

Experimental Investigation Rubric

Judging Criteria for Research Papers, Power Point and YouTube Presentation

The following are criteria for judging used by the Illinois Junior Academy of Science. The CPS Exhibition of Student STEM Research uses the same criteria with some modifications where necessary

- ▶ There are usually three scoring levels (low, middle and high) for each factor being examined during the judging procedure.
- ▶ Student experimenters should strive to achieve the top criteria listed below.

Evidence of Scientific Processing Skills

Science Processing Skills (1-8 pts) _____ points

- ▶ Exhibits a thorough understanding and the application of the scientific method. The student has acquired scientific skills.

Scientific Approach (1-20 pts) _____ points

- ▶ Has a well-defined problem and a clearly stated hypothesis?
Uses a logical, orderly method for solving the problem.
Problem was solved using scientific principles. Method was appropriate and effective.
- ▶ The independent (experimental) variable(s) have been thoroughly defined. Those significant variables not manipulated have been controlled.
- ▶ A control (known standard) was present OR when a control group is not possible or appropriate a comparison was made among trial groups.

Accuracy of Data and Observations (1-8 pts) _____ points

- ▶ An adequate sample size and/or sufficient repetitions were performed to gather enough data to reach a reliable conclusion.
Data collected is numerical and metric, if applicable. Observations were carefully recorded and accurate.

Data Analysis and Discussion (1-8 pts) _____ points

- ▶ The data has been analyzed and its importance has been discussed.
Logical inferences were made.

Experimental Error (1-2 pts) _____ points

- ▶ Measurement error affecting the conclusion has been considered and discussed.

Validity of Conclusion (1-8 pts) _____ points

- ▶ Conclusion is consistent with data and observations and is supported by the data collected.
- ▶ Conclusion referred to purpose and hypothesis.

Originality (1-5 pts)

_____ points

- ▶ Demonstrates a novel approach and/or idea. Exhibits a creative approach to problem-solving.

Scientific Communication – Power Point

Information: Experimental (1-4 pts)

_____ points

- ▶ Gives complete explanation of the project. Power point includes graphics, charts, and/or pictures.

Artistic Qualities (1-3 points)

_____ points

- ▶ Power point is neat, organized, and appealing. No spelling errors are present.

Scientific Communication – YouTube Presentation

Presentation Quality (1-3 pts)

_____ points

- ▶ Clear presentation; concisely summarizes the project. Information is relevant and pertinent. Student exhibits a thorough understanding of their topic area.

Dynamics (1-3 pts)

_____ points

- ▶ Speaks fluently; polite, dynamic, and interested in their project.

Written Report

Abstract (0-2 pts)

_____ points

- ▶ Abstract present; contains a concise summary of the purpose, procedure, and conclusion in 250 words or less. The proper IJAS form was used.

Safety Sheet (0-2 pts)

_____ points

- ▶ The safety sheet identifies all of the major safety hazards, precautions taken, and any endorsement sheets (if necessary), which describe the use of human or non-human vertebrates or microorganisms, and ensures the safe use of such organisms. The proper IJAS form was used.

Title Page/Table of Contents (0-2 pts)

_____ points

- ▶ Title page is clear and concise. The table of contents is complete and includes pagination.

Acknowledgements (0-1 pt)

_____ points

- ▶ Credit has been given to those who have helped with the project.

Purpose and Hypothesis (0-2 pts)

_____ points

- ▶ The testable question (purpose) has been identified and a prediction has been made.

Background Research (BR) (0-4 pts)

_____ points

- ▶ Background research is in-depth and the information is pertinent and supports the experiment. BR is adequately cited using APA format.

Materials (0-2 pts)

- ▶ All materials are listed and measurements are in metric, if applicable.

_____points

Procedure (0-2 pts)

- ▶ Procedure is complete and easily followed; all steps included.
Measurements are in metric, if applicable.

_____points

Results (0-3 pts)

- ▶ Results (data) are organized in tables or graphs and can be easily read by someone not familiar with the work. Discussion or interpretation of data and effect of error should be included.

_____points

Conclusion (0-2 pts)

- ▶ A concise evaluation and interpretation of the data and/or results.

_____points

Reference List (0-2 pts)

- ▶ Quality, quantity and variety of sources (5-12) are adequate for topic. Sources listed are cited within Background Research.
- ▶ Most sources are current.

_____points

Technical Aspects (0-2 pts)

- ▶ Good grammar and spelling are evident. The student’s last name is in the upper right-hand corner of all pages after the table of contents. Font size and type are appropriate.

_____points

Neat and Orderly (0-2 pts)

- ▶ Is neat and follows the Policy and Procedure Manual order as listed on this judging sheet

_____points