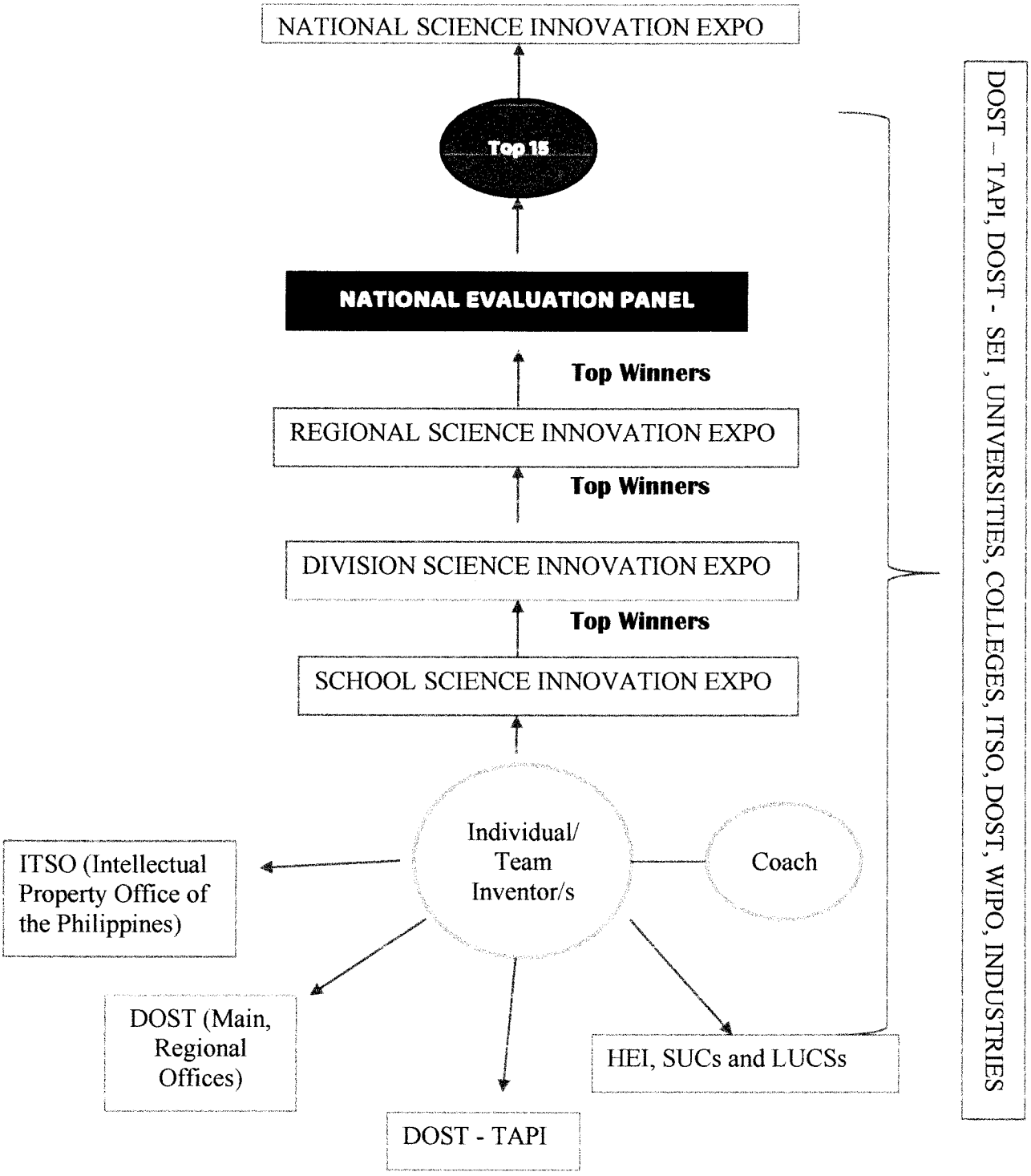
The following are the **members of the evaluation panel** in each level:

A group eight or more judges composed of the ff. listed below shall be members of the evaluation panel who will select the qualified winners in each level:

(a) patent experts
(b) industry experts
(c) business experts
(d) business professionals
(e) scientists
(f) field experts
(g) regional/division supervisors

(Enclosure No. 7 to DepEd Memorandum No. 134, s. 2018)

National Science Innovation Expo - Process Flow



(Enclosure No. 8 to DepEd Memorandum No. 134 s. 2018)

Data for Submission to BCD by the Regional Coordinators

(to be used in the official endorsement of the school to division, division to region and region to central office)

This should be in an **Excel spreadsheet** and should be sent to email address: nstf@deped.gov.ph on or before **December 3, 2018**. Please take note of the sample below:

Region: _____

Division: _____

No.	First Name	Middle Name	Last Name	Grade	High School	Gender	Team / Individual	Team Code	Research Adviser
1	Dona Vel	C.	Lagurin	10	Bayugan Nat'l Compre HS, Bayugan City	F	Individual	__	Jonathan f. Garzon
2	*Venessa Anne Kimberly	M.	Gealan	10	CARAGA RSHS, Surigao Cty	F	Team	1	Maria Ruth Edradan
3	*Quenee Lavern	G.	Pongcol	10		F	Team	1	
4	*Ivy Jean	J.	Turno	10		F	Team	1	
5	Bianca	A.	Muñez	10	Bunawan NHS, Agusan del Sur Bunawan NHS, Agusan del Sur Bunawan NHS, Agusan del Sur	F	Team	2	Jennyvi H. Papellero
6	Farrah Leah	U.	Ebe	10		F	Team	2	
7	El Veena Grace	A.	Rosero	10		F	Team	2	
8	Bryll Jay	I.	Salazar	9	Agusan del Sur NHS, Agusan del Sur	M	Individual	_	Emy S Dacoseo
9	Lea	S.	Aparente	10	Bayugan Nat'l Compre HS, Bayugan City	F	Team	3	Jonathan F. Garzon
10	Jayson Rey	R.	Vicariato	10		M	Team	3	
11	Justin Ryan	S.	Togonon	10		M	Team	3	

Prepared by_____ **Mobile No.**_____

School/Office Address and Phone No.: _____

Regional Coordinator:_____

Note:

1. **Team code number** is used to indicate the number of teams that joined the Division STF and the member of each team.
2. Include all the schools that participated in the Division STF.
3. Insert an *asterisk* before the first name of students who are qualified to join the National STF.
4. Insert an *asterisk* before the school name whose student-proponents are in the Special Science Classes of S&T-Oriented High Schools or Science, Technology and Engineering (STE) program .

(Enclosure No. 9 to DepEd Memorandum No. 134 s. 2018)

UPDATED CHECKPOINTS FOR SRC REVIEW
Source: Society for Science and the Public

Checklist for SRC Review

This document was developed to provide guidance for an SRC to review a project after experimentation.

ABSTRACT

Review the abstract text and check boxes keeping the following questions in mind, and then review the information provided on each form to see if it answers the questions, has any inconsistencies, etc. that will require follow up.

Did the area of study require PREAPPROVAL?

Human Participants: Does the study mention people, interviews, responses, answers, consent, etc? (requires Form 4). Exempt studies include prototype/invention testing if only done by student researcher, public data review, some observational studies. All others require IRB preapproval.

Animals: Look for indications of type of study and research site. Strictly observational studies with no interaction are exempt. Tissue studies in which the student is given the tissue and did not interact with the animal do not need animal forms but will still need preapproval as a PHBA tissue study.

A. Projects may be conducted at home, school, or field ONLY IF the study involved agricultural, behavioral, observational, or supplemental nutrition AND was non-invasive AND had no negative effects on health and wellbeing (requires Form 5A).

B. Projects must be conducted at research institution with IACUC preapproval in all other cases (requires Form 5B).

PHBA's Study included microorganisms, rDNA, or fresh/frozen tissue, blood, body fluids. Used terms like culturing, plating, tissue, source of tissue, etc. Exemptions include non-primate established cell lines, yeast, lactobacillus, meat from a grocery store, and other items listed in the rules (all non-exempt PHBA's require Form 6A and IRB pre-approval; tissue studies require Form 6A, 6B, and IRB pre-approval)

Was the study done at a Regulated Research Institute/Industrial Setting (RRI)? Is the terminology or equipment very sophisticated? Look for possible RRI. (Form 1C)

Does this appear to be a Continuation? Any mention of previous research? Uses terms like previously, earlier research, improved, redesigned, year 3, etc. (Form 7)

Any discussion of a Partner in a non-team study? Uses "we" consistently (math projects and international studies frequently use "we" for all studies). Form 1C answers this question for studies done at a university.

Any possibly hazardous chemicals, activities, or devices? Includes high voltage, hazardous equipment, radioactivity, firearms, explosives, prescription drugs, DEA-controlled substances, alcohol and tobacco. (Form 3)

Time Line: Project appears too long/too old: more than one year or started before January of last year. (Form 1A contains this information)

CHECKBOXES ON ABSTRACT

Checkbox 1. Project involved human participants, vertebrate animals, or PHBA's. Requires preapproval and additional forms. Exempt studies do not check this box.

Checkbox 2. Abstract may only reflect their work not the mentor's. May require abstract rewrite.

Checkbox 3. Worked at RRI. (Requires 1C)

Checkbox 4. Project is a continuation. (Requires Form 7, previous abstract & research plan)

CHECKLIST FOR ADULT SPONSOR (1)

This form asks more specifically about projects that required preapproval (humans, animals, PHBA's), continuations, RRI's, and lists the forms that are required. The answers to this checklist need to be consistent with the answers on other forms.

This page is signed when the project is reviewed which should be before the project starts.

STUDENT CHECKLIST (1A)

Grade: Student must have been in high school at time of research in order to compete.

Contact information: If questions cannot be resolved from the paperwork, it is sometimes necessary to contact the student or adult sponsor.

Continuation: If a continuation, must include Form 7, previous abstracts, and last year's research plan. This information should match the checkmarks on the abstract and on Form 1.

Start/End Dates: Project may only be one year in length and may not have started before January of the previous year. Student should have competed in the first fair which was held after the end date. Fair dates can be found in the Find-a-Fair search.

Information regarding Research Site: This will tell you if you need additional paperwork. For example, Form 1C for RRI, Form 5A if animals at school, field, home, Form 5B if animals at RRI, no culturing of microorganisms is allowed at home (FTQ), Form 6A for BSL-1 & BSL-2 studies which must be in the appropriate facilities.

RESEARCH PLAN/POST PROJECT SUMMARY

Review the research plan and post project summary to find information regarding each of the questions asked in previous section under Abstract. The Research Plan and Post Project Summary Instructions page lists the items that should be included. This needs to be very detailed and must be consistent with the documentation found on all other forms. If more information is needed about the study, the student or adult sponsor may need to be contacted (email, phone or interview).

Human Participants:

Look for information about subjects (any risk groups), recruitment, methods, risks & benefits, protection of privacy (HIPPA & FRPA), and informed consent (participant knows what they are being asked to do, that they may withdraw at any time, there is no coercion, etc.). Must have preapproval and often will require written consents. (Requires Form 4)

Is the level of risk appropriate? What risk assessment was done? Should the study have written Consent/Permission/Assent? Is the survey attached?

Animals:
Pay particular attention to the detailed procedures and care of the animals in the research and if they looked for alternatives to animal research. (Requires 5A or 5B and SRC or IACUC pre-approval)

Look for any potential FTQ items such as a study conducted at home, school or field that should have been done at an RRI, no indication of preapproval, any animal deaths due to experimental procedures, weight loss ≥15% in any group or subgroup, toxicity studies, studies designed to kill, studies which cause more than momentary pain or suffering, predator/prey, inappropriate water or food restriction, euthanasia by student, etc. Ensure that an allowable embryonic study didn't hatch and become a vertebrate study that is not permitted.

PHBA's: (Potentially Hazardous Biological Agents)

The source, quantity, and Biosafety Level (BSL) must be indicated for all microorganisms including established cell lines. All non-exempt microorganisms, cell lines, and tissues require SRC pre-approval, Form 6A and sometimes Form 6B.

Culturing of microorganisms may NOT be conducted at home. (FTQ) All BSL-1 studies must be conducted at a BSL-1 facility or higher. If a petri dish or culture container with unknown or BSL-2 microorganisms is opened, it becomes a BSL-2 study and may only be conducted at a BSL-2 facility. (FTQ if opened, subcultured, etc. in BSL-1 lab.) Most high school laboratories are BSL-1 facilities but it is possible that a high school could meet the more stringent requirements of a BSL-2 lab. BSL-3 or -4 studies, culturing CRE (Carbapenem Resistant Enterobacteriacae), and studies designed to engineer bacteria with multiple antibiotic resistance are not permitted.

Procedures to minimize risk must be clearly indicated. rDNA studies require close review to ensure proper oversight. Proper disposal methods must be listed (autoclaving, 10% bleach solution/sodium hypochlorite, biosafety pick up, etc.).

Hazardous Chemicals, Activities, or Devices:
Look for detailed descriptions of risks and safety precautions and procedures used including methods of disposal.

APPROVAL FORM (1B)

Dates: Signatures from student and parent should be before the start date shown on 1A.

Preapproval #2a: Must be signed by SRC or IRB before experimentation begins (Start date on 1A) for human, animal, and PHBA studies but possible FTQ if no preapproval is documented.

Postapproval #2b: SRC signs after experimentation ends (End date on 1A) if the study was conducted at a RRI. Institutional approval forms must also be submitted. (Possible FTQ)

Note: Some fairs will have the fair SRC pre-review a study before it is done at an institution, even if it is approved before experimentation by the institution, and then will also post-approve after the study is complete. They will therefore sign both boxes. Usually, however, it is either pre- or post-approval, not both.

Final SRC Approval: This is signed after the project is complete (End date Form 1A) and immediately before competition.

REGULATED RESEARCH INSTITUTION FORM (1C)

The information provided by the scientist on this form must be consistent with what the student answered on other forms. It must not be filled out by the student. This form is posted so the judges can easily see exactly what the student did rather than what the mentor or others in the research group did. All information must be on the form not "see attached." This form may only be from a university, college, or industrial site and may not be from their high school.

Checkboxes a) and b) help determine who did what and where.

Questions:

1. "Have you reviewed the rules" helps determine the amount of oversight and if an error was made in following the rules, if this an adult problem or a student problem or both.

2. "Is this a subset of your work" helps differentiate student research from mentor research.

3. "How did student get idea" helps determine originality by student.

4. "Was student part of a research group" indicates whether student worked with another high school student, which is only allowed for team projects not individual, or was part of a larger team of adult researchers, undergraduate or graduate students, which is allowed. Students are judged only on their own work, so it needs to be clear what part of the study was done by the entire group or the mentor and what was the student's work.

5-6. "What procedures" and "how independent" again help indicate what was actually done by the student.

Continuation: Frequently, the mentor will say "the student worked with me last year" or "in his previous research" or list dates of research which will indicate that the study must be treated as a continuation with Form 7, etc. It also could indicate that the study is too old, too long, or that the student is presenting multiple years of research.

This form is signed by the mentor AFTER the study is completed (End date on 1A).

QUALIFIED SCIENTIST FORM (2)

Look for answers that are consistent with the information on other forms. For example, if the scientist marks yes to 'used humans' but other human subject forms

aren't present, will need to clarify. Any yes responses on #2 will require documentation on additional forms.

This form documents the amount of oversight that the student had and the safety precautions needed. The QS and DS review the study before the experiment begins. All approval signatures must be before research begins (Start date on 1A).

Even when not required, this form may be submitted to show the oversight of the study.

RISK ASSESSMENT FORM (3)

Documents that both the student and the supervisor have assessed the risks involved in the research and describes what safety precautions and procedures are needed including the disposal procedures. This form is completed before experimentation (Start date on 1A).

This risk assessment is required for hazardous chemicals, activities, or devices, and for some PHBA's including protists, composting, coliform water test kits, decomposition of vertebrate organisms, etc.

Even when not required, this form may be submitted to show the oversight of the study.

HUMAN SUBJECTS FORM (4)

Make sure Form 4 is complete including decision checkmarks in the box and all 3 signatures. (If project is approved with expedited review, only one signature is required.) Missing checkmarks or signatures indicates no documentation of prior review and therefore could Fail to Qualify. All approval dates must be before research begins. (Start date on 1A.) The IRB should not include the adult sponsor, designated supervisor, qualified scientist or a relative (e.g. parent) of the student because of conflict of interest.

Research Plan: Refer to the research plan for subject information: any risk groups, recruitment, methods, risks and benefits, protection of privacy (HIPPA & FRPA), and informed consent (participant knows what they are being asked to do, that they may withdraw, no coercion, etc).

Risk Level: Is the level of risk marked appropriate? Was a risk assessment done? Should the study have written Consent/Permission/Assent? Is the survey attached?

HUMAN INFORMED CONSENT FORM

Does the form clearly explain what the participant is being asked to do, how long it will take, the potential risks and steps that will be taken to mitigate risk, the benefits to the participant or to society, how confidentiality will be maintained, that it is completely voluntary and that they may withdraw at any time.

Adult participants sign giving their consent, minors give their assent, and parents of participants give permission. All approval signatures must be before research begins (Start date on 1A).

VERTEBRATE ANIMAL FORM (5A)

Since these animals are not in a research institution, which would provide a high level of oversight, special attention must be paid to the housing and husbandry that will be provided by the student. The final disposition of the animals must also be

appropriate. Any death, illness, or unexpected weight loss must have been investigated and documented by an attached letter from the QS, DS, or a veterinarian. If there were any deaths due to the experimental procedure, the project will Fail to Qualify.

All approval signatures must be before research begins (Start date on 1A). Capture & Release approvals must be attached when applicable.

VERTEBRATE ANIMAL FORM (5B)

Research which causes more than momentary pain or suffering is prohibited. Appropriate use of anesthetics, analgesics and/or tranquilizers must be documented. Any death, illness, or unexpected weight loss must have been investigated and documented by an attached letter from the QS, DS, or a veterinarian.

Euthanasia by student researchers is prohibited so the final disposition of the animals should also be indicated. If there were any deaths due to the experimental procedure, the project will Fail to Qualify.

If tissues were collected, how were they obtained and how will they be used.

The IACUC approval forms must be attached. They must clearly cover this study and must indicate that the study was approved before the start of the student research. Not all IACUC approval documentation will list the student individually, but the student research training must be indicated on the Form 5B. A letter from the QS or Principal Investigator indicating that the study had IACUC approval is not sufficient.

PHBA FORM (6A)

Identification, Including Biosafety Level (BSL): The source, quantity, and BSL must be indicated. A plant or non-primate established cell line will not require Form 6A but the student may fill out this form in order to document that it is from ATCC, etc. However, human and other primate established cell lines and tissue cultures require Form 6A.

Prohibited Studies: BSL-3 or -4 studies, culturing CRE (Carbapenem Resistant Enterobacteriacae), and studies which are designed to engineer bacteria with multiple antibiotic resistance are not permitted. (FTQ)

Site: Microorganisms may NOT be cultured at home. (FTQ) All BSL-1 studies must be conducted at a BSL-1 facility or higher. If a culturing plate with unknown microorganisms is opened, except for disinfection or disposal, it becomes a BSL-2 study and may only be conducted at a BSL-2 facility. FTQ if opened, subcultured, etc. in BSL-1 lab. Most high schools are BSL-1 facilities but it is possible that a high school could meet the more stringent requirements of a BSL-2 lab.

Risk Reduction: Procedures to minimize risk must be clearly indicated. rDNA studies require close review to ensure proper oversight.

Disposal: Proper disposal methods must be listed: autoclaving, bleach solution, biosafety pick up, etc.

Approval Dates: All approval signatures must be before research begins (start date on 1A.)

HUMAN AND VERTEBRATE ANIMAL TISSUE FORM (6B)

Students may conduct tissue studies with tissue they are given from an IACUC approved study within a research institution but the animal may not be euthanized solely for the student's tissue study. The first checkbox in the signature box indicates this.

The second checkbox in the signature box is marked to indicate that the substances were handled in accordance with the safety standards for Blood Borne Pathogens.

All approval signatures must be before research begins (start date on 1A).

CONTINUATION FORM (7) Previous Year's Abstract & Research Plan

This form is posted with the project so that the judges can tell at a glance exactly what was new and different about this year's study. All information must be on the form, not "see attached." Because research projects may only be 1 year's work, they will be judged on the current work only not on previous work, and this form is used to document current versus previous research. Previous Intel ISEF projects can be found here.

Frequently, students don't wish to call their project a continuation, but it's good research to continue a line of investigation even when the focus is now totally different. If the study is in the same field, if anything they learned in a previous year helped with the current study, or if the current study refers to any earlier research, then it is a continuation and Form 7 and previous abstract and research plan are required.

Repetition of a previous study that reflects no changes but simply retests or increases sample size is not permitted.

A longitudinal study, in which time is a critical variable, is permitted but the original data from previous years cannot be presented only the comparison between years.

NSTF Scientific Review Committee (SRC)

Review & Recommendation Report

Project Title:_____

Fair Division: [ ] Life [ ] Physical/Applied **Category:** [ ] Individual [ ] Team

Instruction: Please put a check [✓] in the appropriate column and if necessary, write recommendations on the space provided.

PART 1: REQUIRED FORMS FOR ALL RESEARCHES	**Complete**	**Incomplete**	**Recommendations**
1. **Checklist for Adult Sponsor (1). Is it accomplished and signed?**			
2. **Student Checklist 1A. Is it complete and signed?**			
If answer to item 5 is **YES**, must also have Form 7 (See Part II, item 13 below)			
If answer to item 7 is **Research Institution** or **Other**, must also have Form IC (See Part II, item 6 below)			
3. **Research Plan** (Attachment to item 2, above). Does it include the following:			
A. **RATIONALE**. Does it Include a synopsis of background information that supports the research problem and explains why the research is important scientifically? If applicable, does it explain the societal impact of the research?			
B. **HYPOTHESIS(ES), RESEARCH QUESTION(S), ENGINEERING GOAL(S), EXPECTED OUTCOMES**. Is this based on RATIONALE?			
C. **RESEARCH METHODS AND CONCLUSIONS**			
a. Procedures. i. Does it show all procedures and experimental designs, including methods for data collection?			

ii. There should be NO inclusion of work of mentor or others. iii. Parameters should NOT be too strict to allow for possible changes.			
b. Risk and Safety. Does it identify all potential risks and safety precautions needed?			
c. Data Analysis. i. Does it describe all procedures for data analysis? ii. Parameters should NOT be too strict to allow for possible changes			
D. **BIBLIOGRAPHY**. Does it have at least 5 major references? If using vertebrate animals, include 1 reference on animal care. (Chicago Manual of Style)			
Note: Items 3.E-H are needed ONLY for researches on HUMAN PARTICIPANTS, VERTEBRATE ANIMAL, POTENTIALLY HAZARDOUS BIOLOGICAL AGENTS (see attached Research Plan/Project Summary Instructions)			
E. HUMAN PARTICIPANTS RESEARCH. Does it provide for the following? a. Description b. Recruitment c. Methods d. Risk Assessment e. Protection of Privacy f. Informed Consent Process			
F. VERTEBRATE ANIMAL RESEARCH. Does it provide for the following? a. Potential ALTERNATIVES to vertebrate animal use b. Potential impact or contribution of research c. Detailed procedures d. Detail animal numbers, strain, sex , age, source, etc. e. Describe housing and oversight of daily care f. Disposition of animals at study termination			

G. POTENTIALLY HAZARDOUS BIOLOGICAL AGENTS RESEARCH. Does it provide for the following? a. Biosafety Level (BSL) Assessment and determination b. Source of agent, specific cell line. c. Safety precautions d. Methods of disposal			
H. HAZARDOUS CHEMICALS, ACTIVITIES and DEVICES. Does it provide for the following? a. Risk Assessment process and results b. Chemical concentrations and drug dosages c. Safety precautions and procedures to minimize risks d. Methods of disposal			
4. Approval Form 1B (for ALL students)			
5. Abstract			
VERY IMPORTANT 2: See Part II, Risk Assessment (3) for 1. Studies involving protists, archaea and similar microorganisms. 2. Research using manure for composting, fuel production, or other non-culturing experiments. 3. Commercially-available color change coliform water test kits. These kits must remain sealed and must be properly disposed. 4. Studies involving decomposition of vertebrate organisms (such as in forensic projects). 5. Studies with microbial fuel cells.			

PART 2: ADDITIONAL REQUIRED FORMS	**Complete**	**Incomplete**	**Recommendations**
6. Regulated Research Institutional or Industrial Setting Form (1C). Must be completed AFTER experimentation by the adult supervising the student research conducted in a regulated research institution or any work site aside from home, school or field. **Is it properly accomplished and signed by the DESIGNATED SUPERVISING ADULT?**			
7. Qualified Scientist Form (2) – for researches with human participants, vertebrate animals, potentially hazardous biological agents, Drug Enforcement Administration (DEA)-controlled substances; completed and signed BEFORE			

start of experimentation. **Is it properly accomplished and signed by the QUALIFIED SCIENTIST?**			
8. Risk Assessment Form (3) – for researches using hazardous chemicals, activities or devices and microorganisms exempt from pre-approval. Must be completed BEFORE experimentation. **Is it properly accomplished and signed by DESIGNATED SUPERVISING ADULT OR QUALIFIED SCIENTIST (when applicable)?**			
9. Human Participants Form (4) – for researches involving human participants not at a Regulated Research Institution. **Did the the DESIGNATED ADULT SUPERVISOR/ INSTITUTION approve the research BEFORE experimentation?**			
10. Vertebrate Animal Form (5A) – for researches involving vertebrate animals that is conducted in a school/home/field research site. **A. Is it properly accomplished, approved and signed by SRC BEFORE experimentation?** **B. Is it properly accomplished, approved and signed by DESIGNATED VETERINARIAN BEFORE experimentation?** **C. Is it properly accomplished, approved and signed by DESIGNATED SUPERVISOR OR QUALIFIED SCIENTIST (as applicable) BEFORE experimentation?**			
11. Vertebrate Animal Form (5B) – for researches involving vertebrate animals that is conducted at a Regulated Research Institution. **A. Does it have IACUC approval BEFORE experimantation?** **B. Is it properly accomplished, approved and signed by a QUALIFIED SCIENTIST/PRINCIPAL INVESTIGATOR?**			
12. Potentially Hazardous Biological Agents Risk Assessment Form (6A) – for researches involving microogranisms, rDNA, fresh/frozen tissue (including primary cell lines, human and			