SCIENCE FAIR CENTRAL

ENGINEERING PROJECT STARTERS

According to the National Academy of Sciences, engineering is the application of science and technology to solving a problem. Invention is really about engineering a solution. For students, this can be:

- A problem they want to solve
- A process or physical design they want to improve

In designing and engineering a solution, students:

- Find a local problem or something that needs to be improved
- Research it to find out what others know
- Suggest a solution and explain why it should work
- Design the solution and the method for testing to see if it works
- Build and test the solution
- Collect data to be sure your solution made a change
- Make sense of the data – how do you know it worked, or didn't work?
- Develop a report and share it with your fellow scientists

Note that sometimes the invention is a model or a sample set. Once the model or design shows that the solution can work, it can be applied to the real world. Examples are: improving the aerodynamic design of a model car; controlling the spread of a pest; improving building design to better conserve energy.

As with investigations, the key to defining the project is by posing the right question. Students can ask themselves, "What bothers me?" "What have I heard other people complaining about?" Is it something that could be fixed or improved on.

General Science Topic	Problem Examples	Design Question
Gravity and mass	My backpack is too heavy to carry.	How can I make it easier to get it to school?
Dog behavior	Our dog barks too much.	How can I get him to quiet down without hurting him?

General Science Topic	Problem Examples	Design Question
Visibility	When I'm in a crowd, I can't see around me.	What can I do or use to help me see more?
Conserving heat	My juice gets warm in my lunchbox.	How can I keep it cold?
Reflection of sound	The echo in our cafeteria is so bad that it's hard to hear, even when people talk loudly.	What can we do to cut down on the echo in there?
Plant Growth	Our petunias dried out last summer and died after one week.	How can I keep them watered without having to go out and do it every day?
Remote Sensing	We have to wait too long for the bus. We'd rather wait inside where it's more comfortable.	How can we tell when the bus is approaching without having to wait at the stop?
Food storage	I make sandwiches ahead of time on Sunday, but by the end of the week, they go stale.	How can I better preserve my sandwiches so the one I eat on Friday is as fresh as the one on Monday?
Human accessibility	My younger brother and sister are too small to reach the light switches. I always have to go turn on the light for them.	How can I make it so they can turn their bedroom room lights on or off?
Security	I caught my brother in my room, but he says he never goes in there.	How can I tell if someone has gone into my room when I'm not there?
Convenience	I sometimes forget my backpack.	Is there a way to be sure I always take my backpack to school?
Solar energy	Sunlight coming in windows makes the house warmer in winter. But we keep the drapes closed and forget to open them.	Is there a way to make sure the drapes stay open when the sun is shining in the winter?

✔️ **Once your student has identified a design question, have him validate the question.**