

OUT-OF-SCHOOL SETTINGS | GRADES 6-8

## Put a Lid on It: Engineering Safety Helmets

### Unit Overview

When people bike, board, or play ball, they wear a helmet to keep them safe. But how do helmets work? Youth participating in this unit learn how different types of helmets are constructed and how they protect the brain. They then use each step of the Engineering Design Process as they become biomechanical engineers and design their own helmet to crash test.

### Engineering Application/Unit Goals

Biomechanical engineers use what they know about physics and biology to better understand how physical forces impact living organisms. They develop solutions to a broad range of problems, including the improvement of safety equipment like helmets, life jackets, and bulletproof vests. In this unit, youth use what they learn about the brain and protective materials as they work together to design safety helmets to protect a model head from damage when it is dropped.

**Engineering Everywhere** inspires learners in grades 6-8 to shape the world around them. Our twelve hands-on units were tested in afterschool, summer camp, and out-of-school time settings, and they are proven to engage learners in innovative problem solving. Each unit begins with a Special Report video, which sets the context for the engineering design challenge and explores problems like food scarcity, prosthetics, and disease control. As learners work through our design challenges, they'll sharpen 21st century skills like critical thinking, teamwork, and communication, preparing them for success in school and in life.



## Unit Map

### **Prep Activity 1: What is Engineering?**

Youth are introduced to engineering and the Engineering Design Process as they work in teams to engineer a wall that will support Humpty Dumpty.

### **Prep Activity 2: What is Technology?**

Youth play a Technology Trivia game that guides them to think about the breadth of technology.

### **Activity 1: Pasta Package**

Youth investigate ways to protect fragile pasta from breaking upon impact.

### **Activity 2: Brains**

Youth learn about the lobes of the brain and the functions they control and identify the impacts of concussions by simulating the symptoms of a severe concussion.

### **Activity 3: Create Your Helmet**

Youth work in groups to plan, create, and test their first helmet design.

### **Activity 4: Improve Your Helmet**

Groups improve their designs to better meet the criteria.

### **Activity 5: Engineering Showcase**

Youth communicate their work to each other and to visitors.

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