

## Registration

*Paper presenters must register ON-LINE by February 26.*

**Paper presenters need to email the following two attachments to [iriss@bgsu.edu](mailto:iriss@bgsu.edu) by the deadline for competitive consideration:**

- 1. The abstract in publishable form (single spaced).**
- 2. The research paper (doubled spaced) with its abstract as described in the guidelines.**

A sample paper and abstract may be viewed on the National JSHS website at [www.jshs.org](http://www.jshs.org) under the *Participation Guidelines* link.

## Initial Application

All high school students who have completed an original research investigation in the sciences, engineering, or mathematics are invited to apply to the Ohio JSHS for the oral presentation. All students in grades 9-12, enrolled in public, private, or home schools within Ohio are eligible. Investigations reporting on experimental, field, observational, or applied research are eligible. The written and oral reports should present the results of original research carried out by the student, although students are encouraged to obtain assistance from teachers, mentors, parents, or other students. While review or library research is a part of the research process, these investigations alone are not appropriate.

There are two components to the paper competition. Interested students must first submit a written report of the original research investigation for review by a regional panel of judges. If selected, the students will then deliver a concise oral presentation to the symposium participants, made up of high school students from throughout Ohio, distinguished judges who are experts in their field of study, and invited teachers, parents, and guests from the community. The top students earn awards and recognition, including the opportunity to advance to the National JSHS.

## Requirements for the Oral Presentation

### Session timing and conduct

- The research presentation may not exceed 12 minutes, followed by a maximum 5-minute question period. A session moderator will aid the student speaker in maintaining this schedule and in fielding questions from the audience. The procedure for maintaining the time includes a 10-minute signal for the student, and finally a 12-minute signal. At the 12-minute point, the student speaker must stop the presentation even if he or she has not finished.
- Set-up time for the presentation is a maximum of 2 minutes. This set-up time is not included in the above presentation time.
- Following the presentation, the session moderator will ask for the judges' questions followed by questions from the audience, if time permits.
- The speaker may entertain questions while the exchange appears interesting and relevant. Questions intended to harass the student speakers will not be allowed by the session moderator.
- The speaker may repeat a question before answering so the audience may understand the entire dialogue.

### **Suggestions for preparing for the oral presentation**

- Explain your research in enough detail so the audience will understand what you did, how you did it, and what you learned. Remember, you are the expert. No one in the audience knows as much about your research investigation as you.
- Whenever possible, avoid jargon or unnecessary terminology. If it is essential to use specialized terms, remember to explain the specialized term briefly. Give your audience enough time to understand what you are trying to convey.
- Graphs, tables and other representation help explain your results. Keep them simple and uncluttered. Focus on important information; for example, remember to name the variables on both axes of a graph, and state the significance of the position and shape of the graph line.
- Deliver your presentation at a comfortable pace.
- It helps to practice your presentation where you can perfect the presentation and the timing.

### **Use of Audio Visuals - Available equipment**

Available audio-visual equipment in each session at National includes:

1. LCD projector
2. projection screen
3. laser pointer

**Aids to the presentation.** No written handouts are permitted. Research apparatus may be used if it is integral to the presentation and only if the apparatus is hand-held.

**Software such as Powerpoint is generally used to prepare or drive slides or overheads.**

**Student presenters who use video in their presentation should comply with the following ground-rules:**

- The video component cannot make up more than two (2) minutes of the presentation.
- No audio or background music is permitted other than sounds that are an integral part of the research. Recorded or mechanically produced narration is not permitted. Narration must come from the speaker.

### **Research Paper Guidelines**

The research paper is utilized by the administrative committee to qualify students for the oral presentation of the paper competition. It then serves as a supporting document for the oral presentation during the judging process. The following guidelines are found on the National JSHS website at [www.jshs.org](http://www.jshs.org). They also represent guidelines for the Ohio JSHS.; although the paper presenter is encouraged to decide on the most appropriate form for the research paper with his or her mentor.

## GUIDELINES

- The paper should be a minimum of 5-6 pages and a maximum of 20 pages, including appendices.
- A maximum size limit for the electronic research paper is 1.8 Mb. Utilize size 10 or 12 Times New Roman font. Double space the body of the paper; single space the abstract.
- Photography may not be used in the electronic research paper although photography may be used in the oral presentation.
- Graphs, tables, diagrams, charts, or other graphic representation should be simple to allow the judges on-line access to the research paper.
- A recommended outline for the research paper includes:
  - a title page, or cover page stating the student's name, school address, and title of the research;
  - acknowledgement of major assistance received;
  - table of contents;
  - if applicable, a statement that “research involving non-human vertebrates or human subjects was conducted under the supervision of an experienced teacher or researcher and followed state and federal regulatory guidance applicable to the human and ethical conduct of such research”;
  - introduction;
  - materials and methods;
  - results (data or findings);
  - discussion and conclusions;
  - references, or literature cited;
  - appendices (if necessary).

### Paper Guidelines for the Beginning Student

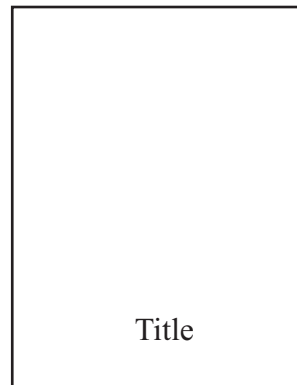
Students who need more direction in writing their research papers may find the following information helpful.

#### *Title page*

Make your title investigative in nature

- The Effects of ....
- A Comparison of ....
- A Study of ....
- Design and Testing of....

Title  
Name  
School  
School's Address



Do not include personal information in the rest of the paper in order to maintain fairness during the initial screening process.

*Acknowledgements* (See above)

*Table of Contents*

### *Abstract*

This section is a summary of your research. Begin with one introductory sentence to capture the attention of the reader. Next, state the purpose of your study. Briefly describe how you studied the problem (your procedure), then describe what you found (your results). This section should be no more than 200 words and is generally written last.

In the following sections, utilize essay form. Using APA style or the style recommended by your mentor, you should reference both your introduction and discussion sections.

### *Introduction* (includes purpose; 1-2 pages)

Introduce your research question and provide a referenced discussion. Incorporate information you have found in journals or on the Internet. In your final paragraph of this section, you may present the purpose of your study.

### *Hypothesis* (Short Paragraph)

Based on what you have read and/or on your experience, what is the probable answer to your research question? If you are utilizing a T-test, develop your null hypothesis and alternate hypothesis in this section.

### *Materials and Methods* (approx. 1 page)

Utilizing chronological order, describe your experimental procedure in a clear and precise manner. (Reminder: Use essay format.) How did you study the problem? Who were your subjects? What materials did you utilize? Other researchers should be able to repeat this research based on your description. This section should be referenced if you utilize another researcher's design.

### *Results* (length varies)

What did you find? This is your section. Include only your data, not another researcher's data or observations. Do not reference. Include data tables, analysis tables, and/or graphs in this section within the body of the text when appropriate to explain or support your text.

### *Discussion and Conclusion* (1-2 pages)

Discuss your results. What do these findings mean? How do your results compare with what other researchers have found? What is your conclusion? How is this research useful? What are the practical applications of this research? Do you have any future plans for expanding this research? This section should be referenced to support what others have found.

*Works Cited Utilizing APA Style or the style recommended by your mentor, you should include only those references that were actually cited in the text of your paper.*

## Judges' Score Sheet

The Ohio JSHS recognizes students for original research achievements in the sciences, technology, engineering or mathematics (STEM). The overall focus of the judges is to select the students who successfully demonstrate valid investigation and experimentation aimed at discovery of knowledge.

A total score of 30 points is assigned using the below scale and serves as the basis for discussions among the judging team. The students' oral presentation will be ranked utilizing the following criteria:

**5 = Superior 4 = Excellent 3 = Good 2 = Satisfactory 1=Fair**

| JUDGING CRITERIA   | SUGGESTED WEIGHT |
|--|------------------|
| <b>Statement and identification of research problem</b> <ul style="list-style-type: none"> <li>• Is the problem clearly stated?</li> <li>• Does the presenter demonstrate understanding of existing knowledge about the research problem?</li> </ul>   | 1 2 3 4 5        |
| <b>Scientific thought, creativity/originality</b> <ul style="list-style-type: none"> <li>• Process skills demonstrated by the student in the solution to the research problem and/or the research design</li> <li>• Student demonstrates his or her individual contributions to and understanding of the research problem</li> <li>• Level of effort</li> </ul>  | 1 2 3 4 5        |
| <b>Research design, procedures (materials &amp; methods), results</b> <p><b>1. Science</b></p> <ul style="list-style-type: none"> <li>• Appropriateness of research design and procedures</li> <li>• Identification and control of variables</li> <li>• Reproducibility</li> </ul> <p><b>2. Engineering, computer science, technology</b></p> <ul style="list-style-type: none"> <li>• Workable solution that is acceptable to a potential user</li> <li>• Recognition of economic feasibility of solution</li> <li>• Recognition of relationship between design and end product</li> <li>• Tested for performance under conditions of use</li> <li>• Results offer an improvement over previous alternatives</li> </ul> | 1 2 3 4 5        |
| <b>Discussion/Conclusions</b> <ul style="list-style-type: none"> <li>• Clarity in stating conclusion</li> <li>• Logical conclusion that is relevant to the research problem and the results of experimentation or testing</li> <li>• Recognizes limits and significance of results</li> <li>• Evidence of student's understanding of the scientific or technological principles</li> <li>• Theoretical or practical implications recognized</li> <li>• What was learned?</li> </ul>  | 1 2 3 4 5        |
| <b>Skill in communicating research results – Oral Presentation and written report</b> <ul style="list-style-type: none"> <li>• Clarity in communicating research results to nonspecialized audience and to judges</li> <li>• Definition of terms as necessary</li> <li>• Appropriate use of audio-visuals</li> <li>• Response to questions from audience and judges</li> </ul>   | 1 2 3 4 5        |
| <b>Acknowledgement of sources and major assistance received</b>  | 0 or 5           |
| <b>TOTAL SCORE</b>   |                  |

## **Rules for Experiments Involving Non-human Vertebrates and Human Subjects Non-Human Vertebrates Rules**

The Ohio Junior Science and Humanities Symposium has adopted the following rules on non-human vertebrate experimentation (adapted from Bonkalski et al., 1994).

- Only animals that are lawfully acquired shall be used in experimentation and their retention and use shall be in every case in strict compliance with state and local laws and regulations.
- Animals used in experimentation must receive every consideration for their bodily comfort; they must be kindly treated, properly fed, and their surroundings kept in a sanitary condition.
- No intrusive techniques may be used, including surgery, injections, or taking of blood.
- When animals are used by students for their education or the advancement of science, such work shall be under the direct supervision of an experienced teacher or an investigator at a research institution with an approved active protocol for the use of vertebrate animals for this research.

## **Human Subjects Rules**

The Ohio Junior Science and Humanities Symposium has adopted the following rules on research involving human subjects (adapted from Bonkalski et al., 1994).

- No project may use drugs, food, or beverages in order to measure their effect on a person.
- Projects that involve exercise and its effect on pulse, respiration rate, blood pressure, and so on are approved if a valid normal physical examination is on file and provided the exercise is not carried to the extreme.
- If your research involves administration of questionnaires or surveys, a proper consent from subjects must be obtained.
- If you are conducting research that involves human subjects and your school has no formal policy regarding such research, contact the JSHS Director for guidelines.
- No human cultures of any type—mouth, throat, skin, or otherwise—will be allowed.
- Tissue cultures purchased from reputable biological supply houses or research facilities are suitable.
- The only human blood that may be used is that which is either purchased or obtained from a blood bank, hospital, or laboratory. No blood may be drawn by any person or from any person specifically for a science project. This rule does not preclude a student making use of data collected from blood tests not made exclusively for a science project. Blood may not be drawn exclusively for a science project.