



PLTW Engineering

12/Testing Plans and Data Collection

April 20, 2020



12/EDD

Lesson: 4/20/2020

Objective/Learning Target: Students will be able to discern different types of data and understand how to collect data to support their research.



Test data

As a design engineer, your product designs will have to be tested in order to prove their validity - that is their ability to solve the design problem.

Today we will take a look at some common types of test data used in engineering design and also how to organize it into useful charts.



What information are we testing for?

Usually in engineering design we are looking for three main types of information:

Functionality - it asks does your prototype actually work the way it is designed to?

Reliability - tests how your product will hold up over time - what are potential failure points?

Performance - is based on how your prototype solves the problem statement and can be compared to current products in the market place.



What information are we testing for?

Within the categories of Functionality, Reliability, and Performance, we have sub-categories that will further define each aspect of this product.

Criteria / Benchmark	Description of data needed	Quantitative or Qualitative	Degree of Accuracy



Detailed testing plan

The criteria / benchmark column relates to the specific data you are trying to collect. An example might be a syringe design. A functional test might have criteria requiring the syringe to draw and expel fluid based on plunger movement.

Criteria / Benchmark	Description of data needed	Quantitative or Qualitative	Degree of Accuracy



Detailed testing plan

The description of data needed describes what proof is required by the testing engineer in order to demonstrate whether or not the product passes or fails that test. An example might be the reading on a gauge or an observation.

Criteria / Benchmark	Description of data needed	Quantitative or Qualitative	Degree of Accuracy



Detailed testing plan

The third column relates to the type of data being collected. Quantitative data is numerical in nature, like 17 gallons per minute. Qualitative data is information observed and is not numerical, like observing peoples reactions when they are shown a set of images and recording for comparison.

Criteria / Benchmark	Description of data needed	Quantitative or Qualitative	Degree of Accuracy



Detailed testing plan

The final column - degree of accuracy relates to how close to the criteria / benchmark the test results need to be. If the data is quantitative the accuracy can be +/- a specific number. If the data is qualitative, most times the degree of accuracy will be either yes/no or pass/fail.

Criteria / Benchmark	Description of data needed	Quantitative or Qualitative	Degree of Accuracy



Testing can now begin

With charts defined for each of the major testing categories, we can begin testing.

This method can be used for either proof of concept testing, prototype testing, or final solution testing prior to mass production runs.



Quiz yourself

1. What does it mean to test a products validity?
2. What are the 3 main types of product testing?
3. Create a hypothetical functionality test for any product you choose. Fill out the chart below relating each section to that product you choose.

Criteria / Benchmark	Description of data needed	Quantitative or Qualitative	Degree of Accuracy



Helpful Links

[Tutorial for creating a test plan](#)

[Testing plan example for software development](#)