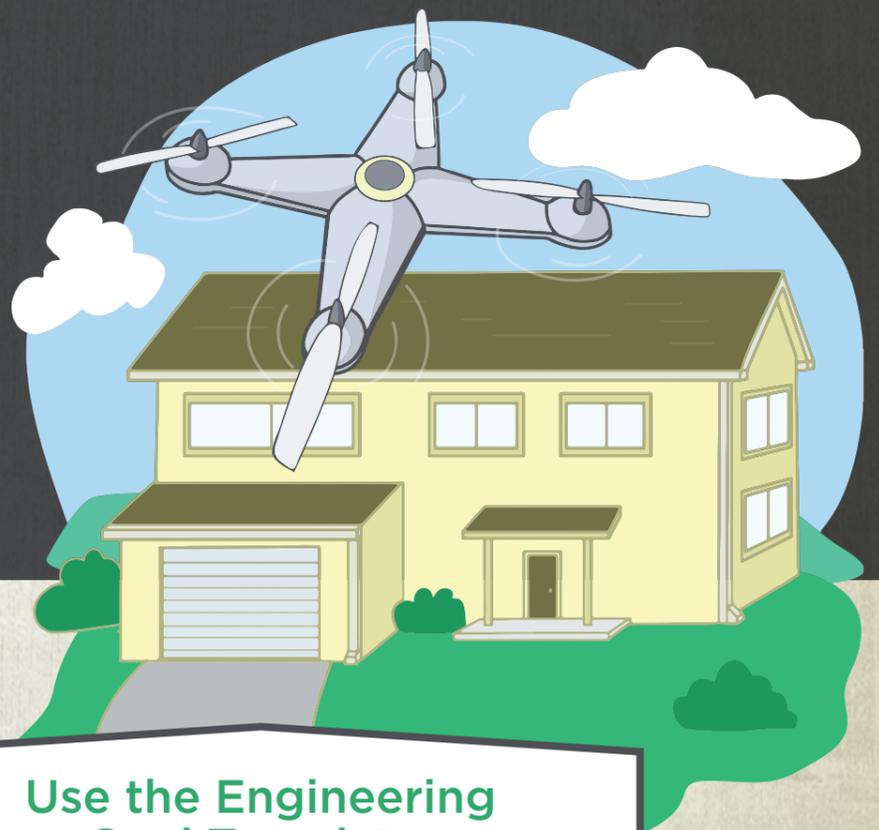


Engineering Design Process

NEXT GENERATION SCIENCE STANDARDS (NGSS) aim to facilitate understanding of core ideas and ensure engagement in the practices and projects that will instill deeper levels of scientific and engineering comprehension. At the Synopsys Outreach Foundation, we believe hands-on science projects are the perfect vehicles for implementing NGSS. Here is an Engineering Design Process example. Engineering happens in zig zags and spirals, so the process may look different for each product.



Be A Problem Solver

Can you design something to solve a problem for a customer? Think - Faster, Lighter, Cheaper, Safer. As you go, record every step in your notebook.

Use the Engineering Goal Template:

The design of (project) for (user) to do (function).
The design of a drone for homeowners to clean their roof gutters.

Research Possible Alternatives

What's been done? Read articles, patents, search databases. Find other things to try. Blow the leaves out?

Establish Criteria & Constraints

Determine requirements for building the product. Think about size and specifications. Is it safe or too heavy?

Construct a Prototype

Try building your design prototype to test. Expect to build more than one.

Define a Test Plan

Your test plan should vary many parameters, one at a time, to measure the robustness of your design. Sometimes it is appropriate to combine test factors. Does it work on all types of leaves? What if the leaves are wet?

Make Design Changes

Figure out what happened; go back and tweak the prototype. Take detailed notes as you make changes.

Conduct Tests

Use the parameters of your test plan. Learn about your product. Characterize its performance limits.

No.

Failure Analysis

Does it satisfy your design requirements?

Yes.

Document all the Details, Including Dates.

Draw your design and record test results. Make sure to include assembly, materials, test plans, and cost. Not just what was done, but why? Congratulations! You did it!

