The Ohio Academy of Science (OAS) is a membership-based, not for profit organization founded in 1891. It is the leading organization in Ohio to foster curiosity, discovery, and innovation. OAS strives to unite all who value education, science, engineering, technology, or their applications to benefit society. The Academy conducts professional meetings, publishes a scientific journal, and directs District Science Day Programs and the State Science Day Program. The success that we have achieved over the years in our Science Day Programs is due in part to the professional integrity and conduct of the judges who volunteer to assess our students.

It is vital that each judge understands thoroughly his or her duties and obligations prior to student project judging in the Science Day Program. This Judges' Guide should be read by each potential judge before arrival at the Science Day site. For additional information or questions prior to the event, please contact the Ohio Academy of Science:

Phone: 614.488.2228
Email: info@ohiosci.org
Website: http://www.ohiosci.org

Note that all judges are expected to have a genuine interest in young people combined with a desire to offer Science Day participants both guidance and encouragement as they pursue learning in the various fields of science, engineering, mathematics and technological design. Judges will assess each student's research project and award numerical points using the Criteria described within this document. Judges also are expected to write comments to the student that provide support and evidence regarding the numerical number and rating assigned. Comments are to be stated in a professional manner, and should provide the student with encouragement for what they have achieved, as well as suggestions for further research, data collection, sampling, model design, etc. that would improve their score.

Table of Contents

I. Expectations for all Judges of the Ohio Academy of Science

Judges are expected to:

- **Attend the informational meeting held prior to the distribution of student project score cards.**
- **Ask for clarification or additional information at the meeting when necessary.**
- **Be knowledgeable of all The Ohio Academy of Science's requirements and expectations for Science Day participants.**
- **Review each student name, school, and project title on the judging cards received.**
- **Immediately return any student judging card to Science Day officials when (1) the student is known, (2) the project is out of the area of expertise, or (3) there are language issues that may impair communication.**
- **Address a Science Day Official when experiencing any problems or questions during the Judging process.**
- **Keep in mind that the Mission of the Ohio Junior Academy of Science is to discover and foster interest in science, technology, engineering and mathematics among students in grades 5-12.**

II. Instructions

Students have been instructed to present their project to two judges, one of whom (where possible) will be a K-12 educator. This may be achieved as a team of judges or separately, with the scores averaged. Each Judge's scores are to be determined using the criteria of The Ohio Academy of Science. Although judges should discuss the performance of the student, each judge shall score independently of the other judge and shall not reveal the scores to the other judge(s) or to the student. Only Science Day officials may inform the student of the scores or ratings after judging.

- Judges should introduce themselves upon approaching a student and establish a friendly rapport to help reduce the participant's tension. Judges are expected to be exceptionally courteous to all students.

- The student should first be asked to give their prepared oral presentation of the project while judges listen carefully to the complete report. Secondly, it is proper for Judges to ask questions within the discipline or subject matter involved at the student's level of learning. Students are expected to respond to questions about her/his work on the specific problem.

- Judges should also question the participant on his/her work on the specific problem or design, the materials and tools used, the methods of construction, terms mentioned, the sources of information, as well as the amount and type of assistance enlisted in the preparation of the project.

- Judges should take an active part in the evaluation; silence may be interpreted as disinterest or boredom, which can have a very discouraging effect on the participant. Judges should determine the span of sustained interest in the particular field of science, as well as the approximate amount of time spent in developing the project being evaluated. Some premium should be granted for considerable extended interest and effort to encourage this quality of persistence.

- Judges are **required** to check through the abstract, the research plan, and research report to determine their quality. A check of the references will assist judges in making fair determination of the scope and depth of the literature search. The quality and quantity of the references should be taken into account to evaluate the student's research methodology.

- Judges are to **review the Project Data Book** used for documentation. Note the number of entries, the dates, as well as the number of subjects or specimens used. Consider if the number is adequate to generalize to the larger group what the sample is intended to represent.

- Judges **are expected to write statements to the student/s in a professional manner** on the back of each score card. The scorecard will be returned to the student, thus the comments should reflect reasons for the rating, as well as suggestions for improvement.

- Judges are to discuss the final scoring of the project a considerable distance from the participant, since disclosure of scores is delayed until the judging of all student projects is completed.

III. Judging Scores

Minimum number of points for each rating:

For Individual Student Projects (maximum of 40 points)

36 is the **minimum** number of points required to earn a **Superior Rating**

24 is the **minimum** number of points to earn an **Excellent Rating**

12 is the **minimum** number of points to earn a **Good Rating**

4 is the **minimum** number of points to earn a **Satisfactory Rating**

(Satisfactory Ratings are not given at State Science Day)

For Team Projects (maximum of 50 points)

45 is the **minimum** number of points required to earn a **Superior Rating**

30 is the **minimum** number of points required to earn an **Excellent Rating**

15 is the **minimum** number of points required to earn a **Good Rating**

5 is the **minimum** number of points required to earn a **Satisfactory Rating**

(Satisfactory Ratings are not given at State Science Day).

All students at local, District or State Science Days shall have an abstract and a written report, which documents that the student has searched relevant literature, stated a

question and/or tested an hypothesis or a technological design statement, collected and analyzed data, and drawn conclusions.

To earn a Superior rating, an individual student shall receive a minimum of 36 points, based on the criteria of: 1) Knowledge Achieved, 2) Effective Use of Scientific Method or Technological Design, 3) Clarity of Expression, 4) Originality and Creativity. A fifth criterion, Teamwork, consisting of a maximum of 10 points, shall be applied to team student research projects. Thus, a team research project needs a minimum of 45 points for a superior rating

IV. Judging Criteria for Individual and Team Projects

- **Individual Projects will be judged on the following criteria:**
  - Knowledge Achieved (considering student's age and grade level)
  - Effective use of Scientific Method or Technological Design
  - Clarity of Expression
  - Originality and Creativity

  Each criterion is rated 1 through 10 points with 40 points being the maximum
  - Superior range is 36- 40 points
  - Excellent range is 24-35 points
  - Good range is 12-23
  - Satisfactory range is 4-11

- **Team Projects will be judged on the following criteria:**
  - Knowledge Achieved (considering student's age and grade level)
  - Effective Use of Scientific Method or Technological Design
  - Clarity of Expression
  - Originality and Creativity
  - Teamwork

  Each criterion is rated 1 through 10 points with 50 being the maximum
  - Superior range is 45-50 points
  - Excellent range is 30-44 points
  - Good range is 15-29 points
  - Satisfactory range is 05-14 point

V. The Criteria Interpreted

The following explanations interpret the various criteria on which the student's project or exhibit will be judged. The bullets refer to elements of the student/s project to be considered; they have no numerical value.

Knowledge Achieved (considering the student's age and grade level)

- Accurate use and understanding of terms, principles, concepts, and data
- Evidence that student acquired in-depth knowledge
- Literature search: consider the extent of scientific, engineering or medical journals/sources.
- Supplements responses with additional information

Effective Use of Scientific Method or Technological Design

- Well-documented Project Data Book/notebook/ lab journal.
- Experimental Design: specific problem or question, clearly stated hypothesis or technological design statement
- Experimental Design: clear method(s) with correctly defined and measured variables and controls
- Experimental Design: sufficient understanding of methods from related studies in the literature
- Data handling, data tables, graphs, statistics; sufficient number of trials or samples for the problem
- Valid conclusion(s) related, or a discussion of results
- Effective and accurate use of professional equipment, or construction/use of home-made apparatus, equipment, experimental materials, or models

Clarity of Expression

- Explanation and understanding of the entire project is demonstrated in the student's Oral Presentation and/or in responses to questions.
- Written report: shows comprehension of topic; includes title, organization, data, results, citations, and references are listed.
- Abstract with clear statement of results
- Ability to explain written passages of the Abstract, Research Report, and Project Data Book.

Originality and Creativity

- New idea, concept, principle, hypothesis, insight or non-obvious approach or problem definition
- Novel association or relationship of previous discoveries or knowledge
- Inquiry or Designed based rather than a summary of knowledge
- Unique approach to a problem, ingenious use of materials
- Evidence of initiative; rigorous analyses of extensive or robust data, or results that reveal previously unknown relations

Teamwork

- Team projects shall be accepted at all District Science Days. The revised 50-point rating scale shall be used to evaluate team projects.
- A team consists of a maximum of three students. A District Science Day may allow a maximum of two students per team due to local limitations.
- All team members must be present to be judged at District and State Science Day or the project will be disqualified.
- All team members are required to belong to the same school and same grade brackets (a) grades 5-6, (b) grades 7-8, and (c) grades 9-12.
- Each team should appoint a team leader to coordinate the work and act as spokesperson. However, each member of the team is expected to be able to serve as spokesperson, be fully involved with the project, and be familiar with all aspects of the project. The final work should reflect the coordinated efforts of all team members.
- A supplemental sheet of the contribution each member made towards the team project must be signed by each member and must be included in the project display and in the Project Data Book.
- Full names of all team members must appear on the Abstract and Registration forms.
- The judges are expected to request from each team member, a description of what the student considers to be their most important contribution.

VI. Ranking vs Criteria

Judges for the Academy are expected to compare students with the judging criteria to determine the earned score, except to fill quotas for participation in District and State Science Days, The Ohio Academy of Science does not rank students at Local, District, or State Science Days.

VII. Judging Ethics

Judges shall:

- Have no prior involvement with the participant or project
- Adhere to all Ohio Academy of Science Guidelines
- Judge students against CRITERIA not against other students
- Listen carefully to student's complete presentation
- Be attentive and courteous to students at all times
- Evaluate theoretical and applied projects without bias toward either
- Provide written, constructive criticism and suggestions for improvement
- Seek written permission from students to photograph them
- Not photograph students or projects during judging
- Avoid discussion of ratings with others prior to public release