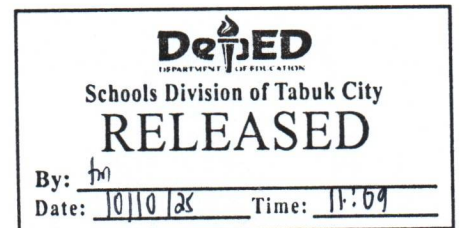




Republic of the Philippines
Department of Education
Cordillera Administrative Region
Schools Division of Tabuk City



Office of the Schools Division Superintendent

9/October/2025

Division Memorandum
No. 458 s. 2025

CONDUCT OF DIVISION SCIENCE AND TECHNOLOGY FAIR

To: Public Schools District Supervisors
All Public and Private Secondary School Heads
All others Concerned

1. The Division Office through the Curriculum and Implementation Division shall conduct a Division Science and Technology Fair (DSTF) with the theme: **"Harnessing the Unknown: Powering the Future Through Science and Innovation"** this November 13-14, 2025 at Tabuk City National High School.
2. This year's DSTF aims to:
 - a. Develop the Science, Technology, Engineering and Mathematics (STEM) skills of learners through the conduct of research projects that address the local, national and global issues;
 - b. Provide an avenue for high school learners to communicate research findings and showcase their investigation and innovations to the STEM community and the public;
 - c. Foster a culture of creativity and innovation among the youth; and
 - d. Identify the most creative and innovative student researchers who shall represent the Division in the Regional Science and Technology Fair.
3. The DSTF will involve the following events and competitions:

TUKLAS- a STEM research competition with four (4) categories: Physical Science, Life Science, Robotics and Intelligent Machine and Mathematics and Computational Science.

STEM Innovation Expo- a STEM Innovation competition that aims to recognize the most creative and market viable project addressing major issues in food safety, water conservation, renewable energy, cyber security, road safety, health, disaster mitigation, agriculture and environment.



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4. The participants from each STEM implementing school shall only be the 1st rank in the different categories.

a.	Life Science (Individual & Team)
b.	Physical Science (Individual & Team)
c.	Robotics and Intelligent Machine (RIM)-(Individual & Team)
d.	Mathematical and Computational Science (Individual & Team)
e.	STEM Innovation Expo (Individual & Team)
f.	MI-Problem-based (Individual & Team)
g.	MI-Research-based (Individual & Team)

5. The schools shall submit 1 entry for each event before October 31, 2025, soft and hard copies (3 sets) for judges to read and evaluate the manuscripts. Soft copies of the manuscripts shall be emailed to this address: cresencia.naoy@deped.gov.ph.
6. The mechanics and criteria of the different contested activities and the investigative project template shall follow the 2025 NSTF rules. Enclosed with this memorandum are Enclosures 1 and 2 or the mechanics of the activities and judging criteria, and list of TWGs.
7. For wide dissemination and appropriate action.

BENEDICTA B. GAMATERO PhD, CESO V
Schools Division Superintendent

For the Authority of the
SCHOOLS DIVISION SUPERINTENDENT

JAN NOWEL E. PEÑA
Asst. Schools Division Superintendent



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**Enclosure 1. Mechanics and Judging Criteria (Please see annex) or download
the School, Division, Regional and National Science and
Technology Fair Handbook, First Edition May 2023**

Enclosure 2. DSTF List of Technical Working Group

#	Name	Office/School
1	Benedicta B. Gamatero PhD, CESO V	Schools Division Superintendent
2	Ramonchito A. Soriano	CES-CID
3	Jasmin Dona-al	DOST Kalinga
4	Robert Rodolfo	KSU- R and D
5	Cresencia M. Na-oy	SDO-CID
6	Emmanuel C. Ubuan	SDO-CID
7	Gemmaline Bumanglag	SDO-CID
8	Shamgar Louie Candelario	SDO-SGOD
9	Joselito B. Cabello	TCNHS
10	Petronila G. Buslig	TCNHS
11	Reymar Galinggan	TCNHS

A.



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Guidelines on Problem-Based Mathematical Investigation

1. A problem is given for you to explore and prove in 3 hrs.
2. Below is the format in solving following its process in investigating the problem:
 - A. Title:
 - B. Focus of Investigation / Objectives:
 - C. Definition (s) and Representation:
 - D. Exploration:
 - Systematic listing/drawing
 - Organizing relationships in tables or graphs
 - HOTS: Organizing, comparing – identifying similarities/differences
 - Classifying – grouping into categories
 - Ordering – sequencing according to criterion
 - Representing – changing in form to show how critical elements are related.
 - E. Conjecture (s):
 - Making general statements about patterns or relationships observed in the cases considered
 - A conjecture is generalization obtained inductively, which has not been validated or proven true.
 - HOTS: Synthesizing – involves putting together the relevant parts or aspects of a solution, understanding or principle.
 - F. Testing / Verifying Conjectures:
 - Checking consistency of conjectures using existing cases
 - Predicting results for untried cases for which data are available
 - G. **Explaining/Justifying Conjectures**
 - Explaining why the conjectures made will work for new or all cases
 - Proving the conjectures (by mathematical induction, direct/indirect proof, visual proof)
 - HOTS: Evaluating – involves assessing the reasonableness of ideas.
 - H. Justification (s), Proof(s) and Explanation:

3. Criterion on Mathematics Investigation

A) Use of Notation (5 pts)

Achievement Level	Descriptor
1	The student does not use appropriate notation and terminology
3	The student uses some appropriate notation and terminology
5	The student uses appropriate notation and terminology in a consistent manner and does so through the work.



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 Telephone No: (074) 422 – 1318
 Email Address: car@deped.gov.ph

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B) Communication (5 pts)

Achievement Level	Descriptor
1	The student neither provides explanations nor uses appropriate forms of representation.
2	The students attempt to provide explanations or use some appropriate forms of representations.
3	The student provides adequate explanations or arguments, and communicates then using appropriate forms of representation.
5	The student provides complete, coherent explanations or arguments, and communicates then clearly using appropriate forms of representation.

C) Patterns (10 pts)

Achievement Level	Descriptor
1	The student does not attempt to use a mathematical strategy.
2	The student uses a mathematical strategy to produce data.
4	The student organizes the data gathered.
6	The student attempts to analyze data to enable the formulation of a general statement.
8	The student successfully analyzes the correct data to enable the formulation of general statement.
10	The student tests the validity of the general statement by considering further examples.

D) Generalization (10 pts)

Achievement Level	Descriptor
1	The student does not produce any general statement consistent with the patterns and/or structures generated.
2	The student attempts to produce a general statement that is consistent with the patterns and/ or structures generated.
4	The student attempts to produce a general statement that is consistent with the patterns and /or structures generated.
6	The student expresses the correct general statement in appropriate mathematical terminology.
8	The student correctly states the scope or limitations of the general statement.
10	The student give a correct, formal proof of the general statement.

E) Use of Technology (5 pts)

Achievement Level	Descriptor
1	The student uses a calculator or computer for only routine calculations.
2	The student attempts to use a calculator or computer in a manner that could enhance the development of the task.
3	The student makes limited use of a calculator or computer in a manner that enhances the development of the task.
5	The student makes full and resourceful use of a calculator or computer in a manner that significantly enhances the development of the task.



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F) Use of Work (5 pts)

Achievement Level	Descriptor
1	The student has shown a poor quality of work.
3	The student has shown a satisfactory quality of work.
5	The student has shown an outstanding quality of work.

4. Oral Defense (10 pts)

5. Total Points 50 points

Prepared by:


WILFRED C. BAGSAO, PhD
EPS, Mathematics

CLMD/JPA/WCB



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Mathematical Investigation Format

I. Title /Topic for Investigation

The title page is the first page of the paper and includes:

- the title of the paper
- name of the researcher
- name of the Adviser

II. Abstract

This section includes only the essence of the other sections.

“ Give me a birds-eye-view of what you have done.”

- it should be as brief as possible
- telling the reader what the goal of the investigation was
- what was found
- the significance of the findings

The abstract is often placed at the beginning of the paper rather than at its end.

III. Introduction

A. Background of the study

This may include the following:

1. Information about its origin, how you arrive to it
2. Purpose
3. Reason why there's a need to undertake the study

B. Statement of the Problem

Called the HEART of a research study

C. Definition of Terms

- i. Operational Definition
- ii. Conceptual Definition

D. Significance of the Study

- This part of the report highlights the possible contributions of the investigation findings.
- It describes
 - (a) the relevance of the research to felt needs
 - (b) how the investigation output maybe directly useful
 - (c) how the research contributed to the advancement of mathematics

E. Scope and Limitation or Delimitation

IV Exploration

- a. Diagrams showing the figures drawn from the cases considered
- b. Table or list showing the results obtained from the observations
- c. Patterns observed



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V Conjectures

Is a tentative generalization which is not known whether or not it is true for all possible instances

VI Testing Conjectures

A support for a conjecture is sought by checking (testing) whether it holds for the instances for which data are available.

VII Justification for Conjectures

It is a proof of a conjecture which deals with instances in general and does not depend on particular instances.

It is an explanation why the conjecture holds and a way to convince yourself and possibly someone else that you understand why the conjecture holds.

VIII Conclusion

This answers the question “What is the meaning of what you found out in the study?” It starts with a **brief summary** of the study (i.e. from the problem to the results), followed by the **conclusions** and, finally, the **recommendations**.

IX Recommendation

This section contains the implications of the investigation findings.

1. Based on specific findings. If a directly relevant finding cannot be cited, the recommendation is not acceptable.
2. Present two implications of investigation findings:
 - a. implication for action (what should be done)

This gives the reader a good justification for the study or research.

- b. implication for further investigation (what improvements can be done on the present study; how the present study may be expanded; etc.)

References:

- *International baccalaureate organization (2004). Teacher training workshop (Mathematics HL). & Myrna Bermudo Libutaque: Hand outs on: Workshop on the Development of Learning Resource Package for Mathematical Investigation, Pasig City, Aug. 6-8, 2019*

Prepared by:

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APPENDIX 5:

Innovation Expo Paper Format

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

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 provide supporting details that your invention does not exist yet. Explain what products are already on the market that are somewhat like your invention and describe how yours differs.

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.

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?

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

Acknowledgements: This part gives credit to those who have assisted you, including individuals, businesses, and educational or research institutions.

References/Bibliography: Your reference list should be written based on the APA (American Psychological Association) style formatting and citation.

APPENDIX 6:

Innovation Expo Display Board Format

Title	Create a clear and attention-grabbing title that accurately reflects your innovation.
Introduction	Provide a brief introduction to your innovation, highlighting its purpose and significance.
Problem Statement	Clearly state the problem or challenge that your innovation addresses.
Solution/Innovation	Describe your innovative solution concisely and prominently on the poster.
Features and Specifications	Present the key features and specifications of your innovation using bullet points or visuals.
Materials and Methods	Use simple visuals or graphics to illustrate the materials used and the steps in the development process.
Results and Discussion	Showcase the results of your innovation and compare them to expectations or existing solutions. Use graphs, charts, or infographics to present data effectively.
Benefits	Emphasize the potential benefits of your innovation to the target users or the community.
Visuals	Include images, diagrams, and photographs to enhance the visual appeal and understanding of your innovation.
Conclusions	Summarize the main conclusions and the broader implications of your innovation.
Future Development	Discuss potential future developments or applications of your innovation.
Developers' Name	Indicate the name/s of the proponent/s (Do not indicate the name of the school/region)

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

APPENDIX 12:

Innovation Expo Screening Form

TITLE OF THE PROJECT		
INDIVIDUAL/TEAM		
PROJECT PROPONENT/S		
CRITERIA	WEIGHT	RATING
ORIGINALITY AND CREATIVITY <small>This criterion assesses the uniqueness and innovation of the project. It looks at how the research addresses a problem in a novel way or introduces creative solutions.</small>	35%	
COMMUNITY CONNECTION & IMPACT <small>This criterion evaluates how the innovation research benefits the community or society. It assesses the project's potential to make a positive impact and address real-world issues.</small>	25%	
MARKET ATTRACTIVENESS <small>This criterion examines the commercial viability of the innovation. It considers the potential market demand, scalability, and sustainability of the project.</small>	25%	
UTILIZATION OF PATENT INFORMATION <small>This criterion focuses on how well the project utilizes relevant patent information and avoids infringement on existing patents.</small>	15%	
TOTAL	100%	
COMMENTS		

Signature Over Printed Name
Date Signed:

APPENDIX 13:

Innovation Expo Judges Form

TITLE OF THE PROECT		
INDIVIDUAL/TEAM		
PROJECT PROPONENT/S		
CRITERIA	WEIGHT	RATING
ORIGINALITY AND CREATIVITY This criterion assesses the uniqueness and innovation of the project. It looks at how the research addresses a problem in a novel way or introduces creative solutions.	25%	
COMMUNITY CONNECTION & IMPACT This criterion evaluates how the innovation research benefits the community or society. It assesses the project's potential to make a positive impact and address real-world issues.	20%	
MARKET ATTRACTIVENESS This criterion examines the commercial viability of the innovation. It considers the potential market demand, scalability, and sustainability of the project.	15%	
FUNCTIONALITY AND TECHNOLOGY VALIDATION This criterion evaluates the practical functionality and performance of the innovation. It assesses how well the innovation functions in real-world scenarios and whether it meets the intended objectives. Researchers should demonstrate evidence of successful testing, validation, or prototypes to support the claims of the innovation's effectiveness.	25%	
PRESENTATION AND PRODUCT PRESENTATION This criterion looks at how effectively the innovation and research are presented to the audience. It assesses the clarity, coherence, and visual appeal of the poster display and any supplementary materials. Additionally, researchers' ability to communicate the innovation's key features, benefits, and impact in a compelling and engaging manner is considered. The criterion also considers how well the researchers answer questions and engage with expo attendees during their presentation.	15%	
TOTAL		
COMMENTS:		

Signature Over Printed Name
Date Signed:

APPENDIX 19:

Project Evaluation Form

Title of Research Project: _____ Code: _____

Fair Division: [] Life Science [] Physical Science [] Robotics and Intelligent Machines
[] Mathematics and Computational Science Category: [] Individual [] Team

CATEGORY	SCORE
<p>1. CREATIVE ABILITY (30)</p> <p>1. Does the project show creative ability and originality in the:</p> <ol style="list-style-type: none"> questions asked? approach to solving the problem? analysis of the data? interpretation of the data? use of equipment? construction or design of new equipment <p>2. Creative research should support an investigation and help answer a question in an original way.</p> <p>3. A creative contribution promotes an efficient and reliable method for solving a problem. When evaluating project, it is important to distinguish between gadgeteering and ingenuity.</p>	
<p>2. SCIENTIFIC THOUGHT (30)</p> <p>(If an engineering project, please see 2b Engineering Goals.)</p> <ol style="list-style-type: none"> Is the problems stated clearly? Was the problem sufficiently limited to allow plausible approach? Good scientists can identify important problems capable of solutions. Was there a procedural plan for obtaining a solution? Are the variable clearly recognized and defined? If controls were necessary, did the student recognize their need and were they used correctly? Are there adequate data to support the conclusions? Does the finalist/team recognize the data's limitations? Does the finalist/team understand the project's ties to related research? Does the finalist/team have an idea of what further research is warranted? Did the finalist/team cite scientific literature, or only popular literature (e.g. local newspapers, Readers Digest)? <p>ENGINEERING GOALS</p> <ol style="list-style-type: none"> Does the project have a clear objective? Is the objective relevant to the potential user's needs? Is the solution: workable? Acceptable to the potential user? Economically feasible? Could the solution be utilized successfully in design or construction of an end product? Is the solution a significant improvement over previous alternatives or application? Has the solution been tested for performances under the conditions of use? 	
<p>3. THOROUGHNESS (15)</p> <ol style="list-style-type: none"> Was the purpose carried out to completion within the scope of the original intent? How completely was the problem covered? Are the conclusions based on a single experiment or replication? How complete are the project notes? Is the finalist/team aware of other approaches or theories? 	

6. How much time did the finalist or team spend on the project?
7. Is the finalist/team familiar with scientific literature in the studied field?
8. Are the relevant details (including the pages and dates) of the experiment recorded in the research data logbook?

4. SKILL (15)

1. Does the finalist/team have the required laboratory, computation, observational and design skills to obtain the supporting data?
2. Where was the project performed (i.e. home, school laboratory, university laboratory)
Did the student or team receive assistance from parents, teachers, scientists or engineers?
3. Was the project completed under adult supervision, or did the student/team work largely alone?
4. Where did the equipment come from? Was it built independently by the finalist or team?
Was it obtained on loan? Was it part of a laboratory where the finalist/team worked?

5. CLARITY (10)

1. How clearly does the finalist or team discuss his/her/their project and explain the purpose, procedure, and conclusions? Watch out for memorized speeches that reflect little understanding of principles.
2. Does the written material reflect the finalist's or team's understanding of the research?
3. Are the important phases of the project presented in an orderly manner?
4. How clearly is the data presented?
5. How clearly are the results presented?
6. How well does the project display explain the project?
7. Was the presentation done in a forthright manner, without tricks or gadgets?
Did the finalist/team perform all the project work, or did someone help?

TOTAL

Signature Over Printed Name of Judge