



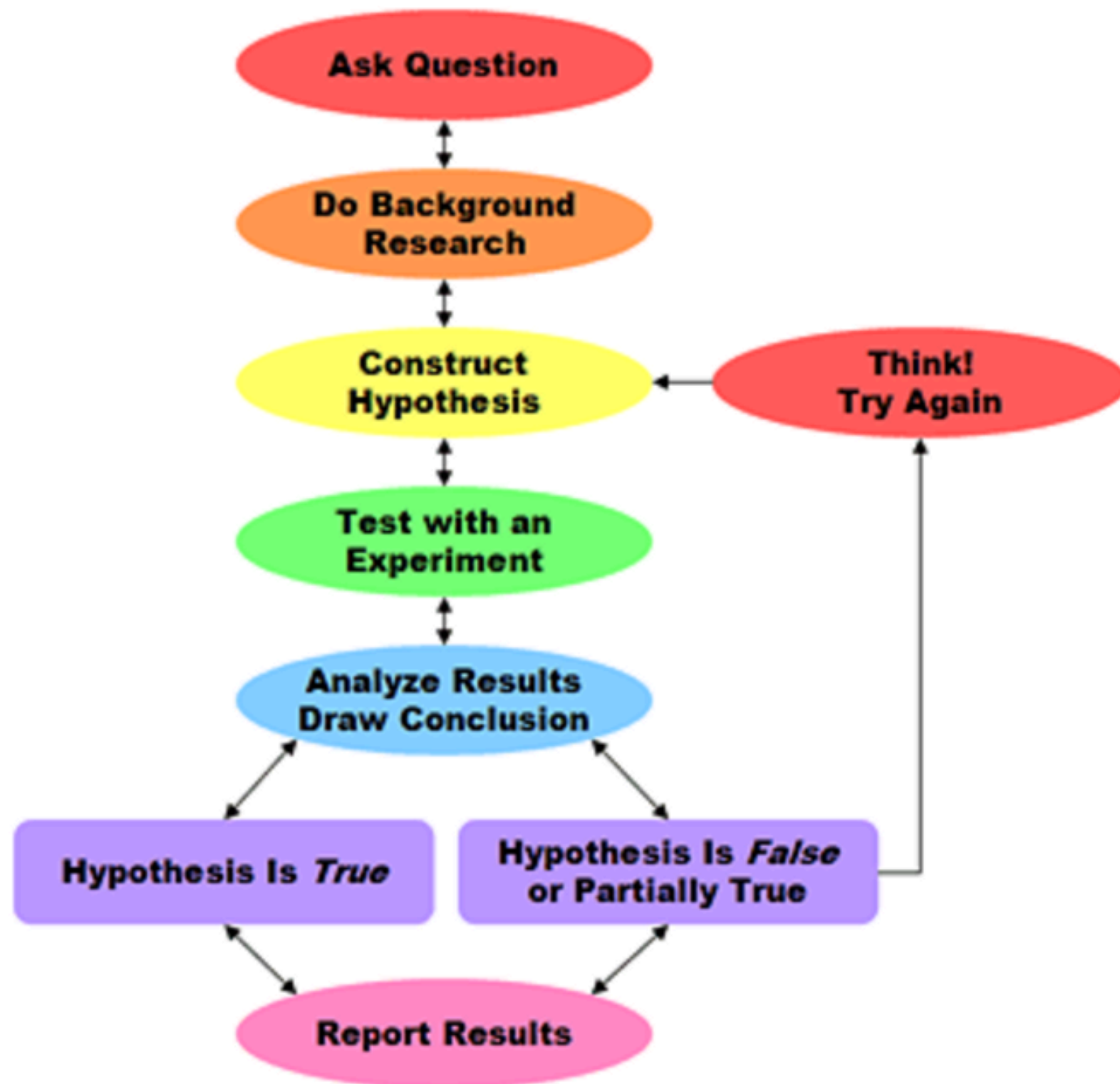
# Analyzing Data & Preparing a Research Project



# OVERVIEW

- Tools to organize data
- Interpreting your results
- Creating a research report

# Scientific Method



## Recap!

- We learned how to use the scientific method
- Different types of research methods
  - Experimental, field, policy, etc.
- Data and the different collection methods
  - Survey, measurements, interviews, etc.
- How to make sure our data and research is credible

# Organizing Your Data

- Before you analyze your data, it's helpful to organize it into productive ways
- For example, lets look at a hypothetical data set
- Imagine these are test scores from Dr. Duke's students in the Intro to Research in Ag class

Adam	76	Mary	92
Alice	80	Ralph	64
Bill	72	Robert	60
Chuck	68	Ruth	96
Kathy	84	Tom	56
Margaret	88		

# How can we organize this data?

- When you organize your data, its easier to
  - Understand what the results mean
  - Identify trends
  - Find patterns
  - Find correlations

Adam	76	Mary	92
Alice	80	Ralph	64
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If we take the data, and lay it out horizontally with the gender, we might notice something:

- The lowest score is from a boy
- The highest score is from a girl

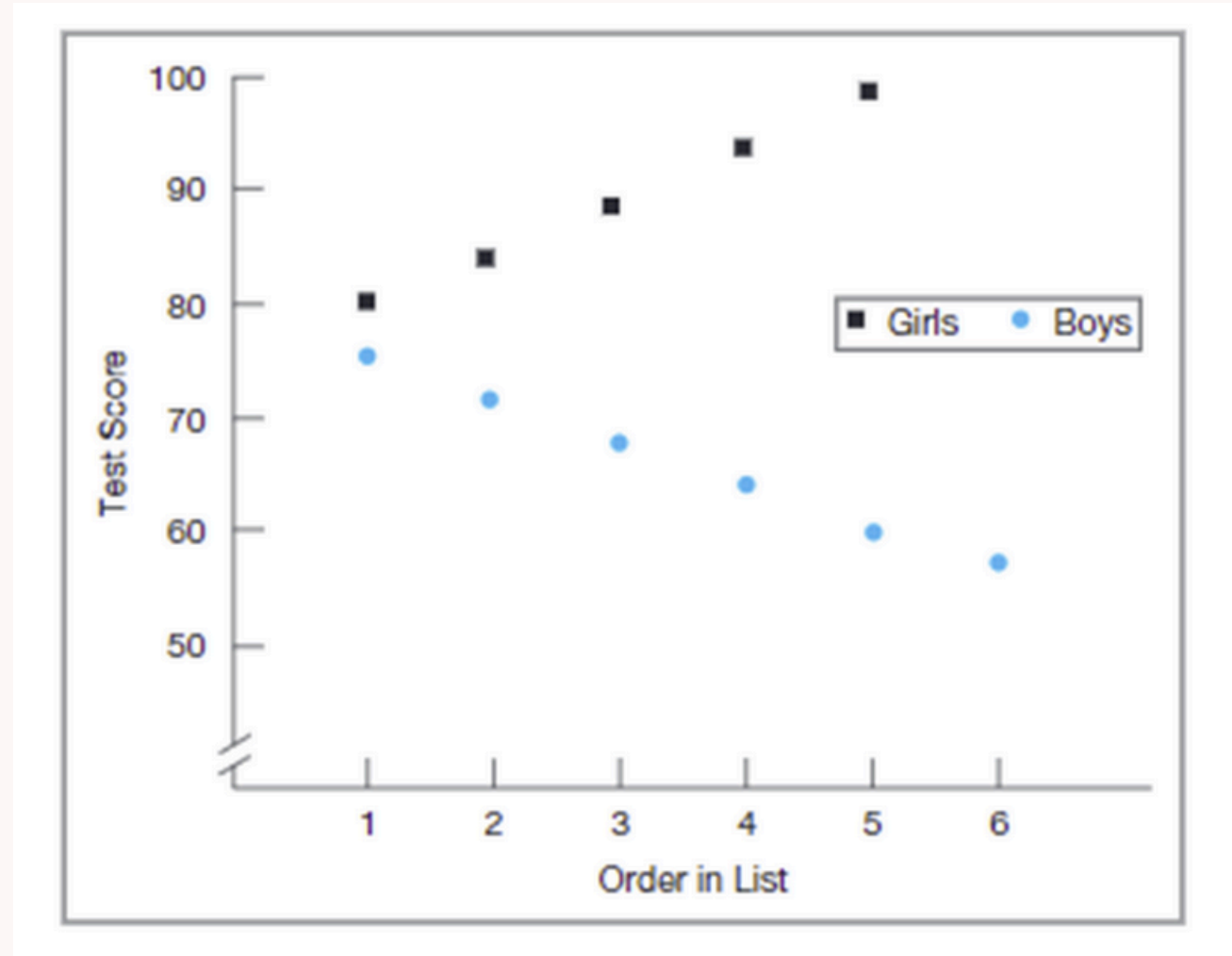
76	80	72	68	84	88	92	64	60	96	56
♂	♀	♂	♂	♀	♀	♀	♂	♂	♀	♂

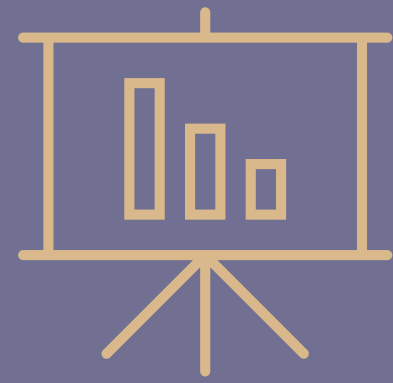
# How can we organize this data?

- If we separate the data into 2 tables alphabetically by name, it will look like this...

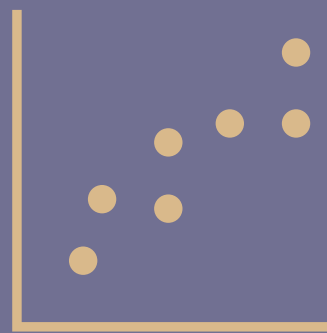
<i>Girls</i>		<i>Boys</i>	
Alice	80	Adam	76
Kathy	84	Bill	72
Margaret	88	Chuck	68
Mary	92	Ralph	64
Ruth	96	Robert	60
		Tom	56

- If we make a scatterplot of the boy scores and the girl scores, it will look like this...





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# Tools for Organizing Data

- Excel spreadsheets
- Bar charts
- Pie charts
- Graphs
- Tables
- Graphical images

# INTERPRETING YOUR DATA

## 1. Cleaning

- when you collect a lot of information, sometimes you collect duplicates or badly formatted data
- before you analyze, make sure your data is clean of formatting errors or duplicates so you do not analyze incorrect data



# INTERPRETING YOUR DATA

## 2. Analyzing

- by using statistical analyses, regressions, text analyses, etc., you can start manipulating your data.
- at this stage, you will find trends, variations, and patterns



# INTERPRETING YOUR DATA

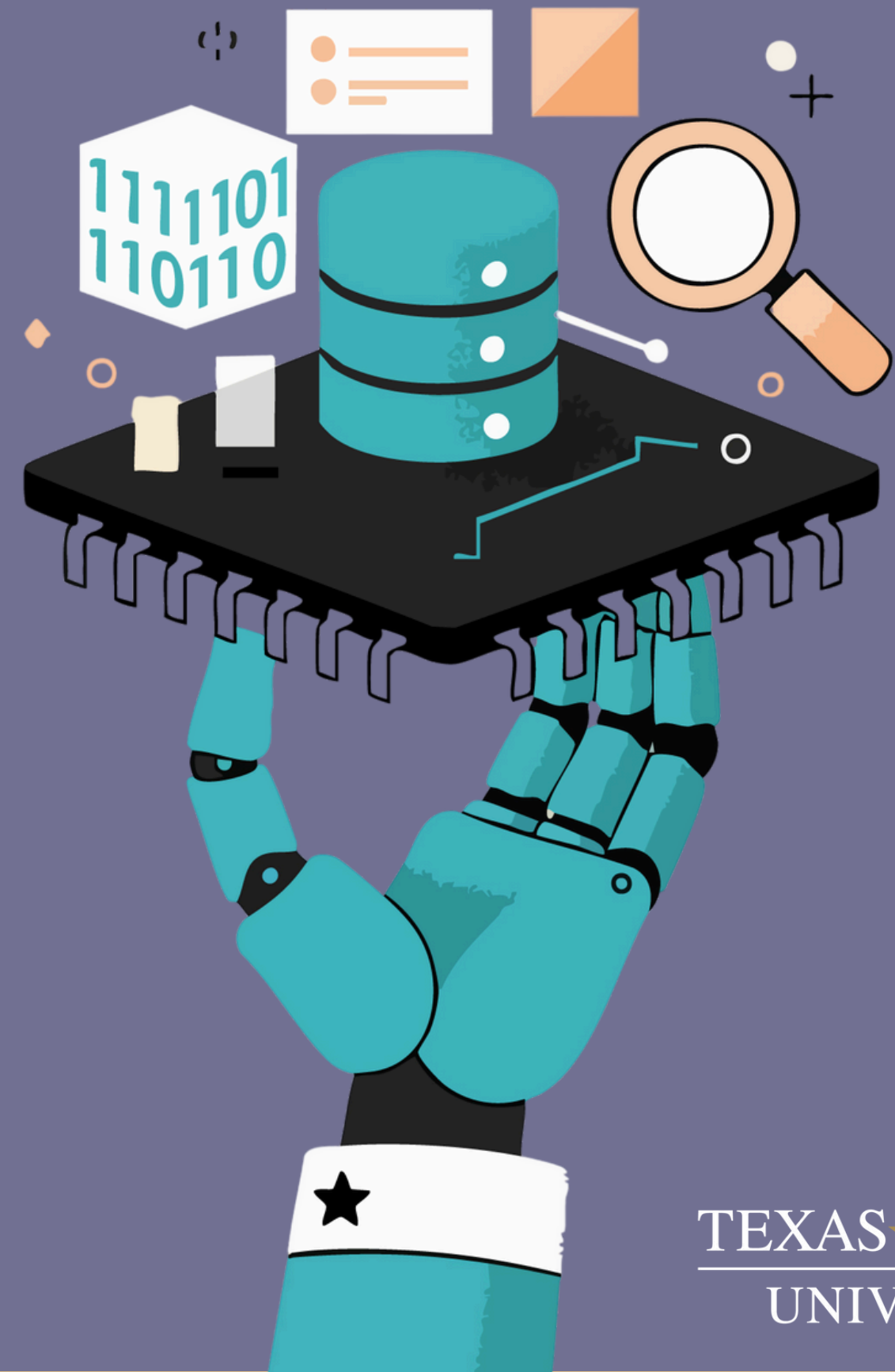


## 3. Interpreting

- lastly, look at the patterns/findings from your research and determine your course of action
- at this stage, you may also find limitations in your research

# TYPES OF DATA ANALYSIS

- Descriptive analysis – what happened
- Diagnostic analysis – why it happened
- Predictive analysis – what will happen



# LET'S ANALYZE AN EXAMPLE DATA SET

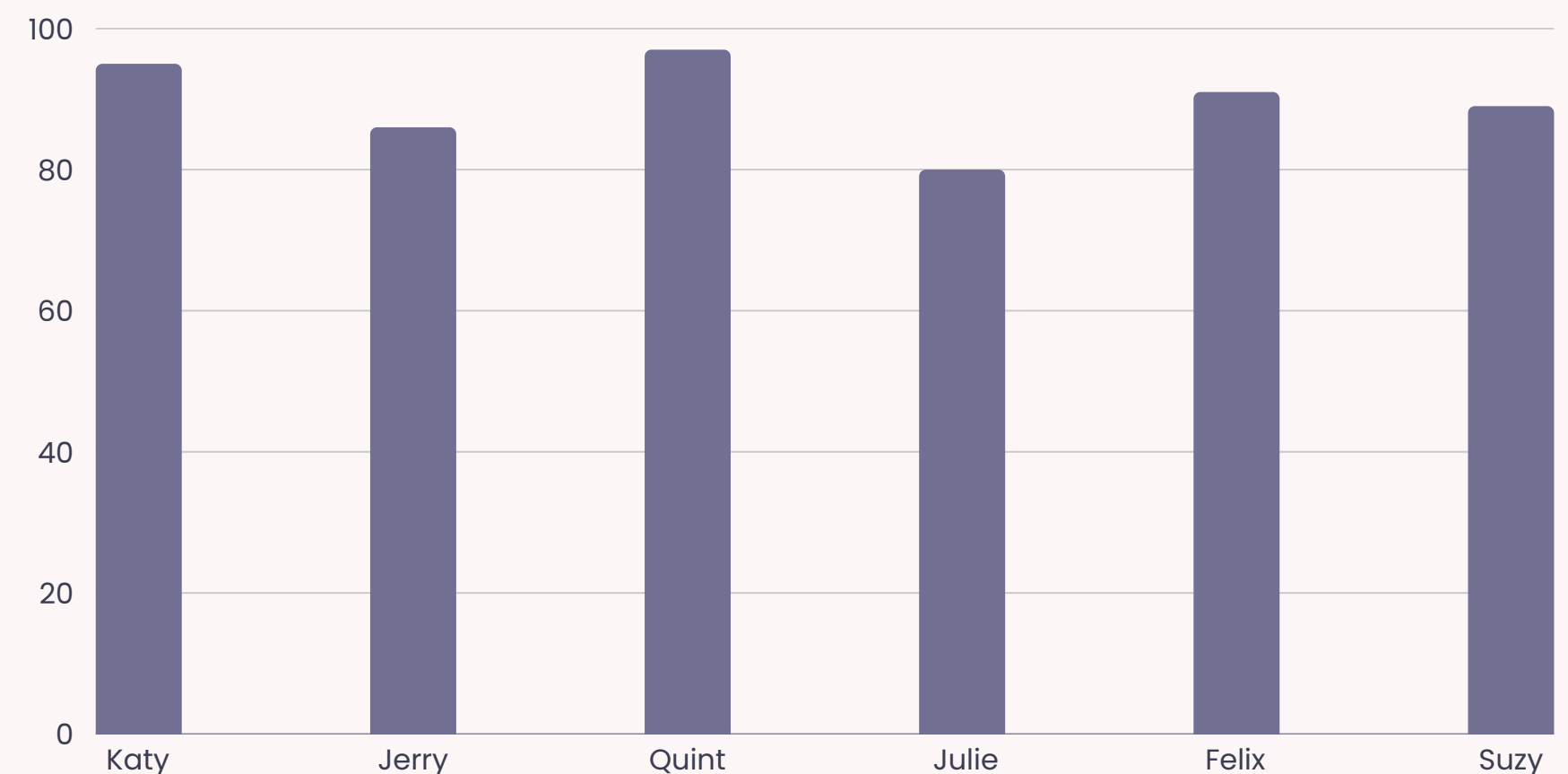
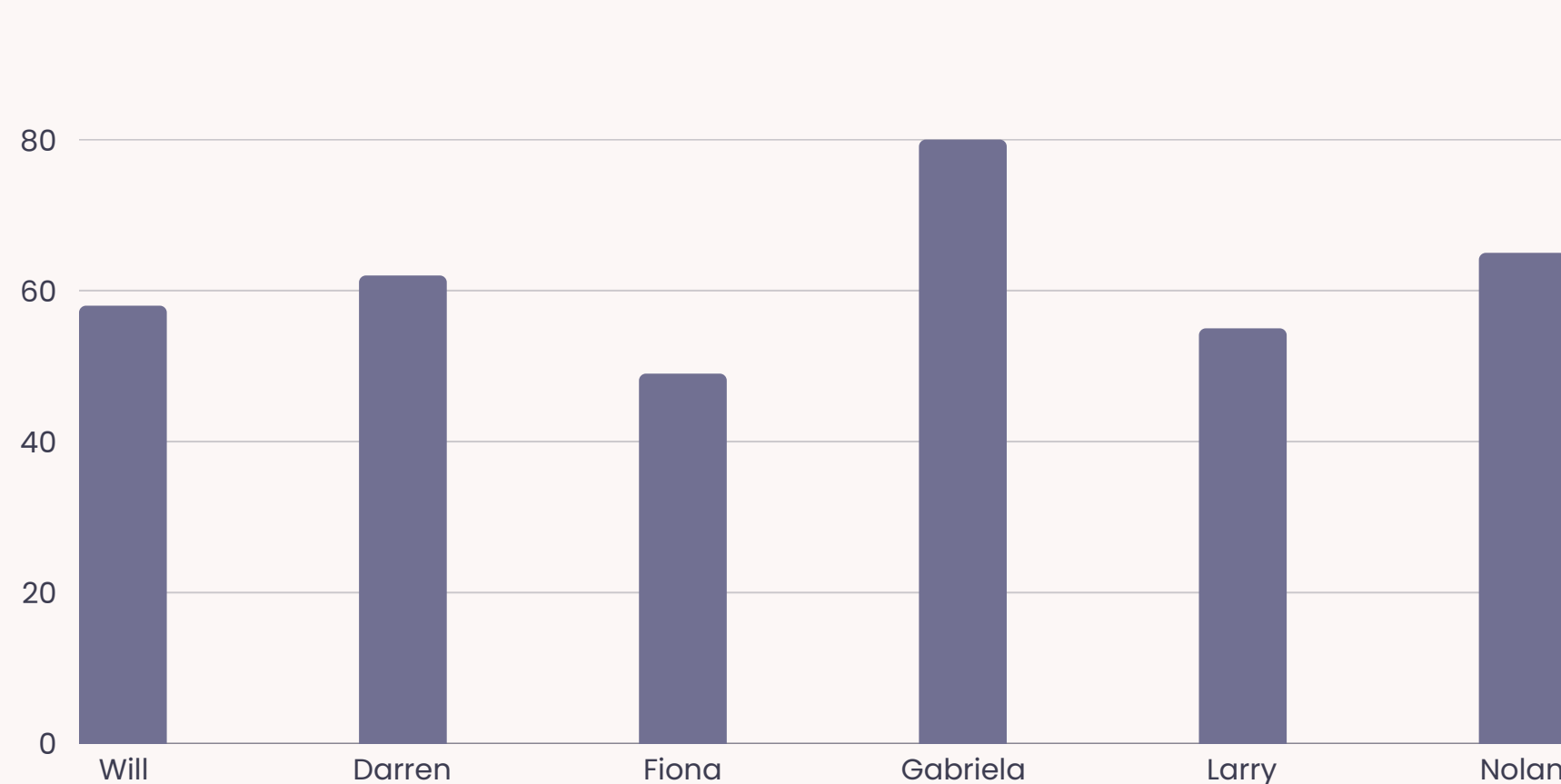
The students in Dr. Anderson's welding class are taking their final welding exam. Half of the class trained using the live + VR welding machine and the other half only used the live welding machine.

The table shows the final welding exam scores for the two groups of students.

Student Scores Group 1 (Live and VR)	Student Score Group 2 (Live)
Katy - 95	Will - 58
Jerry - 86	Darren - 62
Quint - 97	Fiona - 49
Julie - 80	Gabriela - 80
Felix - 91	Larry - 55
Suzy - 89	Nolan - 65

# ANALYZING AN EXAMPLE DATA SET

- WE CAN ORGANIZE THE DATA INTO A CHART OR GRAPH TO HELP US VISUALIZE THE DIFFERENCE BETWEEN THE GROUP'S SCORES
- WE CAN THEN IDENTIFY TRENDS AND DRAW CONCLUSIONS FROM THE RESEARCH

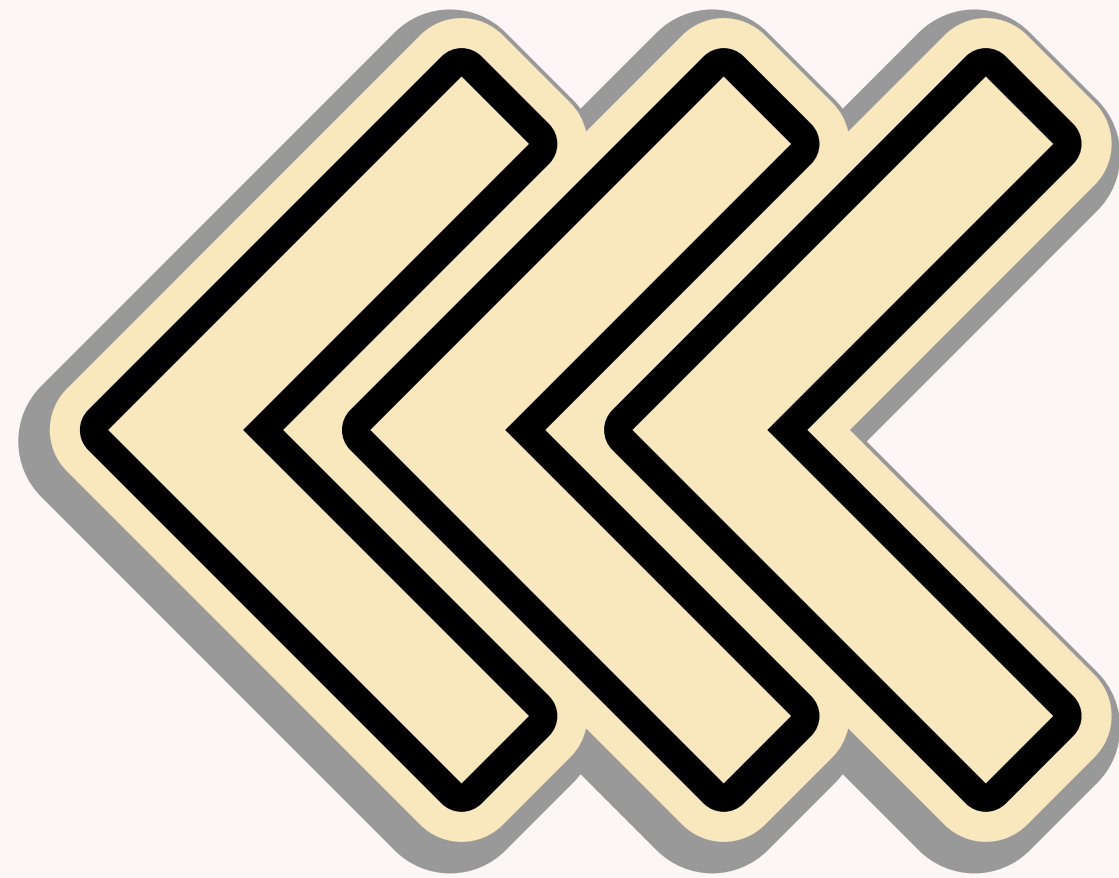


# WHAT CAN WE FIND FROM THIS DATA?

- We can see that the students in Group 1 (live + VR training) had generally higher exam scores than the students in Group 2 (only live training)
- What can we conclude from this?
  - Maybe the live + VR training combo is better for training students
  - Maybe the live training more challenging for students
  - Maybe the live training students had less experience
    - We should have collected this data to know for sure!
- When interpreting your research data, you cannot make assumptions, you can only make statements that the data supports

EVIDENCE-BASED CONCLUSIONS






# Recap!

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- How to organize your data
- Tools to organize them
- Interpreting your results



# Creating your research report

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# Essential Elements of a Research Report

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1. Introduction
2. Methodology
3. Data and Findings
4. Conclusions
5. References



# INTRODUCTION

The introduction is where you explain:

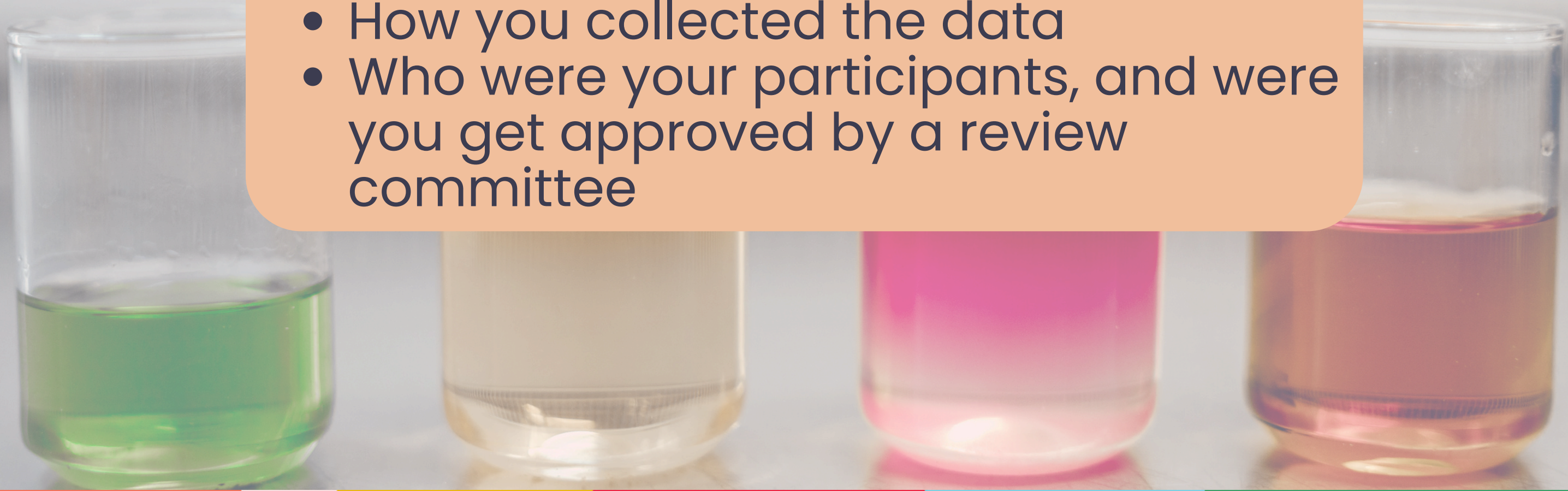
- Your research problem
- History behind it
- Related research and literature
- Introduce your research question

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# METHODOLOGY

In your Methodology section, you explain:

- All research protocols & procedures
- How you designed the study
- How you collected the data
- Who were your participants, and were you get approved by a review committee



# DATA & FINDINGS

In your Findings section, you explain:

- What method you used to analyze your data and information
- The trends, averages, patterns in your data
- What these trends and patterns mean (interpretations)



# CONCLUSIONS



Your conclusion section will wrap up your research report! A good conclusion will:

- Summarize your research report and findings
- Identify the possible weaknesses of the study
- Explain what the findings mean to a broader group or society

# REFERENCES

- The last section of your research report is the Reference or Works Cited
- This section is where you list the literature and articles you mentioned throughout the report
- Reference lists will show the
  - Author, Title, Year Published, Publisher, etc.
- Different teachers/publishers will require different styles of citation
  - APA, Chicago, MLA, AMA



When writing your research report, it is important to maintain **academic integrity**

Academic integrity includes:

- Crediting the words and ideas of other people
- Maintaining confidentiality and protecting participants' right to privacy
- Identifying any biases in your sample selection
- Describing the limitations of your assessment strategies
- Providing a complete report of your findings, including findings that may not support your predictions

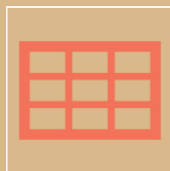
# WHAT DOES A COMPLETE RESEARCH REPORT LOOK LIKE?

- **Introduction (1-2 pages)** —————> Introduce the research topic and problem, previous literature, etc.
- **Methods (1-3 pages)** —————> Explain what your research design was, data collection method, etc.
- **Results (2 pages)** —————> Explain your data analysis and what you found, trends, averages, etc.
- **Conclusions (1 page)** —————> Interpret the results, wrap up the report, come to conclusions, mention weaknesses.
- **References/Works Cited (2+ pages)** —————> Cite all authors and articles that were mentioned in the report.

# Lesson Summary



Before today, we learned how to formulate a research question, a research design, and how to collect different data.



Today, we learned how to organize our data, different data organization tools, and how to interpret results.



We also learned how to create a research report, a skill you will use often in school and your research career.



**Lesson 3  
Complete!!**

