What do I do with my data?

Dr. Cora Neal cneal@weber.edu



ISEF Judging Criteria: How should you spend your time?

- I. Research Question (10 pts)
- II. Design and Methodology (15 pts)
 - a. Well designed plan and data collection methods
 - b. Variables and controls defined, appropriate and complete
- III. Execution: Data Collection, Analysis and Interpretation (20 pts)
 - a. Systematic data collection and analysis
 - b. Reproducibility of results
 - c. Appropriate application of mathematical and statistical methods
 - d. Sufficient data collected to support interpretation and conclusions
- IV. Creativity (20 pts)
- v. Presentation (35 pts)
 - a. Poster (10 pts)
 - b. Interview (25 pts)

100 points possible

- ~ 25 points for analysis and poster
- ~ 25 points for interview
- ~ 50 points for designing and performing your experiment or project

Spend <u>half</u> of your time on your experiment, the other <u>half</u> on data analysis, poster, and presentation!

What	methods	are	appro	priate?
------	---------	-----	-------	---------

	Middle School	High School
Methods of Data Collection and Study Design	V	\checkmark
Data Summaries (counts, averages, standard deviations)	V	V
Charts and Visualizations	V	 V
Limitations of Data and Study Design		\checkmark
Incorporate study design techniques (reduce bias/confounding, adjusting for other variables)		•
Assess reproducibility and the impact of variability (margin of error, confidence intervals, p-values)		~



Are your variables categorical or numerical?

Categorical variables typically have a 'word' answer

Numerical variables have a number for an answer

Studies often have **independent** and **dependent** variables

Independent variables are the 'inputs' to the study. These are also called predictor variables.

Dependent variables are the 'outputs' of the study. These are also called a response variables.





Four different outcomes; each requires a different type of chart and analysis

Independent: categorical	Independent: categorical	
Dependent: categorical	Dependent: numeric	
Bar charts	Box plots	
Chi-squared test of independence	T-tests/ANOVA	
Independent: numeric	Independent: numeric	
Dependent: categorical	Dependent: numeric	
Charts can be tricky	Scatter plots	
Logistic Regression; classification	Regression	

