



# Part Three: Guidelines for Judging

## Judging Criteria for Posters and Papers – Experimental Investigation

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 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

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

#### Scientific Approach: Overall

- ▶ 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.

#### Scientific Approach: Variables

- ▶ The independent (experimental) variable(s) have been thoroughly defined. Those significant variables not manipulated have been controlled.

#### Scientific Approach: Control/Comparison Group

- ▶ 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

- ▶ 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

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

#### Experimental Error

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

#### Validity of Conclusion

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

#### Originality

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

### Scientific Communication - Display

#### Information: Experimental

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

#### Artistic Qualities

- ▶ Display board is neat, organized, and appealing. No spelling errors are present.

### Scientific Communication - Oral Presentation

#### Presentation Quality

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



## **Dynamics**

- ▶ Speaks fluently with good eye contact; polite, dynamic, and interested in their project.

## **Written Report**

The parts of the written report should be evaluated for their merits as further evidence of scientific processing skills.

### **Abstract**

- ▶ 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**

- ▶ 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**

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

### **Acknowledgements**

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

### **Purpose and Hypothesis**

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

### **Background Research (BR)**

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

### **Materials**

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

### **Procedure**

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

### **Results**

- ▶ 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.

### **Conclusion**

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

### **Reference List**

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

### **Technical Aspects**

- ▶ 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.

### **Neat and Orderly**

- ▶ Is neat and follows the Policy and Procedure Manual order as illustrated on left side of judging sheet



# Judging Criteria for Projects and Papers – Design Investigation.

## Evidence of Design Processing Skills

### Design Processing Skills

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

### Design Approach: Overall

- ▶ Has identified a need or real world problem. Uses a logical, orderly method for addressing the problem or need. Method was appropriate and effective.

### Design Approach: Performance Criteria

- ▶ Clear performance criteria have been developed to address the features of the product, algorithm, proof, model, etc.

### Design Approach: Preliminary Design Plan

- ▶ A clear plan had been presented using a block diagram, flowchart or sketch. The design plan shows all of the parts and/or subsystems of the design and how all parts of the design work together.

### Constructing and Testing the Design Prototype

- ▶ Have constructed and tested a prototype of their best design. This may involve targeted users and/or analysis of data sets. (This may or may not include traditional data).

### Redesign and Retest

- ▶ Shows evidence that changes in design were made to better meet the performance criteria established at the beginning of the project. Test results may be included in tables, if applicable. Data analysis/validation may be present.

### Validity of Evaluation/Conclusion

- ▶ The conclusion accurately reports the successes and failures of the preliminary design, what changes were made, and how the redesign more closely met the performance criteria.

### Originality

- ▶ Demonstrates a novel approach and/or idea. Exhibits a creative approach to design. Shows evidence that other designs were investigated that addressed the same need or real world problem.

## Scientific Communication - Display

### Information: Experimental

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

### Artistic Qualities

- ▶ Display board is neat, organized, and appealing. No spelling errors are present.

## Scientific Communication - Oral Presentation

### Presentation Quality

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

### Dynamics

- ▶ Speaks fluently with good eye contact; polite, dynamic, and interested in their project.

## Written Report

- ▶ The parts of the written report should be evaluated for their merits as further evidence of design processing skills.

### Abstract

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