Turn Class Data into an Engineering Decision

Difficulty	Time	Type
Intermediate	60 minutes	Skill Builder

Background

Engineers must convert raw measurements into a clear conclusion that supports a design decision.

Engineering Problem

Analyze a class data set, create appropriate visualizations, and make an evidence-based engineering recommendation.

Learning Objectives

- Organize and clean data
- Select appropriate graph types
- Use descriptive statistics
- Connect evidence to a decision

Materials

- Class data set
- Spreadsheet software
- Calculator
- Engineering notebook

Procedure

1. Import or enter the data and check units, labels, blanks, and obvious entry errors.
2. State the engineering question the data should answer.
3. Calculate mean, median, range, and one additional useful statistic.
4. Create at least two graph types and choose the one that communicates the result best.
5. Identify any outlier and decide whether to keep, correct, or investigate it.
6. Compare at least two groups or conditions.
7. Write a claim supported by two specific pieces of evidence.
8. Make one recommendation and state one limitation.

Engineering Requirements

- Use a data set with at least 15 values
- Label all axes and units
- Calculate at least four statistics
- Create at least two candidate graphs
- Support the recommendation with numerical evidence

Constraints & Safety

- Do not delete outliers without explanation
- Use graph scales that do not exaggerate differences

- Protect student names or private information
- Conclusions must stay within the available data

Deliverables

- Clean data table
- Statistic calculations
- Two candidate graphs
- Final selected graph
- Claim-evidence-reasoning paragraph
- Recommendation and limitation

Reflection Questions

1. Which graph communicated the data best?
2. How did the mean and median differ?
3. What did the outlier change?
4. What additional data would strengthen the recommendation?

Engineering Tip
Start with the decision question, not the graph type.

Common Mistake
A visually dramatic graph can still be misleading if the scale or labels are inappropriate.

Stretch Goal

Create a dashboard with a filter or comparison control.

Career Connection

Test, quality, and systems engineers use data visualization to monitor performance and support decisions.