JSHS
JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM

Georgia Junior Science & Humanities Symposium

2023 HANDBOOK with RULES & GUIDELINES

UNIVERSITY OF GEORGIA
Center for Continuing Education & Hotel

The Georgia Junior Science & Humanities Symposium is administered by the Office of Academic Special Programs at the University of Georgia Center for Continuing Education & Hotel

www.georgiacenter.uga.edu/gjshs

About JSHS

Junior Science and Humanities Symposium (JSHS) is a Tri-Service sponsored competition for high school students who engage in research investigations in the sciences, technology, engineering, or mathematics (STEM). Students are invited to compete in an affiliated JSHS regional symposium and may win the opportunity to advance to the National JSHS.

The primary aims of JSHS are to promote original research and experimentation in STEM at the high school level, and to publicly recognize students for outstanding achievement. By involving talented students and their teachers in affiliated symposia, and by recognizing students' research endeavors through scholarships and other awards, JSHS aims to encourage continued interest and participation in the sciences and ultimately to widen the pool of trained scientific and engineering talent prepared to conduct research and development vital to our nation.

Program Sponsorship

The Junior Science and Humanities Symposia (JSHS) Program is a collaborative effort between the research offices of the **United States Army, Navy, and Air Force**, the **National Science Teaching Association**, and **leading research universities** throughout the nation. The Department of Defense generously provides funding for the National symposium and JSHS scholarships.

For more information about the partnerships that make JSHS possible, visit www.jshs.org/about-jshs/tri-service-sponsors.

Georgia JSHS

Georgia's affiliated regional JSHS program, the Georgia Junior Science & Humanities Symposium (GJSHS), is administered by the Office of Academic Special Programs at the University of Georgia Center for Continuing Education & Hotel, a unit of Public Service & Outreach.

Students selected to attend GJSHS are invited to participate in the three-day event on the University of Georgia campus in Athens. Georgia teachers are also selected to attend GJSHS as chaperones based on submitted applications. Lodging and meal expenses (with some exceptions) are covered for all participants (students and teachers/ chaperones) selected to attend. Students selected for GJSHS are expected to fully participate in all Symposium activities. All participants are responsible for travel to and from the Symposium, as well as one meal during the event.

JSHS Objectives

- ***Promote*** research and experimentation in STEM at the high school level.
- ***Recognize*** the significance of research in human affairs, and the importance of humane and ethical principles in the application of research results.
- ***Search out*** talented youth and their teachers, recognize their accomplishments at symposia, and encourage their continued interest and participation in STEM research.
- ***Expand*** the horizons of research-oriented students by exposing them to opportunities in the academic, industrial, and governmental communities.
- ***Increase*** the number of adults capable of conducting research and development.

Why Participate?

Students and teachers participating in regional and national symposia may…

- Gain self-confidence not only through the experience of the research investigation but also through networking among participants with similar interests.
- Participate in a forum honoring exceptional work and encouraging personal and academic growth.
- Participate in a scientific conference, take field trips, and have their work published.
- Have the opportunity to tour laboratories and/or campus.
- Interact with practicing researchers who offer a look beyond high school to opportunities in post-secondary education and to academic and career development in STEM fields, and presentations by guest speakers
- Develop higher-order thinking skills and integrated learning across disciplines through the process of scientific inquiry, writing a scientific paper, and delivering a presentation - all skills that will benefit future post-secondary and graduate pursuits.

Eligibility

Competition Eligibility

The Georgia Junior Science & Humanities Symposium (GJSHS) invites high school students who have completed an original research investigation in the sciences, technology, engineering, or mathematics and who meet the eligibility requirements below to submit an application:

- Students may compete in only ***one*** regional symposium.
- **Grade Level / School Type:** GJSHS is open to students in grades 9-12 who are enrolled in a public, private, or home school located in the state of Georgia.
- **Citizenship:** Students must be a citizen or permanent resident of the United States or U.S. territory to participate in JSHS.
- **Continuation Projects:** Students may continue a research investigation; however, a study which merely adds data from a previous year's project is not considered a strong continuation project. If a continuation project is submitted, the student must address how the project was expanded (i.e. methodology, new variables), discuss any revisions in experimentation, and present new data.
- **Team Projects:** A student may present a report on work done as part of a class project, or as a science fair project, or summer research project. If a student is part of a larger group, the student should report on their individual contributions to the work while also addressing the coordinated efforts of all team members and properly acknowledging the contributions of each team member. A team leader should be selected to submit the JSHS application and present the results of the group work. The research may not be presented by any other member of the team. **If the project is selected for GJSHS, only the team leader will be invited to attend.** If an individual presenter from a group project is selected as a Regional finalist and is invited to present at the National JSHS, the same presenter must present at the National Symposium; if the presenter is unable to attend the National JSHS, the opportunity will be passed on to the next ranking project. All team members must meet JSHS eligibility. Exceptions are unlikely but may be considered case-by-case at the discretion of GJSHS leadership.
- **Attendance / Participation:** The date and time for the student's presentation(s) are determined by regional and national Symposia leadership. A student must be present for the assigned time(s) or risk disqualification. **Students must participate fully in all Symposium activities.**
- **Appropriateness:** Projects that are demonstrations, 'library' research, or informational projects are not appropriate for GJSHS.

Scholarship Eligibility

- A student must be a citizen or permanent resident of the United States or U.S. territory to be eligible for the government-sponsored scholarship awards.
- The total scholarship awards available through JSHS are capped at a maximum total of $30,000 per individual student winner.
- **Team Projects:** Scholarships and other awards available at Regional and National Symposia are awarded only to the presenter.

Scholarship Conditions

Student scholarship recipients must meet the following:

- Demonstrate full-time enrollment as an undergraduate student at an accredited institution.
- Declare a major in a science, technology, engineering, or mathematics field.
- Maintain a cumulative GPA of 3.0 or above.
- Follow conditions and instructions listed at www.jshs.org/awards/scholarship-eligibility-and-payments for claiming a JSHS scholarship award.

Application Process & Dates

Students are selected to attend the Georgia Junior Science & Humanities Symposium (GJSHS) after a preliminary evaluation of submitted abstracts and research papers. Based on the results of this review, **45-60** Georgia students in grades 9-12 will be selected to participate in the GJSHS event at the University of Georgia as either Presenters or Observers.

- **PRESENTERS** participate in the oral presentation competition. GJSHS culminates with the selection of five presenters to win an expense-paid trip to the National JSHS. The top three finalists will be awarded scholarships. The top two finalists will have the opportunity to compete in the oral presentation competition at National JSHS, and the other three finalists will be invited to attend National JSHS as Observers and may be invited to enter the National JSHS poster competition.
- **OBSERVERS** are invited to attend the symposium and present their research in a poster session.

Note: The number of Presenters and Observers may change from year to year, and the Observer component may omitted.

All GJSHS applicants must follow the *Rules & Guidelines* beginning on page 9.

Selection Process:

1) Students submit application materials using the online application portal. **The portal will open on December 1 at www.georgiacenter.uga.edu/gjshs.**
2) As part of the online application, students upload a written **Abstract**, **Research Paper**, and **Statement of Outside Assistance** prepared in accordance with GJSHS Rules & Guidelines (pages 9-13).
3) Judges read and evaluate papers.
4) Based on these evaluations, Presenters (and Observers, if applicable) are selected; selections are announced on February 3 (date subject to change).
5) At the GJSHS event February 26-28, 2023, Presenters deliver an oral presentation of their research to a panel of judges and peers. Observers may participate in a poster session.
6) Based on the presentations, Presenters may be selected for awards and/or to advance to the National Junior Science & Humanities Symposium in April.

January 10, 2023
GJSHS Application Deadline

*The GJSHS application, Abstract, Research Paper, and Statement of Outside Assistance must be submitted via the online application portal. The application portal will open on **December 1** at www.georgiacenter.uga.edu/gjshs.*

February 3, 2023 (tentative)
Announcement of Invited Presenters

The list of students selected to attend the 2023 GJSHS will be announced and posted at www.georgiacenter.uga.edu/gjshs.

February 26-28, 2023
Georgia Junior Science & Humanities Symposium

Held at the University of Georgia Center for Continuing Education & Hotel in Athens, GA

Tentative agenda:

Sunday, February 26

4:30 pm	Registration
5:45 pm	Dinner & Welcome
7:30 pm	Practice Sessions

Monday, February 27

7:00 am	Breakfast
8:45 am	Oral Presentations
12:00 pm	Lunch
1:00 pm	Oral Presentations
3:00 pm	UGA/Lab Tours
7:30 pm	Finalist Practice Sessions

Tuesday, February 28

7:00 am	Breakfast
8:15 am	Finalist Oral Presentations
12:55 pm	Closing Banquet
2:30 pm	Awards Ceremony

April 12-15, 2023
National Junior Science & Humanities Symposium

Virginia Beach, VA

Project Categories

Projects submitted to the Georgia Junior Science & Humanities Symposium (GJSHS) must be entered in ONE of the eight categories below. Some projects may fit in multiple categories (especially those in areas related to biomedical science / medicine and health), but only one category should be selected. *Note: The National Junior Science & Humanities Symposium may use different project categories and/or subcategories than GJSHS.*

When selecting a category, consider what type of professionals would be most qualified to evaluate your project, and what areas of expertise are most important for a judge to have.

BIOMEDICAL SCIENCE

(includes Biomedical Medicine, Microbiology, Cellular and Molecular Biology, Genetics, Immunology, Pharmacology, Virology)

CHEMISTRY & MATERIALS SCIENCE

(includes Physical Chemistry, Materials, Alternative Fuels, Organic Chemistry [possibly in Life Sciences], Chemical Engineering, Earth Science, Geochemistry, Materials Science)

ENGINEERING & TECHNOLOGY

(includes Aerospace, Aerodynamics, Electrical Engineering, Solar Energy, Vehicle Development, Devices, Mechanical Engineering, Robotics)

ENVIRONMENTAL SCIENCE

(includes Environmental Engineering, Bioremediation, Ecosystems Management, Land Resource Management, Pollution, Toxicity in Ecosystems)

LIFE & BEHAVIORAL SCIENCES

(includes Developmental Biology, Plant Physiology, Population Genetics, General Biochemistry, Microbiology, Behavioral Science)

MATHEMATICS & COMPUTER SCIENCE

(includes Probability and Statistics, Mathematics, Computer Science, Algorithms, Databases, Networking, Computer Engineering)

MEDICINE & HEALTH

(includes Biochemistry, Bioengineering, Disease Diagnosis and Treatment, Epidemiology, Immunology, Neuroscience, Physiology, Pathology)

PHYSICAL SCIENCES

(includes Astronomy, Theoretical Physics, Solid State Physics, Acoustics, Optics, Thermodynamics, Particle Physics, Quantum Physics, Nuclear Physics, Internet of Things [Network of physical objects embedded with electronics, software, sensors, and network connectivity])

Paper & Presentation Criteria

The following criteria, adapted from the National Junior Science & Humanities Symposium judging process, will be used to guide discussions and evaluations of submitted research papers and oral presentations for the Georgia Junior Science & Humanities Symposium (GJSHS).

1. Research Problem

- Problem is clearly defined.
- Research is based on clear rationale, model, theory, or philosophy.
- Clearly and accurately provides background information.
- Shows thorough understanding of existing knowledge about research problem and its inherent complexities.

2. Scientific Thought, Creativity/Originality

- Shows understanding and application of appropriate scientific method and processes for the research problem.
- Demonstrates significant individual contributions to and understanding of the research problem.
- Research demonstrates high level of effort.

3. Research Design, Procedure*

- Procedures are detailed, clearly defined, and appropriate for the problem.
- Identification and control of variables are clearly explained and appropriate.
- Procedures are replicable.

***for projects in Engineering, Technology, & Computer Science fields:**

- Presents a workable solution that is acceptable to a potential user.
- Recognizes economic feasibility of solution.
- Recognizes relationship between design and end product.
- Tested for performance under conditions of use.
- Results offer improvement over previous alternatives.

4. Discussion/Conclusions

- Results are clearly stated and thorough.
- Conclusions are logical and relevant to the research problem and results.
- Recognizes limits and significance of results.
- Shows a clear understanding of scientific or technological principles.
- Theoretical or practical implications are explained.

5. Skill in Communicating Results

- Demonstrates clarity in communicating results to non-specialized audience.
- Terms are appropriately and helpfully defined.
- Writing is clear, articulate, and grammatically correct.
- Charts, graphs, and tables are used appropriately and contribute to reader's understanding of the research.

6. Sources/Acknowledgements

- References are cited correctly and sources of major assistance are acknowledged.

All GJSHS applicants must follow the *Rules & Guidelines* beginning on page 9.

Judging

The Judging Process

At the Georgia Junior Science & Humanities Symposium (GJSHS), the first round of judging occurs when the students' research papers are reviewed by a team of science, technology, engineering, and mathematics professionals and researchers in the field. Selected students are invited to deliver oral presentations of their research at GJSHS February 26-28, 2023. These presentations will represent the finest efforts of high school students in the state toward either original laboratory research, field research, or applied research. Following judging of the oral presentations on Monday, February 27, the judging team will deliberate to select approximately ten students for the finalist presentations on Tuesday, February 28. From the finalists, five student delegates will be selected to advance to the National Junior Science & Humanities Symposium. The 1st, 2nd, and 3rd place finalists will receive $2,000, $1,500, and $1,000 scholarships, respectively.

During oral presentations, judges are permitted a questioning period during which the judging team may ask questions about the students' paper, research process, or presentation. These questions are intended to aid judges by clarifying the student's depth of understanding, the amount of work and level of effort the student put in to the project, and the individual contributions to the research problem.

At the National JSHS, student research presentations will be organized in concurrent sessions by discipline. Military-sponsored scholarships and other awards will be made to finalists from each of the sessions.

In the evaluation of the presentations, judges are reminded that a key element of JSHS is the intellectual development of the individual student as an experimenter and researcher. The student presentation should clearly demonstrate in its quality and content that it is in alignment with the major objectives of the Junior Science and Humanities Symposia Program.

All GJSHS applicants must follow the *Rules & Guidelines* beginning on page 9.

Judging Criteria

Regional and national judges evaluate the research papers and presentations using a set of standardized criteria, which provide a framework and basis for discussion among judges for the selection of students to advance to subsequent rounds of competition. These criteria are stated briefly below; see page 6 for more details.

1) Statement and identification of **research problem**;
2) Scientific or engineering **thought**; **creativity** and **originality**;
3) Research or engineering **design**, **procedures**, **results**;
4) **Discussion/conclusions**;
5) Skill in **communicating the research results**; oral presentation and written reports;
6) Acknowledgement of **sources** and **major assistance received**.

The GJSHS Judging Team

The GJSHS judging team includes individuals who have significant graduate-level education and experience in the general fields of research that are represented by the GJSHS student presenters. Although specialized experience in each student's field of research at the GJSHS is typically represented among the judges, it is not guaranteed given the submitted paper topics and available judges in any given year. Therefore, student presenters are reminded of their responsibility to communicate their results so that they may be understood by both the non-specialized audience and by the judges. Judges are also selected for their interest in encouraging the students and in the future development in the STEM fields.

The GJSHS office, the National Science Teaching Association, and the judging team recognize the significant effort that students undertake in conducting their research. Therefore, our objective is to ensure an equitable competition by selecting qualified judges and by communicating the rules of competition to both students and judges. We realize that in any competition of this nature, differences of opinion about the judges' interpretations may occur. **It is the policy of the sponsors of the Georgia JSHS (i.e., the University of Georgia as well as the Army, Navy, and Air Force) to support the interpretations and final decisions of the judges' panel.**

Awards

Significant awards are available to JSHS regional and national student finalists. University contributed scholarships or other awards are sponsored by many regional symposia. The availability of these additional awards, type of award, and value vary by region. The Departments of the Army, Navy, and Air Force jointly sponsor the following awards (subject to the availability and release of government funding).

For students who participate in regional and national symposia...

- **Public recognition and certificates**, honoring achievement and interest in research pursuits
- **Attain a sense of achievement and self-confidence** resulting from interaction with students from other schools and regions and with professional researchers and educators. To quote a former JSHS alumnus, "[At JSHS] I learned a tremendous amount of science, got to meet other high school students who shared my interests in science, and learned that I could succeed at any program that I chose to pursue."

For teachers...

- **$500 in awards** to teachers at each of the Regional symposia, honoring the individual teacher and their school's contributions to advancing student participation in research.

For the regional finalists...

- **An expense-paid trip to the National JSHS**, awarded to five finalists at each regional symposium. The National JSHS brings together over 360 participants in a program of educational and scientific exchange.
- **An invitation to present their original research investigation at the National JSHS**, awarded to two finalists at each regional symposium.
- **A total $4,500 undergraduate, tuition scholarships**, awarded at $2,000, $1,500, and $1,000 to each of three regional symposium finalists. (Scholarship payable upon matriculation and upon meeting the JSHS scholarship conditions.)

For the national finalists…

- **$12,000 undergraduate, tuition scholarships**, awarded to each of the 1st place finalists in the National JSHS competition.
- **$8,000 undergraduate, tuition scholarships**, awarded to each of the 2nd place finalists in the National JSHS competition.
- **$4,000 undergraduate, tuition scholarships**, awarded to each of the 3rd place finalists in the National JSHS competition.

Scholarship Eligibility

Students must be a citizen or permanent resident of the United States or U.S. territory to be eligible for the government-sponsored scholarship awards. The total scholarship awards available through JSHS are capped at a maximum total of $30,000 per individual student winner. See the www.jshs.org/awards/scholarship-eligibility-and-payments for details.

Required for Entry: STATEMENT OF OUTSIDE ASSISTANCE

All JSHS applicants must prepare and submit the Statement of Outside Assistance form with their application. This form requires students to report on their contributions to the research investigation. Comments by the supervising teacher and/or supervising mentor are reported, to include 1) comments on the students' individual contributions to the research investigation or engineering/computer science project; and 2) acknowledgment that the student conducted the research in accordance with proper procedures and protocols for the conduct of animal research or human research. Students may only use the JSHS-provided form. **Please ensure the Statement of Outside Assistance form is *complete* before submitting. This includes all required signatures and comments from the teacher/mentor (or parent if no teacher/mentor was involved).**

Required for Entry: ABSTRACT

All JSHS applicants must submit a 250-word maximum abstract as a single-page PDF. The abstract should accurately convey the essential nature of the research conducted and the most significant conclusions reached. A further purpose of the abstract is to attract the interest and curiosity of the non-specialist reader and thus encourage exchange, discussion, and elaboration between various authors and between authors and readers.

NEW FOR 2022-2023 For GJSHS, the Abstract must be uploaded to the online application as a stand-alone, single-page PDF, separate from the Research Paper. The Abstract does not need to be incorporated into the Research Paper. (In previous years, the Abstract has been required to be submitted as plain text or incorporated into the Research Paper PDF.)

ABSTRACT REQUIREMENTS

Please read carefully before preparing abstract. See also ***Additional Tips for Abstracts and Research Papers*** *on page 11. Note that National JSHS may have different Abstract requirements than Georgia JSHS.*

1. Maximum 250 words
2. Standard formatting: 1-inch margins, keyed in 10 or 12 point standard font such as Times New Roman or Calibri
3. Should include the following elements, written in ***narrative form*** without subtitles:
    a. The **title** should be brief and descriptive.
    b. The **statement of the problem** tells the reader what specific questions are addressed in the study. The variables and limitations are identified. The intent and objectives of the research effort are made explicit in this statement.
    c. The **purpose** states the usefulness of the study. It an-swers the question as to why the project was undertaken.
    d. The **hypothesis** is an educated guess that shows the relationship between a set of observed facts and a theory. The hypoth-esis limits the scope of the investigation and unifies the research design. **Engineering, math, computer science, and sometimes physics projects do not have a hypothesis**.
    e. The **procedure** provides a brief summary of what was done.
    f. The **conclusions** provide a concise statement of the outcomes of the investigation. They should be written in non-technical language and be related directly to the hypothesis. The conclusions should identify unsolved aspects of the original problem or any new problems identified.

There is no "standard" or required arrangement for the parts of an abstract (although format listed above is recommended). Its statements may be in any sequence that enables the most information to be conveyed in the fewest words. Its sequence can be, and frequently is, totally different from that of the paper. A good abstract is usually drafted and re-drafted, eliminating, adding, or rearranging words. Financial sponsorship mentioned in the paper must be concisely credited in the abstract: "Research supported by ..." **Note: This is different from science fair rules.*

Required for Entry: RESEARCH PAPER

The Research Paper details the original scientific research and should generally follow "best practices" in the field. Work must be that of the student, not the mentor. The Research Paper should be uploaded to the student's online application ***as a PDF document*** (see guidelines below).

RESEARCH PAPER REQUIREMENTS

Please read carefully before preparing research paper.

1. Must be typed in a standard 12-point font, such as **Times New Roman** **or** **Calibri**.
2. Must be minimum of 6 pages and **maximum of 20 pages** (includes **ALL** paper components, i.e., title page, table of contents, works cited, **appendices**, etc.).

   RESEARCH PAPERS EXCEEDING 20 PAGES WILL BE DISQUALIFIED.
3. Must be **double-spaced**. *Note: Students who are selected to advance to the National JSHS may be asked to resubmit the research paper after the Georgia JSHS and prior to the National JSHS. Those* ***resubmitted*** *papers may be a maximum of 40 double-spaced pages.* ***The research paper submitted for competition at the Georgia JSHS must be a maximum of 20 double-spaced pages.***
4. Must use **1-inch margins**.
5. Must be submitted as **PDF**. Please double-check formatting of images, tables, page numbering, etc. before submission to ensure distortion did not occur during PDF conversion.
6. Must use APA style format. For help with APA, see the APA Guide and Purdue OWL.
7. **The following elements and format are recommended:**
   a. TITLE PAGE - The cover page must contain the title of the research, category, student's name, school, and school address. Make sure your title is concise but also descriptive.
   b. ACKNOWLEDGMENT OF MAJOR ASSISTANCE - Include a statement on where and when the research was done and acknowledge those who assisted you with the study.
   c. As applicable, 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 humane and ethical conduct of such research."
   d. TABLE OF CONTENTS - List the topics and sub-topics in order and the page numbers on which they start. Include a list of all graphs, tables, and other representative figures. Each figure should have a title and page number.
   e. INTRODUCTION - Write the introduction to provide background details or the setting of your specific research problem. Assume that the reader will be scientifically literate, but he or she may not be familiar with the details. State the purpose of the research study early in the introduction, and then state the hypotheses that you are testing. Describe what is already known about the research.
   f. MATERIALS, METHODS, AND PROCEDURES - State the materials, methods, or procedures used to conduct the research in a step-by-step manner. This section should be written specifically enough so that the research could be replicated.

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g. RESULTS (DATA OR FINDINGS) - Present the results of your research finding in logical order. Use graphs, tables, and/or other representations. Tables and graphs should be numbered separately and should include captions. Numbering will enable you to refer to them in the body of your paper quite easily. Explain in your paper the important features of each table, graph, etc. Report the results of statistical analyses of your data and the type of statistical tests used.

h. DISCUSSION AND CONCLUSIONS - In this section, interpret your results. First, restate the hypotheses and explain how the data either supported or rejected the initial hypotheses. Discuss your research findings in relationship to what is already known about the research problem (reported in the introduction section). Draw conclusions based upon your research findings. The conclusions can include relevant, subjective observations or comments, but do state that these are speculation.

   Acknowledge any limitations which affect the research results. For example, what further experiments need to be performed? Statistical techniques used to manipulate the data may have limitations. Some of the treatment effect might have been caused by a random, uncontrolled, intervening variable. Again, acknowledge these limitations and other factors over which the researcher had no control, and state how these might have influenced the study outcomes.

i. LITERATURE CITED - This is a list of citations for every article cited in your text. Endnotes are needed for all direct quotations and for all important statements of fact or opinion that are taken from written sources. Figures, dates, descriptions of situations, scientific data, opinion, representations and the like which are presented to advance the subject of the paper must have a stated source. Check with your teacher or other advisors if you need further assistance in the format for endnotes.

j. APPENDICES - In some cases, you may wish to include large tables of raw data in your report. You should include such items in an appendix at the very end of your research report. Label and paginate your appendices. **Appendices are included in total page count. Total page count may not exceed 20 pages.**

Additional Tips for Abstracts and Research Papers

1. Use past tense and third person in describing completed research and present tense when stating existing facts and what is in the paper.
2. Incorrect spelling and sentence structure will discourage interest in your project.
3. Assume that the reader has a good general technical vocabulary, but try to avoid use of highly-specialized words or abbreviations.
4. In an abstract, if reference to procedure is essential, try to restrict it to identification of method or type of process employed. In the research paper, discuss the details of procedures and equipment.
5. State results, conclusions, or findings in a clear, concise fashion.
6. Have your teachers read your abstract and paper to make sure they communicate clearly.
7. Helpful references:
   a. Kathryn, Geese & Rezba, Students and Research (ISBN 0-8403-7766-5)
   b. Matthews, Bowen & Matthews, Successful Scientific Writing (ISBN 0-521-55948-0)
   c. Rezba, Sprague, Fiel, Funk, Learning and Assessing Science Process Skills (ISBN 0-8403-8430-0)

Research Involving Vertebrate Animals or Human Subjects

Research involving vertebrate animals or human subjects must be conducted under the direct supervision of a qualified teacher or mentor with an approved active protocol which complies with local, state, or federal regulations for such research. The Junior Science & Humanities Symposium requires students to acknowledge in their written research report, and in the *Statement of Outside Assistance*, that proper procedures and protocols were followed. Projects that were conducted without proper supervision will be disqualified from both Regional and National competition.

The JSHS Program recognizes that students may conduct research in a high school setting, and both students and teachers may have questions on how to obtain proper approvals if the research is conducted in a school, home, or field research setting versus in a university laboratory.

General guidelines follow on experimentation involving vertebrate animals (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 a committee of individuals knowledgeable of applicable regulations governing the care and animal of animals in the conduct of the project.
- At no time should a student do harm to a vertebrate animal in the conduct of the research.

General guidelines follow 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.
- 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.
- Experimentation involving human subjects requires direct supervision of a committee of individuals knowledgeable of applicable regulations governing the conduct of such research. Non-regulated research institutions (i.e. high schools) should establish a committee of knowledgeable teachers and other mentors to view the research plan prior to the conduct of the research.

Presentation Rules & Guidelines

Students who are selected as Presenters for the Georgia Junior Science & Humanities Symposium (GJSHS) will prepare an oral presentation of their scientific research. For this presentation, students may use a computer-projected presentation developed with *PowerPoint* or other slide presentation software.

GJSHS is modeled after the National JSHS. The purpose of the presentations is to afford students the opportunity and experience of reporting their research and experimentation to an assemblage of their peers, teachers, and other symposium attendees, and to allow judges to select those presentations that merit special recognition.

SESSION TIMING

The research presentation may not exceed 12 minutes, followed by a maximum 6-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. At the 12-minute point, the student speaker must stop the presentation, even if they have not finished. Following the presentation, the session moderator will ask for judges' questions. The speaker may repeat a question before answering so the audience may understand the entire dialogue. The speaker may entertain questions from the audience at the discretion of the session moderator if time permits and while the exchange appears interesting and relevant. Questions intended to harass the student speakers will not be allowed by the session moderator.

EQUIPMENT

Available audio-visual equipment in each session at GJSHS includes: (1) projector; (2) projection screen; (3) laptop computer. Students may bring their own laptop computer for use during their presentation. Equipment operators will not be available in each session. Students may enlist the help of a teacher or fellow student when experiencing difficulty with the audiovisual equipment. Students should be prepared to re-show visuals during the questioning period.

COMPUTER USAGE

Presentations must adhere to the following:

1. Incorporate any illustrations or other graphical representations into a PowerPoint (or other slide presentation program) for presentation during the symposium.
2. Save the presentation file in a reliable location, such as a USB flash drive, the cloud, or both.
3. Prepare for any equipment problems by bringing back-up presentation materials.
4. Start computer equipment that may be brought to the symposium prior to the designated presentation time. Additional presentation time may not be available to cue up a presentation.

AUDIO AND VIDEO USAGE

Any use of audio or video must comply with the following:

1. Audio/video may be used only for aspects of the presentation that cannot adequately be presented in a slide.
2. Audio/video material must integral to the research and should not be a substitute for presentation of data.
3. Video must not be used showing common procedures, equipment, or laboratory facilities.
4. Audio/video should illustrate work that was done and should not be used for stimulation or aesthetic value.
5. Audio/video cannot make up more than one (1) minute of the presentation.
6. Audio/video must be embedded in the presentation.
7. Recorded or mechanically produced narration is not permitted. Narration must come from the presenter.

OTHER PRESENTATION AIDS

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.**

Presentation Tips & Suggestions

Remember, you are the expert. No one in the audience knows as much about your research investigation as you. Explain your research in enough detail so the audience will understand what you did, how you did it, and what you learned. 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.

Practice will help perfect the presentation and the timing. Deliver your presentation at a comfortable pace. It helps to practice your presentation before a non-specialized audience. Do listen to the advice of your non-specialized audience but also get help from a teacher or other advisors as needed.