**Conduct Your Experiment(Scientific Method) :**

**or**

**Build and Test Your Prototype(Eng Design):**

1. **Conduct your Experiment (Scientific Method) or Build and Test your Prototype (Engineering Design)**
   1. Follow your steps outlined in your approved research plan carefully.
   2. Prepare empty data tables in your project data book (log book) to be used when recording data.
   3. Use a logbook to write down observations and project details recorded during the experiment or prototype testing. Keep a detailed record of your trials and data. Date any log book entries. Write down any notes about your experiments (include what worked and what did not work). If you created a scale (e.g. color scale 0-3, intensity scale, opinion scale), record in project data book what each number on the scale represents. This is a qualitative form of data, and your scale is a non-standard scale.
   4. Observe all the safety precautions described in your research plan
2. **Collect your Data and Analyze your Data**
   1. Carefully record your measurements in data tables.
   2. Understand the type of data recorded: Quantitative Data – results measured using a standard scale (e.g. time, temp, pH, mass, length, or number) Qualitative Data – results that are described using a non standard scale (e.g. color that is assigned numbers 0-3, any scale that is subjective, etc)
   3. Analyze your quantitative measurements using appropriate mathematical steps.
   4. Summarize your qualitative data using “mode” or “maximum” or “minimum”. *Remember that qualitative results are not measured using a standard scale, and thus cannot be added, subtracted, multiplied , divided, averaged, etc.*
   5. Draw graphs to show trends in your findings to help answer your testable question.
   6. Statistically analyze your results
   7. Take note of any trends seen in analyzed data. Record key observations in project data book (log book).
   8. Take note of any experimental errors that may have impacted the accuracy of your data.
3. **Make Conclusions (Scientific Method) or Make Modifications to your Prototype and retest (Engineering Design)**  (Note: some of these items will be put into the “Discussion” section of your research paper)
   1. Did the variable cause a measurable change when compared to the control group?
   2. What patterns do you see from your graphs comparing the variable with control?
   3. Did you collect enough data? Do you need to do more experimentation?
   4. Never alter your results to fit your theory. Try to explain why you obtained results that differed from the literature that you researched.
   5. Remember – one experiment can support a hypothesis but does not ***prove*** that hypothesis. A well designed experiment can ***disprove*** a hypothesis.
   6. Are there any practical applications for your findings? How can this information be used in the real world?
   7. How could you improve this project?