

Science Day

District 14 Science Day 2017-18

Procedures & Requirements

University of Rio Grande
Lyne Center
Rio Grande, Ohio

March 25, 2017




District 14 Science Day

- Information, instructions and forms are available at www.rio.edu/scienceday
- **Who is eligible to compete?**
 - You must be a student, grade 5-12, attending public school, private school, or home school, and residing in Adams, Gallia, Lawrence, Pike or Scioto Counties.
- **How do I register for District 14 Science Day?**
 - Information and registration forms for may be found on www.rio.edu/scienceday



Student Orientation

- Includes explanation of benefits of completing a science day project-original student research.
 - It is recommended that students complete research projects individually.
 - Some students may choose to form teams of two or three students if the difficulty of the project shows this need.
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Topic Selection and Background Research

- There are 13 project topic categories and many subcategories. The complete list is available at www.rio.edu/scienceday. They include botany, zoology, medicine & health, chemistry, physics, engineering, environmental science, and more...



Topic Selection and Background Research

- Students should begin with a broad area of interest and narrow content following background research of the topic.
 - Topic area should be of personal interest to the student, or the project may be designed to answer a specific question that has impacted the student or the student's family.
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Topic Selection and Background Research

- Teachers should schedule a meeting to review student progress and answer questions
- Students should have a general topic selected and have listed sources for obtaining background information on that topic.
- If a student is having trouble selecting topic or finding sources of information, the teacher may assist, and/or refer the student to the website for ideas.
- If a student still is unsure how to proceed, they may contact the District 14 Contacts from the website. Would be happy to offer suggestions.




Research Plan

- After the student has narrowed the scope of the project topic and gathered sufficient background information on the topic, student should begin writing a Research Plan. Additional background research may be necessary as the project progresses.
 - The Research Plan should be 3-5 pages, double-spaced, in a Word document for electronic submission.
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Research Plan

- The Research Plan must include student's name(s), school, grade.
 - A working title – which may be changed as the project takes a more specific form.
 - A statement of the problem or question to be answered – a paragraph.
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Research Plan

- Include background research/information relevant to the problem or question. This might include statements or findings from previously published research and/or pertinent facts and figures from reliable sources – two or three pages.
- Student should provide a summary of the proposed project including what the student hopes to demonstrate – related to stated problem/question, a general idea of the procedure and the expected results based of student's research so far.
- Include a Hypothesis – A good hypothesis answers the question and provides a reason why.
- Engineering design projects do not require a hypothesis.




Research Plan

- Bibliography – All statement, facts, tables, and other quoted or copied information from any source must be correctly cited in your paper and included in your bibliography. Information regarding plagiarism is included on the website.
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Research Plan

- The teacher should schedule a meeting to review student progress and answer questions.
 - Students should have submitted their research plan, have any questions ready, and be prepared to answer general questions about their proposed project.
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Research Plan

- The teacher should review each research plan to be sure all of the required parts are included, before forwarding to the Local Scientific Review Committee (SRC).
- Local SRC should determine if the project is permitted as submitted or if it requires any revisions.
- A preliminary okay by Local SRC does not authorize the students to begin their experiment. There are additional steps.




Research Plan

- The teacher should advise each student if the project may proceed or requires modification, based on Local SRC comments.
 - All research notes, articles, photos, or other collected documents related to the project should be kept in a journal or binder along with a complete copy of the approved research plan.
 - The next step is to design the experiment.
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Design the Experiment

- ▶ Hypothesis based experiments – Students must design the experiment based on the best scientific practices.
 - ▶ A good experiment tests the relationship between an independent variable – the change the student can control – and a dependent variable – a possible change student does not control.
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Design the Experiment

- All other variables must be identified and be either controlled or eliminated – kept consistent throughout the experiment for all tests, or the result may not represent the actual relationship between the independent and dependent variables being tested.
 - More information about variable and test controls may be found on the website.
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Design the Experiment

- Students must develop a step-by-step procedure for their experiment. It should be written with enough detail that others could follow the instructions and complete the same experiment.
 - Students must include a list of materials and equipment to be used in the experiment.
 - Students must identify any potential hazardous material and/or procedures and state how safety will be addressed.
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Engineering Design

- Engineering Design Projects – Students just design a prototype which addresses an identified problem or need. This may require several sequential versions as student tests and modifies the prototype to improve function or performance.
 - Students must include a list of materials and equipment to be used in the design process.
 - Students must identify any potential hazardous materials and/or procedures, and state how safety will be addressed.
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The Experiment

- If possible, the teacher may consider scheduling a Peer Review where student may present the proposed project to classmates. Questions and comments may help students to identify problems to be corrected or provide ideas for improvements.
 - Students could also present the project to others outside of school and gain the same benefits.
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The Experiment

- Students should resubmit to the Local SRC their initial research plan with any recommended modifications, and with the step-by step procedure or engineering design plans, and the materials/equipment list included.
 - Students should also complete and submit required ISEF Forms 1, 1A, 1B at this time.
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Project Forms

- ▶ All projects require completed ISEF Forms 1, 1A, 1B with requested signatures. All signatures must be dated prior to the start date for the experiment – data collection.
- ▶ Forms should be completed on a computer – forms are available as a fillable pdf. Print and obtain required signatures. Submit signed forms to teacher who will review. Keep forms in binder along with a copy of approved research plan.
- ▶ Form 1: Checklist for Adult Sponsor
- ▶ Form 1A: Student Checklist
- ▶ Form 1B: Approval Form



Project Forms

- All projects require completed ISEF Forms 1, 1A, 1B with requested signatures.
- Form 1A: Checklist for Adult Sponsor
 - Adult Sponsor may be a parent, teacher, or mentor.
 - Whoever will be working most with the student. Boxes 1, 2, 3, and all appropriate boxes under 5 should be checked.
 - Only check boxes under 4 & 6 if those items apply to this project.
 - Follow instruction regarding additional forms for each box checked under 4 & 6.
 - Fill in adult sponsor information.



Project Forms

- All projects require completed ISEF Forms 1, 1A, 1B with requested signatures.
- Form 1A: Student Checklist
 - Complete all information, items 1-4.
 - Item 5, check “No”, unless project is continued from last year.
 - Item 6, the start date refers to when you plan to begin data collection – the actual experiment.
 - End date is when you plan to stop collecting data – these dates may change due to circumstances not planned for.
 - Complete items 7 & 8.




Project Forms

- All projects require completed ISEF Forms 1, 1A, 1B
- Form 1B: Approval Form
 - Complete all spaces in Part 1.
 - Do not write in Part 2 or Part 2 boxes.



Additional Project Forms

- All projects require completed ISEF Forms 1, 1A, 1B
 - Some projects will require additional ISEF Forms to be completed and submitted in order for the project to be approved.
 - Projects which involve human participants, vertebrate animals, micro-organisms, tissues, or hazardous chemicals, activities, or devices may require additional forms.
 - If a student is unsure which forms are required for their project, ask the Local SRC or the District 14 contacts for recommendations.
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Additional Project Forms

- ▶ All projects require completed ISEF Forms 1, 1A, 1B. Must be completed before experimentation.
- ▶ Additional Forms which may be required:
 - ▶ Form 1C Regulated Research Institutional or Industrial Setting
 - ▶ Form 2 Qualified Scientist
 - ▶ Form 3 Risk Assessment
 - ▶ Form 4 Human Participants
 - ▶ Human Informed Consent Form
 - ▶ Form 5A Vertebrate Animal
 - ▶ Form 5B Vertebrate Animal—Regulated Research Institution
 - ▶ Form 6A Potentially Hazardous Biological Agents Risk Assessment
 - ▶ Form 6B Human & Vertebrate Animal Tissue
 - ▶ Form 7 Continuation of Project



Additional Project Forms

- Form 1C Regulated Research Institutional or Industrial Setting.
- This form only used if data collection occurs in a regulated laboratory or an industrial setting.
- It is the only form to be completed AFTER the experiment is completed.
- The Local SRC should advise student if this form is required after review of Research Plan.




Additional Project Forms

- ▶ Form 2 Qualified Scientist
- ▶ This person should be extremely knowledgeable of the topic area, the experimental procedures to be used, and best safety practices involving the project.
- ▶ May be required for research involving:
 - ▶ Human Participants
 - ▶ Vertebrate Animals
 - ▶ Potentially Hazardous Biological Agents
 - ▶ DEA-Controlled Substances
- ▶ The Local SRC should advise student if this form is required after review of Research Plan. Must be completed before experimentation.



Additional Project Forms

- Form 3 Risk Assessment
 - Required for projects using hazardous chemicals, activities, or devices and microorganisms.
 - Designated Supervisor (or Qualified Scientist) must be complete signature box of this form.
 - The Local SRC should advise student if this form is required after review of Research Plan. Must be completed before experimentation.
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Additional Project Forms

- Form 4 Human Participants
- Required for all research involving human participants (data not collected at a Regulated Research Institution).
- Complete top box form only.
- Bottom box to be completed by Institutional Review Board (IRB).
- Student must submit form (4) along with completed Research Plan and other required ISEF Form.
- The Local SRC will advise student if this form is required after review of Research Plan. Must be completed before examination.




Additional Project Forms

- Form 4 Human Participants
- Many student proposed projects involving human participants will not be permitted due to restrictions involving privacy laws and safety issues for participants and student researchers.
- Read all of the Human Participant restrictions found in the ISEF Rules & Guidelines.
- Most projects involving Human Participants also require a Human Informed Consent Form.
- Students should involve a mentor and/or appropriate health professional in planning their project.



Additional Project Forms

- ▶ Form 4 Human Participants
 - ▶ Students should be advised early in the process to avoid projects involving Human Participants, unless they understand what is required and are willing to complete ALL the paperwork involved.
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Additional Project Forms

- Human Informed Consent Form
- An informed consent/assent/permission form should be developed in consultation with the Adult Sponsor, Designated Supervisor or Qualified Scientist.
- Not every Human Participant project requires an informed consent form, but almost all will. If required, then every participant must sign a copy.
- Minors will require parental signatures in most cases.



Additional Project Forms

- Human Informed Consent Form
 - Consent Form must include information specific to the project, including purpose, requirements or participants, time required, potential risks, if any, potential benefits to participants, if any, and how confidentiality will be maintained.
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Additional Project Forms

- Form 5A Vertebrate Animals
- Required for all research involving vertebrate animals that is conducted in a school/home/field research site.
- Student should complete Items 1-5 as they apply to the project. Be thorough in providing the requested information.
- The Local SRC should review the Research Plan and advise if a Veterinarian, or Designated Supervisor, or both are required.
- If so, those individuals will need to complete the appropriate boxes at the bottom of the form.



Additional Project Forms

- Form 5B Vertebrate Animals
 - Required for all research involving vertebrate animals that is conducted at a Regulated Research Institution.
 - The Local SRC should review Research Plan and advise if this form is required.
 - If this form is required, a Qualified Scientist will need to complete the appropriate information, not the student.
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Additional Project Forms

- Form 6A Potentially Hazardous Biological Agents Risk Assessment
- Required for all research involving microorganisms, rDNA, fresh/frozen tissue, blood, blood products and body fluids.
- Many projects of this type are only permitted to be done in licensed laboratories or facilities that meet certain rules and regulations. Some may be permitted in school science labs. Very few may be conducted at home.
- The Local SRC should review Research Plan and advise if this form is required and where the project must take place. If approved, some of these projects require the completion of Form 6B also.



Additional Project Forms

- Form 6B Human and Vertebrate Animal Tissue
- Required for all research involving fresh/frozen tissue, blood, blood projects and body fluids
- Many projects of this type are only permitted in licensed laboratories or facilities that meet certain rules and regulations. Some may be permitted in school science labs.
- The Local SRC should review Research Plan and advise if this form is required and where the project must take place. If approved, Form 6A must also be completed.




Additional Project Forms

- Required for projects that are a continuation/progression in the same field of study as a previous project. Students may wish to conduct additional testing of a variable using a modified and/or improved procedure or better equipment, or they may test a different variable, or make some other change to the original project.
- This form must be accompanied by the previous year's abstract and Research Plan. Students should also mark the appropriate boxes on Form 1A.




Additional Project Forms

- ▶ Even when all appropriate forms are completed, there are some activities, procedures and/or materials which are not permitted by the Ohio Academy of Science.
 - ▶ The Local SRC should advise if project can continue, only after a completed research plan and all required forms have been submitted and reviewed.
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The Experiment

- Teachers should review research plans to insure all required parts are included and check required ISEF Forms before submitting all final documents to the Local SRC.
 - Teachers may wish to schedule a meeting along the way to review student progress and address any questions.
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The Experiment

- ▶ Submission Checklist:

- ▶ Research Plan

- ▶ Student Name(s) School, Grade Title, Statement of Problem/Question
 - ▶ Hypothesis – not required for engineering design
 - ▶ Background Research
 - ▶ Step by step Procedure –or engineering design process to be followed
 - ▶ Material/Equipment List
 - ▶ Bibliography




The Experiment

- Submission Checklist:
 - ISEF Student Project Forms
 - All projects: Forms 1, 1A, 1B
 - Other Forms as required – the Local SRC should advise
 - All forms include required signatures and signature dates precede the experiment Start Date. (This sentence doesn't make sense)




The Experiment

- The student may begin the experiment – collection of data – ONLY AFTER the student has submitted a complete Research Plan and all required ISEF Forms, and has received written approval from the Local Scientific Review Committee (SRC) to proceed with the project.
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The Results

- Decide how to report your findings
 - The best method to use may be
 - Graphs
 - Tables
 - Visuals
 - Some combination, or
 - Simply text as part of your report
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The Results

- The appropriate method(s) depends on the type and amount of data collected.
 - Graphs and tables need to be labeled correctly and all figures given in appropriate scientific units of measure.
 - Photos should be identified and photo credit given to the source/photographer.
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The Results

- Some amount of discussion of your results is required to explain in more detail how data were measured and/or reported and whether any problem occurred or if modification of the procedure was required.
- Teachers may require students to submit their collected data and their explanation of the results about three weeks prior to their scheduled Science Day for Teachers to review. These results do not need to be forwarded to the Local SRC unless the teacher has concerns about the project or the results.



Conclusions

- Using your collected data, explain whether you accepted or rejected your hypothesis. For engineering design, how did prototype perform?
- You should include statistical analysis of your data.
- You may include an analysis of why you think results supported/did not support your hypothesis, problems encountered with the experiment, what you would do differently if anything, what new questions resulted from the project, and what you might do to continue the project.




The Abstract

- Finally, students must write an abstract of 250 words or less, which should include a brief summary of the problem, procedure, results, and conclusions.
- Instructions for writing a good abstract are found on the website. Students should also ask their Language Arts teacher to proof their work. The abstract may be the only part of the research paper that judges will read, so it is important that it is well written.
- The abstract should be submitted to the teacher at least one week prior to Science Day.



The Presentation

- ▶ Just as important as conducting research is the ability to communicate the results to other scientists and engineers.
 - ▶ Science Day is the student's opportunity to provide an oral and visual report of their project.
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The Presentation

- ▶ Project Display Board must include:
 - ▶ Student Name(s), School, Grade
 - ▶ Title – final form
 - ▶ Abstract – 250 words or less
 - ▶ Problem/Question
 - ▶ Background Research – summary of relevant information



The Presentation

- ▶ Project Display Board must include:
 - ▶ Materials
 - ▶ Procedure – step by step bullet points – might not be as detailed as in a written report.
 - ▶ Results:
 - ▶ May be in paragraph form. tables, graphs, figures, photos, or combinations.
 - ▶ Be certain to use scientific units of measure, and use those units consistently.
 - ▶ Label all tables, graphs –including axes. figures and photos.
 - ▶ Credit the source of all tables, graphs, figures, and photos.




The Presentation

- Project Display Board must include:
- Conclusions
 - Include proposed additional research and/or changes you would consider to improve the project if repeated.
 - List references used.
 - Project Display Board Guidelines & Samples are Available on the website.
- Project Display Board must NOT include any other names besides the involved student(s) and must NOT include any logos




The Presentation

- Practice the oral presentation in front of the class, family & friends, or even a video recorder.
 - The questions they ask will often be the same questions that will be received from the judges.
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District Science Day

- Students receiving a “Superior Rating” at their respective Local Science Days are eligible to compete at the District 14 Science Day to be held Saturday, March 25, 2017, on the campus of the University of Rio Grande.
 - District Science Day Registration is required if the student decides to participate.
 - After registration, the submitted Research Plans and ISEF forms will be reviewed by the District SRC.
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District Science Day

- The big day has finally arrived. Review all of the instructions for Science Day provided on website.
 - Check the Science Day schedule on website.
 - Arrange for transportation to Science Day ahead of time. If a student will be unable to arrive at the listed time for registration, have the teacher let the District 14 contacts know when to expect them.
 - Dress professionally – no jeans or tee shirts.
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District Science Day

- ▶ What to bring:
 - ▶ Your Poster – standard trifold – in plastic bag in case of bad weather.
 - ▶ One copy of your complete research paper 2-4 copies of your abstract – with student name, school, grade, Project Title – Journal/Notebook – contains all of your background research, notes, data as collected, Safety Data Sheets (SDS), if any.




District Science Day

- ▶ What else to bring:
 - ▶ You may bring a book, homework, or quiet electronics – iPod, Kindle, tablet, etc. – only for use when not being judged.
 - ▶ You may bring water and a snack if you wish, but there will be water available at Science Day.




District Science Day

- ▶ What else to bring:
 - ▶ You may bring a battery powered laptop or tablet which may be used only for simulation. Modeling, animation or data display integral an essential to understand, analyze or interpret the project results and not for general PowerPoint or other visual or sound presentations.
 - ▶ Electricity will not be provided.
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District Science Day

- What NOT to bring:
 - NO equipment or materials from the experiment will be permitted at Science Day.
 - NO test samples or materials may be applied to poster.
 - NO freestanding displays or apparatus.
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District Science Day

- ▶ What to expect:
 - ▶ Specific instructions will be issued for the Science Day event.
 - ▶ When you arrive, sign in, pick up your name tag, find your space assignment and set up your poster.
 - ▶ Availability of water will be announced.




District Science Day

- ▶ What to expect:
 - ▶ Be at assigned space at announced judging start time.
 - ▶ Judges will be wearing name tags.
 - ▶ Each project will have a pair of point judges and one or more special awards judges. In some cases there will be an additional referee judge.
 - ▶ Stand and be courteous when delivering presentations, including for the public viewing period. That time will be announced when judging is concluded.



District Science Day

- ▶ What to expect:
 - ▶ An Awards Ceremony will take place shortly after the judging is concluded. Public recognition of student achievement is part of the reward for the student's efforts.
 - ▶ If a student is unable to stay, advise the District 14 contacts and designate a representative to pick up the student's judging sheets, certificate, and any awards received.
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District Science Day

- Funding to cover the expenses for the Science Day Program and all of the awards given are provided by area sponsors. These businesses, organizations, individuals, and schools are listed in the printed program and on the District 14 website.
 - Students receiving monetary awards should thank the sponsor in writing when possible. We want the sponsors to understand that their support is recognized and appreciated.
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