

**PURPOSE**

- Asking Questions and Defining Problems
- Make sense of problems and persevere in solving them
- Why are you doing the experiment?
- What did you observe in the world that made you ask your question?
- What made you curious?

**QUESTION/PROBLEM**

- Asking Questions and Defining Problems
- Make sense of problems and persevere in solving them
- Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation
- What are you trying to figure out?
- What problem are you trying to solve?

**HYPOTHESIS**

- Developing and Using Models
  - Constructing Explanations and Designing Solutions
  - Construct viable arguments and critique the reasoning of others
  - Write arguments to support claims using valid reasoning
- What do you think a likely answer or solution to your question/ problem could be? Why?

**RESEARCH & BACKGROUND**

- Obtaining, Evaluating and Communicating Information
- Attend to precision
- Integrate and evaluate content presented in diverse media and formats, including visually and quantitative, as well as in words
- Gather relevant information from multiple print and digital source, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism
- Draw evidence from informational texts to support analysis, reflection, and research
- What have others said about the topic of your inquiry?
- How does this research influence how you will approach your project?
- Have others done this experiment before?
- How will your project further the research and experimentation that has already been done?

**Project Title**

A good title attracts attention, but also gives information about the project.

**ABSTRACT**

Provide a concise paragraph summary of your project including: purpose, hypothesis, procedures used, data summary or analysis, and conclusions.

**MATERIALS**

Record everything you use for your project. You do not include the materials for the board.

**PROCEDURE**

Record the steps you did during your experiment. Make sure others can follow them.

**DATA**

Visually communicate your data in the format that matches the type of data you collected. You can show both raw and interpreted data. For example: spreadsheets, photos, diagrams, charts, maps, graphs, models, etc.

- Planning and Carrying Out Investigations
- Developing and Using Models
- Using Mathematics and Computational Thinking
- Make sense of problems and persevere in solving them
- Model with mathematics
- Use appropriate tools strategically
- Attend to precision
- Integrate and evaluate content presented in diverse media and formats, including visually and quantitative, as well as in words



Write down everything you do from start to finish for your project. Do not include preparing the board. Journal should be hand written and authentic. Be sure to have your journal on display with your board.

**RESULTS**

- Analyzing and Interpreting Data
- Obtaining, Evaluating and Communicating Information
- Reason abstractly and quantitatively
- Attend to precision
- Look for and make use of structure
- Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective analysis of content

This is a summary of results from the experiment. Explain your Data, Photos, Charts, Graphs and models in paragraph form.

**CONCLUSION**

- Engaging in Argument from Evidence
- Obtaining, Evaluating and Communicating Information
- Construct viable arguments and critique the reasoning of others
- Draw evidence from informational text (including student data) to support analysis, reflection, and research
- Write arguments to support claims using an analysis (of all components of process and research) using valid reasoning and valid and sufficient evidence

Restate question  
Describe your observations: before, during & after the experiment  
Summarize your research  
Describe your experiment  
Explain and justify your conclusion with your data and observations.

**NEXT STEPS**

- Obtaining, Evaluating and Communicating Information
- Asking Questions and Defining Problems
- Make sense of problems and persevere in solving them
- Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation
- What new questions do you have as a result of your inquiry?

**PURPOSE**

- \* Why are you doing this project?
- \* What did you observe in the world that made you ask your question?
- \* What made you curious?

**PROBLEM**

- \* What is the problem or need?
- \* Who has the problem or need?
- \* Why is it important to solve?

**DESIGN REQUIREMENTS**

- \* State characteristics that your solution must meet to be successful.
- \* List should provide a complete description of the key features that will make your design successful.
- \* List should be feasible. Think of what you might need... time, materials, etc.

**RESEARCH & BACKGROUND**

Learn from the experiences of others — this can help you find out about existing solutions to similar problems, and avoid mistakes that were made in the past. Research two areas:

1. Users or customers
2. Existing solutions

- \* How does this research influence how you will approach your project?
- \* How will your project further the research and design that has already been done?

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**SOLUTIONS**

- \* Brainstorm possible solutions
- \* Evaluate possible solutions
- \* Show notes, pictures, etc.
- \* What criteria did you use to find the best possible solution?

**MATERIALS**

- \* Record everything you use for your building your prototype.
- \* Do not include the materials for the board.

**PROTOTYPE**

- \* What process did you use to create your prototype?
- \* Did you encounter any challenges as you built?
- \* Did you need to redesign it as you were building it?

**TEST & REDESIGN**

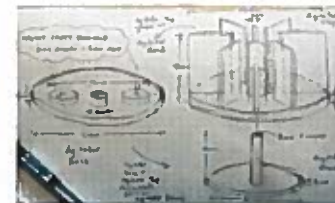
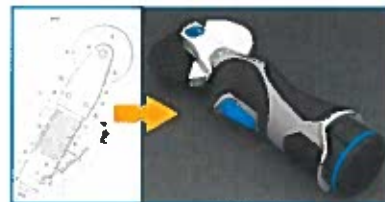
- \* Go out and test your final design
- \* How did feedback from others help you redesign?
- \* What problems occurred and how did you fix them?
- \* Which parts were successful and why?
- \* Repeat process and retest multiple times until your solution is as successful as possible.

**DISCUSSION**

- \* Restate your problem.
- \* Summarize your research
- \* Describe your process of designing, testing, redesigning, testing...
- \* Describe your project
- \* Explain and justify your conclusion with data and observations.

**NEXT STEPS**

- \* What new questions do you have as a result of your Engineering Design?
- \* What are some ideas for future research or improved designs?
- \* What additional materials and resources would you need to make future designs successful?



Include Pictures

- \* Sketches
- \* Labeled diagrams
- \* Detailed drawings
- \* Photos of your prototype



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**RESULTS**

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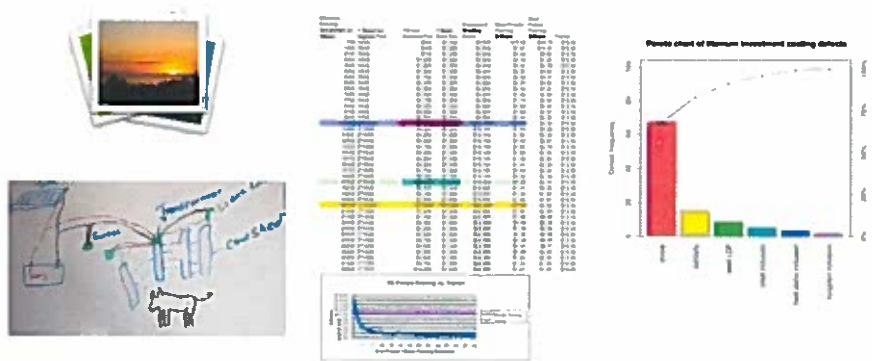
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**CONCLUSION**

Restate question  
Describe your observations: before, during & after the experiment  
Summarize your research  
Describe your experiment  
Explain and justify your conclusion with your data and observations.

**NEXT STEPS**

What new questions do you have as a result of your inquiry?  
What are some ideas for future research?



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