Junior Science and Humanities Symposium
Core Rules of Competition

Junior Science and Humanities Symposium (JSHS) is a Department of Defense sponsored STEM program (U.S. Office of the Secretary of Defense and the U.S. Departments of the Army, Navy, and Air Force) for high school students enrolled in grades 9-12 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.

Eligibility Rules: Regional and National Symposia

1. Students may compete in only one regional symposium. The address of the student's school/organization determines the region.
2. Citizenship. Students must be a citizen or permanent resident of the United States or U.S. territory to participate in JSHS.
3. 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 discuss how the project was expanded (e.g., methodology, new variables); discuss any revisions in experimentation and present new data.
4. 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 presenter is part of a larger group, the presentation should focus on the coordinated efforts of all team members and properly acknowledge the contributions of the team (students, mentors, and/or teachers). A team leader should be selected to register and present the results of the group work. The research may not be presented by any other member of the team. The judging criteria used to judge all JSHS presentations remains the same.
5. Team projects awards. 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. Scholarships and other awards available at Regional and National Symposia are awarded to the presenter.
6. Projects that are demonstrations, 'library' research or informational projects are not appropriate for JSHS.
7. The date/time for the student's presentation is determined by regional and national symposia leadership. A student must be present for the assigned time or risk disqualification.

Students who wish to apply to JSHS should contact the JSHS regional symposium director in their area to obtain application guidelines and materials and be prepared to:

- Submit a written report (abstract or abstract and paper) of the completed research investigation through CVENT for review by a regional panel of judges.
- Submit the JSHS provided *Statement on Outside Assistance* form, which states your role in the conduct of the research investigation, describes any outside assistance received, and attests to

the proper conduct of research procedures and protocols in any research involving vertebrate animals or human subjects; deliver a concise oral presentation to the symposium.
- Complete registration with all application materials through CVENT by the regional submission deadline.
- Comply with regional and national rules and policies that apply to the preparation of the written reports and the oral presentations.

The written and oral reports should present the results of the student's original research investigation. Assistance from teachers, mentors, parents, or other students may be obtained. However, students must clearly communicate their role in the completion of the investigation and understanding of the research results.

To request application materials, or to find out how you and your school may participate, please contact the director of the regional symposium in your area.

Schedule and Deadlines

Eligible high school students are invited to apply to the JSHS Regional Symposium in their area. Application deadlines vary by region with regional symposia held as early as October through March. Students and teachers are strongly encouraged to visit the JSHS website to find the regional submission deadline.

September – December	JSHS Regional Symposia invite student applications and teacher nominations. Regional symposia deadlines vary.
January – March	JSHS Regional Symposia held.
April – May	National JSHS held. National JSHS student finalists win the honor to progress to National JSHS at affiliated regional symposia. The number of student finalists who advance to National JSHS varies by regional symposium.

Core Rules and Guidelines for JSHS Submissions

Students apply to JSHS by submitting a written report (abstract and/or paper as required by the region) of the completed research investigation, and *Statement on Outside Assistance* through CVENT. Additional supplementary forms will be requested and communicate regional policies and procedures.

A first round of judging is conducted by university faculty and other STEM personnel who review the student's submissions to select those students who will compete in the regional symposium. Selected students may be invited to present their research in oral competition, poster competition, or attend as a student delegate. Selected presentations will represent the finest efforts of high school students in the state or region toward either original laboratory research, field research, or applied research. Both oral and poster presenters are competing at the regional symposium for the opportunity to advance to the National JSHS. The number of students who advance to National JSHS may vary based on the presentation format as determined by the regional symposium.

Eight Categories of Regional and National Symposia

At regional and National Symposia, student research presentations will be organized into eight categories. Categories are assigned based upon a review of all abstracts and the area of research suggested by the student. Student presenters must state on the abstract the major category and the sub-category of their research.

Categories

Environmental Science

Environmental Science/Engineering: Bioremediation, Ecosystems management, Environmental engineering, Land Resource Management, Pollution, toxicity; impact upon ecosystem

Biomedical Sciences

Biomedical medicine, Microbiology, Cellular/Molecular Biology, Genetics, Immunology, Pharmacology, Virology

Life & Behavioral Sciences

Developmental Biology, Plant Physiology, Population Genetics, General Biochemistry, Microbiology, Behavioral Sciences

Medicine & Health

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

Engineering & Technology

Aerospace, Aerodynamics, Electrical Engineering, Energy – Solar, Vehicle Development, Devices, Mechanical Engineering, Robotics

Mathematics & Computer Science

Probability and Statistics, Mathematics, Computer Science – Algorithms, Databases, Networking, Computer Engineering

Physical Sciences

Astronomy, Physics-theoretical, Physics-Solid state, Acoustics, Optics, Thermodynamics, Particle Physics, Quantum Physics, Nuclear; Internet of Things–network of physical objects or “things” embedded with electronics, software, sensors, and network connectivity

Chemistry

Physical Chemistry, Materials, Alternative Fuels, Organic Chemistry (possibly in life science), Chemical Engineering, Earth Science, Geochemistry, Energy–Alternative Fuels, Material Science

Abstract Preparation

All JSHS student applicants must submit a 250-word maximum abstract in electronic format. 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.

The format for the 250-word abstract includes 1-inch margins, keyed in 10 or 12-point font (Times or Times New Roman). Abstracts must be adequate in length but not exceed these specifications. The header preceding the abstract body must include:

1. Title of the research;
2. Authors name(s);
3. High school, high school city, high school state;
4. Name of teacher/mentor/sponsor and his or her organization. Precede the individual's name with a subheading (i.e. teacher, mentor, sponsor);
5. Include one line of space between the heading and the abstract body.

Symposium proceedings will include abstracts. Please carefully proofread your submission since abstracts will not be typed or edited.

Research Paper Preparation

Affiliated regional symposia require submission of the research paper at varying times during the application process. Regional symposia may require submission of the research paper at the beginning of the application process or invite papers after the first review of abstracts is completed. Requirements for the research paper follow.

- The paper should be in APA Style student format. For help with APA, see the APA Guide and Purdue OWL. Both sites also have sample papers as examples.
- The paper should be a minimum of 5-6 pages and a maximum of 40 pages double-spaced, including appendices and references.
- Submitted papers must be double-spaced.
- Photography, graphs, tables, diagrams, charts, or other graphic representation
- presented in the paper must be simply presented and comply with the maximum file size limit of 1.8 Mb.
- A maximum size limit for the electronic research paper is 1.8 Mb.
- 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,
    - 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",

- table of contents,
- introduction,
- materials and methods,
- results (data or findings),
- discussion and conclusions,
- references, or literature cited, and
- appendices (if necessary but please keep in mind that the introduction is far more valuable in the judging process than appendices of raw data)

Statement on Outside Assistance

All JSHS applicants prepare and submit a Statement on Outside Assistance form as a part of their registration. 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.

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 JSHS requires students to acknowledge in their written research report, and in the *Statement on Outside Assistance*, that proper procedures and protocols were followed. Projects which 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.

Suggestions to Prepare for the Presentations

Remember, you are the expert. No one in the audience knows as much about your research investigation as you. Therefore, remember to 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.

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

Requirements for the Oral Presentations

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. At the 12-minute point, the student speaker must stop the presentation even if he or she has not finished. Following the presentation, the session moderator will ask for judging panel questions. If time permits, the speaker may entertain questions from the audience while the exchange appears interesting and relevant. Questions intended to harass the student speakers will not be allowed by the session moderator. The speaker should repeat a question before answering so the audience may understand the entire dialogue.

Requirements for the Poster Presentations

Display

Materials for the poster may be pre-printed or handwritten and may be attached to a tri-fold board as one large sheet or in pieces. Posters for competition must include and or meet the following standards:

- Poster board dimensions are 36" high x 48" wide. The poster board includes two folds;
- fold dimensions are 12” x 24” x 12”.
- Header boards are allowed and must be no larger than 10” high x 36” wide. The Header
- board should only contain a title.
- The poster should be visible from a 4-foot distance.
- The Title should be at least one inch (72 pts) in height. The student’s name and regional should be included and should be (48 pts). All other lettering should be in 24-point font size. (Point size indicated above is suggested size only).
- The poster should be balanced and organized in a logical, sequential order.
- Keep the amount of text to a minimum.
- There should be more emphasis on graphics, tables, charts, and graphs. These items should be cited on the poster board.
- Photographs in addition to other illustrations may be used. Figures may be in color.
- No hazardous materials are allowed. No specimens, no apparatus, no chemical reagents, no models are to be used during the presentation. Only printed material, affixed to the poster, will be allowed for the poster presentation.
- All materials must be prepared (printed) and “poster ready” in advance of arriving.

Judging Process

Judging Criteria

Regional and National judges evaluate students’ presentations using the below criteria. National judges rank each of the presentations based on the criteria and using a scale from 1 to 5. The scores are tallied for each presenter and used as the basis for discussion among judging team members where each criterion is considered.

- Statement and identification of research problem

- Scientific thought, creativity/innovation, appropriate duration
- Research or engineering design and procedures
- Logical conclusion relevant to the research problem. What was learned? Did student recognize contribution to the field?
- Skill in communicating results

PowerPoint Suggestions

Student presenters are reminded to:

- Embed any video, or other presentation developed through other software, into PowerPoint.
- Save the PowerPoint presentation to an IBM-compatible thumb drive and plug into available PC-based equipment with that thumb drive.
- Bring back-up media.
- If using video, students must comply with the following ground rules:
- The video component cannot make up more than one (1) minute of the presentation and must be directly relevant to the project.
- 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.
- Videos (and audio, if any) may be used only for those aspects of the presentation that cannot adequately be presented in a slide. Video material presented must be an integral part of the research and should not be a substitute for presentation of data. Videos must not be used for presentation of common procedures, illustrating equipment or showing laboratory facilities. Videos should illustrate work that was done and should not be used for stimulation or aesthetic value.