Republic of the Philippines
Department of Education
REGION IX, ZAMBOANGA PENINSULA
SCHOOLS DIVISION OF DAPITAN CITY

Office of the Schools Division Superintendent

June 10, 2026

Division Memorandum
No. 299 s. 2026

CONDUCT OF DIVISION SCIENCE AND TECHNOLOGY AND MATHEMATICS FAIR FOR SCHOOL YEAR 2026-2027

To: Assistant Schools Division Superintendent
Chief Education Supervisors, CID and SGOD
Education Program Supervisors
Public Schools District Supervisors
Public and Private Secondary School Heads
All Others Concerned

1. The Schools Division of Dapitan City is committed to honing learners' scientific and research skills through the conduct of Division Science and Technology Fair. This year's fair envisions that participating learners continue to come up with innovative solutions to promote environment well-being. The event encourages forward thinking and collaborating efforts to explore practical approaches to address global challenges, underscoring the importance of shared responsibility and actionable steps in achieving long-term sustainable goals.

2. This office announces the conduct of the Division Science and Technology and Mathematics Fair for school year 2026-2027 on September 2-3, 2026 to be hosted by Dapitan City National High School, Banonong, Dapitan City. Technical Working Group and activities are found in Annex A.

3. All secondary schools are enjoined to participate in this activity. The official participants shall only be limited to the teacher-coaches and student-researchers of the Rank 1 School Winners, and Top 2 qualifiers in the Special Program in Science (SPSTEM) each of the different categories. Research entries must be approved by the School Scientific Review Committee (SRC).

4. The DSTF fair feature is "Tuklas" - a STEM research competition that provides Junior and Senior High School learners opportunities to showcase their research projects based on their field of interest and/or real-world problems, issues and concerns. The description and the maximum number of official participants are the following:

Categories	Number of Participants	
	Individual	Team
Life Science	1	3
Physical Science	1	3
Robotics and Intelligent Machine	1	3
Mathematics and Computational Science	1	3

5. The Science Department Head or assigned Focal Person in each participating schools is requested to submit three (3) copies of the research manuscript in each category on or before August 28, 2026 with official endorsement of the school head to the DSTF focal.

6. Research format, labelling and coding should base on Enclosure No. 1 to DepEd Memorandum No. 006, s. 2026, "National Science and Technology Fair". (attached)

7. The participating school shall shoulder the supplies, materials, and transportation expenses of the participants chargeable against Science Club Funds/school MOOE, while prizes, meals and snacks shall be charged against Special Education Fund subject to availability of funds and the usual accounting and auditing rules and procedures.

8. First place winners in the DSTF shall represent to the Regional Science and Technology Fair. Date and venue to be announced.

9. All teachers and personnel involved in the conduct of DSTF are entitled to service credits pursuant to DepEd Order No. 013, s. 2024, "Revised Guidelines on the Grant of Vacation Service Credits for Teachers" and CSC-DBM Joint circular No. 2, s. 2004 "Non-Monetary Renumeration for Overtime Services", whichever is appropriate and applicable if the activity falls on Saturday, Sunday and Non-Working Holiday.

10. Queries regarding this matter can be channeled to the Chief Education Supervisor of the Curriculum Implementation Division or through the DSTF focals, Bobbie E. Gurabot, EPS for Science and Esmeralda A. Bagaipo, EPS for Mathematics at 09499907636/09126177243.

11. Attached is the list of the Technical Working Group and Program of Activities.

12. Immediate and widest dissemination of this Memorandum is enjoined.

JAY S. MONTEALTO, CESO V
Schools Division Superintendent

Department of Education
Division of Dapitan City
RELEASED
No. 299 Date: 6/15/26
Time: 3:58 By:

Annex A

School Year 2026-2027 Division Science and Technology Fair (DSTF)
September 2-3, 2026
Dapitan City National High School
Banonong, Dapitan City

Technical Working Committee

Overall Chairperson of DSTF: Supt. Dr. Jay S. Montealto, CESO V
Asst. Chairperson of DSTF: Asst. Supt. Aurelio A. Santisas, CESO VI

Overall Overseer: CID Chief Dr. Vicente Jose V. Suarez II
Assistant Overseer: Dr. Bobbie E. Gurabot, EPS for Science
Dr. Esmeralda E. Bagaipo, EPS for Math:

Hosting Chair: Jr Simed Joseph B. Saguin, Principal III, DCNHS
Co-Chair: Jaime S. Montealto, Head Teacher V

COMMITTEES:	Roles and Responsibilities
Division Scientific Review Committee EPS for Science EPS for Mathematics	Conduct pre-evaluation on submitted projects manuscript, required forms approval and data logbooks. Prepare list of qualifiers to the DSTF.
Venue for the Opening Program, Display and Research Congress Chairperson: Regie E. Bait-it Members: Nemia H. Dengal Glynda A. Jamolod Christi D. Adjain	Design, prepare, and set up the stage and venue decorations that reflect the theme of the event Execute and set up stage decorations before the event. Arrange backdrop, centerpieces, VIP seating and podium. Dismantle and safely remove decorations.
Secretariat Chairperson: Erline B. Nicdao Members: Edralen D. Daymiel Marivic P. Tome Alona C. Eguia	Prepare and organize participant registration forms. Manage the registration and attendance desk. Provide assistance to participants, coaches, and judges regarding queries. Consolidate and file results, reports, and attendance records. Prepare and distribute certificates of appearance to participants.
Program and Invitation Chairperson: Mary Lyndie G. Borgonia Members: Cykee Hannah Tome Sheila May Credo	Prepare the official program, design the flow of activities, and handle invitations to ensure the smooth conduct of the Science and Technology Fair.
Certificates and Medals Chairperson: Sherrie Mae J. Fernandez Members: Reycia R. Mohametano	Prepare and distribute certificates of participation, recognition, and appreciation to winners.

Sound System Chairperson: Nena B. Hoyohoy Members: Shayne J. Adasa	Ensure all audio needs of the event are met, including presentations, background music, and program support, with clear and uninterrupted sound throughout the fair. During the event, operate microphones and audio devices for program presenters, and speakers.
Projector/Led Wall/Smart TV Chairperson: Don David B. Cabilin Members: Lorraine B. Duhaylungsod	Install projectors, screens, LED walls, or Smart TVs in proper positions for optimal viewing. Manage all display equipment during the event, ensuring that presentations, videos, slideshows, and other digital content are clearly visible to the audience at all times.
Timer Chairperson: Ritz Rhei E. Alingal Members: Marife J. Diez	To manage and track the allotted time for each participant presentation, during science congress. Coordinate with the program coordinator and judges on time limits for presentations
VIP Protocol Officers/Usherettes Chairperson: Janice B. Cagatan Members: Yvonne A. Sagang GSP/BSP	To ensure the smooth reception, guidance, and assistance of VIPs, guests, and judges throughout the Science and Technology Fair, maintaining professionalism, courtesy, and proper protocol.
Food Chairperson: Rhodora C. Dayna Members: Maridol Avenido Joy Gahisan	To manage all aspects of food and refreshments during the event. Serve food and drinks efficiently to participants, judges, and guests.
Documentation Chairperson: Marvin C. Jauculan Members: Jasmin B. Adasa	To record, compile, and preserve all aspects of the Science and Technology Fair through photos, videos, and other media for reporting, publicity, and archival purposes.
Program Host Opening Program: Salome Sharon C. Yap Science Congress: Mary Lyndie G. Borgonia	To guide the flow of the program, introduce presenters, engage the audience, and ensure smooth transitions between activities during the Science and Technology Fair.
Medical Response Committee Chairperson: Narcelle T. Bacatan Members: Nena B. Hoyohoy	Set up a first aid station within the venue that is accessible to all participants. Coordinate with the nearest hospital, clinic, or ambulance service for quick response in case of serious emergencies.

Annex B

School Year 2026-2027 Division Science and Technology Fair (DSTF)
September 2-3, 2026
Dapitan City National High School
Banonong, Dapitan City

Program of Activities

Time	Activity
August 28, 2026	Deadline on the submission of three (3) copies of the research manuscript in each category to the Division Scientific Review Committee.
August 28-September 1, 2026	Final Review of Documents by the SRC
September 2, 2026 8:00 AM – 12:00 PM	Arrival and Registration Setting up of Exhibit
1:00 PM – 5:00 PM	Pre-judging on the qualified research projects manuscript.
September 3, 2026	
8:00 am – 8:30 am	Opening Program
8:30 am – 10:30 am	Public viewing of exhibits Onsite Judging
10:30 am – 12:00 pm	Science Congress
11:30 am – 12: 45 pm	Lunch Break
12:45 pm – 3:30 pm	Continuation of Science Congress
3:30 pm – 5:00 pm	Awarding & Closing Program

Note: Project Labelling and Coding

Categories	Codes	Color Coding
Life Science-Individual	LS-I	Green
Life Science-Team	LS-T	Yellow
Physical Science-Individual	PS-I	Blue
Physical Science-Team	PS-T	Orange
Robotics and Intelligent Machine-Individual	RIM-I	Pink
Robotics and Intelligent Machine-Team	RIM-T	Brown
Mathematics and Computational Science Category-Individual	MCS-I	Red
Mathematics and Computational Science Category-Team	MCS-T	Purple

Annex C

2026-2027 Division Science and Technology Fair (DSTF)
September 2-3, 2026
Dapitan City National High School
Banonong, Dapitan City

Opening Program

• National Anthem	
• Opening Prayer	
• Regional Hymn	
• SDO-Dapitan Hymn	
• Welcome Remarks	Principal, JR Simed Joseph Saguin,
• Acknowledgment Participants	EPSvr, Esmeralda A. Bagaipo
• Message	SDS, Jay S. Montealto, CESO V
• Intermission (optional)	
• Overview of the DSTF	EPSvr, Bobbie E. Gurabot
• Official Declaration of the opening Of the Science and Technology Fair	SDS, Jay S. Montealto, CESO V

Science Congress

- Prayer
- Introduction of Contest Mechanics and Criteria
- Introduction of Judges and Committees
- Announcement of Shortlist and Oral Presentation

Closing Program

• Awarding of Certificates to TWG	SDS Jay S. Montealto, CESO V EPSvr, Bobbie E. Gurabot EPSvr, Esmeralda A. Bagaipo
• Awarding of Winners	SDS Jay S. Montealto, CESO V EPSvr, Bobbie E. Gurabot EPSvr, Esmeralda A. Bagaipo
• Closing Remarks	EPSvr, Bobbie E. Gurabot

(Enclosure No. 3 to DepEd Memorandum No. 006, s. 2026)

TUKLAS RESEARCH PAPER FORMAT

I. TUKLAS Categories

The STEM research competition is divided into four (4) categories. The student researchers and advisor should carefully consider which category best describes the research project. They may enter the competition as an individual or as a team.

Life Science

This category deals with living organisms such as plants, microorganisms, and animals, including humans and their life processes. Projects that involve systematic observation, development, experimentation, and understanding of living things and biological processes belong to this category. *Subcategories include Animal Sciences, Biomedical and Health Sciences, Cellular and Molecular Biology, Microbiology, Plant Sciences, and Translational Medical Science.*

Physical Science

This category deals with the nature and properties of non-living matter, energy and systems. Projects that involve systematic observation, development, experimentation, and understanding of materials and phenomena belong to this category. *Subcategories include Astronomy, Chemistry, Earth and Environmental Sciences, Energy, Engineering Technology, Statics and Dynamics, Sustainable Materials and Design, Environmental Engineering, Materials Science, and Physics.*

Robotics and Intelligent Machines

This category deals with the design, implementation, and use of prime technologies and machine intelligence in providing a wide range of innovative solutions and advancements across multiple disciplines to reduce reliance on human intervention. *Subcategories include Biomechanics, Cognitive Systems, Control Theory, Machine Learning, and Robot Kinematics.*

Mathematics and Computational Science

Mathematics deals with the measurement, properties and relationships of quantities and sets using numbers and symbols. *Subcategories include Algebra, Analysis, Combinatorics, Graph Theory, and Game Theory, Geometry and Topology, Number Theory, Probability and Statistics.*

Computational Science deals with the development and implementation of mathematical models and simulations to understand natural systems and processes and solve STEM problems using computers. *Subcategories include Computational Biology and Bioinformatics, Computational Chemistry, Computational Mechanics, and Theoretical, Computational and Quantum Physics.*

Note: *For the full description of the sub-categories, selection, forms and sample project titles visit the official website of ISEF category at https://bit.ly/ISEF2025 or scan the QR code below.*

II. RESEARCH PLAN

This should be written prior to experimentation, following the instructions below to detail the rationale, research questions, methodology, and risk assessment of the proposed study.

(This is compiled separately from the rest of the research manuscript.)

All projects should include the following:

a. *Rationale:* Include a brief synopsis of the background that supports your research problem and explain why this research is important, and if applicable, explain any societal impact of your research.
b. *Research Question or Problem* being addressed
c. *Goals/ Expected Outcomes/ Hypotheses*
d. *Procedures:* Detail all procedures and experimental design to be used for data collection.
e. *Risk and Safety:* Identify any potential risks and safety precautions needed.
f. *Data Analysis:* Describe the procedures to be used to analyze the data/results that answer research questions or hypotheses.
g. *Bibliography:* List at least five (5) major references (e.g., science journal articles, books, internet sites) from your literature review using the APA Manual of Style. If you plan to use vertebrate animals, one of these references must be an animal care reference.

III. PROJECT DATA LOGBOOK

A project data logbook is an organizational tool used by student researchers to document and record the narrative and evidence of research activities, including planning, research design, drawings/illustrations, procedures, data collection, analysis and presentation, inferences, and conclusions. Detailed and accurate notes, whether in paragraphs or bullet points, demonstrate consistency and thoroughness, which will be helpful when writing the research paper.

It is recommended to use hard-bound notebooks instead of spring notebooks to prevent pages from being torn out, to write entries with permanent pens, and to minimize erasures. Representing procedures in flow charts and organizing data in tables are also helpful. Although entries may appear a little 'messy,' it is important to accurately record both qualitative and quantitative data (including units of measurement). Each logbook entry should be dated and signed by the supervising adult (if applicable) during the research activity.

IV. RESEARCH PAPER FORMAT

Science Project

1. *INTRODUCTION* - What relevant background information supports your research problem/ questions?

   - Explain what is known or has already been done in your research area. Include a brief review of relevant literature. If this is a continuation project, a summary of your prior research is appropriate here. Be sure to distinguish your previous work from this year's project.

- Include a brief description on how your project will address an issue, concern, or problem. Explain why this research is important and any societal impact of your research.

2. *METHODS* – What procedures were carried out for the experimentation?
   - Explain in detail what you did. What data did you collect, and how did you collect that data? Discuss your control group and the variables you tested.
   - Discuss your control group and the variables you tested. The statistical treatment used and handling and disposal of waste may be included if applicable.
   - DO NOT include a list of materials.

3. *RESULTS* - What were the result(s) of your project?
   - Include tables and figures which illustrate your data.
   - Include relevant statistical analysis of the data.

4. *DISCUSSION* - What is your interpretation of these results?
   - What do these results mean? Compare your results with theories, published data, commonly held beliefs, and expected results.
   - Discuss possible errors. Did any questions or problems arise that you were not expecting? How did the data vary between repeated observations of similar events? How were results affected by uncontrolled events?

5. *CONCLUSIONS* - What conclusions did you reach?
   - What do these results mean in the context of the literature review and other work being done in your research area? How do the results address your research question? Do your results support your hypothesis?
   - What application(s) do you see for your work?

6. *REFERENCES* - What are your sources?
   - This section should not exceed one page. Limit your list to the most important references.
   - List the references/documentation used which were not of your own creation (i.e., books, journal articles).
   - Your reference list should be written based on the American Psychological Association. For more information, you may visit this link: https://apastyle.apa.org/.

Engineering Project

1. *INTRODUCTION* - What is your engineering problem and goal?
   - What problem were you trying to solve? Include a description of your engineering goal.
   - Explain what is known or has already been done to solve the problem, including work on which you may build. You may include a brief review of relevant literature.
   - If this is a continuation project, a brief summary of your prior work is appropriate here. Be sure to distinguish your previous work from this year's project.

2. *METHODS* – What are your methods and procedures for building your design?
   - Explain what you did. How did you design and produce your prototype? If there is a physical prototype, you may want to include pictures or designs of the prototype.
   - If you tested the prototype, what were your testing procedures? What data did you collect, and how did you collect that data?
   - DO NOT include a separate list of materials.

3. *RESULTS* - What were the result(s) of your project?
   - How did your prototype meet your engineering goal?
   - If you tested the prototype, provide a summary of testing data tables and figures that illustrate your results.
   - Include relevant statistical analysis of the data.

4. *DISCUSSION* - What is your interpretation of these results?
   - What do these results mean? You may compare your results with theories, published data, commonly held beliefs, and/or expected results.
   - Did any questions or problems arise that you were not expecting? Were these problems caused by uncontrolled events? How did you address these?
   - How is your prototype an improvement or advancement over what is currently available?

5. *CONCLUSIONS* - What conclusions did you reach?
   - Did your project turn out as you expected?
   - What application(s) do you see for your work?

6. *RI ICES* – What are your sources?
   - section should not exceed one page. Limit your list to the most rtant references.
   - the references/documentation used which were not of your own tion (i.e., books, journal articles).
   - r reference list should be written based on the American chological Association. For more information, you may visit this κ: https://apastyle.apa.org/.

Mathematics and Computational Science Project

1. *INTRODUCTION* - What is your research question?
   - Explain what is known or has already been done in your research area. Include a brief review of relevant literature.
   - If this is a continuation project, a brief summary of your prior work is appropriate here. Be sure to distinguish your previous work from this year's project.

2. *FRAMEWORK* – What is your framework?
   - Introduce the concepts and notation needed to specify your research question, methods, and results precisely.
   - Define relevant terms, and explain prior/ background results. (Novel concepts developed as part of your project can be presented here or in Section 4, as appropriate.)

3. *FINDINGS* – What are your findings and supporting arguments?
   - What did you discover and/or prove? Describe your result(s) in detail. If possible, provide both formal and intuitive/verbal explanations of each major finding.
   - Describe your methods in general terms.
   - Present rigorous proofs of the theory results – or, if the arguments are long, give sketches of the proofs that explain the main ideas
   - For numerical/statistical results, include tables and figures that illustrate your data. Include relevant statistical analysis. Were any of your results statistically significant? How do you know this?

4. *CONCLUSIONS* - What is your assessment of your findings
   - How do the results address your research question? And how have you advanced your readers' understanding relative to what is already known?
   - Discuss possible limitations. Did any questions or problems arise that you were not expecting?
   - What challenges do you foresee in extending your results further?
   - What application(s), if any, do you see for your work?

5. *REFERENCES* – What are your sources?
   - This section should not exceed one page. Limit your list to the most important references.
   - List the references/documentation used which were not of your own creation (i.e., books, journal articles).
   - Your reference list should be written based on the American Psychological Association. For more information, you may visit this link: https://apastyle.apa.org/.

V. ABSTRACT

The abstract should be 250 words or less. Do not discuss specific aspects of the research in 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 only summarize the current year's work. If it is necessary to mention supporting research from the previous year(s), it must be minimal.

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

Do not include acknowledgments in the abstract. There should be no 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 or 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.
- 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 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 ISEF abstract does not include a bibliography.
- ISEF requires the bibliography as part of the research plan to be provided on Form 1A.

Ethics Statement

- Scientific fraud and misconduct are prohibited 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.

(Enclosure No. 4 to DepEd Memorandum No. 006, s. 2026)

TUKLAS PROJECT POSTER DISPLAY FORMAT AND

SAFETY GUIDELINES AND SAMPLE ABSTRACTS

Display Guidelines

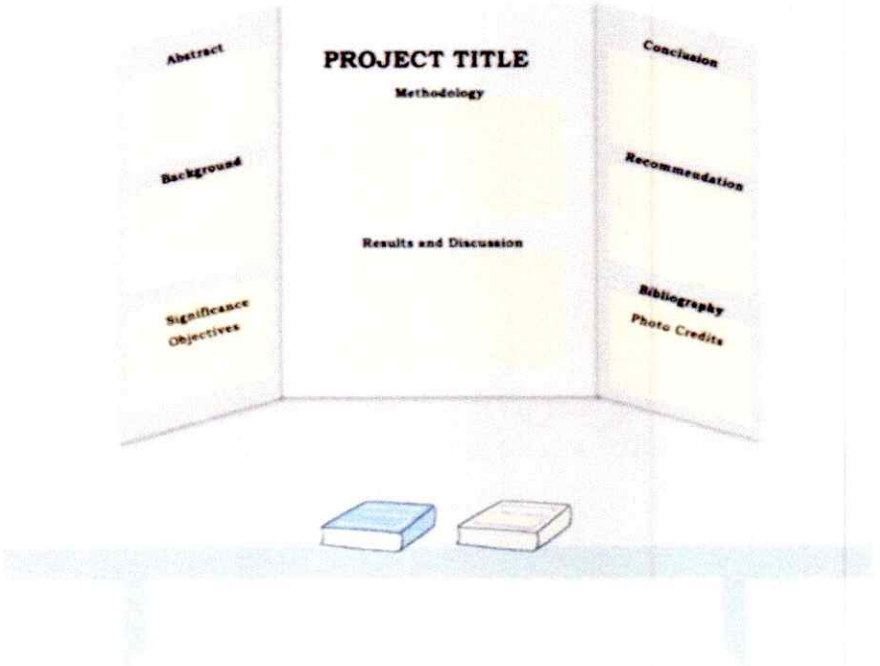
The project display, printed on photo paper, should summarize the research project and focus on the proponent's work for this year's study, with only minimal reference to previous research, if applicable. It shall be in trifold setup capable of standing on its own on the provided table. Researcher/s may use cardboard or illustration board to make the poster sturdy. Tarpaulins are not allowed at any level of Science Fair competition, in support of the government's environmental advocacy to reduce the consumption of non-biodegradable or non-recyclable materials.

Safety regulations must adhere to or be consistent with the guidelines set by the International Science and Engineering Fair (ISEF).

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

Project Poster Display Dimension

The dimensions of the project poster display should be 48 inches wide and 48 inches in height and should be able to stand on a table. A sample is provided below.



Research Logbook:
These forms do NOT need to be in this particular order, just present in the logbook.
1. Signed ISEF Abstract
2. Signed Checklist for Adult Sponsor Form 1
3. Student Checklist Form 1A
4. Research Plan
5. Signed Approval Form 1B
6. All other pertinent ISEF forms

Photography/Images:
Display of photographs other than that of the learner/s MUST have a photo release signed by the subject, and if under 18, also by the guardian of the subject.

Any photography, visual image, chart, table, and/or graph is allowed if:

1. It is not deemed offensive or inappropriate (which includes images/photos showing vertebrate animals/ humans in surgical, necrotizing or dissection situations) by the SRC, Display & Safety Committee.
2. It has a credit line of origin.
3. If it is from the Internet, magazine, newspaper, journal, etc., and a credit line is attached.
4. It is a photograph or visual depiction of the finalist.
5. It is a photograph or visual depiction for which a signed consent form is at the project.
6. Images used as backgrounds including those created or taken by the researcher must also be credited.

Items NOT Allowed to be Displayed with the Project:
1. Awards, medals, business cards, flags, logos, CDs, DVDs, flash drives, brochures, booklets, endorsements, giveaway items, and/or acknowledgments (graphic or written) unless the item(s) are an integral part of the project.
2. Postal addresses, Internet, email and/or social media addresses, QR codes, telephone and/or fax numbers of a student.
3. Active internet or email connections as part of the display or operating the project.

Safety Guidelines
Items NOT Allowed at the Project poster display:
1. Living organisms, including plants
2. Soil, sand, rock, and/or waste samples, even if permanently encased in acrylic
3. Taxidermy specimens or parts
4. Preserved vertebrate or invertebrate animals
5. Human or animal food
6. Human or animal parts or body fluids
7. Plant materials (living, dead, or preserved) that are in their raw, unprocessed, or non-manufactured state (Exception: manufactured construction materials used in building the project or display)
8. All chemicals, including water (projects may NOT use water in any form in a demonstration)
9. All hazardous substances or devices (i.e., poisons, drugs, firearms, weapons, ammunition, reloading devices, lasers, etc.)
10. Dry ice or other sublimating solids
11. Sharp items (i.e., syringes, needles, pipettes, knives, etc.)
12. Flames or highly flammable materials
13. Batteries with open-top cells
14. Glass or glass objects, unless deemed by the Display & Safety Committee to be an integral and necessary part of the project
15. Any apparatus deemed unsafe by the Scientific Review Committee, the Display & Safety Committee of the Fair

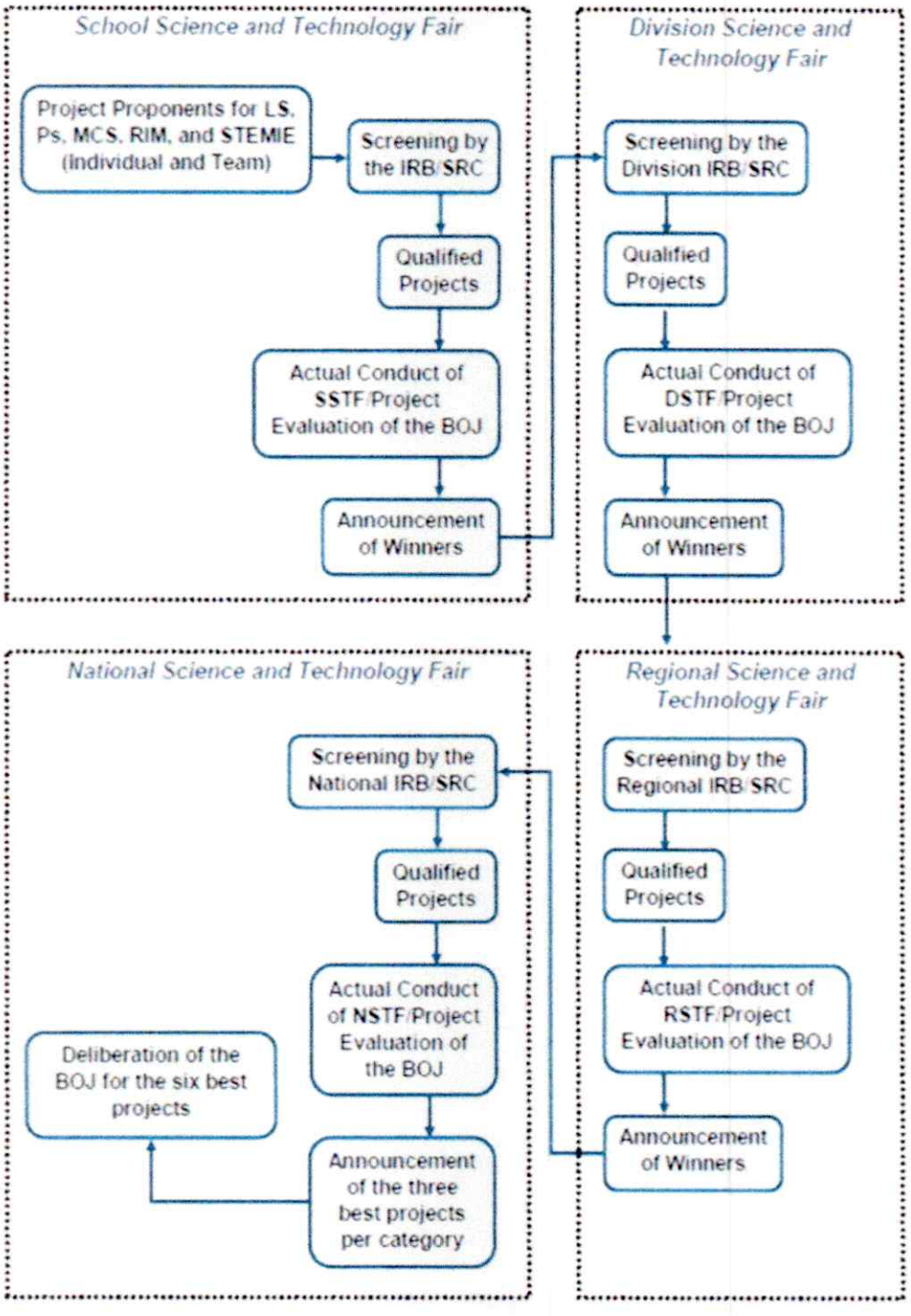
Other Safety Restrictions:
1. Any inadequately insulated apparatus producing extreme temperatures that may cause physical burns is not allowed.
2. Any apparatus with unshielded belts, pulleys, chains, or moving parts with tension or pinch points must be for display only.
3. Project sounds, lights, odors or any other display items must not be distracting.
4. The Display & Safety Committee and/or the Scientific Review Committee at various levels of the Science Fair reserve the right to remove any project for safety reasons or to protect the integrity of the NSTF and its rules and regulations.

SAMPLE ABSTRACTS

2018 ISEF Second Grand Award, Energy Physical	**2024 REGENERON ISEF National Geographic Society Excellence in Geography and Geospatial Science Award**
Solar-Tracking Adaptive Robot PV Panels By Cadores, Keith Russel ; Rivera, Eugene ; Manzanero, Joscel Kent Adviser: Johnny T. Samino 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 ($p = 0.000261$, $a = 0.05$). This robotic design amplifies capacity to harness solar power through a photovoltaic cell.	**Flood Mitigation of Tarlac City Through 3D Simulation of Groundwater Discharge to Flood Inundation Using Rainfall Prediction and Integration of Spatio-Temporal GIS in Hydrodynamic Models** By Arnon Yzabel G. Guinto Adviser: Nica Joyce Aquino The Philippines, ranking as the third most vulnerable nation to natural disasters on a global scale, faces escalating danger posed by typhoons and floods, resulting in significant human casualties, property destruction, and economic repercussions. Among the regions susceptible to such hydrological threats, Tarlac City stands out as particularly prone to inundation. This research aims to address this challenge by proposing the development of a 3D spatio-temporal Geographic Information System (GIS) along with a hydrodynamic model, specifically designed to replicate flood inundation induced by rainfall, groundwater discharge dynamics, and surface flooding occurrences in Tarlac City. It emphasizes its proficient application of advanced methodologies for flood prediction and risk assessment within Tarlac City. Results showed that the Long- Short Term Memory Neural Network effectively anticipates rainfall patterns, while hydrological data facilitated the development of a 3D digital elevation map. The elevation of the areas ranges from 44.69 ft to 57.55 ft, while the low-lying area, Amucao, has an elevation of 24.38 ft to 32.5 ft. This information supplements groundwater discharge data to create a flood inundation model, enabling the identification of flood-prone regions. Moreover, areas in San Vicente, San Roque, Part San Sebastian, San Isidro, Maliwalo, Matatalaib, Tibag, F. Tañedo were prone to minimal to severe risks of flooding. In conclusion, this research augments the disaster preparedness within barangays in Tarlac City susceptible to flooding, contributing significantly to risk mitigation.

(Enclosure No. 2 to DepEd Memorandum No. 006, s. 2026)

SCHEMATIC DIAGRAM OF THE FLOW OF STF ACTIVITIES



*IRB: Institutional Review Board