



## *Lesson Overview*

# Engineering Activities

The backbone of the 4-H program is centered around the “learning by doing” philosophy, as known as experiential learning. The more that learners can put education into their own hands – literally! – the more they can connect to the material and learn in their own, fun way!

Many engineering activities – including building structures and experimenting with forces – are very easily learned using the experiential learning method as learners are allowed to work with materials on a small scale to solve a problem or create a solution that relates to the real world.

Under the engineering and building umbrella you find the following activities and lesson plans. These can be implemented in your 4-H club meetings, as an after-school activity, or serve as the educational pieces for a 4-H SPARK Club. These lessons can stand alone or can be used in conjunction with one another to help teach the overall concept of engineering. Each lesson plan includes a materials and supplies list. Dependent on the size of your group and/or the variation in the lessons you make, you may need additional supplies. Be sure you read through the directions before you begin to ensure you have what you need. Additionally, times for building, testing, and debrief will vary based on grade/skill level and/or group size.

Additionally, each lesson plan has review and application questions. Some of them have recommended answers but many are open-ended as students will learn and explore in their own ways – leading to many different answers and findings. Along these same lines, it is important to let the students explore and find the answers themselves without too much guidance. The overall goal is for students to make connections and engineering concepts in their own way, not necessarily the same way or “right” way.

- **DIY Hovercraft** (*Friction*)
- **Trampoline Challenge** (*Building Concepts & Forces*)
- **Keep-A-Cube** (*Materials/Composition & Energy Transfer*)
- **Seismic Shake-Up** (*Building Concepts & Forces*)
- **Make Your Own Seismometer** (*Building Concepts & Forces*)
- **Leave It To Levers** (*Simple Machines*)

Remember that, while these lessons are structured, they are very easily editable to fit your topic area or group. Have fun incorporating engineering and other STEM-related topics into your 4-H programming!