Experimental Design

Division B/C

Georgia Tech Event Workshop Series
2024-25

Science Olympiad at Georgia Tech®

01 RULES SHEET

02 DIFFICULT TOPICS

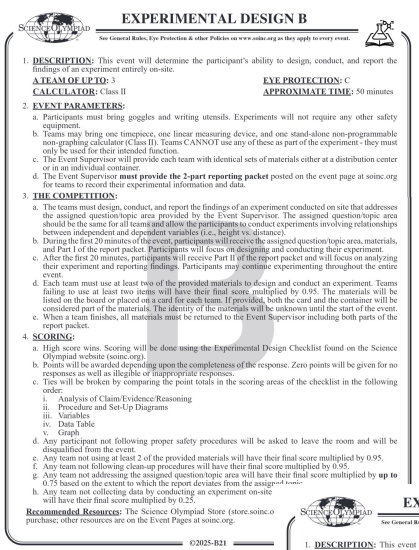
03 COMMON QUESTIONS

04 TIPS FROM A VETERAN

05 OTHER FREE RESOURCES

The Rules Sheet

- **Short/Basic Description:** make a science fair project in 50 minutes
- **Differences between Div B and C:**
  - Standard Of Comparison
  - 3 vs 4 levels of IV
  - Sig Figs
  - Abstract
- **NEW**: “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”



EXPERIMENTAL DESIGN B

See General Rules, Eye Protection & other Policies on www.soinc.org as they apply to every event.

1. **DESCRIPTION:** This event will determine the participant's ability to design, conduct, and report the findings of an experiment entirely on-site.
   A TEAM OF UP TO: 3 **EYE PROTECTION:** C
   CALCULATOR: Class II **APPROXIMATE TIME:** 50 minutes
2. **EVENT PARAMETERS:**
   a. Participants must bring goggles and writing utensils. Experiments will not require any other safety equipment.
   b. Teams may bring one timepiece, one linear measuring device, and one stand-alone non-programmable non-graphing calculator (Class II). Teams CANNOT use any of these as part of the experiment - they must only be used for their intended function.
   c. The Event Supervisor will provide each team with identical sets of materials either at a distribution center or in an individual container.
   d. The Event Supervisor **must provide the 2-part reporting packet** posted on the event page at soinc.org for teams to record their experimental information and data.
3. **THE COMPETITION:**
   a. The teams must design, conduct, and report the findings of an experiment conducted on site that addresses the assigned question/topic area provided by the Event Supervisor. The assigned question/topic area should be the same for all teams and allow the participants to conduct experiments involving relationships between independent and dependent variables (i.e., height vs. distance).
   b. During the first 20 minutes of the event, participants will receive the assigned question/topic area, materials, and Part I of the report packet. Participants will focus on designing and conducting their experiment.
   c. After the first 20 minutes, participants will receive Part II of the report packet and will focus on analyzing their experiment and reporting findings. Participants may continue experimenting throughout the entire event.
   d. Each team must use at least two of the provided materials to design and conduct an experiment. Teams failing to use at least two items will have their final score multiplied by 0.95. The materials will be listed on the board or placed on a card for each team. If provided, both the card and the container will be considered part of the materials. The identity of the materials will be unknown until the start of the event.
   e. When a team finishes, all materials must be returned to the Event Supervisor including both parts of the report packet.
4. **SCORING:**
   a. High score wins. Scoring will be done using the Experimental Design Checklist found on the Science Olympiad website (soinc.org).
   b. Points will be awarded depending upon the completeness of the response. Zero points will be given for no responses as well as illegible or inappropriate responses.
   c. Ties will be broken by comparing the point totals in the scoring areas of the checklist in the following order:
      i. Analysis of Claim/Evidence/Reasoning
      ii. Procedure and Set-Up Diagrams
      iii. Variables
      iv. Data Table
      v. Graph
   d. Any participant not following proper safety procedures will be asked to leave the room and will be disqualified from the event.
   e. Any team not using at least 2 of the provided materials will have their final score multiplied by 0.95.
   f. Any team not following clean-up procedures will have their final score multiplied by 0.95.
   g. Any team not addressing the assigned question/topic area will have their final score multiplied by **up to** 0.75 based on the extent to which the report deviates from the assigned [illegible]
   h. Any team not collecting data by conducting an experiment on-site will have their final score multiplied by 0.25.

Recommended Resources: The Science Olympiad Store (store.soinc.o purchase; other resources are on the Event Pages at soinc.org.

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EXPERIMENTAL DESIGN C

See General Rules, Eye Protection & other Policies on www.soinc.org as they apply to every event.

1. **DESCRIPTION:** This event will determine the participant's ability to design, conduct, and report the findings of an experiment entirely on-site.
   A TEAM OF UP TO: 3 **EYE PROTECTION:** C
   CALCULATOR: Class III **APPROXIMATE TIME:** 50 minutes
2. **EVENT PARAMETERS:**
   a. Participants must bring goggles and writing utensils. Experiments will not require any other safety equipment.
   b. Teams may bring one timepiece, one linear measuring device, and one stand-alone calculator (Class III). Teams CANNOT use any of these as part of the experiment - they must only be used for their intended function.
   c. The Event Supervisor will provide each team with identical sets of materials either at a distribution center or in an individual container.
   d. The Event Supervisor must provide the 2 part reporting packet posted on the event page at soinc.org, for teams to record their experimental information and data.
3. **THE COMPETITION:**
   a. The teams must design, conduct, and report the findings of an experiment conducted on site that addresses the assigned question/topic area provided by the Event Supervisor. The assigned question/topic area should be the same for all teams and allow the participants to conduct experiments involving relationships between independent and dependent variables (i.e., height vs. distance).
   b. During the first 20 minutes of the event, participants will receive the assigned question/topic area, materials, and Part I of the report packet. Participants will focus on designing and conducting their experiment.
   c. After the first 20 minutes, participants will receive Part II of the report packet and will focus on analyzing their experiment and reporting findings. Participants may continue experimenting throughout the entire event.
   d. Each team must use at least two of the provided materials to design and conduct an experiment. Teams failing to use at least two items will have their final score multiplied by 0.95. The materials will be listed on the board or placed on a card for each team. If provided, both the card and the container will be considered part of the materials. The identity of the materials will be unknown until the start of the event.
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   g. Any team not addressing the assigned question/topic area will have their final score multiplied by up to 0.75 based on the extent to which the report deviates from the assigned topic.
   h. 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.

Recommended Resources: The Science Olympiad Store (store.soinc.org) carries a variety of resources to purchase; other resources are on the Event Pages at soinc.org.

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EXPERIMENTAL DESIGN CHECKLIST C

See General Rules, Eye Protection & other Policies on www.soinc.org as they apply to every event.

(Note: The maximum points available for each task are shown.)

Part I – Design and Construction of the Experiment (70 pts)

A. Statement of the Problem (2 pts)
- ② ① ⓪ Statement addresses the experiment including variables (Not a yes/no question)

B. Hypothesis (6 pts)
- ② ① ⓪ Statement predicts a relationship between the independent and dependent variables
- ② ① ⓪ Statement gives specific direction to the prediction(s) (i.e., a stand is taken)
- ② ① ⓪ A rationale is given for the hypothesis.

C. Variables (20 pts)

a. Independent (IV) & Dependent (DV) Variable (12 pts)
- ④ ③ ② ① ⓪ IV Correctly identified and operationally defined
- ④ ③ ② ① ⓪ Levels of IV given
- ④ ③ ② ① ⓪ DV Correctly identified and operationally defined

b. Controlled Variables (CV) (6 pts)
- ② ① ⓪ First CV correctly identified and relevant
- ② ① ⓪ Second CV correctly identified and relevant
- ② ① ⓪ Third CV correctly identified and relevant

c. Constant (2 pts)
- ② ① ⓪ First Constant correctly identified and relevant

D. Experimental Control (Standard of Comparison) (4 pts)
- ② ① ⓪ SOC logically identified for the experiment
- ② ① ⓪ Reason given for selection of SOC

E. Materials (4 pts)
- ② ① ⓪ All materials used are listed and quantified
- ② ① ⓪ No unused or extra materials are listed

F. Procedure and Set-up Diagrams (14 pts)
- ② ① ⓪ Procedure is presented in list form
- ② ① ⓪ Procedure is in a logical sequence
- ② ① ⓪ Steps for repeated trials are included
- ② ① ⓪ Multiple diagrams of setup are provided
- ② ① ⓪ All diagrams are appropriately labeled
- ④ ③ ② ① ⓪ Procedure detailed enough to repeat experiment accurately

G. Qualitative Observations (12 pts)
- ④ ③ ② ① ⓪ Observations about procedure provided
- ④ ③ ② ① ⓪ Observations about the results provided
- ④ ③ ② ① ⓪ Observations given throughout the course of the experiment

H. Quantitative Data - Data Table (8 pts)
- ② ① ⓪ All raw data is provided
- ② ① ⓪ Condensed data table with only the data to be graphed is provided
- ② ① ⓪ Tables and columns labeled properly
- ② ① ⓪ All data has units

Part II – Data, Analysis and Conclusions (97 pts)

I. Graph (12 pts)
- ④ ③ ② ① ⓪ Appropriate Graph is provided
- ④ ③ ② ① ⓪ Graph properly titled and labeled
- ④ ③ ② ① ⓪ Appropriate scale and units included

J. Statistics (14 pts)
- ④ ③ ② ① ⓪ Statistics of Central Tendency used (i.e., best fit, median, mode, mean)
- ④ ③ ② ① ⓪ One example calculation is given for each statistic with units
- ④ ③ ② ① ⓪ Statistics of Variation are included (i.e., minimum, maximum, range, standard deviation)
- ② ① ⓪ Calculations are accurate

K. Significant Figures (12 pts)
- ④ ③ ② ① ⓪ Data is reported using correct significant figures
- ④ ③ ② ① ⓪ Graph completed using correct significant figures
- ④ ③ ② ① ⓪ Statistics are reported using correct significant figures

L. Analysis of Claim/Evidence/Reason (CER) (18 pts)
- ② ① ⓪ Variation Claim completed logically
- ② ① ⓪ Variation Evidence completed logically
- ② ① ⓪ Variation Reasoning completed logically
- ② ① ⓪ Outliers Claim completed logically
- ② ① ⓪ Outliers Evidence completed logically
- ② ① ⓪ Outliers Reasoning completed logically
- ② ① ⓪ Data Trend Claim completed logically
- ② ① ⓪ Data Trend Evidence completed logically
- ② ① ⓪ Data Trend Reasoning completed logically

M. Possible Experimental Errors (8 pts)
- ④ ③ ② ① ⓪ One specific error is identified and effect on results discussed.
- ④ ③ ② ① ⓪ Second specific error is identified and effect on results discussed.

N. Conclusion (8 pts)
- ② ① ⓪ Hypothesis is re-stated
- ② ① ⓪ Hypothesis Claim completed logically
- ② ① ⓪ Hypothesis Evidence completed logically
- ② ① ⓪ Hypothesis Reasoning completed logically

O. Applications & Recommendations for Further Use (9 pts)
- ③ ② ① ⓪ Suggestions to improve the experiment with rationale are provided
- ③ ② ① ⓪ Suggestions for practical applications of experiment are provided
- ③ ② ① ⓪ Suggestions for future experiments are provided

***Continued on back ***

EXPERIMENTAL DESIGN CHECKLIST C

See General Rules, Eye Protection & other Policies on www.soinc.org as they apply to every event.

P. Abstract (16 pts) **(State and Nationals Only)**
- ④ ③ ② ① ⓪ Brief and well-organized
- ④ ③ ② ① ⓪ Contains the Statement of the Problem and Hypothesis
- ④ ③ ② ① ⓪ Describes the research procedure
- ④ ③ ② ① ⓪ Includes major findings and conclusion

School:_____Team#_____

Point Total: _____/167

Deduction multiplier(s): _____
Materials Used (0.95),
Non-clean up (0.95),
Off topic (0.75),
Non-lab/**Fake/Falsified Data** (0.25)

Final Score: _____

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EXPERIMENTAL DESIGN CHECKLIST

SCIENCE OLYMPIAD

See General Rules, Eye Protection & other Policies on www.soinc.org as they apply to every event.

2023 Experimental Design Division C Checklist

(Note: The maximum points available for each task are shown.)

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② ① ⓪ **Variation** Claim completed logically

② ① ⓪ **Variation** Evidence completed logically

② ① ⓪ **Variation** Reasoning completed logically

② ① ⓪ Outliers Claim completed logically

② ① ⓪ Outliers Evidence completed logically

② ① ⓪ Outliers Reasoning completed logically

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***Continued on back ***


DIFFICULT
TOPICS

Topic 1: Terminology

- **Hypothesis:** an educated guess or prediction about the relationship between the independent and dependent variables in an experiment (if... , then... , because...)
- **Independent Variable:** the variable that you purposely change in an experiment to test its effects
- **Dependent Variable:** the variable that is measured in response to changes in the independent variable
- **Controlled Variable:** variables that are kept the same throughout the experiment to make sure that any changes in the dependent variable are due to the independent variable, not other factors.
- **Standard of Comparison (Control):** The baseline condition in an experiment that serves as a reference point to compare the effects of the independent variable on the dependent variable.
- **Constant:** any factor in an experiment that remains unchanged and is IMPOSSIBLE for the experimenter to change (ex: g = 9.8 m/s^2)

Topic 2: Significant Figures

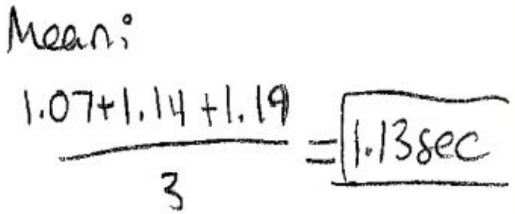
https://scioly.org/wiki/index.php/Significant_Figures

- **Reading the number of significant figures in other people's measurements:**
  - All non-zero numbers count as significant figures.
  - Zeroes placed between significant figures are always significant; 4009 kg has four significant figures.
  - Zeroes placed after a decimal point and a non-zero number are significant; **4.00 kg has three significant figures** and **0.0400 has three significant figures**.
  - All other digits are insignificant. **So the 0 in 0.493 is insignificant and 0.493 has 3 sig figs.**
- **Pure Numbers:** Pure numbers have infinite significant figures, meaning they are exact. If you have 12 eggs, then 12 is a pure number. You don't have 12.01 eggs, or 11.9 eggs. **Do NOT put decimals for pure numbers.**

Topic 2: Significant Figures

https://scioly.org/wiki/index.php/Significant_Figures

- **Addition and Subtraction:** your answer will have as many **decimal places** as the number with the least decimal places.
  - Ex: 4.1 - 3.456 + 44.4 - 2.35 = 42.694 -> 42.7
- **Multiplication and Division:** When multiplying or dividing two physical numbers, the answer will have the same number of significant figures as the number with the least number of significant figures
  - Ex: 2.10 * 3.607 = 7.5747 -> 7.57



From the EXD "Scoring Explanation Doc":

- All data are reported using the proper number of significant figures for the tool of measurement used
  - *These rules do not mean that all numbers must have the same number of significant figures and/or be reported to the same level of precision; rather, each individual measurement must reflect the level of precision of the tool measurement used.*

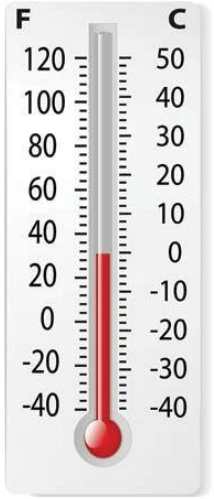
Topic 2: Significant Figures Common Mistakes

Division C

H. Quantitative Data - Raw & Condensed Data Tables

Temperature of Corn Syrup (c°)

Amount of Corn Syrup that drips in 30.0 seconds (grams)	11.7°c	16.3°c	20.0°c
Trial 1	3.74 g	5.96 g	10.9 g
Trial 2	4.28 g	5.98 g	9.87 g
Trial 3	4.11 g	5.83 g	9.13 g



Topic 2: Significant Figures Common Mistakes

J. & K. Statistics - Central Tendency & Variation with sample calculations

Statistic	Mass of Rigid Body (grams) 0.725g	1.38g	2.81g
Min	0.810sec	1.07sec	1.37sec
Median	0.840 sec	1.14sec	1.42 sec
Max	0.868 sec	1.19sec	1.59sec
Range	0.050sec	0.12sec	0.22sec
Mean	0.836sec	1.13sec	1.46sec
Mode	N/A	N/A	N/A
Standard Deviation	0.0206 sec	0.0493 sec	0.0942 sec

Line of Best Fit: $y = 0.288x + 0.670$

R^2: 0.969

Ex Calcs:

1.07sec, 1.14sec, 1.19sec

↑ Min ↑ Median ↑ Max

Mode: 1.07 1.14sec ≠ 1.19sec

N/A

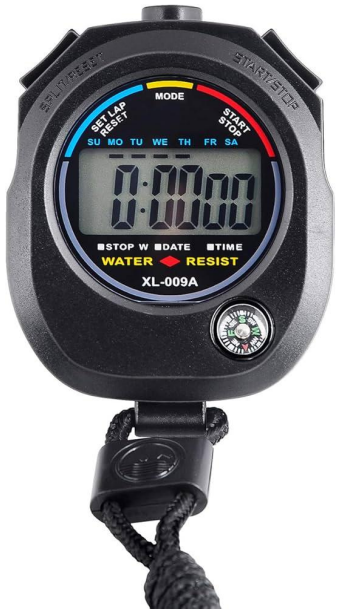
Range: 1.19sec − 1.07sec = 0.12sec

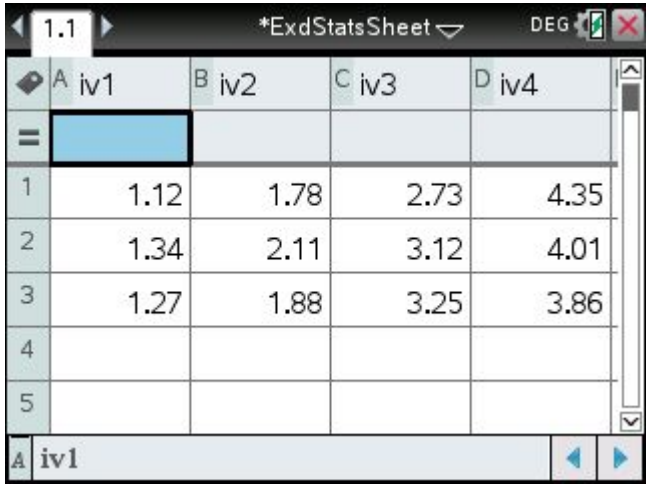
SD: $\sqrt{\frac{(0.06)^2+(0.01)^2+(0.06^2)}{3}}$

$= 0.0493$ sec

Mean:

$\frac{1.07+1.14+1.19}{3} = \boxed{1.13\text{sec}}$

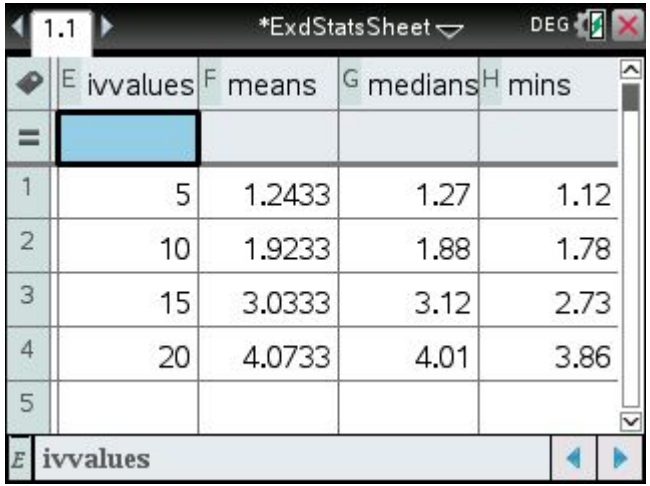




1.1 *ExdStatsSheet DEG

	A iv1	B iv2	C iv3	D iv4
=				
1	1.12	1.78	2.73	4.35
2	1.34	2.11	3.12	4.01
3	1.27	1.88	3.25	3.86
4				
5				

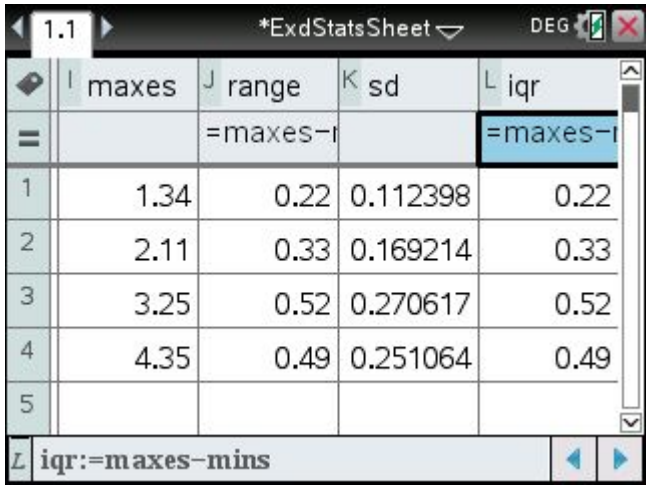
A iv1



1.1 *ExdStatsSheet DEG

	E ivvalues	F means	G medians	H mins
=				
1	5	1.2433	1.27	1.12
2	10	1.9233	1.88	1.78
3	15	3.0333	3.12	2.73
4	20	4.0733	4.01	3.86
5				

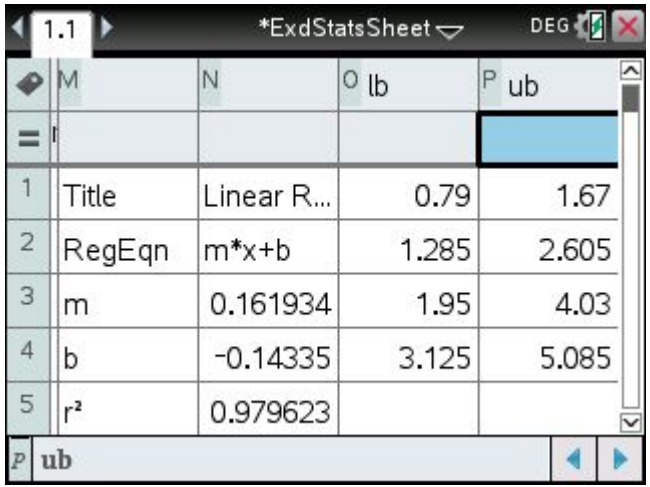
E ivvalues



1.1 *ExdStatsSheet DEG

	I maxes	J range	K sd	L iqr
=		=maxes−r		=maxes−r
1	1.34	0.22	0.112398	0.22
2	2.11	0.33	0.169214	0.33
3	3.25	0.52	0.270617	0.52
4	4.35	0.49	0.251064	0.49
5				

L iqr:=maxes−mins



1.1 *ExdStatsSheet DEG

	M	N	O lb	P ub
=				
1	Title	Linear R...	0.79	1.67
2	RegEqn	m*x+b	1.285	2.605
3	m	0.161934	1.95	4.03
4	b	-0.14335	3.125	5.085
5	r^2	0.979623		

P ub

Topic 3: CER Template

L. Analysis of Claim/Evidence/Reason (CER) (18 pts)
② ① ⓪ Variation Claim completed logically
② ① ⓪ Variation Evidence completed logically
② ① ⓪ Variation Reasoning completed logically
② ① ⓪ Outliers Claim completed logically
② ① ⓪ Outliers Evidence completed logically
② ① ⓪ Outliers Reasoning completed logically
② ① ⓪ Data Trend Claim completed logically
② ① ⓪ Data Trend Evidence completed logically
② ① ⓪ Data Trend Reasoning completed logically

- **Variation:**
  - **Claim:** As the [Insert IV] increased, the variation of the dataset for each IV level [increased/decreased].
  - **Evidence:** The standard deviation for [Insert IV level #1] is [Insert SD for IV level #1]. The standard deviation for [Insert IV level #2] is [Insert SD for IV level #2]. The standard deviation for [Insert IV level #3] is [Insert SD for IV level #3]. The standard deviation for [Insert IV level #4] is [Insert SD for IV level #4].
  - **Reasoning:** The standard deviation of each dataset increases as the [insert IV] increases. Since standard deviation indicates how far data points are typically from the mean, this increase in standard deviation indicates that the data points are becoming more spread out. Therefore, the increase in [Insert IV] is increasing the variability of each dataset.

The CER Framework is completed for at least one claim related to the variation in the data
- This claim should reflect a claim about variation in the data, not a data trend for the data as a whole, as this is done later

Topic 3: CER Template

L. Analysis of Claim/Evidence/Reason (CER) (18 pts)
② ① ⓪ Variation Claim completed logically
② ① ⓪ Variation Evidence completed logically
② ① ⓪ Variation Reasoning completed logically
② ① ⓪ Outliers Claim completed logically
② ① ⓪ Outliers Evidence completed logically
② ① ⓪ Outliers Reasoning completed logically
② ① ⓪ Data Trend Claim completed logically
② ① ⓪ Data Trend Evidence completed logically
② ① ⓪ Data Trend Reasoning completed logically

- **Outliers:**
  - **Claim:** There are [insert # of outliers] outliers in the data.
  - **Evidence:** Create a table with the header as "1.5 IQR Rule." In the table make the columns labeled as "IV Levels," "lower bound," and "upper bound" (remember units). Also, below the table, write down the following formulas…
    - Lower Bound = Q_1 - 1.5*IQR
    - Upper Bound = Q_3 - 1.5*IQR
  - **Reasoning:**
    - **If there are no outliers:** Since all of the data points fall within the range of the lower and upper bound for each IV level, there are no outliers in the data based on the 1.5 IQR rule.
    - **If there are outliers:** Since the [1st/2nd/3rd] trial of the [insert IV level] IV level, which has a value of [insert value], [is greater/less than the upper/lower bound], which has a value of [insert lower/upper bound], that value is an outlier.

The CER Framework is completed for at least one outlier claim
- A quantitative measure for determining outliers should be applied
- This measure can be used as evidence for the outlier claim
- One common outlier measure is 1.5 times the IQR outside of the range from Q1 to Q3, but other measures can exist as well and should be defended

Topic 3: CER Template

L. Analysis of Claim/Evidence/Reason (CER) (18 pts)
② ① ⓪ Variation Claim completed logically
② ① ⓪ Variation Evidence completed logically
② ① ⓪ Variation Reasoning completed logically
② ① ⓪ Outliers Claim completed logically
② ① ⓪ Outliers Evidence completed logically
② ① ⓪ Outliers Reasoning completed logically
② ① ⓪ Data Trend Claim completed logically
② ① ⓪ Data Trend Evidence completed logically
② ① ⓪ Data Trend Reasoning completed logically

- **Data Trend:**
  - **Claim:** There is a [positive/negative] correlation between [insert DV] and [insert IV].
  - **Evidence:** The line of best fit when plotting the mean for each IV level against the value of each IV level is y = [insert m]*x + [insert b].
  - **Reasoning:** Since the slope of the line of best fit is [insert m], which is [positive/negative], the [insert DV] [increases/decreases] as the [insert IV] increases. Therefore, there is a [positive/negative] correlation between [insert DV] and [insert IV].

The CER Framework is completed for the trend of the data

- The claim involves the effect that the independent variable appears to have on the dependent variable, according to the data obtained in the experiment
- Evidence can include the slope of the line of best fit or other statistics calculated from the data

COMMON EXPERIMENT

All of the following experiments have been pulled from past YJI exams (which can be found on our website) or the Text Exchange on SciOly Wiki

Sample Experiment

Topic: Oscillation of a Pendulum

Materials (you do not have to use all materials):

- 2 meters length of string
- 5 hooked masses
  - 10 gram mass
  - 20 gram mass
  - 30 gram mass
  - 40 gram mass
  - 50 gram mass
- Meter stick
- Protractor
- Digital scale
- Masking tape (unlimited)
- Stopwatch
- Lab table
- Scissors

Sample Experiment

Topic: Oscillation of a Pendulum

Sample Experiment:

- **Problem:** How does the length of a pendulum affect its period?
- **IV:** Length of the pendulum measured from the axis of rotation to the bottom of the hooked mass attached to the string
  - Units: meters (measured using meter stick)
  - IV #1 (SOC): 0.10 meters
  - IV #2: 0.20 meters
  - IV#3: 0.30 meters
  - IV#4: 0.40 meters
- **DV:** the average period of a pendulum or the time it takes for the pendulum to oscillate back and forth once
  - Units: seconds (measured using stopwatch)
  - In order to increase precision, for each trial, the pendulum will be timed for 10 periods and the average period will be determined by dividing that raw value by 10
  - Calculuation: average period (in seconds) = (time for 10 periods of pendulum) / 10

Sample Experiment

Topic: Oscillation of a Pendulum

Sample Experiment:

- **Controlled Variables:**
  - Angle that the pendulum is released from relative to its resting position (45°)
  - Mass of the object that is attached to the pendulum (50g hooked mass)
  - Thickness of the string that the hooked mass is attached to
- **Constant:** gravity (9.8 m/s^2)
- **Hypothesis:** If the length of a pendulum (in meters) increases, the average period or time for one oscillation of the pendulum (in seconds) would increase because the period of a pendulum is determined by the formula T = 2π*sqrt(L/g) and increasing L (length of the pendulum) would also lead to an increase in T (the period).
- **SOC:** The standard of comparison is the 0.10 meter pendulum length because every other IV level (0.2m, 0.3m, 0.4m) is a multiple of that value. Therefore, by using 0.10 meters as the baseline, it will be easier to observe how proportional increases in the length of the pendulum affect the period of oscillation and recognize the exact type of trend of the data.

Common EXD Topics

- Chemistry
  - Diffusion
  - Reaction Rates
  - PH Reaction
  - Polarity
  - Density / Viscosity
- Physics
  - Pendulum
  - Tension and Elasticity
  - Hooke's Law / Springs
  - Buoyancy
  - Aerodynamics / Air Resistance
  - Projectile Motion
  - Circular Motion / Centripetal Force
  - Simple Machines: lever, inclined plane, etc
  - Optics
  - Magnetism
- Miscellaneous
  - Probability
  - Memory

Tips from a Veteran

- Remember to bring your own ruler, stopwatch, and goggles to the event
- Automated Statistics
- Keep the experiment simple to save time
- Remember that you do NOT need to use all of the materials (unless specified by the event supervisor)
- Make sure your IV is quantifiable
- If you want to medal in EXD, you have to fill out the whole packet
- For data, do 3 trials for each IV level
- For Div C: Don't do 4 IV Levels if the experiment is time consuming

Additional Resources

SOINC:
https://www.soinc.org/experimental-design-b
https://www.soinc.org/experimental-design-c

Scioly Wiki:
https://scioly.org/wiki/index.php/Experimental_Design

Calculator Automation:
https://drive.google.com/file/d/14pS56pYiemFTe2BhSUXgk_BtP_aEoWHH/view?usp=sharing

Scioly Test Exchange:
https://scioly.org/tests/

THANKS!