

Experimental Design B/C

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Disclaimer

- This presentation was prepared using draft rules. There may be some changes in the final copy of the Rules.
- The Rules released in September 2024 will be the official Rules and should be used for all competitions.

Parts of this Presentation

- Review of the Event and the Rules
- Suggestions for Preparing Students

The Importance of Experimental Design



Ex Des: Rules Overview

- Teams of up to 3 participants design, conduct, and report the findings of an experiment conducted on site that addresses the assigned question/topic area (3.a)
- Participants must complete a laboratory activity and collect real data or score will be reduced (4.g)
- Teams will have an approximate time of 50 minutes and must have Eye Protection C (chemical splash goggles) available.

Ex Des: Rules Overview

- During the first 20 minutes of the event, participants receive the topic, materials, and Part I of the report packet.
Participants will design and conduct their experiment (3.b)
- After the first 20 minutes participants will receive Part II of the report packet and will focus on analyzing their experiment and reporting findings (3.c)
- Only the lab report will be scored according to a rubric (4.a)
There are different rubrics for Divisions B and C.

The Report Rubric

- Part I – Design and Construction of the Experiment (first 20 min)
 - Statement of the Problem
 - Hypothesis
 - Variables
 - Experimental Control (Standard of Comparison) (C Only)
 - Materials
 - Procedure and Set Up Diagrams
 - Qualitative Observations
 - Quantitative Data - Data Table

The Report Rubric

- Part II - Data, Analysis & Conclusions
 - Graph
 - Statistics
 - Significant Figures (C Only)
 - Analysis of Claim/Evidence/Reason (CER)
 - Possible Experimental Errors
 - Conclusion
 - Recommendations for Further Experimentation
 - Abstract (C Only - NEW - State & Nationals ONLY)

Rule Changes for 2023-2024

- For Division C - the Abstract section is only completed and scored at the state and national levels.
- Rule 4i: Any team not collecting data by conducting an experiment on-site **or falsifying/making up fake data** will have their final score multiplied by 0.25.

Suggestions for Preparing Students

- Practice, Practice, Practice!
- Set up sample topic areas for students with materials and have the students complete the lab and write the report
- Have the students score their report using the rubric to determine areas to improve
- Have other students score the report using the rubric and have a discussion (Peer Review)

Suggestions for Teachers

- Consider using this in the classroom at the beginning of the year when introducing scientific inquiry thinking
- Go over the rubric with the students and divide the students into groups
- All groups have the same topic area/materials or different for each group (have a set of 10-15 different kits available)
- The first time give kids a couple of class periods to complete the entire activity
- This makes a great activity when a sub is needed

Additional Resources

- [Information on Claim, Evidence, Reasoning Framework](#)
- Division B Scoring Rubric (coming this fall)
- Division C Scoring Rubric (coming this fall)
- SO test packets with past national topic areas and material lists, are available on www.soinc.org