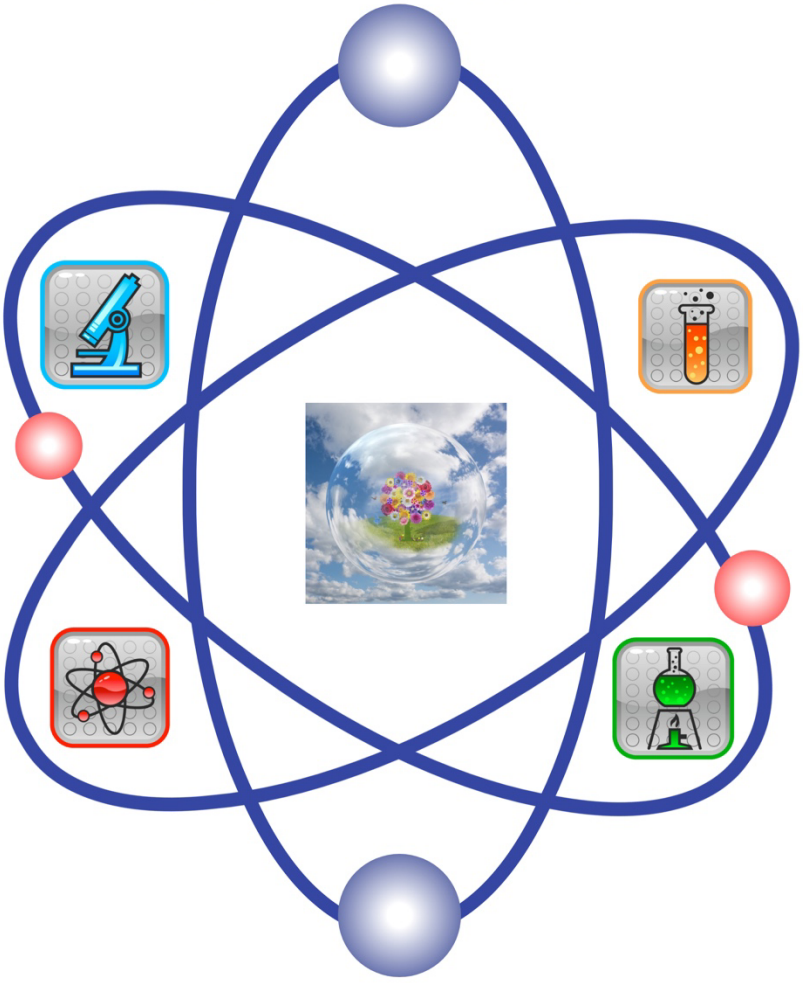
SCIENCE TECHNOLOGY ENGINEERING ARTS MATHEMATICS

STEAM

NATIONAL SCIENCE FAIR 2024
TEACHER MANUAL

ENVISION THE SOLUTION: REIMAGINING SUSTAINABLE DEVELOPMENT THROUGH STEAM



DATE: 14TH - 16TH MARCH 2024

TIME: 9AM

Venue: Multipurpose Sports Complex

GOVERNMENT OF THE VIRGIN ISLANDS
Ministry of Education, Youth Affairs and Sports

NATIONAL SCIENCE FAIR 2024

THEME: Envision the Solution: Reimagining Sustainable Development Through S.T.E.A.M.

DATE: 14th to 16th March 2024

LOCATION: Multipurpose Sports Complex, Road Town, Tortola, BVI

INTRODUCTION

It has been recognized that Science and Technology have made a significant contribution towards developing our country and the world. They both have affected not only education but the business community as well. Therefore, partnerships needed to be forged with the Ministry of Education, UNESCO, and community stakeholders to plan and host the annual Science Fair, which was disrupted due to Hurricane Irma and the recent COVID-19 pandemic. This initiative intends to provide a platform for students to display their creative, innovative, and original projects, showcasing their inventive capabilities.

MAIN GOALS

To provide an opportunity for students to:

- display their creativity;
- stimulate their interest and desire to explore;
- foster independence;
- strengthen data interpretation and analytical skills, and
- show a connection between what is learned in class and what happens in real life.

PARTICIPATION

All educational institutions are eligible to submit entries. The competition is open to individual students and groups.

There can be two members per group; groups can be made with students within the same grade. Grades K-3 can submit class projects at the Primary level and be

judged as a class. Enid Scatliffe Pre-Primary School (with more grades K and 1) can only submit two projects from each grade.
At the Secondary level:

- students in support programmes can combine to form 5-member groups
- students in different science classes can create groups within the same grade
- senior students taking more than one science can do ONE project for both classes.

Projects can be either in the form of a model, an experiment or artwork.

- A **model** ~ displays how something works in the real world. E.g. Solar powered race car.
- An **experiment** ~ shows testing being done and the gathering of data. E.g. Testing which battery lasts longer
- **Artwork** (secondary ONLY) ~ includes drawings, paintings and sculptures. These submissions **MUST** be individual entries. E.g. 3D sculpture of a beating heart. For ALL formats, students' input must be seen.

Presently, there are FIVE (5) levels of participation. There are multiple categories within each division.

Level	Division	Category
K-3	Lower Primary	Earth Science Physical Science Mathematics Life Science Technology
4-6	Upper Primary	Earth Science Physical Science Mathematics Life Science Technology
7-9	Lower Secondary	Science Mathematics Technology Visual Arts
10-12	Upper Secondary	Agricultural Science Biology Chemistry Food & Nutrition Human & Social Biology Integrated Science Physics Technology Visual Arts
HLSCC Students	Tertiary/Observer	Open

The Performing Arts will be showcased during the opening and closing ceremonies. **Not towards the competition. This category includes and is not limited to:

- Music
- Theatre
- Dance
- Spoken Word / Poetry

CEREMONIES

The Opening Ceremony is scheduled for **Thursday, 14th March 2024** (9 am), while the Final Judging / Closing and Awards-Giving Ceremony is on **Friday, 15th March** (3:30 pm - 4:30 pm). All institutions will be represented at the Opening Ceremony and can participate in this non-grading exercise, showcasing students within the Performing Arts section.

The presentation of awards will take place during the Closing Ceremony, where the Minister for Education, Culture, Youth Affairs and Sports will present the awards to the winners. Ensure that participants are present during the closing so everything can be concluded smoothly.

Submissions of intent to participate in these ceremonies will be accepted by **Monday, 15th January 2024**. All participating schools are expected to be represented with a flag or banner during ceremony processions.

PROJECT SUBMISSION

****especially at the secondary level***

- Phase 1 (*All Students*) - The plan and design stage of the project should be completed by the end of this term. In this stage, the students do not have to complete the experiment but should submit the hypothesis, aim, materials/apparatus, method, and expected results. All students will be given an Advent project grade (rubric included), for work completed at this point. Modify the criteria for models and artwork if needed (but keep the exact total [30]). **Teacher can set deadlines for completing this phase – factor in the presentation time required.

- Phase 2 (*Selection of Students*) - A team of teachers (within your school) will meet at the end of this term to select the best projects to go forward to the Science Fair (only for Secondary schools). Only selected students will work towards completing their project for entry. Once the project has been selected, the consent form will be sent home for parents to sign (Form 1). **Feel free to add the school logo to the form.
    - An abstract will be submitted ONLY by the projects advancing to the finals. This is needed at least two weeks before the fair (so judges can prepare).

- Deadline Submission of ALL Entries: **February 5th, 2024**. See the attached registration form. Ensure the correct spelling of names is submitted.
- When schools register their projects, they will be assigned a project number. **See attached registration forms
- Set up will be at the Multipurpose Sports Complex, using the project number assigned at registration. Students will be granted permission to set up projects from the day before the opening ceremony.

PRIZES

- The 1st, 2nd, and 3rd place will be awarded for each category.
- Special prizes for top projects that are centred around water will be awarded.
- At the National Level - 1st, 2nd, and 3rd place awards for the best innovative project overall.

GUIDELINES FOR JUDGING

On the judging day, the Complex will be closed to the public from 8:30 am to 3:00 pm. The judges will interview the students responsible for the projects during this time. They will also determine if the students are familiar with the project and grade accordingly.

Oral Presentations

Only Grades K-3 students will be granted permission to present with the teacher present. Teachers for Grades 4-12 will **NOT** be allowed to be present during oral presentations. **See attached forms for grading criteria.

One student from each project is expected to make a 2-minute oral presentation with the other participants and judges. The presentation can be done with or without the aid of the project. **See attached forms for grading criteria.

If more clarity is needed, don't hesitate to get in touch with the Education Officer for Science & PE, Ms. Renee Weston at 547-7520 or renee.weston@vischools.edu.vg

GOVERNMENT OF THE VIRGIN ISLANDS
Ministry of Education, Youth Affairs and Sports

INDIVIDUAL/GROUP
SCIENCE FAIR CONSENT FORM

PLEASE RETURN YOUR FORM TO YOUR TEACHER

Students must submit a project as part of their project grade.
It is a Science class requirement.

Grade Level _____

Science Teacher _____

Student(s) Name _____

Project Title _____

Description

_____

_____

_____

_____

_____ I need an electrical outlet

(cut and return to me)

****

*All parents must sign and approve their child's Science Fair Project.

I acknowledge that I have received and reviewed the materials for the Science Fair and I am aware that my child is required to complete a Science Project. I have approved and given permission for my child _____ to participate in this year's Science Fair.

Student's Signature _____ Date _____

Parent's Signature _____ Date _____

Teacher's Approval of Project ☐ Please Conference with your Teacher about the Project. ☐

Teacher's Signature _____ Date _____

FORM 2

GOVERNMENT OF THE VIRGIN ISLANDS
Ministry of Education, Youth Affairs and Sports

ADVENT TERM 2023
INDIVIDUAL
SCIENCE FAIR GRADING RUBRIC

Students must submit 1st and 2nd drafts as part of their project grade.
It is a Science class requirement.
Secondary ONLY

Grade Level _____ Date _____

Student Name _____

Criteria	Total pts	Score
Submitted title/topic on time	1	
Submitted hypothesis & purpose on time	2	
Identified the variables	2	
Submitted their 1st draft of their procedure (stating all the materials needed) **	5	
Provided background information on topic with at least 3 sources cited	3	
Listed their bibliography accurately	2	
Stated real-life connections with the project	2	
Submitted their 2nd draft ***	5	
Presented designed plan to the class		
- Speaks clearly (volume and speed moderate)	2	
- Explains project well	2	
- Speech well developed (strong intro & ending)	2	
- Answers questions asked accurately & confidently	2	
	30	

***1st draft ~ must include title, purpose, hypothesis, materials, and proposed steps*
****2nd draft ~ must include corrections to 1st draft as well as bibliography & real connections*

GOVERNMENT OF THE VIRGIN ISLANDS
Ministry of Education, Youth Affairs and Sports

ENVISION THE SOLUTION: REIMAGINING SUSTAINABLE DEVELOPMENT THROUGH STEAM
SCIENCE FAIR REGISTRATION FORM
INDIVIDUAL/GROUP

SCHOOL _____

DATE

_____

PROJECTS [total number of Projects _____]

NAME OF PROJECT	CATEGORY (Science, Math etc.)	DIVISION (Primary Secondary Tertiary)	STUDENTS [Individuals or teams of three]

Special Requests

VERBAL PRESENTATIONS

Name of Student	Name of Project	Level and Division	Category

GOVERNMENT OF THE VIRGIN ISLANDS
Ministry of Education, Youth Affairs and Sports

ENVISION THE SOLUTION: REIMAGINING SUSTAINABLE DEVELOPMENT THROUGH STEAM
SCIENCE FAIR JUDGING SHEET

FOR EXPERIMENTS

PROJECT		**CATEGORY**
LEVEL	Lower Primary _ ___ Upper Primary ___ Lower Secondary ___ Upper Secondary ___	

[Circle appropriate no.]
MIN MAX

A. **RELEVANCE TO THE THEME** (5 pts total)

A1. How well does the project reflect the theme 1 2 3 4 5

Theme Total

B. **SCIENTIFIC THOUGHT & APPLICATION OF PRINCIPLES & SKILLS** (30 pts total)

B1. Project is well designed, includes all sections 1 2 3 4 5
B2. Scientific procedures are appropriate and organized – purpose tested 1 2 3 4 5
B3. Project exhibits good representation of data 1 2 3 4 5
B4. Project exhibits good analysis of data 1 2 3 4 5
B5. Logical conclusion – hypothesis proved/disproved & real-life connection 1 2 3 4 5
B6. Explains how project can be improved 1 2 3 4 5

Scientific Principles Total

Definitions/Explanation
B1. Project follows scientific methodology, includes all required sections (Introduction/Problem,
Methods/Procedures, Results, Discussion/Conclusion), testable hypothesis, well thought out design (in terms of controls, variables, trials)
B2. Methods/procedures are clear, logically ordered, complete, can be repeated, can test hypothesis
B3. The layout of tables/figures is well thought out and data are easy to describe/understand, table/figure is appropriately labelled (axes, units, etc.), Table/Figure is self-explanatory (can stand alone)

B4: Data are discussed/analyzed with justification, trends included, scientific principle(s) applied.
B5. Conclusion is logical and based on the proposed hypothesis (statement to accept/reject hypothesis), and the overall purpose of the project has a connection to real life (addressed/aimed to solve/understand a specific real-life scenario, etc.)
B6. Explanations of improvements well thought out and plausible

C. **COMMUNICATION** (20 pts total)

C1. Responds accurately to questions	1 2 3 4 5
C2. Answers clearly & thoroughly	1 2 3 4 5
C3. Demonstrates understanding of project	1 2 3 4 5
C4. Presents project well orally	1 2 3 4 5

Communication Total	

Definitions/Explanation
C1: Provides accurate responses regarding the scientific principles of the project and the process of completing the project
C2: Well-articulated and audible, adequate details regarding project are provided
C3: There is a clear understanding of the project purpose, the design, how the project was carried out, and what the results indicate/conclude
C4: Speaks grammatically correct English with moderate pace, maintains eye contact, good rapport with audience, confident, enthusiastic throughout, minimal vocal pauses (umms, ah, ok, etc.)

D. **ORIGINALITY/CREATIVITY** (10 pts total)

D1. The topic is innovative/creative	1 2 3 4 5
D2. Shows resourceful use of equipment	1 2 3 4 5

Originality/Creativity Total	

Definitions/Explanation
D1. Introduces new ideas, methods, technique, original
D2. Careful and thoughtful choice in materials/equipment/apparatus used in the design and the implementation of the project

E. **DISPLAY** (20 pts total)

E1. The project is neat and captures attention	1 2 3 4 5
E2. Easy to follow – sequenced logically & legible	1 2 3 4 5
E3. Overall construction of display	1 2 3 4 5
E4. Accurate grammar & spelling	1 2 3 4 5

Display Total	

Definitions/Explanation
E1. Project is well put together, not messy, eye-catching, piques curiosity of audience
E2. Sequenced logically, written information is large enough/legible (appropriate font and size)
E3. The overall layout of key sections is well displayed
E4. Proper use of English grammar and correct spelling

TOTAL PROJECT POINTS	

JUDGES' COMMENTS (Relate comments directly to observations made while judging the above categories (Scientific thought & application of principles & skills, Communication, Originality/Creativity, Display)

List of good aspects of the project: (What we liked about the project)
Suggestions to improve the project:

SIGNATURE OF JUDGE _____ DATE _____

ENVISION THE SOLUTION: REIMAGINING SUSTAINABLE DEVELOPMENT THROUGH STEAM
SCIENCE FAIR JUDGING SHEET
FOR MODELS

PROJECT		**CATEGORY**
LEVEL	Lower Primary ___ Upper Primary ___ Lower Secondary ___ Upper Secondary ___	

[Circle appropriate no.]
MIN MAX

A. **RELEVANCE TO THE THEME** (5 pts total)

A1. How well does the project reflect the theme 1 2 3 4 5

Theme Total

B. **SCIENTIFIC THOUGHT & APPLICATION OF PRINCIPLES & SKILLS** (25 pts total)

B1. Project is well designed 1 2 3 4 5
B2. Scientific use / Application of purpose 1 2 3 4 5
B3. Level of complexity 1 2 3 4 5
B4. Explains how project can be improved 1 2 3 4 5
B5. Model is clearly presented in detail (realism) 1 2 3 4 5

Definitions/Explanations
B1. The overall design of the model is well thought out and representative of the scientific principle or application.
B2. The model accurately demonstrates the scientific thought/application of principles & skills it is designed to illustrate
B3: The model demonstrates complex thought relative to scientific understanding and application
B4: Explanation of improvements are well thought out and plausible
B5: The details of the model provide a realistic perspective of the intended design

Scientific Principles Total

C. **COMMUNICATION** (20 pts total)

C1. Responds accurately to questions 1 2 3 4 5
C2. Answers clearly & thoroughly 1 2 3 4 5
C3. Demonstrates understanding of project 1 2 3 4 5
C4. Presents project well orally 1 2 3 4 5

Definitions/Explanation
C1: Provides accurate responses regarding the scientific principles of the project and the

process of completing the project
C2: Well-articulated and audible, adequate details regarding project are provided
C3: There is a clear understanding of the project purpose, the design, how the project was carried out, and what the results indicate/conclude
C4: Speaks grammatically correct English with moderate pace, maintains eye contact, good rapport with audience, confident, enthusiastic throughout, minimal vocal pauses (umms, ah, ok, etc.)

Communication Total	

D. **ORIGINALITY/CREATIVITY** (15 pts total)

D1. The project is innovative	1 2 3 4 5
D2. Shows resourceful use of materials	1 2 3 4 5
D3. Shows creativity in the overall design (functionality)	1 2 3 4 5

Definitions
D1. Introduces new ideas, methods, technique, original, and creative with design (thinking outside the box?)
D2. The materials selected are appropriate and carefully incorporated into the design
D3. Project is creative in design to allow for functionality of the model (Design choices serve their purposes in the model). The design elements of the model allow for functionality (model serves its purpose)

Originality/Creativity Total	

E. **DISPLAY** (15 pts total)

E1. The project is neat and captures attention	1 2 3 4 5
E2. Sturdy – carefully and solidly assembled	1 2 3 4 5
E3. Scale – pieces are designed in the correct scale & proportion	1 2 3 4 5

Display Total	

Definitions-
E1. Model is not messy, welcoming/attractive, piques curiosity of audience, careful craftsmanship (no dangling/hanging parts)
E2- I believe these are self explanatory Model is sturdy, does not look like it will fall apart or over, well-constructed
E3- I believe these are self explanatory Model is built to scale and true to what it depicts (replica of the actual concept /system/etc.

TOTAL PROJECT POINTS	

JUDGES' COMMENTS (Relate comments directly to observations made while judging the above categories (Scientific thought & application of principles & skills, Communication, Originality/Creativity, Display)

List of good aspects of the project: (What we liked about the project)
Suggestions to improve the project:

_____ _____

SIGNATURE OF JUDGE DATE

ENVISION THE SOLUTION: REIMAGINING SUSTAINABLE DEVELOPMENT THROUGH STEAM

VISUAL ARTS

PROJECT		**CATEGORY**
LEVEL	Drawing _ ___ Painting ___ Sculpture ___	
	Lower Secondary ___ Upper Secondary ___	

[Circle appropriate no.]
MIN MAX

A. **RELEVANCE TO THE THEME** (5 pts total)

A1. How well does the project reflect the theme 1 2 3 4 5

Theme Total

B. **PREPARATORY WORK** (10 pts total)

B1. Development of Concept 1 2 3 4 5
B2. Development of Design 1 2 3 4 5

Preparatory Work Total

C. **CRAFTSPERSONSHIP** (25 pts total)

C1. Appropriateness of material or relevance to theme or task

1 2 3 4 5 6 7 8 9 10

C2. Level of skill in manipulation of materials or media

1 2 3 4 5 6 7 8 9 10

C3. Experimentation 1 2 3 4 5

Craftespersonship Total

D. **DESIGN AND COMPOSITION** (15 pts total)

D1. Manipulation of design element (line, texture, color, shape, mass, space).
1 2 3 4 5

D2. Manipulation of principles (balance, contrast, unity and aesthetic appeal)
1 2 3 4 5

D3. Functionality (decorative or utilitarian) 1 2 3 4 5

Design & Composition Total	

E. **COMMUNICATION** (15 pts total)

E1. Responds accurately to questions 1 2 3 4 5
E2. Responses are clear & thorough 1 2 3 4 5
E3. Demonstrates understanding of project 1 2 3 4 5

Communication Total	

F. **ORIGINALITY / DISPLAY** (20 pts total)

F1. Conceptualisation 1 2 3
F2. Level of personal interpretation 1 2 3 4 5
F3. The project is aesthetically pleasing to the eyes 1 2 3 4 5
F4. Proportion – pieces are designed in the correct size and proportion 1 2 3 4 5
F5. Neat and carefully assembled 1 2

Display Total	

TOTAL PROJECT POINTS	

JUDGES' COMMENTS (Relate comments directly to observations made while judging the above categories (Scientific thought & application of principles & skills, Communication, Originality/Creativity, Display)

List of good aspects of the project: (What we liked about the project)

Suggestions to improve the project:

_____ _____

SIGNATURE OF JUDGE DATE

FORM 7

GOVERNMENT OF THE VIRGIN ISLANDS
Ministry of Education, Youth Affairs and Sports

ENVISION THE SOLUTION: REIMAGINING SUSTAINABLE DEVELOPMENT THROUGH STEAM
SCIENCE FAIR JUDGING SHEET
ORAL PRESENTATIONS

PROJECT	**DIVISION** (check one)	**CATEGORY**
	Junior Senior	

	[Circle appropriate no.] MIN MAX
A1. Shows evidence of background reading	1 2 3 4 5
A2. Explains accurate information	1 2 3 4 5
A3. English used properly	1 2 3 4 5
A4. Voice well controlled	1 2 3 4 5
A5. Speaks clearly & at moderate pace	1 2 3 4 5
A6. Maintains eye contact	1 2 3 4 5
A7. Speech well developed - strong intro & closure	1 2 3 4 5
A8. Confident in presenting	1 2 3 4 5
A9. Rapport with audience	1 2
A10. Use of Wit / Humour	1 2
A11. Conformed with time limit	1 2 3

TOTAL PROJECT POINTS	

SPECIAL COMMENTS OR CLARIFYING STATEMENTS

SIGNATURE OF JUDGE _____ DATE _____

FORM 8

GOVERNMENT OF THE VIRGIN ISLANDS
Ministry of Education, Youth Affairs and Sports

ENVISION THE SOLUTION: REIMAGINING SUSTAINABLE DEVELOPMENT THROUGH STEAM
SCIENCE FAIR JUDGING SHEET
JUDGES' COMMENT

To be returned to students and teachers after the fair.

Project Title: _____

School: _____

Level: _____

Category: _____

List of good aspects of the project:

_____

_____

_____

_____

_____

_____

_____

_____

List of ways to improve project:

_____

_____

_____

_____

_____