

# OUSDK-12 ScienceFair

## Engineering Challenge

### What is an engineering challenge?

An engineering challenge is when you apply the principles of science to develop solutions to a problem. The main steps of the engineering process are:

- **Identify the Problem** - describe the challenge to be solved, including limitations and constraints
- **Explore** - research what others have done and what materials are available
- **Design** - use your knowledge and creativity to sketch out multiple solutions
- **Create** - choose one idea and build a physical model of it
- **Try It Out** - test your solution under appropriate controlled conditions
- **Make It Better** - evaluate how the solution worked and any necessary improvements

### What are some examples of engineering challenges connected to FOSS content?

Grade & FOSS-related Topic	Engineering Challenge <i>Source: Engineering is Elementary Units, Museum of Science, Boston</i> <a href="http://legacy.mos.org/eie/20_unit.php">http://legacy.mos.org/eie/20_unit.php</a>	Related Scientific Investigation
1 <sup>st</sup> Parachutes	Imagine, plan, design, create, test and improve own parachute design.	Test isolated variables (canopy material, canopy size, length of suspension line) in design of a parachute.
1 <sup>st</sup> Wind	Imagine, plan, design, create, test and improve a process to capture wind energy in the form of a windmill.	Observe and describe how sails made of different materials (or shapes) catch wind differently.
2 <sup>nd</sup> Sound	Imagine, plan, design, create, test and improve an original representation of a bird call.	Test different methods for damping sound.
4 <sup>th</sup> Pollination	Imagine, plan, design, create, test and improve a hand-pollination system	Identify effective materials & methods for picking up and dropping off pollen
4 <sup>th</sup> Environments	Imagine, plan, design, create, test and improve a process for cleaning up an oil spill.	Identify effective materials and methods for cleaning up an oil spill.
5 <sup>th</sup> Human Body	Imagine, plan, design, create, test and improve a knee brace design.	

From: *Engineering is Elementary Units* (Museum of Science, Boston)

### High quality web resources for Elementary Engineering:

- [http://www.theworks.org/fb/teachers/welcome\\_teachers.html](http://www.theworks.org/fb/teachers/welcome_teachers.html) - lessons for *what is engineering?* activities, engineering design process poster, kid-friendly PowerPoint
- [http://www.theworks.org/fb/teachers/engineering\\_design\\_process.html](http://www.theworks.org/fb/teachers/engineering_design_process.html) Engineering Design Process, clear and simple, and ready-to-use pdf poster.
- <http://www.tryengineering.org/lesson.php> - searchable lessons by age, category, keywords, lessons w/ PowerPoints, student worksheets, etc.
- [http://legacy.mos.org/eie/engineering\\_design.php](http://legacy.mos.org/eie/engineering_design.php) - see engineering units for project ideas