



Republic of the Philippines
Department of Education
REGION X – NORTHERN MINDANAO
SCHOOLS DIVISION OF MISAMIS ORIENTAL

Office of the Schools Division
Superintendent

October 9, 2023

DIVISION MEMORANDUM
No. 600 s. 2023

CONDUCT OF THE DIVISION SCIENCE AND TECHNOLOGY FAIR 2023

**To: Public Schools District Supervisors
Elementary and Secondary School Heads
District Science Coordinators
Science Teachers
This Division**

1. In preparation for the upcoming Regional Science and Technology Fair, this Office announces the conduct of the DIVISION SCIENCE AND TECHNOLOGY FAIR (DSTF) 2023, on November 25, 2023, at Salay National High School, Salay District, Salay, Misamis Oriental.

2. This event will showcase the immense wit of the learners in Science in Quiz Bee and Investigatory/Research Project Competitions.

3. For Quiz Bee, the participants are district winners from Grade 3 to Grade 10. Each district is encouraged to have 1 representative per grade level.

4. For the Investigatory/Research Projects Competition, the participants are from Elementary, Junior High School, and Senior High School categories. Each district will have only 1 entry per category. The categories are as follows:

- Life Science Category
- Physical Science Category
- Robotics and Intelligent Machines Category
- Mathematics and Computational Science
- National Science Innovation



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5. The teaching personnel involved in the DSTF can claim a service credit while CTO for non-teaching personnel.
6. The link for the online registration will be posted to the PSDS FB group chat.
7. The mechanics of each contest are enclosed in this memorandum.
8. Travel and other expenses incurred for this activity shall be charged to local and other funds subject to its availability and subject to the usual accounting and auditing rules and regulations.
9. Immediate dissemination of this Memorandum to all concerned is desired.


EDILBERTO L. OPLENARIA, EdD, CESO V
Schools Division Superintendent 

cc: *ELO/egd/cid/ssa/lbs*



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MECHANICS FOR QUIZ BEE
(Participants: Grades 3 – 10)

1. This is a face-to-face contest.
2. Each participant will be given an answer board and chalk to show their answer.
3. The quiz master will read the questions twice.
4. After the question is read, the timekeeper will signal the time limit of 15 seconds for each question for easy and average rounds. For the difficulty round, the participants will be given 30 seconds to write their answers.
5. There will be a proctor assigned to monitor the answers of the participants. The proctor will declare if the answer is correct or wrong which will be recorded by the tabulator.
6. There will be 10 questions in each round: for easy rounds, 1 point for each correct answer; for average 2 points; and for difficult 3 points.
7. For the easy round (true or false); for the average round, (multiple choice); and for difficult round, the participants will provide the answer by writing on the answer board.
8. The breaking of ties will be in the First Place only. Places/Ranks of winners will be up to 5th place.



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MECHANICS FOR INVESTIGATORY/RESEARCH PROJECT

(Participants: Elementary, Junior & Senior High School)

1. This is a team category composed of 3 researchers.
2. The participants will present their completed study for a maximum of 10 minutes. Each of the three panels will ask questions for a maximum of 3 minutes.
3. The participants will prepare 3 copies of the manuscripts for the panelists.
4. The exhibit of the projects shall be displayed in the designated area.



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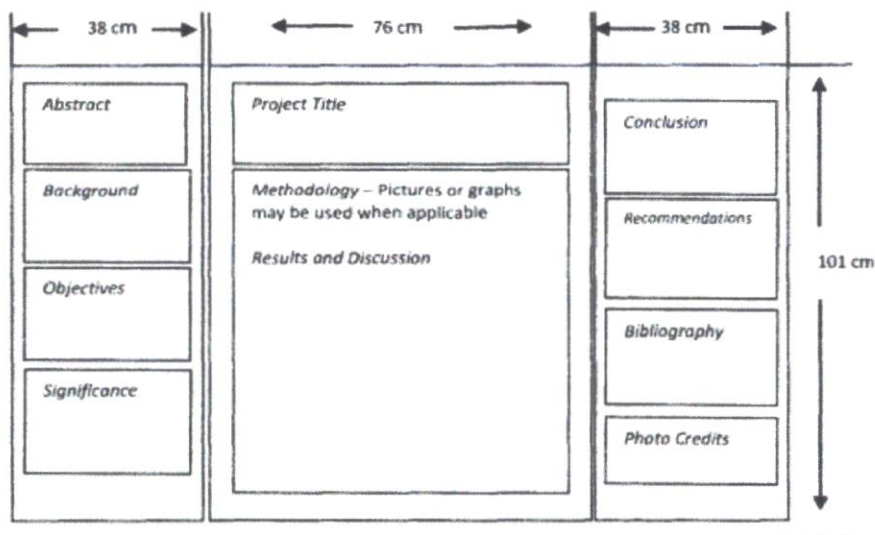




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Enclosure: Science Investigatory Project Format (Ref. DM 134, 2018)

The Exhibit



The 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.

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



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- 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>

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.



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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.



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Sample Abstracts

<p>2018 ISEF Second Grand Award, Energy Physical Solar-Tracking Adaptive Robot PV Panels</p>	<p>2018 ISEF Third Grand Award, Earth and Environmental Science Biosorption of Manganese Mine Effluents Using Crude Chitin from Shell Wastes of Philippine Bivalves</p>
<p>By Cadores, Keith Russel ; Rivera, Eugene ; Manzanero, Joscel Kent Adviser: Johnny T. Samino</p>	<p>By Saquin, Elaine ; Molejona, Randt Adviser: Ronilo Aponte</p>
<p>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.</p>	<p>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 <i>Bractechlamys vexillum</i>, <i>Perna viridis</i>, and <i>Placuna placenta</i> 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, <i>B. vexillum</i> yielded the highest adsorption percentage of 91.43% and 99.58%, comparable to <i>P. placenta</i> of 91.43% and 99.37%, while significantly different to <i>P. viridis</i> 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 <i>B. vexillum</i> and <i>P. placenta</i> can be biosorbents for water treatment of manganese-impacted effluents, and promote appropriate waste management of local bivalves</p>



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Judging Criteria for Science Investigatory/Research Projects

I. Research Question	10%
a. clear and focused purpose	
b. identifies contribution to the field of study	
c. testable using scientific methods	
II. Design and Methodology	15%
a. well-designed plan and data collection methods	
b. variables and controls defined, appropriate, and complete	
III. Execution: Data Collection, Analysis, and Interpretation	20%
a. systematic data collection and analysis	
b. reproducibility of results	
c. appropriate application of mathematical and statistical methods	
d. sufficient data collected to support interpretation and conclusions	
IV. Creativity	20%
a. project demonstrates significant creativity in one or more of the above criteria	
V. Presentation	35%
a. Poster (10 pts)	
1. logical organization of material	
2. clarity of graphics and legends	
3. supporting documentation displayed	
b. Interview (25 pts)	
a. clear, concise, thoughtful responses to questions	
b. understanding of basic science relevant to the project	
c. understanding interpretation and limitations of results and conclusions	
d. degree of independence in conducting a project	
e. recognition of the potential impact on science, society and/or economics	
f. quality of ideas for further research	
g. contributions to and understanding of project by all members	
Total:	100 %



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