The Science Project & Science Fair Template Use these science & engineering practices to guide you through an investigation or project.

1. Ask questions & define a problem: Pick a question that you want to try answering with your drone

Team members

2. Develop & use models: Draw a diagram that shows what you think you will find.

3. Create a draft project title based on your question:

4a. Plan your investigation: What are you steps? What will you do to collect the information you need?

4b. Sketch a map showing planned route for your drone to fly and from which directions. If you are taking photos, where will the photos be taken?

4c. Use Math / Computational Thinking: How you will measure the size of objects and the height of your drone? (Hint: cut a tarp into a circle or square, one-meter across – other methods?)

5. Carry out your investigation: Add information about your data in a table. What new questions did you think of while conducting your investigation? Record data about each session and flight. Use your data to answer the question you asked.

6a. Analyze & Interpret Data: Organize the data – How do they contribute to answering your questions?

6b. Use Math / Computational Thinking during your analysis: Measure the objects in your photos - are circles actually circles? How do the sizes of objects in photos change? Generate statistics from your data. What patterns do you see?

7. Construct Explanations & Design Solutions: What have you learned from data that help you answer your project questions? How would you have changed your investigation design?

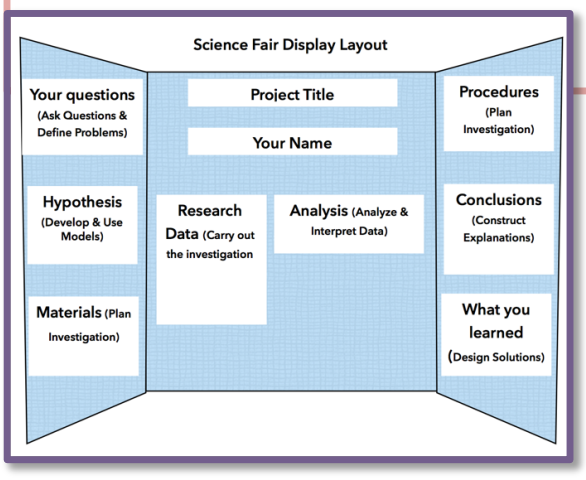
8. Engage in argument from evidence: What questions might others ask you? How would you respond and how would you use your data and analyses as supporting evidence for your discussion?

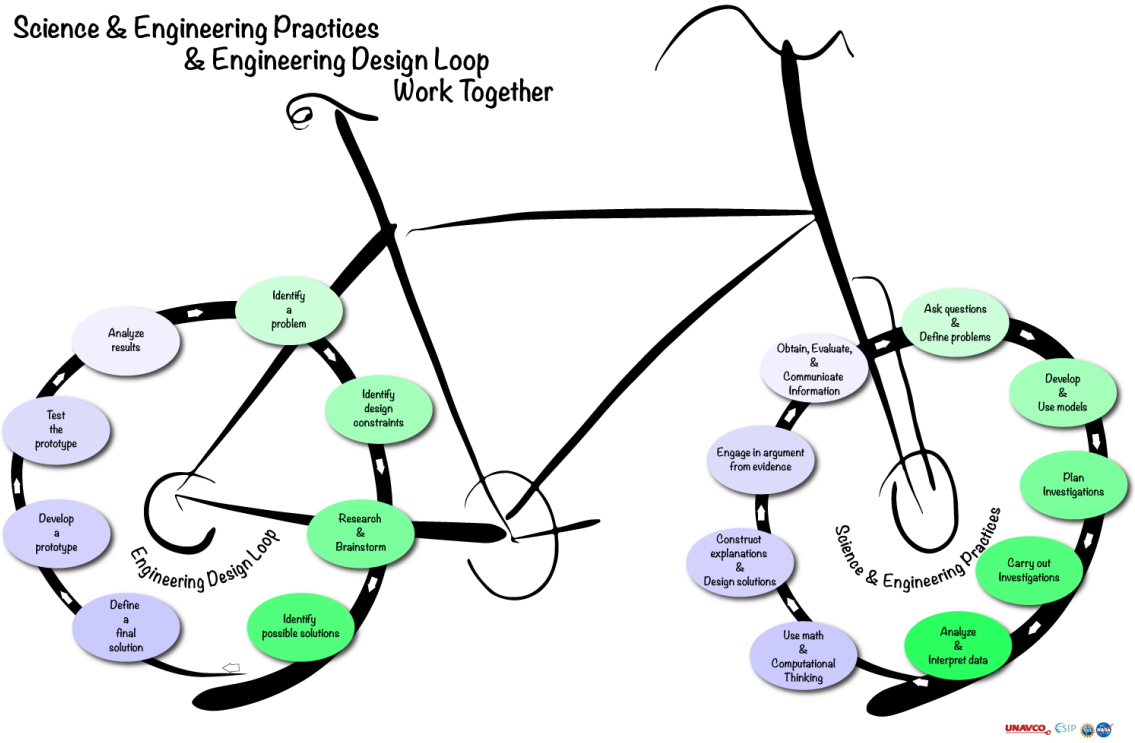
9b. Communicate & Evaluate: What would you tell your community leaders?

What other data would be useful to evaluate if drones are useful & successful for these types of investigations?

9a. Communicate: Make a Science Fair Display of your project and results

Go online – what information would add to your project? What other ways could you use this information?





The Science & Engineering Practices and the Engineering Design Loop Work Together: An example.

You've found the perfect science project to try out! Your question has helped define the problem you want to study, and you are working through the Science & Engineering Practices. As you start putting together a model to describe your hypothesis and plan your project, you realize that you don't have all of the parts to make the study work. They could be rubber bands and Velcro to hold a tiny instrument to your drone. Maybe you're working with a team of makers to build your own sensor. Perhaps it's a better camera that is super lightweight. Maybe you want to change the angle of the camera so that it points straight down or straight ahead.

Either way, your project has taken a turn towards engineering design! Whether it is a small modification or a complete separate project, the Engineering Design loop is a great way to approach to solve a problem. While the loop is drawn in a circle, you might find that you need to do some jumping within the loop around to come up with a working prototype and final design. In fact, often scientists and engineers will go back and forth between the two loops to inform, test, and refine the product being produced and its impact on the scientific study.

Try it out! You might realize that you are already doing both science & engineering in your projects!