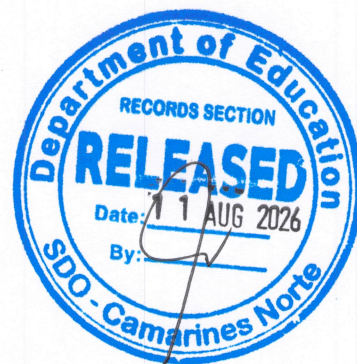




Republic of the Philippines  
**Department of Education**

Region V – Bicol

**SCHOOLS DIVISION OFFICE OF CAMARINES NORTE**



**11 August 2026**

DIVISION MEMORANDUM

No. 309                      s., 2026

**DIVISION SCIENCE AND TECHNOLOGY FAIR FOR SY 2026-2027**

**TO: OIC-Assistant Schools Division Superintendent**  
**Chiefs, CID and SGOD**  
**Education Program Supervisors**  
**Public Schools District Supervisors**  
**Principals/Heads, Public/Private Elementary, Integrated, and Secondary Schools**  
**SDO Section/Unit Heads**  
**All Others Concerned**

1. In preparation for the coming Regional Science and Technology Fair, this Office through the Curriculum Implementation Division (CID) shall conduct the Division Science and Technology, Fair for SY 2026-2027 on **September 8-9, 2026**, at **San Roque National High School, Mercedes, Camarines Norte**.

2. The Science and Technology Fair aims to:

- a. develop and strengthen the Science, Technology, Engineering, and Mathematics (STEM) skills of learners through the conduct of research projects that address local, national, and/or global issues.
- b. provide an avenue for high school learners to communicate research findings and showcase investigations, innovations and robotics skills to the STEM community and the public,
- c. provide an opportunity to establish research networks and collaborations among students, researchers, teachers, higher education institutions, industries, other agencies and communities, and
- d. foster a culture of creativity and innovation among the youth.

3. The Science Fair shall include the following activities, which shall be conducted at the school, division, and regional levels in preparation for the Regional and National Science and Technology Fair.

- a. Tuklas – a STEM research competition with four categories: (1) Life Science, (2) Physical Science, (3) Robotics and Intelligent Machines, and (4) Mathematics and Computational Science. This provides junior and senior high school learners with opportunities to showcase their research projects based on their field of interest and/or real-world problems, issues and concerns.
- b. STEM Innovation Expo – 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.

- c. **STEM Academy** = a conference designed to provide the participants with learning opportunities and experiences through various talks promoting innovation, creativity, and excellence in the fields of STEM.
  - d. **On-the Spot Poster Making Contest** – a two-hour competition that empowers learners to express their ideas visually and engage with real-world problems. This contest encourages critical thinking, creativity, and innovation.
  - e. **Division Shoutout** – a short public expression of greeting, celebration, and acknowledgement by each division for their DSTF participants during the actual event after their 30-second video presentation.
  - f. **Robotics Olympics** – a robotics competition featuring challenges such as the Autonomous Navigation Challenge, Autonomous Battle Arena, and RC Robot Soccer. It provides learners with opportunities to apply robotics, programming, engineering design, and computational thinking in completing challenge-based tasks while fostering innovation, teamwork, creativity, and technical excellence.
4. Relative to this, the following schedule of activities shall be observed:
- September 4, 2026, Planning Conference with Technical Working Group
  - Online Submission of Division Entries for the Regional Scientific Review Committee (SRC) Paper Evaluation
    - October 26, 2026
    - October 28, 2026 (*initial meeting of Regional SRC Team*)
  - Regional Scientific Review Committee Paper Evaluation
    - October 29 to November 18, 2026 (*self-paced/off site*)
    - November 20, 2026 (*Final Meeting of SRC (onsite)*)
    - November 24, 2026, Release of SRC Results
  - Online Submission of Revised Paper (for Qualified Researches only)
    - November 30, 2026
  - Regional Science and Technology Fair
    - December 8-11, 2026
  - Cliniquing of Qualifiers to the National Science and Technology Fair
    - December 16-17, 2026
5. **All STE and SSES implementing** are required to participate in the Division Science and Technology Fair (DSTF) to qualify for the Regional Science and Technology Fair (RSTF) and the NSTF. Expenses incurred during the STF shall be charged to local funds and/or other sources subject to the usual accounting and auditing rules and regulations.
6. The declared first-place winners at the division level shall submit soft copies of their research papers and all required documents, **using the new ISEF Forms**, for evaluation by the Regional Scientific Review Committee (SRC). The submission shall be endorsed by the Schools Division Superintendent and submitted on or **before October 26, 2026, until 5:00 p.m. only.**
7. All division entries shall be downloaded **once immediately after the deadline.** Late and individual submissions shall not be accepted; **only the submission link from the Division Focal Persons containing all division entries shall be considered valid.** The submission link must be emailed to [rstfrov@gmail.com](mailto:rstfrov@gmail.com) following the prescribed format:

| Folder Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Contents of the Folder                                                                                                                               | Sample Content of the Folder for Forms                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| LS-I-Albay<br>*Life Science-Individual-Albay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Manuscript:<br>LS-I-Division-School Name<br>ex:<br>LS-I-Albay-MORMS                                                                                  |                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Folder containing the needed forms:<br><br>LS-I-Division-Forms<br><br><i>*Name of the folder where all of the soft copies of the forms are found</i> | LS-I-Albay-Form 1<br>LS-I-Albay-Form 2<br>LS-I-Albay-Logbook |
|  LS-I-Division →  LS-I-Division-Forms →  LS-I-Division-Data logbook<br> LS-I-Division-Form 1<br> LS-T-Division<br> PS-I-Division<br> PS-T-Division<br> RIM-I-Division<br> RIM-T-Division<br> MCS-I-Division<br> MCS-T-Division<br> SIE-I-Division<br> SIE-T-Division |                                                                                                                                                      |                                                              |

8. The participation of schools in the DSTF shall be clustered into categories: Life Science, Physical Science, Robotics and Intelligent Machines, Mathematics and Computational Science, and Science Innovation Expo. Special categories for Robotics Olympics are further classified into: Autonomous Navigation Challenge (Line Follower), Autonomous Battle Arena Challenge (SumoBot), and RC Robot Soccer.

| Life Science<br>(Grades 9-12) |   | Physical Science<br>(Grades 9-12) |   | Robotics & Intelligent Machines<br>(Grades 9-12) |   | Mathematics & Computational Science<br>(Grades 9-12) |   | Science Innovation Expo<br>(Grades 9-12) |   | Autonomous Navigation Challenge | EcoBot Collection Challenge | RC Robot Soccer |
|-------------------------------|---|-----------------------------------|---|--------------------------------------------------|---|------------------------------------------------------|---|------------------------------------------|---|---------------------------------|-----------------------------|-----------------|
| I                             | T | I                                 | T | I                                                | T | I                                                    | T | I                                        | T | Elementary                      | JHS/SHS                     | JHS/SHS         |
|                               |   |                                   |   |                                                  |   |                                                      |   |                                          |   |                                 |                             |                 |

9. The following documents are enclosed with the information and guidance of all concerned:

Enclosure 1: Mechanics, Guidelines and Paper Format

Enclosure 2: Maximum Number of Participants per SDO

10. **No registration fee shall be collected.** Expenses for SSTF, DSTF, and all other travel-related costs shall be charged against local funds and/or other available sources. Meanwhile, expenses for the regional activity, including meals of TWG members, materials, and medals of the winners shall be charged against the local funds, subject to the usual accounting and auditing rules and regulations.

11. All entries must be endorsed by the Public Schools District Supervisors. Entries not included in the official endorsement will not be accepted. A link to registration forms will be sent to the STE and SSES schools at least two weeks before the fair.

12. For queries and concerns, please contact the regional focal person via e-mail at [depedscierov@gmail.com](mailto:depedscierov@gmail.com). For information, guidance, and wide dissemination.

  
**CRESTITO M. MOREILLA, CESO V**  
Schools Division Superintendent *ny*

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

STEM FAIR  
ROBOTICS  
RSTF  
DSTF  
SSTF

## Enclosure 1

### MECHANICS AND GUIDELINES

#### A. Research Fair and Congress (Individual and Team Categories)

##### Eligibility and Contest Mechanics

- 1<sup>st</sup> Place declared winner at the division level.
- Grades 9 to 12 STE/STEM students who have not reached the age of 20 on or before May 1 of the current school year.
- Learners may work individually or in teams of two (2) to a maximum of three (3) members from the same school. Each learner is allowed to submit only one (1) research project in one (1) of the five (5) research categories: Life Science, Physical Science, Robotics and Intelligent Machines, Mathematics and Computational Sciences, and STEM Innovation Expo. The project should cover no more than 12 months of continuous research and must not include research activities conducted before January of the previous school year. For example, for School Year 2025-2026, with classes targeted to open in June 2025 and ISEF scheduled for May 2026, research projects may span 1-12 month(s) from January 2025 to January 2026.

##### Guidelines

- Approval of the Scientific Review Committee is required for all projects. All approved projects of the division/regional SRC evaluators will advance to the Division/Regional Science and Technology Fair.
- Entries for the Science Innovation Expo (SIE) must have already applied for and secured the Certificate of Patent/Copyright before they are accepted at the Regional Fair. Likewise, Science Innovation Expo follows a different criterion for judging, hence the presentation should focus on product presentation, originality/creativity, community/ connection impact, market attractiveness, functionality, and technology validation.
- All entries shall have a poster exhibit display. Materials for the display will not be provided by the organizer; hence, it shall be the responsibility of the researcher/s.
- Prepare a 5-minute presentation of the research focusing on the extended abstract: Purpose, Procedure, Results, and Conclusion. Q & A shall be at the discretion of the Board of Judges. Remember to follow the standards in preparing a PowerPoint presentation. Do not copy and paste the write-up in the slide decks.
- Submit one (1) hard copy of the revised paper in the required color-coded folders on the day of the fair. Papers must reflect compliance with suggested revisions, which will be checked by the evaluator before the congress. Ensure all changes are clearly indicated (ear-marked) in the write-up.

| Code  | Color Coding | Code  | Color Coding |
|-------|--------------|-------|--------------|
| LS-I  | Green        | MCS-I | Red          |
| LS-T  | Yellow       | MCS-T | Purple       |
| PS-I  | Blue         | SIE-I | Black        |
| PS-T  | Orange       | SIE-T | White        |
| RIM-I | Pink         |       |              |
| RIM-T | Brown        |       |              |

- Both the Research Adviser and Researcher must have read and understood the International Rules for Pre-College Science Research: Guidelines for Science and Engineering Fairs.

### **Criteria for Judging**

#### **Science Innovation Expo**

|                                          |            |
|------------------------------------------|------------|
| Originality and Creativity:              | 30%        |
| Community Connection and Impact:         | 20%        |
| Market Attractiveness:                   | 20%        |
| Functionality and Technology Validation: | 10%        |
| Project Pitching/Product Presentation    | 10%        |
| Utilization of Patent Information:       | <u>10%</u> |
|                                          | 100%       |

#### **Research Projects (Life Science, Physical Science, Robotics and Intelligent Machines and Mathematics and Computational Science)**

|                                      |            |
|--------------------------------------|------------|
| Creative Ability:                    | 30%        |
| Scientific Thought/Engineering Goal: | 30%        |
| Thoroughness:                        | 15%        |
| <u>Skill:</u>                        | 15%        |
| Clarity:                             | <u>10%</u> |
|                                      | 100%       |

#### **Best Presenter**

|                                      |           |
|--------------------------------------|-----------|
| Delivery:                            | 20%       |
| Organization (Logical Presentation): | 20%       |
| Content:                             | 30%       |
| Language:                            | 15%       |
| Visuals:                             | 10%       |
| Time Management:                     | <u>5%</u> |
|                                      | 100%      |

#### **Best Poster Display**

|                                                               |            |
|---------------------------------------------------------------|------------|
| Content:                                                      | 30%        |
| (Accuracy, Clarity & Relevance)                               |            |
| Visual Presentation:                                          | 30%        |
| (Layout & Organization, Aesthetics & Design, Use of Graphics) |            |
| Creativity & Innovation:                                      | 20%        |
| Impact and Relevance:                                         | <u>20%</u> |
|                                                               | 100%       |

## **TUKLAS RESEARCH PAPER FORMAT**

### **I.1 TUKLAS Categories**

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

- *Life Science*
- *Physical Science*
- *Robotics and Intelligent Machines*
- *Mathematics and Computational Science*

### **I.2 Innovation**

- *Science Innovation Expo*

## **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 **animal care reference**.

## **III. PROJECT DATA LOGBOOK**

A project data logbook is used by student researchers to record research activities, including planning, design, procedures, data collection, analysis, findings, and conclusions. Accurate and dated entries help show consistency and support the writing of the research paper.

Researchers are encouraged to use hard-bound notebooks, permanent pens, and minimal erasures. Flow charts, tables, and complete qualitative and quantitative data with units may be included. Each entry should be dated and signed by the supervising adult, if applicable.

## **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/](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. **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/>.

## **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 notations 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 proof 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 unnecessary information for a brief explanation should be included in the written research paper or project exhibit board instead.

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

If the abstract contains special characters, such as mathematical symbols, that cannot be translated electronically, spell out the symbols.

Do not include acknowledgments in the abstract. There should be no references for mentors, institutional facilities, 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 work as one's own, and fabrication of data will not be tolerated. Fraudulent projects are disqualified from the competition.

## **STEM INNOVATION EXPO PAPER FORMAT**

### **Title Page and Table of Contents**

#### **Introduction**

1. **Features and Specifications** - This describes the details of your innovation.
2. **Market Trends and Opportunities** - This part of the report must include three items: an explanation of what inspired you to develop this invention, a description of the problem your invention will solve, and a detailed account of how you confirmed that your invention does not exist yet. Additionally, identify similar products currently on the market and explain how your invention differs.

#### **Materials and Methods:**

Describe in detail how you made your innovation. Explain what materials were used and how you put them together to make your invention. Your report should be detailed enough so that others can repeat the steps and make your invention. Directions on how to use the invention are also necessary here. You must include detailed drawings of your invention.

#### **Results and Discussion:**

This section presents the essence of the research paper. It should compare the results with theoretical values, published data, related literature and studies, commonly held beliefs, and/or expected outcomes. It should also include a discussion of possible sources of error, statistical analysis, graphs, and relevant raw data.

The discussion should explain how the data varied across repeated observations or trials, how the results were affected by uncontrolled factors, what could be improved if the project were repeated, and what further experiments or innovations may be conducted.

## **Conclusions**

This section focuses on the potential applications, possible customer benefits, and impact of the findings or results in solving present and future problems or issues.

## **Acknowledgments**

This section gives credit to those who assisted in the project, including individuals, businesses, and educational or research institutions.

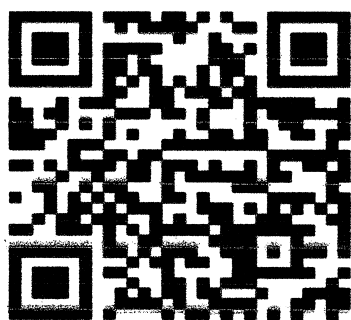
## **References/Bibliography**

The reference list should be written following the APA Manual of Style.

ISEF Rules, Guidelines and latest Forms can be accessed through:

<https://www.societyforscience.org/isef/international-rules/rules-and-guidelines/>

QR Code:



## ROBOTICS OLYMPICS MECHANICS AND GUIDELINES

### A. Autonomous Navigation Challenge (Line Follower) – Elementary

|                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Objective</b><br>The goal of this contest is for each team's robot to autonomously navigate a designated course by following the required path and reaching the finish line in the shortest possible time.                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Qualification</b><br><br>1. Open to Elementary students. Teams may consist of members from either level or a mix of both.<br>2. Each team may consist of up to two (2) student members and one (1) coach.<br>3. Only one (1) team per division is allowed to participate. | <b>Robot Requirements</b><br><br>1. Each team is allowed to use only one (1) robot.<br>2. The robot must not exceed 25 cm x 25 cm in size.<br>3. The robot must be fully autonomous. Remote control, manual steering, or manual intervention is not allowed during operation.<br>4. The robot may have any number of wheels.<br>5. The robot must have an easily accessible on/off switch.<br>6. The robot must be battery-operated. Any type of battery is allowed, provided it is safe and securely mounted.<br>7. Any brand or type of microcontroller or microprocessor may be used, provided the robot operates autonomously.<br>8. The robot must be programmable. Teams may upload and test their code only during the designated practice time.<br>9. Any type and number of sensors may be used to support autonomous navigation.<br>10. Non-compliance with these requirements will result in disqualification. |

### Competition Rules

1. Robots must adapt to the existing lighting conditions. Lighting will not be adjusted for individual teams. Flash photography and IR cameras are allowed unless deemed disruptive by the judges.
2. The arena will open 1 hour before the competition. Each team will be given 5 minutes of practice time.
3. Once the competition begins, no physical adjustments to the robot or changes to its programming are allowed. Code uploading or editing is strictly prohibited during the official match period, and the robots must be immediately placed back in the location specified by the judges.
4. Timing starts when the robot begins moving and stops upon reaching the finish line.
5. Each team will have three (3) attempts. The shortest time will be recorded.
6. The team with the fastest completion time wins.
7. Robots that leave the arena surface will be disqualified for that attempt.
8. If a robot fails to complete the course, partial points will be awarded based on the distance traveled.
9. In the event of a tie, a rematch may be conducted at the discretion of the organizers.
10. All decisions made by the judges and officials are final and binding.

### Organization and Registration

1. All robots must be registered before the competition, including technical inspection and number sticker assignment.
2. Technical inspections must be completed on or before the deadline set by the organizers.
3. The referee will resolve all issues or questions during the event.
4. No objections to the decisions of the facilitators or judges will be entertained.

## B. EcoBot Collection Challenge

### Objective

The Autonomous EcoBot Collection Challenge demonstrates autonomous navigation, object detection, strategic programming, and environmental responsibility. Each robot must locate and transport designated recyclable objects into its assigned collection zone while avoiding the arena boundary, obstacles, and unnecessary contact with the opposing robot. The robot that earns the highest score within the allotted time shall win the match.

### Qualification

1. Open to Junior High School (JHS) and Senior High School (SHS) students. Teams may consist of members from either level or a mix of both.
2. Each team may consist of up to two (2) student members and one (1) coach.
3. Only one (1) team per division is allowed to participate.

### Robot Requirements

1. Each team is allowed to use only one (1) robot.
2. The robot must not exceed 20 cm x 20 cm x 20 cm in size.
3. The robot must not weigh more than one kilogram (1 kg).
4. The robot must be fully autonomous. Remote control or manual intervention is not allowed during matches.
5. The robot may have any number of wheels or locomotion mechanisms.
6. The robot must have an easily accessible on/off switch.
7. The robot must be battery-operated. Any type of battery is allowed, provided it is safe and securely mounted.
8. Any brand or type of microcontroller or microprocessor may be used.
9. Any type and number of sensors may be used for navigation, object detection, boundary detection, and obstacle avoidance.
10. The robot may use fixed or motorized mechanisms for safely guiding, pushing, lifting, or carrying competition objects.
11. All attachments must remain within the maximum robot dimensions at the beginning of the match.
12. Robots must not use adhesives, liquids, projectiles, flames, magnets that interfere with equipment, sharp components, or mechanisms that may damage objects, robots, or the arena.
13. Robots must not intentionally block, trap, overturn, push, or damage the opposing robot.
14. Non-compliance with these requirements shall result in penalties or disqualification.

### **Competition Rules**

1. Teams must be present at the competition area at least five (5) minutes before their scheduled match.
2. Each match involves only two (2) autonomous robots operating simultaneously inside the arena. When more than two teams are registered, matches shall be conducted by batch according to the official match schedule or tournament bracket prepared by the organizers.
3. For thirteen (13) participating robots, six (6) pairs shall compete in the first round, while one (1) robot shall automatically advance to the next round without competing. The pairings and the robot that will automatically advance shall be determined through a transparent drawing of lots conducted by the organizers before the competition.
4. The assignment of opponents, match order, and the robot that will automatically advance to the next round without competing shall be determined through a transparent drawing of lots conducted by the organizers before the competition.
5. Only the two teams scheduled for the current match may place and activate their robots inside the arena. All other teams must remain in the designated waiting or preparation area.
6. Each robot must begin inside its assigned starting zone.
7. Competition objects shall be placed in predetermined positions before each match.
8. At the referee's signal, each contestant may press the robot's start button. The robot must begin operating after five (5) seconds.
9. Contestants must leave the immediate arena area before the robots begin moving.
10. Each match shall have a duration of three (3) minutes.
11. Robots must autonomously locate and transport competition objects into their assigned collection zones.
12. An object shall be counted only when it is completely inside the correct collection zone.
13. Objects may be pushed, guided, lifted, or carried using safe robot mechanisms.
14. An object not yet fully secured inside a collection zone may be moved by either robot.
15. Once an object is completely inside a collection zone, the opposing robot must not intentionally remove it.
16. Robots must avoid intentional contact with the opposing robot. Minor accidental contact is allowed only when the robot immediately moves away.
17. Intentional pushing, trapping, blocking, overturning, or damaging another robot is prohibited.
18. A robot that leaves the arena shall be returned to its starting zone by the referee and shall receive the corresponding penalty.
19. Contestants may not touch, adjust, repair, reprogram, or communicate with their robots during the match.
20. A robot that fails to begin moving within thirty (30) seconds shall be considered inactive.
21. A robot that remains immobilized for more than fifteen (15) seconds may be removed by the referee. The other robot may continue until the match ends.

22. The match shall end when the time expires, all objects are collected, both robots are inactive, or the referee stops the match for safety reasons.
23. The winning robot shall advance to the succeeding round until the semifinal and championship matches are completed.
24. A team that is not present within five (5) minutes after being officially called may forfeit the match, unless the delay is caused by circumstances recognized by the organizers.
25. Adequate preparation time may be provided between matches. However, teams shall not make major structural or programming modifications that would violate the inspected robot specifications.
26. Robots must be switched off and removed promptly after the match.
27. The referee's decisions are final and non-negotiable.

#### **Scoring System**

| <b>Accomplishment or Violation</b>                                                  | <b>Points / Penalty</b> |
|-------------------------------------------------------------------------------------|-------------------------|
| Each regular recyclable object completely placed inside the correct collection zone | 10 points               |
| Each special eco-token completely placed inside the correct collection zone         | 20 points               |
| Robot remains completely inside the arena until the match ends                      | 5 points                |
| All available objects collected before time expires                                 | 10 bonus points         |
| Robot leaves the arena                                                              | -5 points               |
| Object placed inside the opposing team's collection zone                            | -5 points               |
| Object intentionally removed from a completed collection zone                       | -10 points              |
| Intentional blocking or pushing of the opposing robot                               | -10 points              |
| Manual intervention by a contestant                                                 | -15 points              |
| Intentional damage to an object, robot, or arena                                    | Disqualification        |

#### **Determination of Winners:**

1. Each match shall consist of one (1) three-minute round.
2. The robot with the highest total score shall be declared the winner of the match and shall advance to the succeeding round.
3. The competition shall follow a single-elimination tournament format, unless another format is officially announced by the organizers before the event.
4. For thirteen (13) participating robots, the first round shall consist of six (6) matches involving twelve (12) robots. One (1) robot shall automatically advance to the next round without competing. The six (6) match winners and the robot that automatically advances shall proceed to the next stage, resulting in seven (7) remaining robots.
5. When an odd number of robots remains in any succeeding stage, the organizers shall conduct a transparent drawing of lots to determine the match pairings and the robot that will automatically advance to the next round without competing.
6. In case of a tied match, the winner shall be determined based on the following criteria, in this order:
  - a. More number of collected objects;
  - b. Shorter time in collecting the final object;
  - c. Fewer penalties incurred; and
  - d. More consistent autonomous navigation and obstacle avoidance.
7. If the tie remains unresolved, a one-minute tie-breaker round shall be conducted using three (3) objects placed at the center of the arena.
8. The robot that correctly collects the greater number of objects during the tie-breaker round shall be declared the winner.
9. No robot maintenance, reprogramming, or component replacement shall be allowed before the tie-breaker round, except for safety-related corrections authorized by the referee.

## **Violations and Disqualification**

1. Starting before the official signal.
2. Manually controlling or communicating with the robot during the match.
3. Intentionally pushing, trapping, overturning, or blocking the opposing robot.
4. Using an unsafe, sharp, harmful, or prohibited mechanism.
5. Damaging the arena or competition objects.
6. Interfering with officials or another team.
7. Displaying disrespectful, discriminatory, violent, or unsportsmanlike behavior.
8. Failing to comply with robot specifications.
9. Modifying the robot after inspection without permission.
10. Repeatedly violating competition rules after receiving a warning.

## **Organization and Registration**

1. All robots must be registered before the competition and must undergo technical and safety inspection.
2. Inspection shall verify dimensions, weight, autonomous operation, battery installation, collection mechanism, exposed components, and compliance with prohibited-mechanism rules.
3. Robots that fail inspection may be corrected and resubmitted within the period established by the organizers.
4. After passing inspection, major modifications are prohibited unless approved and reinspected by the organizers.
5. The referee shall resolve all issues or questions during a match.
6. No objections to the final decisions of the referees, facilitators, or judges shall be entertained.

## **Materials:**

### **A. Materials to Be Prepared by Each Team**

1. One (1) fully assembled autonomous robot that complies with all size, weight, and safety requirements.
2. Robot battery or batteries, plus one (1) safe spare battery when available.
3. Battery charger and charging cable.
4. Basic hand tools for maintenance, such as screwdrivers, pliers, hex keys, and electrical tape.
5. Spare non-hazardous parts, including wheels, screws, wires, sensors, collection guides, and motor brackets.
6. Laptop and programming cable for use only in the designated preparation area.

## 7. Extension cord

### **B. Materials to Be Prepared by the Organizers**

1. One (1) circular arena measuring 77 cm in diameter with a clearly visible white boundary and a stable, non-slip surface.
2. Two (2) colored collection zones positioned on opposite sides of the arena.
3. Two (2) clearly marked robot starting zones.
4. At least eight (8) uniform lightweight recyclable objects, such as foam blocks, plastic caps, or wooden cubes, plus optional special eco-tokens.
5. Safe and stable stationary obstacles of uniform dimensions, when obstacle avoidance is included.
6. Digital weighing scale and measuring device or sizing box.
7. Stopwatch, timer, start signal, score sheets, pens, and match brackets.
8. Official robot number stickers and colored team identifiers.
9. Inspection table, robot preparation area, and safe charging station.
10. Boundary barriers or a clear safety perimeter for spectators.
11. Basic safety equipment, including a first-aid kit and an appropriate fire extinguisher.
12. Replacement competition objects, zone markers, cleaning cloths, and tape.
13. Printed copies of the rules, arena layout, inspection checklist, scoring sheets, and violation forms.

### **Arena Specifications**

1. Matches shall be conducted in a circular arena measuring 77 cm in diameter.
2. The arena shall have a clearly marked white boundary line.
3. Two collection zones of equal size shall be placed on opposite sides of the arena and identified by different colors.
4. Two starting zones shall be clearly marked inside the arena.
5. Lightweight objects representing recyclable materials shall be placed in predetermined positions near the center of the arena.
6. All regular competition objects shall have uniform dimensions and weights.
7. Organizers may place safe stationary obstacles inside the arena to test navigation and obstacle avoidance.
8. The final arena layout, object dimensions, and object quantities shall be announced before the competition.

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Organization and Registration</b> | <ol style="list-style-type: none"> <li>1. All robots must be registered before the competition, including technical inspection and number sticker assignment.</li> <li>2. Technical inspections must be completed on or before the deadline set by the organizers.</li> <li>3. The referee will resolve all issues or questions during the event.</li> <li>4. No objections to the decisions of the facilitators or judges will be entertained.</li> </ol> |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## B. RC Robot Soccer

|                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Objective</b><br><p>Teams will control three robots to play soccer against another team. The goal is to score more points than the opposing team within the match duration.</p> <p>Strategy, teamwork, and robot control are key to winning.</p>                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Qualification</b><br><ol style="list-style-type: none"> <li>1. Open to <b>Junior High School (JHS) and Senior High School (SHS) students.</b> Teams may consist of members from either level or a mix of both.</li> <li>2. Each team may consist of up to 3 student members and 1 coach.</li> <li>3. Only one (1) team per division is allowed to participate.</li> </ol> | <b>Robot Requirements</b><br><ol style="list-style-type: none"> <li>1. Each team must use three (3) remote-controlled robots.</li> <li>2. Each robot must not exceed 20 cm x 20 cm x 20 cm in size.</li> <li>3. Each robot must not weigh more than 1 kilogram (1 kg).</li> <li>4. Robots must be remotely controlled (wireless).</li> <li>5. Any type of microcontroller, motor driver, and communication module may be used.</li> <li>6. Robots must be battery-powered and safe for operation.</li> <li>7. Robots must not have any sharp edges, projectiles, or mechanisms that could damage the field or other robots.</li> <li>8. Each robot must have a visible team identifier (e.g., sticker or flag).</li> <li>9. Robots must be distinguishable from each other (e.g., numbered or color-coded).</li> </ol> |

Competition Rules

- 1. Teams are expected to be at the field 5 minutes before their game starts.
- 2. The game is played on a rectangular field with goals on each end.
- 3. Each match consists of two halves, each lasting 2 minutes, with a 1-minute break in between.
- 4. The team that scores the most goals by the end of the match wins.
- 5. A kick-off starts the game and resumes play after each goal.
- 6. Robots must stay within the field boundaries. If a robot leaves the field, it will be removed from the field for a **20-second penalty**. The robot is allowed to return if a kick-off occurs before the penalty has elapsed and will be repositioned by the referee to the designated area.
- 7. A maximum of three robots per team is allowed on the field at any given time.
- 8. No intentional blocking, ramming, or pinning of the opponent is allowed.
- 9. A robot is not allowed to hold the ball, which means taking full control by eliminating all its degrees of freedom. This includes fixing the ball to the robot, enclosing it to block access, or trapping it in any way. If the ball doesn't roll while the robot moves, it is likely held.
- 10. If a robot becomes stuck or non-functional, the team may request a **10-second timeout** (once per match) to reset or reposition the robot.
- 11. In the event of a tie, a 2-minute sudden-death overtime will be played. The first team to score wins.
- 12. Scoring

| Action                   | Score                       |
|--------------------------|-----------------------------|
| Goal scored              | 1 point                     |
| Own goal                 | 1 point to the opponent     |
| Unsportsmanlike behavior | Warning or disqualification |

Organization and Registration

- 1. All robots must be registered before the competition, including a technical inspection.
- 2. Robots will be marked with a team number or identifier.
- 3. All issues or disputes will be resolved by the referee.
- 4. No objections to the decisions of the facilitators or judges will be entertained.

## Enclosure 2

### Maximum Number of Participants per Event

| Event                                                        | Student | Coach | Total |
|--------------------------------------------------------------|---------|-------|-------|
| ○ Life Science Individual                                    | 1       | 2     | 3     |
| ○ Life Science Team                                          | 3       | 2     | 5     |
| ○ Physical Science Individual                                | 1       | 2     | 3     |
| ○ Physical Science Team                                      | 3       | 2     | 5     |
| ○ Robotics & Intelligent Machines Individual                 | 1       | 2     | 3     |
| ○ Robotics & Intelligent Machines Team                       | 3       | 2     | 5     |
| ○ Mathematics & Computational Science Individual             | 1       | 2     | 3     |
| ○ Mathematics & Computational Science Team                   | 3       | 2     | 5     |
| ○ Science Innovation Expo Individual                         | 1       | 2     | 3     |
| ○ Science Innovation Expo Team                               | 3       | 2     | 5     |
| ○ Autonomous Navigation Challenge (Line Follower-Elementary) | 2       | 1     | 3     |
| ○ EcoBot Challenge(JHS/SHS)                                  | 2       | 1     | 3     |
| ○ RC Robot Soccer                                            | 3       | 1     | 4     |
| Total                                                        |         |       | = 50  |