ST. EDWARD EPIPHANY SCHOOL PRESENTS

THE DIOCESE OF RICHMOND SCIENCE FAIR

A science and innovation fair for and by students in grades 3rd through 8th

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MARCH 20, 2023
ST. EDWARD ACTIVITY CENTER, RICHMOND, VA

DIOCESAN SCIENCE FAIR RULES

- There will be three levels of competitions. (3rd/4th Grades), (5th/ 6th Grades), (7th/8th Grades)
- Projects must be constructed by the students entering them. Teachers, other professionals, and technically trained people may only act as advisors.
- Students may enter an Individual Project or a Team Project.
- TEAM PROJECT: A team may consist of up to three members within the age/grade division.
    - Team projects must adhere to all of the same rules as individual projects. The final work should reflect the coordinated efforts of all team members and will be evaluated using the same rules and judging criteria as in the other categories.
- Projects must be self-supporting and constructed durably. Maximum size of Project is: 30 inches (76 centimeters) deep - 48 inches (122 centimeters) wide - 108 inches (274 centimeters) high (from floor to top of project)
- Each participant must supply his own Underwriter's Laboratory Approved electrical cords, extension cords, and all other equipment/supplies needed to display, present, and describe projects.
- NO TOXIC CHEMICALS OF ANY KIND may be used in the project display. No dangerous or flammable chemicals including caustics and acids may be used in a project display. No open or concealed flames will be allowed. Inert substitutes may be used in place of disallowed solid substances.
- Every student who exhibits a project in the Diocesan Science Fair must be present and remain with their project until dismissed by the Director. Small chairs and books, electronic devices, headsets/earbuds, etc., are allowed for the student's comfort and entertainment during the judging. Snacks and water are allowed.
- No one will be allowed in the judging area during the actual judging except the exhibitors. One adult representative from each school must remain on campus to be available in case of an emergency.
- A student may enter only one project (either an individual project or as a team participant) and this project may be entered in only one category.
- All projects MUST include a scientific notebook containing all data to include a bibliography and a copy of the rules.

Registration Dates and Information

By October 15, 2022	All students will need to register online using the Google Form that will be sent to your school. You do not need to know the specifics of your projects at this time, but we do need an accurate count of participants.
By December 2, 2022	Student Project Information Sheet Must be Completed and Submitted
March 20, 2023	Diocese of Richmond Science Fair

Diocese of Richmond Science Fair
presented by:
St. Edward-Epiphany Catholic School

March 20, 2023

St. Edward-Epiphany School
Campus Activity Center
10701 W. Huguenot Road
Richmond, VA 23236

Schedule of Events
Projects may be set up in their assigned areas between 8:30 – 9:30AM only after Sponsor or School Representative has registered and retrieved packets

8:30 – 9:00 AM
Registration – Sponsors or School Representatives ONLY
(for registration and the retrieval of packets)
Parents arriving early MUST wait for Sponsor/School Representative to pick up packet and/or set up projects. No exceptions.

9:00 – 9:30 AM
Judges' Meeting

9:30 AM
Welcome and Announcements

9:45AM
All students report to projects

10:00AM – 12:00PM
Judging
Only contestants and judges in activity center and adjoining areas.
Contestants MUST remain at their projects during judging.

12:00 – 1:00PM
LUNCH on your own

1:00 – 2:30PM
Students Report back to projects. Venue is open for the public to view projects.

2:30PM
Awards Ceremony
Projects dismantled & removed after awards ceremony

STUDENT PROJECT INFORMATION SHEET

EMAIL COMPLETED FORM TO: THAMNER@SEESCHOOL.COM- Due by Friday, December 2, 2022

School Name _____

Individual Project: Student's Name _____ Grade_____

Team Project Students' Names:

Name/Grade: Name/Grade: _____ _____

Name/Grade: Name/Grade: _____ _____

Name/Grade: Name/Grade: _____ _____

DIVISION (Check one) CATEGORY (check one)

_____ Elementary (Grades 3-4) _____ Junior (Grades 5-6) _____ Senior (Grades 7-8)

CATEGORY (check one)

_____ Behavioral & Social Science
_____ Biology & Biochemistry
_____ Chemistry
_____ Earth & Environmental Science
_____ Physical Science
_____ Engineering: Civil & Environmental
_____ Engineering: Electrical & Computer Science
_____ Engineering: Mechanical

TITLE OF PROJECT: (Required) _____

STATEMENT OF PURPOSE: State the purpose of the project in the form of a question. (Required)

_____
_____
_____

Does this project require an electrical outlet? _____Yes _____ NO

- I have read and understand the rules and general information concerning the Diocesan Science Fair.
- I further certify that this exhibit was produced by the student named above and that the information supplied herein is correct.

_____ Teacher/Advisor's Signature Teacher

_____ Student's signature(s) Parent Signature

Teachers/Sponsors are required to supply a copy of the rules to each participating student and his/her parent.

Category Descriptions for the Diocese of Richmond Science Fair

Behavioral & Social Science

Science or study of the thought processes and behavior of humans and other animals in their interactions with the environment studied through observational and experimental methods.

Biology & Biochemistry

Studies the structure, function, intracellular pathways, and formation of cells. Studies involve understanding life and cellular processes specifically at the molecular level. Study of microorganisms, including bacteria, viruses, fungi, prokaryotes, and simple eukaryotes. Study of chemical basis of processes occurring in living organisms, including the processes by which these substances enter into, or are formed in, the organisms and react with each other and the environment.

Chemistry

Studies exploring the science of the composition, structure, properties, and reactions of matter not involving biochemical systems.

Earth & Environmental Sciences

Studies of the environment and its effect on organisms/systems, including investigations of biological processes such as growth and life span, as well as studies of Earth systems and their evolution. Includes atmospheric science, climate science and environmental effects on ecosystems, geosciences, and water science.

Physical Science

Studies involving biological and chemical processes of renewable energy sources, clean transport, and alternative fuels. Studies of renewable energy structures/processes including energy production and efficiency. Includes alternative fuels, computational energy science, fossil fuel energy, fuel cells and battery development, microbial fuel cells, hydro power, nuclear power, solar power, sustainable design, thermal power, wind.

Engineering: Civil & Environmental

Studies that focus on science and engineering involving structure. Includes the planning, designing, construction, and maintenance of structures and public works, such as bridges or dams, roads, water supply, sewer, flood control, and traffic. Studies that engineer or develop processes and infrastructure to solve environmental problems in the supply of water, the disposal of waste, or the control of pollution.

Engineering: Electrical & Computer Science

Studies involving the technology of electricity, especially the design and application of circuitry and equipment for power generation and distribution, machine control, and communications. Studies involving algorithms and databases, software and hardware development, computer simulations, and computer graphics.

Engineering: Mechanical

Studies that focus on science and engineering involving movement. The movement can be by the apparatus or the movement can affect the apparatus. Includes aerospace and aeronautical engineering, computational mechanics, control theory, ground vehicle systems, industrial engineering-processing, mechanical engineering, naval systems.

Judging Criteria

Pts.	Evaluation Criteria	Excellent 17-20 points	Good 13-16 points	Fair 9-12 points	Poor 0-8 points
20 score	**Science Project:** • Objectives	-- Clearly stated & well-written -- Appropriate for grade level & original -- Creative approach to problem solving	--Lacking in **1** area: clarity, appropriate level, or creativity	--Lacking in **2** areas: clarity, appropriate level, and/or creativity	--Poorly conceived or lacking in all **3** areas
	• Hypothesis *(question)*	I. Testable, clear, bounded hypothesis	I. Hypothesis present, but not completely testable	I. Hypothesis incomplete or not testable	I. Hypothesis **missing** or poorly defined
	• Use of Resources* **jr/sr projects only*	– A comprehensive, correctly formatted bibliography was included & footnotes are present in text and display – Student(s) used full resources available (e.g. labs, advisors, experts, scientific periodicals & texts, internet)	– Incomplete citations – Used **most** available resources – **Most** internet resources are scientific & reputable	– **Minimal** effort on citing sources – Used **some** available resources – **Some** internet resources are scientific & reputable	– **No** sources or citations – Project suffered as a result of **not** using available resources – Internet resources are **not** scientific or reputable
	Engineering Project: • Problem Statement *(design criteria)*	A. Clear, original problem statement that meets potential users' needs B. Clearly defined design criteria and goals	A. Statement is **not** original B. Goals/criteria are measurable but **vague**	A. **Incomplete** statement B. Goals/criteria are **poorly defined**/not measurable	A. Statement **missing** or poorly defined B. Goals/criteria **missing**
20 score	**Science Project:** • Design & Procedures *Experimental design & implementation (hypothesis testing)*	I. Exemplary, creative plan to support / refute hypothesis with valid testing II. Sequential experimental procedures are quantitatively and/or qualitatively listed, and connect hypothesis, data & results III. Procedures are logical and repeatable IV. Sample sizes, number of trials are sufficient. Valid control group. V. All other variables are carefully controlled	I. Sufficient plan to support / refute hypothesis with all other criteria met, **or** II. Exemplary plan and **3** of **4** other criteria for excellence met, **or** III. **Some** improvements needed throughout	I. Sufficient plan with **3** of **4** other criteria for excellence met, **or** II. Exemplary plan and **2** of **4** other criteria for excellence met, **or** III. **Major** improvements needed throughout	I. Sufficient plan with **1-2** of **4** other criteria for excellence met, **or** II. Plan information is unclear / missing / insufficient, **or** III. Criteria II-V are **lacking** or grossly defficient
	Engineering Project: • Engineering process *(design & prototype)*	A. Design goals & approach clearly stated & reproducible, alternatives considered B. Design creative, schematics / software provided (as applicable), well labeled C. Assembly details or set-up instructions for device are clearly laid out D. Photos provided or prototype on display E. Materials used in appropriate ways	A. **3-4** of 5 criteria required for excellence are met **or** B. **Some** improvements could be made	A. **1-2** of 5 criteria required for excellence are met **or** B. Existing information is **incomplete**, or needs **major** improvement	A. Description of design & implementation not included or **inadequate** to show how design works and/or if design meets requirements B. No engineering. Project was merely **tinkering.**
20 score	**Science Project:** • Data & Results *(experimentation)*	I. Experiments run are appropriate for hypothesis being tested II. Sufficient data. Repetition of experiments III. Correct & appropriate statistical tests run	I. **2** of the **3** criteria for excellence met II. **Some** improvements could be made	I. **1** of the **3** criteria for excellence met II. **Major** improvements required	I. **Incorrect** experiments and data analysis for hypothesis II. **Insufficient** data
	• Documentation* *(notebook)* **jr/sr projects only*	– Clearly written, complete and clear – Procedures are easy to follow – Comments, observations included – Records include dates, signatures	– **3** of **4** standards for excellence were met **or** – **Some** improvements could be made	– **2** of **4** standards for excellence were met **or** – **Major** improvements required	– **1** of the standards for excellence were met **or** – No notebook or **missing**
	Engineering Project: • Problem Solution *(testing and redesign)*	A. Measures of performance/improvement have been made (including cost) B. Functionality is fully tested & validated C. Records on testing are included D. Prototype was redesigned or potential design improvements were identified	A. Final design **works** but has not been fully tested B. **No advantage** over original C. **Some** improvements could be made	A. Final design does **not** meet end user's needs B. **No improvement** over original C. **Major** improvements required	A. Little or **no** testing B. **No** records C. **No** redesigns
20 score	**Science Project:** • Discussion & Conclusions	I. Status of the hypothesis is correctly and logically addressed, and stated in an unbiased manner (confirmed / refuted) II. Completeness of work and validity of conclusions are substantiated III. Discussion is insightful, demonstrates clear understanding of research project, broader subject & suggested new work	I. **2** of **3** criteria for excellence met, **or** II. **Some** improvements could be made	I. **1** of **3** criteria for excellence met **or** II. Overall information is **lacking** in quality and perspective	I. **No** discussion / conclusions provided
	Engineering Project: • Evaluation	A. Significance, relevance, applications, utility, cost effectiveness, improvements, benefits and performance addressed	A. **Some** evaluation areas not addressed	A. **Many** evaluation areas not addressed	A. **No** evaluation areas addressed
20 score	**Science+Engineering:** • Interview	Exemplary understanding… – Research findings / design results – Ability to interpret graphs, statistics, etc... – Related background information – Project rational, details & validity	**Good** understanding... – Research findings – Ability to interpret graphs, statistics, etc. – Related background information	**Fair** understanding… – Research findings – Ability to interpret graphs, statistics, etc… – Related background information	**Poor** understanding… – Cannot answer questions adequately and precisely – Does not incorporate display into interview – Unfamiliar with related background information
	• Display	Exemplary display… -- Creativity, clarity, logic, interpretability, construction, writing, graphics, grammar -- All information directly relates to project	**Good** display -- Most information is appropriate, organized and easily accessible.	**Fair** display … -- Some information is appropriate, organized and easily accessible.	**Poor** display… -- Confusing, unorganized, incorrect or inappropriate information

Scoring Guidelines

You should rely on the judging scorecard to provide a framework for consistent scoring. Also, please make sure you've carefully evaluated the expectations chart above so you are able to base your scoring on what is age-appropriate.

General Scoring:

- The project should demonstrate the use and understanding of the scientific method. While the neatness and organization of the display is important and scored separately, using the scientific method is most important.
- The project should focus on experimentation, not just library research or gadgetry.
- The quality of the student's work is what matters, not the amount of work.
- Do not count it against the student if he or she ended up disproving the objective or hypothesis. Though it might technically be a negative result, the project and process the student went through could still be considered a success.
- State-of-the-art lab equipment does not guarantee the students' understanding of the experiment.

High Scores Should Go to the Following:

- A project that demonstrates the student's full understanding. A simple project that the student understands should receive a higher score than a more sophisticated project that the student does not understand.
- Scientific advances
- Innovative experimental procedures and/or lab equipment that go above and beyond the original experiment and what is expected for the grade level
- An understanding of concepts above and beyond what their resources might typically have allowed them to discover
- Correctly interpreted data
- Repeated trials to verify results
- Analytical techniques to predict and/or reduce the number of trials required, based on the prediction
- The student's display of the entire experiment and the results

Low Scores Should Go to the Following:

- Apparent lack of research; many resources were readily available to the students throughout the project
- Superfluous lab equipment or displays that do not relate to the experiment or were not aids in collecting data
- Poor understanding of terminology and equipment
- A failure to collect data that relates to the scientific question posed
- Results that are derived from another source (such as literature) and not from student experimentation

(Scoring Guidelines adapted from the University of Southern California's California State Science Fair website: http://www.usc.edu/CSSF/Judges/GoodJudge.html. Accessed: February 8, 2008.)

First Steps to Create a Project

HOW TO CREATE a SCIENCE FAIR PROJECT

Brainstorm Some Ideas!

1.

2.

3.

Research your ideas! This can be done at home. Start a 'science fair notebook' and make notes in it. You may want to bring this notebook to the science fair later, to show visitors and judges.

Choose one idea: After researching all your ideas, choose one that is most interesting for you and write it here:

Create a hypothesis: A hypothesis is a tentative, testable answer to a scientific question. Some call it 'an educated guess' as to what your experiment will reveal. Most hypotheses are written as "if...then" statements. For example someone performing experiments on plant growth might write this hypothesis: "**If** I give a plant an unlimited amount of sunlight, **then** the plant will grow to its largest possible size." Write your hypothesis here:

Design a possible experiment for your chosen idea

Describe your experiment:

HOW TO CREATE a SCIENCE FAIR PROJECT

What question will this experiment answer?

Before doing your experiment....

What materials will you need?

-
-
-
-

-
-
-
-

Make a drawing/diagram of how you will set up your experiment:

When you are ready:

Run your experiment.

Record data from your experiment. Use your notebook to write notes, observations and data!

Write your conclusion. Summarize your experiment results in a few sentences and state how these results either support or contradict your hypothesis. You can include key facts from your background research to help explain your results. Search online for examples!