Science Fair Season

Procedures & Requirements
2014 -15

Upper Miami Valley Science Days
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All information, instructions, and forms are available at
www.ohioumvsd.com

Upper Miami Valley Science Days
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“Who is eligible to compete at an Upper Miami Valley Science Day?”
You must be a student, grade 6-12, attending public school, private school, or home school, and residing in Champaign, Darke, Miami, or Shelby County, or an adjacent school district with an existing arrangement with Upper Miami Valley Science Days.

“How do I register for a Science Fair?”
Each county has its own Science Day. Information and registration forms for each may be found on the UMVSD website. Look for your county in the menu.
Student Orientation

- Explain benefits of completing a science fair project (original student research)
- Distribute/Review Science Day Continuum (schedule of assignments, submission deadlines, activities & events)

Orientation should take place prior to October 3rd
Student Orientation

- Provide deadline (by October 10\textsuperscript{th} if possible) for return of signed letters and submission of Registration Fee.
- Fee is required for each student.
It is recommended that students complete research projects individually, however, students may form teams of 2 or 3 if the difficulty of the project warrants.
Topic Selection & Background Research

• Distribute the Topic Background Research Form to each student that submits a completed Letter of Commitment and their Registration Fee.

• Forward all Letters of Commitment and fees to UMVSD. Teachers may want to keep a copy for their own records.
Topic Selection & Background Research

- There are 17 project topic categories and many subcategories. The complete list is available on the website. They include animal science, plant science, medicine & health, chemistry, physics, engineering, energy & transportation, environmental sciences and more …
Topic Selection & 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.
Topic Selection & Background Research

- Teacher should schedule a meeting to review student progress and answer questions. (prior to October 17 if possible)
- By now, students should have a general topic selected and have listed sources for obtaining background information on that topic.
Topic Selection & Background Research

• If 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 student still unsure how to proceed, they may contact the UMVSD Committee from the website. We would be happy to offer suggestions.
After 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. To remain on schedule, it should be submitted prior to November 14 if possible.
Research Plan

- The Research Plan must include student’s name(s), school, grade.
- A working title (which may be changed as project takes more specific form)
- A statement of the problem or question to be answered (a paragraph)
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. (2-3 pages)

- A Hypothesis – student should provide a summary of the proposed project, what student hopes to demonstrate (related to stated problem/question), and the expected results based on student’s research so far.

- A good hypothesis answers the question and provides a reason why.
Bibliography - All statements, 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.
Research Plan

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

Teacher should review each research plan to be sure all of the required parts are included, before forwarding to UMVSD’s Scientific Review Committee (SRC).

SRC will determine if project is permitted as submitted, or if it requires any revisions. Teacher will be notified either way.

Preliminary ok by SRC does not authorize students to begin their experiment. There are additional steps.
Research Plan

- Teacher should advise each student if project may proceed or requires modification, based on SRC comments.
- The next step is to design the experiment.
The Experiment

- Students must design the experiment based on best scientific practices. A good experiment tests the relationship between an independent variable (the change student can control) and a dependent variable (a possible change student does not control).
The Experiment

- All other variables must be identified and be either controlled or eliminated (kept consistent throughout the experiment for all tests), or the results may not represent the actual relationship between the independent and dependent variables being tested.

- More information about variables and test controls may be found on the website.
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 materials and/or procedures, and state how safety will be addressed.
The Experiment

- If possible, the teacher should schedule a Peer Review where student may present the proposed project to classmates. Questions and comments may help student to identify problems to be corrected or provide ideas for improvements.

- Student could also present the project to others outside of school and gain the same benefits.
The Experiment

• Students should resubmit their initial research plan with any recommended modifications, and with the step-by-step procedure, and the materials/equipment list included.

• Students should also complete and submit required ISEF Forms (1) (1A) (1B) at this time.
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).

- Form (1): Checklist for Adult Sponsor

- Form (1A): Student Checklist

- Form (1B): Approval Form
All projects require completed ISEF Forms (1) (1A) (1B) with requested signatures.

Form (1): 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 instructions 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) with requested signatures.

- Form (1B): Approval Form
  Complete all spaces in Part 1.
  Do not write in Part 2 or Part 3 boxes.
Additional Project Forms

- All projects require completed ISEF Forms (1) (1A) (1B) with requested signatures.

- Some projects will require additional ISEF Forms to be completed and submitted in order for 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 student is unsure which forms are required for their project, ask the SRC for recommendations.
Additional Project Forms

- All projects require completed ISEF Forms (1) (1A) (1B) with requested signatures. 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 SRC will 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 SRC will 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 complete signature box of this form.

  The SRC will advise student if this form is required after review of Research Plan. Must be completed before experimentation.
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 on 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 Forms.

  The SRC will advise student if this form is required after review of Research Plan. Must be completed before experimentation.
Additional Project Forms

Form (4) Human Participants

Many student proposed projects involving human participants will not been 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 of the paperwork involved.
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.
Human Informed Consent Form

Consent Form must include information specific to the project, including purpose, requirements of participants, time required, potential risks, if any, potential benefits to participants, if any, and how confidentiality will be maintained.
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 SRC will review 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 in at a Regulated Research Institution.

  The SRC will review Research Plan and advise if this form is required.

  If so, the Qualified Scientist will need to complete the appropriate information, not the student.
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 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 SRC will 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 products 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 SRC will 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.
Form (7) Continuation/Research Progression Projects

- 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).
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 SRC will advise if project can continue, only after a completed research plan and all required forms have been submitted and reviewed.
The Experiment

- Teachers should review papers to insure all required parts are included and check required ISEF Forms before forwarding all documents (electronically) to the SRC.

- Teachers may wish to schedule a meeting prior to December 12 to review student progress and address any questions.
The Experiment

- Submission Checklist:
  - Research Plan
  - Student Name(s), School, Grade
  - Title, Statement of Problem/Question
  - Hypothesis
  - Background Research
  - Step by Step Procedure
  - Material/Equipment List
  - Bibliography
The Experiment

Submission Checklist:

ISEF Student Project Forms

All Projects: Forms (1) (1A) (1B)

Other Forms as required (SRC will advise)

All forms include required signatures and all signature dates precede the experiment Start Date.
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 Scientific Review Committee (SRC) to proceed with the project.
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.
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.
- Some amount of discussion of your results is required to explain in more detail how data was measured and/or reported, and whether any problems occurred or if modification of the procedure was required.
The Results

- 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 SRC unless the teacher has concerns about the project or the results.
Conclusions

- Using your collected data, explain why you accepted or rejected your hypothesis.
- You might want to 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 be well written.

- The abstract should be submitted to the teacher (and forwarded to UMVSD) 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.

• Science Day is the student’s opportunity to provide an oral and visual report of their project.
The Presentation

• Once the Research Paper is completed, including Results, Conclusions, and Abstract, students will then design and construct their Project Display Board.
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 written report)
The Presentation

Project Display Board must include:

- **Results:**
  May be in paragraph form, tables, graphs, figures, photos, or combination.
  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.
  - Bibliography
- Project Display Board Guidelines & Samples are Available on the website.
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.
Science Day

- The big day has finally arrived. Review all of the instructions for Science Day provided by the UMVSD Committee. (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 UMVSD know when to expect them.
- Dress professionally – no jeans or tee shirts.
Science Day

- What to bring:
  
  Your Poster – standard trifold
  (in plastic bag in case of bad weather)
  One copy of your complete research paper
  3-4 copies of your abstract (with student name, school, grade, Project Title)
  Journal/Notebook – contains all of your background research, notes, data as collected, MSDS sheets if any.
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 snack if you wish, but there will be food and drink available at Science Day.
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 and 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.
Science Day

What NOT to bring:

NO equipment or materials from experiment will be permitted at Science Day.

No test samples or materials may be applied to poster.

No freestanding displays or apparatus.
Science Day

What to expect:

Specific instructions will be issued for each Science Day event.

When you arrive, sign in, pick up your name tag, find your space assignment and set up your poster.

Availability of food and drink will be announced.
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. It will be announced when the judging is concluded.
Science Day

- What to expect:
  An Awards Ceremony will take place shortly after the judging is concluded. Students should attend if at all possible. Public recognition of student achievement is part of the reward for the student’s efforts.

If a student is unable to stay, advise the UMVSD Committee and designate a representative to pick up the student’s judging sheets, certificate, and any awards received.
Science Day

- Funding to cover the expenses for the Science Day Program, before and during the event, 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 UMVSD 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.
District Science Day

- Students receiving a ‘Superior Rating’ are eligible to compete at the District Science Day in March.
- These students will be recognized at the Awards Ceremony. Immediately following the awards, there will be a District Science Day orientation with printed instructions.
- District Science Day Registration is required if student decides to participate.
Science Fair Season

All information, instructions, and forms are available at
www.ohioumvsd.com

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